SUSTAINABLE URBAN AREAS 30

Greening governance

An evolutionary approach to policy making for a sustainable built environment

Ellen van Bueren

TU Delft

Delft Centre for Sustainable Urban Areas

Delft University of Technology

Greening governance

An evolutionary approach to policy making for a sustainable built environment

The series **Sustainable Urban Areas**
is published by IOS Press under the imprint Delft University Press

IOS Press BV
Nieuwe Hemweg 6b
1013 BG Amsterdam
The Netherlands
Fax +31 20 6870019
E-mail: info@iospress.nl

Sustainable Urban Areas is edited by
Delft Centre for Sustainable Urban Areas
C/o OTB Research Institute for Housing, Urban and Mobility Studies
Delft University of Technology
Jaffalaan 9
2628 BX Delft
The Netherlands
Phone +31 15 2783005
Fax +31 15 2784422
E-mail mailbox@otb.tudelft.nl
http://www.otb.tudelft.nl

Greening governance

An evolutionary approach to policy making for a sustainable built environment

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Technische Universiteit Delft,
op gezag van de Rector Magnificus prof. dr. ir. J.T. Fokkema,
voorzitter van het College voor Promoties,
in het openbaar te verdedigen
op donderdag 3 december 2009 om 12.30 uur

door

Ellen Maria VAN BUEREN

doctorandus in de bestuurskunde
geboren te Rotterdam

Dit proefschrift is goedgekeurd door de promotoren:
Prof. mr. dr. E.F. ten Heuvelhof, Technische Universiteit Delft
Prof. mr. dr. J. de Jong, Technische Universiteit Delft

Samenstelling promotiecommissie:
Rector Magnificus, voorzitter
Prof. mr. dr. E.F. ten Heuvelhof, Technische Universiteit Delft, promotor
Prof. mr. dr. J. de Jong, Technische Universiteit Delft, promotor
Prof. H. Szejnwald Brown, Clark University, USA
Prof. dr. A.B. Ringeling, Erasmus Universiteit Rotterdam
Prof. dr. W.M. de Jong, Technische Universiteit Delft/Harbin Institute of Technology, China
Prof. dr. ir. J.D.M. van Hal, Technische Universiteit Delft
Prof. dr. ir. H. Priemus, Technische Universiteit Delft

Greening governance. An evolutionary approach to policy making for a sustainable built environment
Thesis Delft University of Technology, Delft, the Netherlands

The author wishes to acknowledge the financial assistance of the Dutch government through the Delft Cluster programme.

Design and dtp: Cyril Strijdonk Ontwerpbureau, Gaanderen
Printed in the Netherlands by: Haveka, Alblasserdam
Cover photo: Frans Brand (The new, sustainably planned and constructed residential area Poelgeest in Oegstgeest is situated underneath a power transmission line, and is an example of the trade-offs made when implementing sustainable development.)

ISSN 1574-6410; 30
ISBN 978-1-60750-078-0
NUR 755

Contents

Acknowledgements

I was once at a showroom with my husband trying to choose tiles for our bathroom. At 6 p.m. precisely, the salesman looked at his watch, put his pen in his breast pocket, told us politely but decisively that it was closing time, turned and left the building, leaving us – astonished – behind. The work of a researcher is never finished in this way, but the moment when a manuscript is sent out for publishing comes close. At such a time, it is appropriate to thank the many people who have contributed to the research.

First and foremost, I am greatly indebted to my promoters Ernst ten Heuvelhof and Jitske de Jong for their never-ending trust, patience and support, and for their efficient and effective supervision. You have succeeded in teaching at a conceptual level, a quality that is reserved for true professors. In addition, I want to thank my colleagues at the Faculty of Technology, Policy and Management of Delft University of Technology. You form an inspiring, challenging, interdisciplinary and dynamic environment of reflective practitioners and academics. In our joint teaching, research and consultancy, you form an endless source of intellectual capital. My direct colleagues at the Policy, Organisation, Law and Gaming section were always there for critical reflection and debate, and made sure I did not lose sight of my roots in public administration. In particular, I want to thank Joop Koppenjan and Igor Mayor for their cooperation and valuable feedback; Martin de Jong for bringing evolutionary theory to my attention; Hans de Bruijn, for giving me room to finish this book; and Hilda Verwest for her practical advice and mental support.

A second group of people that I want to thank are all those who have been involved in the case studies reported in this book, as supervisor, commissioner, reviewer, informant, or respondent. Without your valuable time and input, this research could not have been done. Especially the people who reviewed draft case study chapters deserve mentioning here: Peter Vermij (Waterdienst), Jules Wilhelmus (Stichting Duurzaam Bouw Metaal), Peter van Oppen (SBR), Rogier Goes (NVTB), Dick Tommel (former state secretary), Kees Vriesman (Programme bureau Town-Countryside Randstad, former director-general at the Ministry of Housing, Spatial Planning and the Environment), Rianne Zandee and Douwe Tiemersma (Stichting Natuur en Milieu), and professor Andreas Faludi (Delft University of Technology). I appreciate your corrections, work and help, and enjoyed our debates. You gave me the background information needed to understand the wider context of decision-making at the time.

Parts of the case studies have been conducted in collaboration with other reseachers; I learned a lot from working with you. Joop Koppenjan and Erik-Hans Klijn: in our exploration of the zinc case, you further introduced me to the nitty-gritty of policy networks. Members of the DIOC team: you showed me the design and engineering perspectives of sustainable built environments and with some of you I dived into the National Packages for Sustainable Building. Ernst ten Heuvelhof and Hans de Bruijn: doing research for the

contours case with you gave me a kickstart at your group in Delft and showed me the added value of applied research by academics. Igor Mayer, Pieter Bots and Robin Seijdel and his PRC colleagues: together we took up the challenge to develop the DUBES Game, a true interdisciplinary venture in which you let me discover the value of modelling, simulation and gaming.

A third group of people I want to thank are all those people with whom I collaborated in interdisciplinary projects about sustainable built environments and who directly or indirectly contributed to this thesis. The thesis has its origins in DIOC The Ecological City, the Delft Interfaculty Research Centre. Guided by professor Kees Duijvestein, professor Hugo Priemus and the late professor Charles Hendriks, the committed teamwork in the centre formed an excellent basis for multidisciplinary and interdisciplinary research, which was prolonged in the Delft Centre for Sustainable Urban Areas under the supervision of professor Peter Boelhouwer and Marjolein Spaans. This collaboration has also laid the foundation for the Sustainability in the Built Environment course for the MSc. in Industrial Ecology and for an upcoming textbook, which is a joint production by the Faculties of TPM, Architecture, Civil Engineering and Geosciences and OTB Research Institute for Housing, Urban and Mobility Studies. Then there were projects with external partners, academics, consultants and practitioners. I enjoyed working with TNO on several projects, of which the Sureuro (Sustainable Refurbishment in Europe) project, managed by Karel Dekker, was a very special experience. Delft Cluster formed another inspiring research environment; they deserve special thanks for providing financial support for the delivery of this thesis.

The fourth and final group of people that I explicitly want to acknowledge here are my friends and family: my friends from the Zijstraten, AOD, tennis/volleyball Rijnsburgerweg, the South Africa team, the Provros, and Zandvoort, who were always there to support me, Thurstan for the last-minute language checks, and Titia and Eske for going all the way with me by accepting the questionable honour of being my 'paranimfs'. I would also like to thank my in-laws for their encouragement, and my parents and sister who have done more than their fair share of baby-sitting in support of this thesis. And finally, of course, my thanks go to Marco and my children, for spending many weekends in playgrounds, museums and theatres in order to give me some quiet working hours.

1 The unsettling success of governance for sustainable building[1]

1.1 Introduction

Sustainable development aims to enhance win-win situations between social, environmental and economic values, also known as *people, planet, and profit*. However, the relationships between these values are characterised by competition, conflicts and trade-offs. The sustainable development concept suggests overcoming these conflicts and changing zero-sum relationships into positive-sum relationships through ongoing incremental change. In one generation, a period of about thirty years, Planet Earth could achieve a sustainable, steady state. Public policies could initiate, support and facilitate this process of change.

Throughout the industrialised world, the built environment has been targeted as a sector that can make a significant contribution to sustainable development. The built environment, with its buildings, roads and other types of construction and infrastructure, is one of the largest contributors to unsustainable development in terms of resource depletion, energy use, waste production and land use. Therefore, from the late 1980s onwards, many industrialised countries all over the world have developed policies to promote a sustainable built environment. Sustainability has acquired a place on the agenda in the processes of planning, building and construction and has become a dominant theme in research communities concerned with building and construction. Despite the wide attention for the issue, sustainable building policies have not yet succeeded in significantly improving the environmental performance of the built environment. Reports by authoritative governmental, non-governmental and private institutes around the globe point to the achievements, but also to the big challenge ahead; sustainable building has not yet become common practice (OECD, 2003; UNEP, 2007; World Watch Institute, 2007; IPCC, 2007; and WBCSD, 2007).

This book explores why public policies have not lived up to expectations. It analyses ways of improving policies, of making policies better capable of supporting the people, planet and profit aspects of sustainable development; in short, of making governance 'greener'. This first chapter introduces the research questions and how this book will answer them. But first, the chapter discusses the background of the discontent with policies intended to support sustainable development in the built environment.

1 Parts of this chapter have been published in Van Bueren, E. and J. de Jong (2007), Establishing Sustainability: Policy Successes and Failures, *Building Research & Information, 35* (5): 543-556.

1.2 The sustainability performance of the built environment

In the 1990s, the built environment was singled out by governmental and non-governmental organisations alike as an economic sector wherein significant gains in sustainability could be achieved. Table 1.1 provides some key figures concerning the sector's economic and environmental importance.

In industrialised countries, the publication of alarming facts and figures on the ecological impact of building and construction led to action. Policies and initiatives were developed with the aim of promoting a sustainable built environment at local, regional, national, and international levels. These measures involve sustainable construction, sustainable building, and sustainable planning. Many local, regional, and national governments have established sustainable building programmes and have recruited sustainable building officers. Examples of such policies include energy-saving measures, ranging from subsidies for the use of renewable energy to energy-performance requirements for building designs; the stimulation of reuse and recycling of construction and demolition waste by prohibiting landfill or making it more expensive; and the reduction of car dependency with intelligent urban and transport planning, for example by building offices with many employees and visitors near public transport terminals. In addition, industry has brought many green products to market, such as improved insulation materials, water-saving taps and shower heads, and smart lighting that turns off when there are no users in a room. There is also an increasing focus on the environmental impacts of individual products. Life Cycle Analysis (LCA) has become an accepted method for comparing the environmental performance of construction products throughout their life, from cradle to grave. National and international standards for environmentally responsible building practices have also been developed, ranging from private labels for sustainable buildings such as LEED,[2] developed in the US, and BREEAM,[3] developed in the UK, to government-induced labels, such as the EU energy label for buildings. Throughout the world, numerous projects have demonstrated the value of sustainable designs and technologies. Table 1.1 illustrates some tangible successes in sustainable building.

Thus, within the relatively short period of ten to fifteen years, sustainable building has become institutionalised and is now a formal part of decision-making processes in many public and private organisations involved in planning, building, and construction. However, the successes are counterbalanced by other facts and figures (see Table 1.1) which show that sustainable build-

2 http://www.usgbc.org/DisplayPage.aspx?CategoryID=19 (April 28, 2009).

3 http://www.breeam.org/ (April 28, 2009).

Table 1.1 Some key figures on the sustainability performance of the building and construction sector

Economic impact	In the US, Japan, and the EU, on average the sector accounts for: ■ 5-15% of gross domestic product ■ 45-55% of gross fixed capital formation ■ 5-10% of total employment (OECD, 2003: 20)
Environmental impact	■ in the US, 40% of all extracted materials are used for building and construction (Kibert *et al.*, 2002: 7) ■ in OECD countries, 25-40% of final energy use is employed in the built environment (OECD, 2003: 20) ■ construction and demolition waste makes up 30%-50% of total waste generation in higher income countries (UNEP, 2003: 6-7) and is the largest waste stream in quantitative terms in the European Union (European Commission, 2000: 2) ■ the built environment accounts for some 40% of the world's greenhouse gas emissions (UNEP, 2003: 6)
Improved sustainability performance of the built environment	Some examples: ■ insulation and heating energy efficiency in housing stock led to a saving of 46% in the UK from 1970 to 2001 (Shorrock and Utley, 2003: 13) ■ 25% of construction and demolition waste is reused and recycled in the European Union, with countries such as Denmark, Belgium, and the Netherlands as local champions, with recycling rates of 80% to 90% (Symonds Group Ltd, 1999: 7, European Commission, 2000: 27) ■ to save land and resources, urban areas are being developed in higher densities and renovation is increasingly preferred over building in greenfields, with renovation and maintenance accounting for 33% to 50% of construction activity in European countries (UNEP, 2003: 6)
Deterioration of the sustainability performance of the built environment	Some examples: ■ residential energy use has risen more rapidly than overall energy use in the UK in the period from 1970 to 2001 (Shorrock and Utley, 2003: 14) ■ the waste stream is expected to more than double in the European Union and more than triple in Japan between 1995 and 2010 (OECD, 2003: 27) ■ CO_2 emissions by the world's cement industry are expected to quadruple by 2050 (UNEP, 2003: 6) ■ ongoing trends of urbanisation will destroy or disturb natural habitats and wildlife on over 70% of the Earth's land surface by 2032 (ibid.: 5)

Source: Van Bueren and De Jong, 2007: 544

ing policies have not been an entirely unmitigated success. Nor is this situation likely to change in years to come, especially now that problems such as climate change seem to be more serious and tenacious than was assumed in the late 1980s and early 1990s (Stern, 2007; IPCC, 2007). Accordingly, the result of fifteen years of sustainable building policies is very mixed.

1.3 The performance of sustainable building policies in the Netherlands

In the Netherlands, the geographical setting of the research presented in this book, central government targeted several sectors, including the built environment, to start sustainable development and in the early 1990s initiated

an ambitious programme aimed at enhancing sustainable building. One of the main programme objectives was to apply sustainable building on a large scale. Experiments conducted in the 1970s and 1980s had resulted in the development of knowledge and technologies for sustainable building; now it was time to spread and consolidate this knowledge in the practice of building and construction (VROM Ministry, 1995: 2-3).

The formulation and implementation of the programme took place in close interaction with the target group, the actors in the built environment who would have to make their actions more sustainable, such as the building industry and housing associations. The first Plan of Approach for Sustainable Building stated, "It is important that they [lower authorities and market parties] support the chosen approach and that they are willing to support and implement this approach. This makes them partners in the development and implementation of the policy, instead of a target group." (VROM Ministry, 1995: 19). This participatory approach was also in line with the democratic and economic dimensions of the sustainability concept, which argued that the actors responsible for sustainable development, including its costs, should be involved in the policy process. The actors who had to change their behaviour, in this case, the building and construction sector, were also the ones who knew best how to achieve a positive-sum game between ecological and economic values.

From the viewpoint of public policy theory there were also good reasons to involve the targeted actors in the policy process. Decision making in the built environment is characterised by networked relationships amongst many public and private actors (Winch, 2007). When relationships between governing actors and to-be-governed actors are horizontal and reciprocal instead of hierarchical and one-sided, policy process theories suggest an interactive, collaborative or participatory approach to policy making (De Bruijn and Ten Heuvelhof, 2000). Government has no authority or power to enforce collaboration to achieve its goals; a government actor depends on the collaboration of the actors concerned, just as the other actors in the network. A network approach to governance therefore suggests that those actors that need to change their behaviour to contribute to the success of the policy should be involved in the process. There are two advantages to the network approach over the hierarchical enforcement of policies: first, the actors needing to change their behaviour can choose a way to enhance sustainability to suit themselves, and second, this increases support for the policies.

The Dutch sustainable building programme was thus formulated in accordance with the sustainable development concept and theories of public policy making. However, in 2008, more than ten years after the formal start of the policy programme, it is doubtful whether the policy programme has achieved the win-win situations it was aimed at. Actor involvement seemed to have contributed to economic and social values, for example, by improving the eco-

efficiency of production throughout the building chain and making resident participation a part of the urban renewal process, but – as illustrated in Table 1.1 – other environmental values have been less adequately addressed. Significant progress was made in specific fields, for example, banning dumping of reconstruction and demolition waste led to the reuse of 90% and the energy performance for newly built dwellings was made a part of the Building Code, leading to highly energy efficient dwellings that used for heating only half of the energy needed by a house built in the 1970s (Atriensis, 2009).

However, just as in the international context, there is a downside to these figures. Construction and demolition waste is of low quality and is reused especially in road construction; and the attention given to the energy performance of newly constructed buildings diverted attention from the energy use in existing buildings, where more significant energy savings can be achieved. In the field of energy saving, the building sector has been diagnosed as the sector with the largest unused profitable potential for energy-saving (Menkveld *et al*., 2005). The scaling up of sustainable building as envisaged by the programme, making the people, planet and profit dimensions of sustainability a part of all decisions made instead of just part of incidental projects or just focusing on one or two of the triple Ps, has not yet been achieved. Nevertheless, the Ministry of Housing downsized the sustainable building programme in 2004, leaving further diffusion of sustainable building up to the market. Although some progress has been made, at its current speed, it is doubtful whether the change process will lead to a sustainable built environment within the period of one generation.

The renewed attention for sustainability in the Netherlands, following the Al Gore project An Inconvenient Truth (2006), the Clinton Climate Initiative of former US president Bill Clinton,[4] and the cradle to cradle approach developed by architect McDonough and scientist Braungart (2002), has resulted in campaigns and initiatives in which public and private actors commit themselves to specific goals. Examples of this are the building industry's initiative to develop a green building label for the Netherlands[5], the goal of the city of Rotterdam to halve CO_2 emissions by the year 2025,[6] and the principles for sustainable urban development developed by the new town Almere which are based on the cradle to cradle approach (Duijvestein and Feddes, 2008). However, most of these initiatives are voluntary and there is a risk that the 2008 financial crisis will have already tempered ambitions and will make actors fall back on traditional processes, technologies and decision making that leave little room for innovation (Planbureau voor de Leefomgeving, 2009).

4 http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/ (April 28, 2009).

5 http://www.dgbc.nl/ (April 27, 2009).

6 http://www.rotterdamclimateinitiative.nl (April 27, 2009).

These experiences with the Netherlands' sustainable building policies show a resemblance to international experiences with policies supporting sustainable development. There are successes, but the pace of change set by these successes might be too slow to respond adequately to the growing sense of urgency.

1.4 Explaining policy success and unease: the ambiguity of sustainable development

Why is it difficult to pin down the success of policies supporting sustainable development? And even if policies are successful, why do they still invoke feelings of unease? Answering these questions may form a point of departure for the search into ways of improving policy making for sustainable development, which is the aim of this book. This section begins this search by exploring the characteristics of sustainable development as a policy problem. After all, to be effective, policies are supposed to be tuned to the problem that they are supposed to resolve.

A typology of policy problems

The search for an explanation of the success of sustainable development as a policy concept and of the feelings of unease that arise when actors are asked to judge the results of that policy begins by looking at the type of problem the policies are concerned with. What are the characteristics of sustainable development as a policy problem? A typology of public policy problems will help develop an understanding of the kind of policy problem we are dealing with.

The typology developed by Douglas and Wildavksy (1982: 5) has gained wide acceptance amongst researchers of public policy. They identify four types of problems, based on two distinctions. The first distinction is based on the extent to which the problem is known: is the knowledge of the problem certain or uncertain? The second distinction is based on the extent to which the problem is perceived to be a problem: is the problem contested (some find it a problem, and others do not) or is there consensus about the problem (everyone agrees that this is the problem, if there is a problem at all)? Other authors have applied this typology to policy and planning problems. For example, Van de Graaf and Hoppe (1992: 48) base their typology of policy problems on the distinction certainty-of-knowledge and consensus-on-assessment criteria. Tjallingii (1992, after Christensen, 1985) has tuned the typology to uncertainties in physical planning problems. The typologies are based on the question whether goals are agreed upon or not, and whether the technology (Christensen, 1985) or the means (Tjallingii, 1992) to achieve the goals are known or not. Table 1.2 shows the different problem types resulting from these distinctions.

This typology shows various kinds of problems. In the upper left cell there are the problems that can be solved, because the structure of cause-and-

Table 1.2 Typology of policy problems (after Douglas and Wildavsky, 1982; Christensen, 1985; Van de Graaf and Hoppe, 1992; Tjallingii, 1996)

		Knowledge	
		Consensus	**Contested**
Assessment criteria	**Consensus**	Technical, structured problem that can be tamed	Scientific problem that can be solved by research
	Contested	Ethical problem that can be solved by discussion and negotiation	Unstructured, wicked problem

effect relationships constituting the problem is known and because the actors involved agree on how to assess whether the problem is solved. In the lower right cell are problems with unknown structures, for which there are either no criteria to judge whether and to what extent the problem has been solved or, if criteria exist, they are contested. These unstructured problems tend to persist and thus are called contested (cf. Connolly, 1974, 1983), or wicked (Rittel and Webber, 1973) or intractable (Schön and Rein, 1994).

Essentially contested concepts

Connolly (1983), following Gallie (1956), studied political concepts that address persistent problems that fall in the wicked problems category in the table. These researchers call these concepts *essentially contested concepts*, and as examples they refer to such political concepts as democracy and freedom. Characteristic of these concepts is that they are appraisive, that is, they describe an achievement that is to be valued. Also, they are internally complex; to characterise the concept, reference is made to concepts from various dimensions that are also contested. None of these dimensions alone is sufficient to qualify an act or practice as such. An essentially contested concept is a cluster concept to which a broad range of criteria applies. Various people jointly employing such a cluster concept put different weights to the criteria constituting the concept. They might interpret jointly accepted criteria in subtly different ways, and might add or drop criteria from a jointly established list (Connolly, 1983: 13-15). Even shared rules for understanding the concept are ambiguous: the rules for whether a concept applies to a certain situation can be subject to debate that is likely to start when new and unforeseen situations arise to which the concept may be applied. Connolly therefore remarks that essentially contested concepts "… involve endless disputes about their proper uses on the part of their users" (ibid.: 10). Any attempt to solve the problems addressed by an essentially contested concept runs into difficulties with operationalisation: it is limited and not value free. Because contested concepts are cluster concepts, a wide and indefinite range of criteria may be used to operationalise the concept. The selection of criteria to operationalise the concept is normative: the decision to make some elements part of a concept while excluding others invokes a complex set of judgments.

Wicked problems

In the same period as Connolly, but on the more practical level of problem-solving, the planners Rittel and Webber (1973) concluded that more and more

problems could not be resolved by traditional analytical approaches. They called these problems *wicked*, in contrast to *tame* problems. Like Connolly, they point to the absence of a definitive formulation and operationalisation of the problem, and it is difficult to agree on the abstraction level on which problem and solution should be defined. Every wicked problem can be considered a symptom of another problem. Because of the many dimensions to the problem, there are multiple actors or stakeholders involved, each with their own, changing perceptions on the problem and the potential solutions. This makes it very difficult to find even a temporary consensus on a problem definition (ibid.: 167). In addition, Gallie (1956) pointed out that various groups of stakeholders will compete over the 'right' interpretation of a concept, and that each group has valid arguments to support their claim. When problems are contested, facts no longer contribute to conflict resolution and conflicts tend to be settled rather than resolved (Schön and Rein, 1994).

Rittel and Webber emphasise that wicked problems are essentially unique; despite the long lists of similarities between problems in different domains, in different places and in the past, noting that "… there always might be an additional distinguishing property that is of overriding importance" (Rittel and Webber, 1973: 164). Wicked problems do not have a well-described set of potential solutions and it is difficult to tell when a problem is resolved. Because an unambiguous problem definition and corresponding evaluation criteria are absent, solutions are good or bad instead of true or false and this judgment is only temporary. An immediate and ultimate test is not possible, since solutions generate waves of consequences, and it is impossible to know how all of the consequences will eventually play out (ibid.: 161-163). Buchanan (1992: 16) therefore points out that wicked problems are indeterminate, in contrast to undetermined problems.

Ambiguity contributes to the magic of sustainability

The magic of concepts like sustainable development can thus be ascribed to their indefinite and ambiguous character. Connolly (1983) points to the appraisive character of these concepts. In debates involving an essentially contested concept, there is a mechanism at work that makes it hard if not impossible for actors not to support the goals of the concept. By referring to an ideal situation, concepts like democracy and freedom succeed in building conceptual bridges between conflicting values and interests. Likewise, sustainable development pleads for contradictory developments as continuation and change, growth and reduction, and by including these developments in one definition the concept suggests that these developments no longer form a dilemma. The same can be said for the competing and conflicting values represented by the concept, such as the tension between social and economic goals and between economic and ecological goals. Hajer (1995) therefore calls sustainable development a positive management concept, with only winners and

no losers. Because of the appraisive character of an essentially contested concept, there is no morally accepted justification for not supporting the positive and ideal situation as pictured by the concept. Everyone is for it, there are no exit options. Moreover, all sorts of groups of actors, even with the most opposing interests, want to be associated with the concept and will even try to 'hijack' it by defining it in such a way that it supports their own goals (ibid.). This can lead to unexpected coalitions, such as the one between the environmental movement and the Automobile Association to improve accessibility to recreation in an open, agricultural area in the Netherlands in the late 1990s. Essentially contested concepts thus have the power of enchantment.

Ambiguity also explains the discomfort with regards to sustainability

However, the spell does not last forever. Contested concepts lose their magic when the bills have to be paid, when priorities have to be set and painful choices have to be made. At this point, the concepts no longer succeed in reconciling conflicting values and opposing interests. Stone puts it like this: "Everyone is for them when they are stated abstractly, but the fight begins as soon as we ask what people mean by them." (Stone, 1988: 9). Glasbergen recognises this mechanism in the case of sustainable development. "Sustainable development is a concept that reconciles opposing interests in society by stressing the benefits it can bring. As such, it derives its value mainly from its symbolic content. According to Redclift, sustainable development is a concept 'whose strength is in its vagueness' (Redclift, 1991: 36). Seeking to resolve conflicts, however, the concept masks the social controversies that are bound to emerge as soon as it is translated into actual measures." (Glasbergen, 1995: 2). Healey also signals the difficulty of achieving zero-plus outcomes in the case of trade-off relationships. "The hope embodied in the concept of sustainable development that environmental considerations and economic development priorities could co-exist to mutual benefit, looks increasingly unlikely, as policies reach operational specification." (Healey, 1997: 190).

The enchanting power of a contested concept is thus found in the consensus-seeking character of sustainable development, by framing the concept in such a way that there are only winners. When trying to implement the concept in day-to-day policy practices, there will be winners and losers, and in the absence of definite authoritative arguments, the outcome will be the result of complicated processes of interaction between multiple actors. It is up to policy makers to manage this process.

1.5 How to design policies addressing ambiguous, multi-actor problems?

The ambiguity of sustainable development thus explains the success of policies in support of sustainable development and the feeling of unease with the results. However, this knowledge gives little insight into how policy makers can improve their policies aimed at resolving ambiguous, contested problems. This book searches for a way in which policy makers can evaluate and improve their policies.

Usually, questions of policy design and improvement are answered by evaluating policies. Evaluations assess whether and how policies worked. Classic evaluations measure whether intended policy goals have been achieved by the policy concerned (Fischer, 1996). From evaluation, policy makers can learn what did or did not work and why, and this knowledge can be used to improve policies and to (re)develop policies. However, in the case of ambiguous policy problems, evaluation is difficult because there are no unambiguous criteria for evaluation and policy design. Two factors particularly contribute to the ambiguity of evaluation criteria.

First, the problem is dynamic: it changes over time. New knowledge or views on the indefinite number of variables constituting the problem and interrelationships between these variables continuously challenge the problem as defined in policies. Changed conditions and circumstances must be taken into account when evaluating the performance of a policy that was designed to work in a different situation. The changing problem definition also has repercussions for the interests affected by the policy and thus for the actors involved in the policy process. Changes in the problem definition also result in changes in the network constellation – actors, their goals and interests, and their relationships – which addresses the problem.

Second, the problem is multi-dimensional: it involves multiple actors and each actor, depending on its role, responsibility and background, will have a different focus with regards to spatial scale, disciplinary knowledge, and time horizon within which problems should be solved. A multi-actor context implies various actors participating in decision making, with each trying to protect their own interests and pursue their own goals. Interests and goals of the different actors or stakeholders involved in decision making do not necessarily have to be complementary. It is even more likely that these goals and interests compete for budget and attention and conflict on some points. Each actor will have its own theory of what the problem is about and how it can be solved, including criteria for evaluation; but policy outcomes valued by one actor might be considered detrimental in the eyes of another. Neutral and authoritative criteria for evaluation are absent; instead, evaluation depends on the point of view (actor, scale, discipline, time horizon, etc.).

This book is thus in search of a useful framework to evaluate and improve

policy making in support of the contested goal of a sustainable built environment. A literature study will help to develop this framework and in empirical casestudies, the framework is used for analysing the effectiveness and improvement potential of policy making.

1.6 Research questions

Based on the above reflections, the following research question can be formulated:

How can public policies in support of a sustainable built environment be evaluated and improved?

The following sub-questions will help to answer the main research question:

1. What kinds of policies have been developed in the past to support sustainable development in the built environment and how did these policies address the ambiguity, dynamics and the multi-actor context of sustainability? (Chapter 2).
2. What is a suitable theoretical approach for evaluating an ambiguous problem that needs to be resolved in a multi-actor context? (Chapters 3 and 4).
3. How can this approach be used to evaluate existing public policies in support of a sustainable built environment? (Chapter 5).
4. What lessons can be learned for policy improvement from empirical evaluations of policy processes taking this approach? (Chapters 6 to 9).

The goal of the research is to develop an approach or framework that public policy makers can use to evaluate and improve the governance of such ambiguous policy problems as sustainable development. The object of the study is policy making, in particular policy making for the built environment. With the evaluative framework policy processes are analysed in search for lessons that can help to improve policy making. Therefore, the study will not differentiate between policy making for different types of developments. The difference is relevant on the level of the case study: actor networks involved in new and existing urban developments will be structured differently as well as the ambiguity and trade-offs in these processes. On the case study level, the particularities of the object of policy making will be taken into account; the comparison of the casestudies will focus on the evaluative framework. The framework will help to make governance greener, by showing how public policy making can contribute to sustainable development. Developing this approach also contributes to improving the prescriptive dimension of governance perspectives that focus on the networked relationships between the multiple actors involved in or affected by policy processes.

2 Policies in support of a sustainable built environment[7]

2.1 Introduction

What kinds of policies have been developed in the past to support sustainable development in the built environment and how did these policies address the ambiguity, dynamics and the multi-actor context of sustainability? This chapter answers these questions.

Section 2 begins with a brief history of environmental awareness. Sections 3, 4 and 5 show respectively how the concept of sustainable development changed environmental policy making in general, how it influenced the thinking about the relationship between buildings and the environment and how this changed view was reflected in policy making aimed at influencing building and construction processes. Section 6 introduces the many challenges that policy makers face when they try to govern the built environment towards sustainability. In response to these challenges, various researchers, research institutes and government organisations have made several suggestions for policy improvement. Section 7 discusses these suggestions and their expected ability to cope with the ambiguity, dynamics and multi-actor context of policy making for a sustainable built environment.

2.2 A brief history of environmental awareness

Urbanisation and industrialisation have been the main driving forces for governments to develop policies to protect people and nature from the negative effects of these processes. In the twentieth century, three waves in public awareness of the consequences of our modern way of life on people and nature can be distinguished (cf. Glasbergen, 1995; Driessen and Glasbergen, 2002).

■ *First wave of environmental awareness: nature conservation and urban hygiene* – The first wave started at the end of the 19th century, when urbanisation, industrialisation, and population growth demanded their toll. Cities became crowded and filthy and expanded at the expense of nature and the creatures living in it. City councils were especially concerned with the provision of basic amenities such as sewage, housing and drinking water, and issued laws to improve hygiene in cities. To protect nature from further destruction, public and private organisations established the first nature reserves. Increasingly, the natural and the human environment became two separate worlds. The alienation of man from nature led to reflections on an ideal society where one

7 Parts of this chapter have been published in Van Bueren, E. and J. de Jong (2007), Establishing Sustainability: Policy Successes and Failures, *Building Research & Information, 35* (5): 543-556.

could find a new balance between man and nature. Inspired by such writers as Thomas More and Henry Thoreau new societal concepts were developed, which were dominated by small scale, self-providing communities (De Geus, 1996). Apart from some experiments in communal living, these utopian concepts were never tried on a large scale. In 1898, Ebenezer Howard came up with a more practical concept, the garden city. By giving each dwelling a garden, nature was brought back to man (Clark, 2003).

In the first environmental wave, policy making concentrated on developing laws and regulations in fields such as housing, building and construction, as well as urban planning and hygiene that aimed to bring about a minimum standard of living conditions for citizens.

■ *Second wave of environmental awareness: pollution control* – After two world wars, an economic crisis in the interbellum and continuing industrialisation and urbanisation, the second wave in environmental awareness began in the 1960s. In her book *Silent Spring*, Rachel Carson (1962) aroused new concerns about the effects of industrialisation on the environment. She showed how pesticides used in agriculture unbalanced the ecosystem and caused illness and death amongst creatures, including human beings. Tolerances provided only a false sense of security because of the interference of substances. Taken together various products, each at individually safe levels, could lead to health problems (Marco *et al*., 1987). In 1968, Gareth Hardin added another dimension to the environmental debate. In his influential essay *The Tragedy of the Commons* he framed environmental problems as common pool resource problems, in which rational individual behaviour conflicts with the collective interest. Individual profit maximisation will lead to overuse, exhaustion and eventually destruction of the commons (Hardin, 1968).

Four years later, in 1972, Carson's and Hardin's concerns were underlined by the Club of Rome, an informal platform of thirty individuals from ten countries who tried to foster an understanding of the 'world problematique', of the varied but interdependent components that make up the global system in which we live. In their report *The Limits to Growth* they explained that continuing industrialisation and population growth put commons under great pressure. The report demonstrated this with a simulation model based on systems thinking, with exponential growth based on positive feedback loops as its main feature. It argued that as long as population and industrial growth continue to generate more people and a higher resource demand per capita, the system is being pushed towards its limit: the depletion of the earth's non-renewable resources (Meadows *et al*., 1972: 76). The report concluded that there is a need to establish a condition of ecological and economic stability that is sustainable far into the future. The state of global equilibrium could be designed so that the basic material needs of each person are satisfied and each person has an equal opportunity to realise his individual human potential (ibid.: 29).

Although the Club of Rome report laid the foundations for the sustainable development concept as introduced in the 1980s, the message picked up by the public and by policy makers especially focused on the apocalyptic prophecies, which were underlined by environmental disasters such as the DDT crisis. In the second environmental wave the environmental policies focused on damage control, that is, pollution prevention and control and, under influence of the 1973 oil embargo and the ensuing energy crisis, on energy saving. A detailed system of legislation, standards, and permits evolved, based on techno-scientific assumptions about causes and effects of environmental problems in each of the commons, such as air, water and soil.

■ *Third wave of environmental awareness: towards integrated problem-solving* – The publication of the report *Our Common Future* by the World Commission on Environment and Development (WCED) was the starting point for the third environmental wave. During the 1980s it became clear that many environmental problems endured and were no longer restricted to place and time. As in the case of acid rain, they transcended environmental compartments and national borders and were persistent, that is, next generations would suffer the consequences of the problems caused by their parents and grandparents. The Commission's report introduced sustainable development as the meta-objective for environmental policy making (Beekman, 2001: 3). In this report, sustainable development was defined as "…development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs." (WCED, 1987: 43).

This sustainable development concept called for a holistic approach to environmental problem-solving. It was based on ecosystems thinking, which acknowledged the importance of the balance in the dynamic interactions between plants, animals, and microorganisms and their environment that work together as a functional unit (European Commission, 1996: 46-48). It stressed the responsibility of generations to restore the balance, taking the period of one generation as the timeframe within which this should be done.

The transition from the second to the third environmental wave is characterised by a shift from passive policies that aim to protect the physical environment by reducing the negative impact of social action towards more active policies that aim to contribute to a better world in ecological, economic and social terms. The sustainable development concept tackles environmental problems from an ecosystems point of view, which implies that environmental conditions should be improved without shifting the burden from one environmental compartment to other compartments, from one place to other places, or from one point in time to the future. Environmental policies in the third environmental wave aim to restore the balance in ecosystems, which has been disrupted by man. Approaches such as industrial ecology and ecological modernisation emphasised the opportunities to turn trade-off rela-

tionships into win-win situations. Ecological modernisation emphasised that industrialisation and technology had disrupted the balance in ecosystems, but technological innovation would eventually help to restore the balance as well (Mol and Spaargaren, 2000). Industrial ecology focused especially on opportunities to close loops, for example, eco-industrial parks where industries connected their infrastructures and resource management, thus reducing use of energy and materials and reducing waste production (Graedel and Allenby, 2002).

Near the start of the new millennium, in 2007, a new rise in environmental awareness was stimulated by a growing consensus on the urgency of problems, as reflected in the reports by the IPCC (2007) and Stern (2007), and by the awareness-raising campaign by Al Gore (2007). This was supported by the development of action perspectives, such as the Clinton Initiative, the cradle to cradle approach, and the concept of transition management (Rotmans *et al.*, 2001). These action perspectives show that we do not have to be overwhelmed by the enormity of the challenge faced, but that we can start or continue the process of incremental change which will eventually lead to systemic changes. The future will show whether this renewed awareness is a continuation of the third wave or the start of a new wave.

What were the implications of this thinking in terms of opportunities instead of constraints and impossibilities? The next section focuses on the changes in environmental policy making that have been brought about by the introduction of the sustainable development concept in Our Common Future.

2.3 How sustainable development changed environmental policy making

The sustainable development concept seems to have arrived at the right moment. In the late 1980s, environmental policies were at a dead end. Environmental problems persisted despite the major policy successes in the field of cleaning production and consumption. The sustainable development concept reframed environmental issues from problems to opportunities. This created new ways of understanding and addressing problems (Hajer, 1995). Studies on the history and development of Dutch environmental policies mention a number of policy changes that resulted from the changed perception of environmental problems (Bressers and Klok, 1996; Nelissen, 1998; Grin *et al.*, 2003; Leroy and Van Tatenhove, 2000). On the basis of these studies, this book distinguishes a number of changes that marked the beginning of the third wave in environmental policymaking.

■ *From negative to positive solutions* – Environmental policies with their origins in the first and second waves were characteristically negative: restrictions, limits,

permits, and fines. All were aimed at diminishing resource depletion and pollution and all were about protecting and preserving what we have by controlling and limiting our activities. Sustainable development embodied a more positive attitude towards environmental problem-solving. Instead of telling us what we should leave alone or not do, it put forward a wide range of suggestions on how we can contribute to a better living environment (Hajer, 1995).

■ *From radical breakthrough to incremental changes* – Sustainable development emphasised that the changes required to achieve a steady state do not have to happen all at once; it paved the way for incremental changes. Policies in the second environmental wave insisted on breaking through harmful trends. However, breakthroughs are triggered more by external crises than by policies, and policies that tried to aim for breakthroughs turned out to be more symbolic than effective (Edelman, 1964; Dryzek, 1997). The acknowledgment that the path of incremental change will eventually lead to a sustainable equilibrium created support for policy initiatives aiming at small contributions to sustainable development.

■ *From command and control to collaborative policy making* – Second wave environmental policies consisted of a wide body of complex and detailed normative prescriptions based on the assumption that environmental problems and solutions were known, and that actors would comply with these policies, deterred by sanctions and encouraged by economic incentives. In the 1980s, it became clear that problems that could not be tracked down to a small group of actors identified as causing the problems, and that problems such as diffuse emissions were difficult to address with hierarchical instruments. Policy effectiveness depended on the voluntary cooperation of the actors to be governed, which led to these actors' involvement in the policy process (Glasbergen, 1995).

■ *From legal opportunities for public comment to citizen participation* – The sustainable development concept acknowledges that environmental policies should aim to establish a process in which man lives in balance with the earth and its resources, rather than prescribing what this balance should look like and how it should be established. This process can be stimulated by empowering people to influence decisions about their living environment, and thus reduce the alienation between man and nature that resulted from industrialisation. Sustainable development implied that citizen participation in policy making could no longer be restricted to listening and making use of legal opportunities to comment on decisions already taken, but that citizens could be given a more active role in formulating policies. For example, following the *Global Agenda 21* defined at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, municipalities all over the world started to draw up their own *Local Agenda 21* and citizens and citizen groups were given an active role in this

process, which was supported by the slogan 'Think global, act local'.[8]

■ *From sector and compartment-oriented policies to integrated solutions* – During the second environmental wave, each sector tried to solve its own environmental problems without paying attention to the relationships with other sectors. As a result, problems were 'solved' by shifting them to other sectors. This mechanism was also at work between environmental compartments. For example, end-of-pipe technology shifted pollution from air to water and land. Sustainable development policies defined environmental problems not on the level of sectors or compartments, but at the effect level, such as resource depletion and climate change, which showed that shifting problems to other sectors or compartments no longer contributed to problem-solving. In the Netherlands, for example, sustainable development led to effect-based policies. A number of pressing themes were formulated, such as acidification, dehydration and over-fertilisation; target groups causing the problems were identified, and policy makers in various sectors had to coordinate their policies targeted at these groups (VROM Ministry, 1989).

■ *From external effects to internalisation* – Environmental problems were perceived as negative side effects of activities, and policies tried to reduce these negative effects, for example, with end-of-pipe technology. Sustainable development policies aimed to internalise the external effects in decision making, that is, to make external effects part of the assessment criteria on which decisions are based (Winsemius, 1986). Policies tried to do so at an individual level, with information and awareness-raising campaigns, and at an institutional level, by integrating environmental concerns in public decision-making procedures with, for example, Environmental Impact Assessment (EIA), which ensures that environmental values are represented in the assessment criteria for decision making on projects that could potentially harm the environment – or in decision making by private actors, such as the creation of a market for trading emission permits.

■ *From control to prevention and precaution* – Second wave environmental policies were aimed at controlling environmental effects by keeping them within acceptable limits. Solutions had an end-of-pipe character. Besides addressing environmental effects, sustainable development policies also aimed at preventing these effects from happening at all. In the long run, prevention often turned out cheaper than end-of-pipe solutions, and 'pollution-prevention-

8 "ICLEI's (Local Governments for Sustainability) latest worldwide Local Agenda 21 survey documents that by the year 2002 more than 5,000 local governments throughout Europe [had] started their own Local Agenda 21 process." (http://www.iclei-europe.org/index.php?id=616, July 8, 2009).

pays' became a leading principle amongst policy makers in the 1990s.

Prevention was considered important not just out of economic considerations, but also because effects are often indirect and unknown. Indirect and interfering effects can lead to hazards and risks, with consequences uncertain, unknown and perhaps irreversible. To prevent irreversible environmental damage, institutions such as the Rio Declaration (UNCED, 1992) and the 1995 Maastricht Treaty on European Union (Article 130r) plead for precautionary policies. The precautionary or no-regret principle argues that we should not take decisions on matters for which it is not possible to scientifically establish the effects (O'Riordan and Cameron, 1994). One political and scientific debate dominated by the precautionary principle is on genetic engineering in agriculture, which diminishes the need for chemical pesticides. Supporters have scientific evidence that genetically manipulated crops pose no threat to human health. Opponents, however, argue that scientific models cannot predict the long-term effects of genetically modified crops once introduced in the food chain (Johnson *et al.*, 2007).

■ *From zero-sum games to positive-sum games* – During the second environmental wave, solutions to environmental problems were often presented as a trade-off between ecological and economic values. The sustainable development concept solved this dilemma by stressing that developments should contribute to social, environmental and economic values. Developments are only likely to sustain when they positively contribute to people, planet and profit (Elkington, 1994). The sustainable development concept pointed out that economic growth and environmental degradation did not have to be as tightly coupled as assumed in the 1970s and 1980s. Sustainable development pleaded in fact for positive-sum games, which would benefit both the economy and the environment (Hajer, 1995; Healey, 1997). Economic growth could also generate finances for investments beneficial to the environment and democracy. Policies for sustainable development should thus aim to create or facilitate win-win situations.

■ *From institutional breakdown to institutional reform* – Dissolving the classic economy vs. ecology dilemma by sustainable development offered new opportunities for established powers to actively contribute to environmental problem-solving. Democratic, economic and scientific institutions were causing the problems, but they also had the key to solve them and should be given the time to do so. It should take the period of one generation, that is, about thirty years, to achieve a steady state which restores the balance between man and nature and bring production and consumption within the capacity limits of Earth. Eventually, the institutions that cause problems could also produce their solutions.

The sustainable development concept thus allocated an important role and

responsibility for problem-solving to institutions, instead of putting them aside. Scientists named this greening of our institutions ecological modernisation (Mol and Spaargaren, 2000). Modernisation of society up until then had been restricted to economy, technology and democracy; it had to be completed with an ecological dimension. Institutions were thus given a prominent role in the formulation and implementation of policies for sustainable development.

As this overview of policy changes shows, the introduction of the sustainable development concept gave a new impulse to environmental policy making all over the world. It offered new perceptions on environmental problems and solutions, not just by redefining the problems, but by reframing the roles and responsibilities of individuals and organisations. The concept made very clear that we are all part of the problem, and therefore, we should all take responsibility for solving it.

2.4 A redefined relationship between environment and construction

In building and construction, as in many other sectors, the introduction of the concept of sustainable development led to changes in thinking about the relationship between the man-made, constructed environment and the natural environment. It marked a shift away from attempts to limit and control the use of environmental resources, and the associated adverse effects. This school of thought had dominated the policies and practices of environmental building and construction during the second wave of environmental awareness, from the 1960s to the late 1980s. The focus changed to the ways in which the building and construction sector could contribute to a sustainable living environment (e.g. Glasbergen, 1995).

There was a switch from linear thinking (which dominated the period of environmental control) to systems thinking, in which environmental problems were modelled as dynamic systems with feedback loops and thresholds. This switch was particularly significant in terms of the changes in policies and practices that were needed to improve the environmental performance of the built environment.

Systems thinking was already being adopted in the early 1970s, and it was at the heart of the Club of Rome report entitled *Limits to Growth* (Meadows *et al.*, 1972). However, it did not become accessible to the public until the publication of the 1987 WCED report *Our Common Future*, which explained this scientific theory in simple terms. This paradigm shift was not restricted to researchers alone.

In the built environment, the attention for sustainable development gave rise to a revolution in thinking about problems and solutions. Especially

the shift from linear to systems thinking was significant for the conceptual changes that took place amongst actors in the built environment. It changed their understanding of how the built environment contributed to environmental problems and how this contribution could be reduced. It showed them how the built environment could not just perform better from an environmental point of view, but how at the same time it could enhance other values, such as the health and well-being of occupants.

The foundations for this revolutionary shift had been laid by pioneers in environmental building in the second environmental wave. In this period, there were several private initiatives in the field of building, living and the environment. These small scale, experimental initiatives were often taken by individuals or small groups of professionals, such as architects, planners, and engineers.

Two strands of building environmental research and practice are distinguishable in this period (Cole, 2004: 94-95). The first is integrated environmental design, in which the environmental performance of the building was improved by concerted integration of the building envelope and systems, resulting in designs that aimed to create an efficient and high quality indoor environment. The energy crisis was a major driver of developments in integrated environmental design.

The second strand was driven by revived attention for living in small scale and self-supporting communities. It was based on an aversion to the increased mass-production, technological dependence and individualisation in the decades after World War II, expressed in publications such as *A blueprint for survival* by The Ecologist in 1972 and *Small is beautiful* by E.F. Schumacher in 1973. Architects responded to this thinking with autonomous and self-reliant building designs which applied many alternative technologies. At the community level, this resulted in the establishment of self-supporting ecological communities that combined ecological architecture with principles of permaculture, which implied that the design of human habitats should follow nature's patterns, principles that not just applied to physical design but also to the design of the rules for interaction and decision making within the community (Mollison and Holmgren, 1978; Rosenman, 2007).

Although many of these initiatives were highly idealistic and unsuitable for large-scale replication, they often laid the foundation for further research and development for environmental design. In the third environmental wave of environmental awareness, when environmental issues finally succeeded in penetrating the agenda of the building and construction sector, the pioneers in environmental research and design gained more prominent roles in the policy process. These pioneers were already familiar with the consequences of the paradigm shift for design and construction resulting from the introduction of systems thinking to the built environment; this enabled them to act as examples.

The systems approach of sustainable development argued for comprehensive planning and design of the built environment. It showed how decision-making processes were concerned with one part of the built environment at one particular spatial scale (e.g. a building or road), at one point in time (e.g. design, construction or maintenance), and focused on one particular issue (e.g. noise reduction or energy saving). Relationships between different life-cycle stages, between different themes and between different spatial scales were ignored in this linear way of thinking. The introduction of systems thinking in the built environment thus led to changes in thinking on improving the environmental performance of the built environment.

It affected a broad sweep of actors involved in the built environment who were interested in addressing environmental problems. These ranged from researchers and public policy makers on the one hand, to practitioners and industries on the other. The paradigm shift involved the following changes in the ways that people viewed environmental problems in the built environment.

■ *From staged decision making to lifecycle approaches* – Rather than treating each stage in the life cycle of a building or construction in isolation, the lifecycle approach emphasised the interconnections between the individual stages. Those involved in designing buildings and other construction projects had to make allowances for a number of life cycle stages (such as operation, renovation, and end-of-life). This resulted in demands for flexible structures that could be dismantled, and which included reusable or recyclable components and materials (e.g. Graedel, 1999; Hendriks, 2004).

Since the early 1990s, a substantial part of policy analysis for a sustainable built environment had been dedicated to exploring the effects of lifecycle thinking. Another focus was the development of supportive tools for design, construction, use, maintenance, demolition, and reuse of the built environment (Chau *et al*., 2000). Lifecycle thinking also required new and more intensive forms of coordination and cooperation among the actors involved at different stages of the life cycle. This in turn led to new contractual forms for the regulation of cooperation at various stages (Van Bueren and Priemus, 2002).

■ *Changing the scale of focus* – The 1970s and 1980s were decades when the emphasis was on environmental control. During this period, a substantial proportion of research activities and everyday practice in the building field dealt with integrated environmental design. This involved refining the environmental performance of a building by extensively integrating its envelope and systems. The resultant designs emphasised efficient, high-quality indoor environments, which led to significant improvements in the environmental performance of buildings (Cole, 2004: 94-95; Van den Dobbelsteen, 2004).

However, when researchers and practitioners examined the environmental

performance of such buildings from a systems perspective, they found that it was also influenced by decisions taken at spatial scales other than the building level (e.g. Van Timmeren, 2006). For example, a district's energy infrastructure determines the opportunities for improving the energy efficiency of its buildings and the potential for reducing greenhouse gas emissions. Similarly, the transport infrastructure and range of available services influence the mobility needs of a district's occupants, and their choice of transport mode (Newman and Kenworthy, 2000). Accordingly, the sustainability concept required a more comprehensive approach to planning, one which would take account of the interrelationships between spatial scales (e.g. European Commission, 1996; Lombardi and Brandon, 2002).

■ *From focus on new buildings to a focus on existing ones* – The adoption of a systems perspective also brought about a shift in focus. There was less emphasis on the development of sustainable concepts for new buildings and more on improving the sustainability performance of existing buildings and their surroundings. By this time, a large percentage of planned building stock had been constructed. As a result, these buildings' sustainability performance was relatively poor compared to that of new buildings (Bell and Lowe, 2000).

There was little scope for further improving the environmental efficiency of existing building concepts (Klunder, 2005: 61). Within the context of improving the sustainability performance of the built environment, much greater emphasis was given to enhancing the environmental efficiency of existing buildings. The systems perspective revealed another reason for focusing on existing buildings. A large proportion of extracted materials is stored in the built environment (as much as 90% in the US), making it either a potentially important source of secondary materials in the future, or an enormous source of waste (Kibert *et al.*, 2002: 7). A policy of demolishing existing buildings and replacing them with sustainable ones would severely damage the sustainability performance of the built environment. It is questionable whether the sustainability gains achieved (especially the reduced energy requirement) would outweigh the environmental load caused by factors such as the waste produced, resources extracted, and the energy used for construction (Klunder, 2005).

■ *From ecological issues to social and economic ones* – The systems perspective also showed that sustainable development of the built environment requires more than viewing that environment as a physical system. Its urban structures and infrastructures mean that the built environment is also part of a societal system. Any interventions in the physical system also have implications for the societal system (cf. Van Dorst, 2005). For instance, the renovation or renewal of existing houses cannot be removed from the fact that these residences are occupied by people who are emotionally tied to their homes.

Neighbourhoods are not just physical entities, they are also social networks. Finally, certain buildings might have an architectural or historic value which could outweigh their poor environmental performance. The systems perspective showed that physical and societal systems were interconnected. For example, the physical lifespan of an office was primarily determined by its economic lifespan. The physical condition of housing stock was found to be closely related to the social and economic conditions experienced by its occupants. Attempts to improve the environmental performance of such housing stock could not be separated from improvements to its occupants' living conditions (often referred to as 'liveability'). Accordingly, any attempts to improve the environmental performance of the built environment had to make allowance for social and economic issues.

■ *From desktop planning to participatory processes* – Having acknowledged the importance of the part played by social and economic issues in the built environment, when drawing up their plans designers, planners and public policy makers were obliged to communicate with the people affected. The involvement and support of tenants, home owners, intermediary organisations and other users of the built environment was seen as crucial to a plan's success. By legitimising public decision making, participatory processes were regarded as expressions of democracy. The input of these individuals, as users, complemented the analyses carried out by experts in support of decision making (Fischer, 2000).

A systems approach thus advocated comprehensive planning and design of the built environment. It showed that decision-making processes dealt with a particular part of the built environment on a single spatial scale (e.g. a building or road), at a particular phase (e.g. design, construction, or maintenance), and with regard to a particular issue (e.g. noise reduction or energy saving). While they are disregarded in the linear way of thinking, relationships between different lifecycle stages, themes, and spatial scales are central to the systems approach. As might be expected, systems thinking had consequences for policies that addressed the relationship between buildings and construction and the environment. The following section explores the ways in which policy making for a built environment was influenced by the introduction of the sustainable development concept.

2.5 Changes in public policies addressing construction and environment

From the 1960s to the late 1980s, attempts to deal with environmental problems using the linear way of thinking resulted in public policies dominated by regulations (Glasbergen, 1998). This period often saw environmental poli-

cies all over the world in general being modelled on the US system of environmental regulation (Lunch, 2004). The issues addressed by these regulations were relatively simple. There was no ambiguity regarding the cause-and-effect relationships involved and there were monitoring systems and official sanctions that could be used to identify those who caused a given problem and hold them responsible. For example, at the building level, issues such as energy-saving measures and avoiding the use of hazardous materials, such as lead and asbestos, were addressed in this way. On higher spatial scales, regulatory instruments were used to control the environmental performance of the built environment (e.g. Healey, 1996). For example, land-use regulations could be used to protect designated areas from urban sprawl, while environmental zoning could be used to protect citizens from industrial hazards and risks.

How were environmental policies for the built environment influenced by the shift from linear to systems thinking? Some important changes in public policies for the built environment that have taken place since the late 1980s are examined below.

■ *From prescription of means to performance requirements* – While the regulatory character of environmental policies for the built environment largely resulted from the prevailing perception of environmental problems, it was also in line with the culture of policy making and decision making in this area. The building sector has always expressed a clear preference for regulations as the means of government intervention. However, one of the issues with regulation, especially when it is restrictive in nature, is that it hinders innovation (Sexton and Barrett, 2005: 144-145). This is because regulations involve specific requirements which (although allowing for variations in parameters such as building use and occupancy type) leave little or no scope for anything other than the specified options. Because they are used to define minimum functional requirements for building and construction, regulations provide no incentive for tackling societal goals and tasks as such (Meacham *et al.*, 2005: 92).

This led to a shift away from regulations stipulating the exact means to be used to achieve specific ends, to a system which stressed performance requirements instead. The goal was to stimulate innovation, particularly where this offered the opportunity of improving the sustainability performance of buildings and other structures. This process, which started in the 1990s, is still seen in most countries today (ibid.). For example, rather than specifying how energy use in dwellings should be reduced, the 2003 Dutch building code incorporates an energy performance standard for residential properties.[9] This approach gives architects greater freedom of design, as there

9 http://www.bouwbesluitonline.nl, artikel 5.12 energieprestatiecoëfficient (May 4, 2009). (Dutch Building Code 2003, online version, article 5.12.)

are various ways in which they can comply with this standard. The available options include the passive use of solar energy, the implementation of high efficiency energy technology, and adapting the shell to reduce the dwelling's energy requirements. Performance-based regulations are less prescriptive than the older regulations. They have provided an incentive for innovation and for the diffusion of sustainable innovations.

■ *From regulation to market-based and voluntary arrangements* – However, rules and regulations have limited potential for promoting sustainable development. One commonly encountered obstacle to the enforcement of sustainability measures in building and construction was the lack of clear criteria or methods for distinguishing what was sustainable from what was not. Also, it was often impossible to determine which actors were accountable for the sustainability performance of the built environment. This very anonymity meant that they could not be challenged on this issue. The development and implementation of sustainable solutions for the built environment were often dependent upon the cooperation of actors involved in various lifecycle stages, at various spatial scales. Given the complexity of its nature, such cooperation could not be enforced with unambiguous regulations.

The restricted legal opportunities for enforcing sustainable building resulted in a growing emphasis on voluntary and market-based public policy arrangements. This in turn stimulated actors in the built environment to incorporate sustainability measures into their decision-making processes (Bon and Hutchinson, 2000). The arrangements in question included financial incentives in the form of subsidies and tax profits for actors such as home owners, housing associations, or property developers. Labelling and certification were used to classify products and processes as sustainable. This gave actors greater flexibility, since they were no longer bound by legal stipulations. Communication instruments were used to inform target groups in the built environment about the benefits of specific sustainability measures. The groups in question ranged from professional actors to the end-users.

■ *From private initiatives to subsidised research and development* – As existing legal instruments provided only limited opportunities for promotion of sustainable building, the government launched various schemes to support research, development, and the exchange of know-how in this area (Bakens, 2003: 11-12). A great deal of this research was supported by international organisations and national governments. This was especially true of methodology for analysing and assessing the built environment's sustainability performance, or specific parts of it (e.g. Buckingham-Hatfield and Evans, 1996; Chau *et al*., 2000: 959). The availability of reliable methods was crucial to the development and enforcement of regulatory policies for projects of this kind.

Much of this research initially focused on the development of methods and

tools for the design and assessment of buildings, both residential and commercial. Given the increasing focus on the sustainability impact of decisions at higher spatial scales, support was also provided for attempts to develop similar methods and tools for these levels as well. Such methods and tools often took the form of multi-criteria analyses that were used to quantify and weigh an area's environmental, social, economic and spatial qualities. At the very least, they could be used to generate a list of criteria for inclusion in the analysis (e.g. Lombardi and Brandon, 2002; Ding, 2005).

■ *The building sector's responses to these policy changes* – The actors involved in the design, construction, maintenance and operation of the built environment greeted the above-mentioned policy changes with enthusiasm. They now had more freedom to take initiatives for sustainable development in the built environment; initiatives that were in accordance with their primary goals and interests. However, the relationship between these primary responsibilities and sustainable development was often tenuous in the extreme, or entirely non-existent. Many initiatives were placed in the hands of research institutes deeply involved in developing and promoting initiatives for greening the built environment.

The policy changes in question also received a warm welcome from the pioneers in sustainable building. Market-based and voluntary policies and instruments operated along the lines of the 'polluter pays' principle. The idea was that those actors who caused problems were the ones who should solve them, and they were made responsible for doing so. At last the pioneers' innovations, know-how and expertise were in demand, and research institutes lined up to consult them.

Conclusion

These policy changes resulted in a regulatory framework that guaranteed minimum quality levels, and in voluntary arrangements that motivated actors to do much better than the bare minimum required of them by law. Various national programmes in which the building and construction industry developed its own standards for sustainable building are examples of such arrangements. These include LEED (Leadership in Energy and Environmental Design), the US Green Building Council's green building rating system and in the UK, BREEAM (Building Research Establishment's Environmental Assessment Method). While programmes such as these are well known, widely discussed, and praised on all sides, their voluntary nature means that they only have a limited effect. Despite the enthusiasm with which these policy changes were received and implemented by the sector, Chapter 1 showed that the changes involved were modest with respect to the improvement of the environmental performance, and also in the light of the ever-changing and increasing sustainability challenges, such as climate change. Especially the abil-

ity of the building and construction sector to change was questioned in many studies. The next section will delve deeper into the explanations given for the limited success of public policies with regards to building and construction, and the challenges faced by policy makers who aim to develop policies in support of sustainable development of the built environment.

2.6 Challenges for policy makers

Since the mid-1990s, the reasons for the limited success of sustainable building policies have been explored by researchers in the Netherlands. Many of the studies referred to institutional barriers rather than technological barriers, interestingly so, as architects and engineers working in the built environment are more familiar with barriers of a technological nature. Among the first studies in this field were those by Brezet (1994) and Pries (1995). Brezet looked at why it took fifteen years for high-efficiency heating systems to penetrate the market, despite their evident financial advantages for users (Brezet, 1994). Pries also dealt with the difficulties facing innovation in the building and construction sector (Pries, 1995). Subsequent studies focused on particulars of the industry, on the product, and on the process by which the built environment (or specific parts of it) were realised (e.g. Hertz, 1996; Bossink,1998; Blaauw and Priemus, 2000; Bremer and Kok, 2000; Van der Waals, 2001; Rovers, 2003; Priemus, 2005). More recent studies showed that barriers to policy making are not typically Dutch, but encountered in other countries and in other continents as well (Van Hal, 2000; OECD, 2003; Tirone, 2004; UNEP, 2003, 2007; WBCSD, 2007). These studies point to barriers in policy making in support of sustainable development. Some studies addressed challenges common to many sectors, while others dealt with sector-specific challenges.

Common challenges to sustainable development
The challenges generally encountered by policy makers developing policies for sustainability are identified as follows.

■ *Ambiguity of sustainable development* – How the ambiguous and contested character of sustainable development gets in the way of achieving policy success has already been extensively discussed in Chapter 1. In short, such concepts as sustainable development bridge a range of values that would otherwise compete or conflict with one another, such as economic and ecological values. Everyone seems to be in favour of the goals promoted by sustainable development, but it is very difficult to implement tangible policies and objectives. When priorities must be set and concrete choices made (e.g. allocation of profits and losses), the concept alone cannot reconcile these conflicting values.

Sustainable building projects are often confronted with this problem. People advocate the sustainability concept but they are unable to put it into practice. Sustainable development is always present, in abstract form, throughout the policy process. However, it is almost never operationalised in concrete goals, and on those few occasions when this does occur, there are no criteria for evaluation and assessment. As a result, it is impossible to establish whether the goals have been met, which provides the actors with an easy get-out (Buckingham-Hatfield and Evans, 1996; Healey, 1997).

■ *The rebound effect* – The rebound effect is where a measure aimed at reducing environmental impact induces a behavioural response (or any other systematic response) that actually offsets the intended effect of the measure in question. As a result, the measure results in fewer environmental benefits than anticipated; indeed, it may even have a net negative effect (Hertwich, 2005: 86). Efficiency measures may either not be as effective as expected, they might fail to materialise at all, or they may even backfire completely (ibid.). Take the goal of improving the energy efficiency of dwellings. This can be annulled by an increase either in the number of households or in their net floor area, or by the expectation of a higher level of service from electrical appliances and heating systems (Shorrock and Utley, 2003: 13; Kibert, 2002).

■ *Systemic barriers* – Systemic barriers to sustainable development derive from the institutional systems which develop the policies. Economic and financial institutions in particular fail to take account of environmental and social costs. For example, as long as labour is taxed more heavily than the use of materials, it is cheaper to demolish and replace buildings than to renovate and refurbish them. Similarly, as long as agricultural land is cheaper than urban sites, the urban sprawl model is a cheaper form of accommodating the growth of towns and cities than a compact city model. Some hold political institutions responsible for the failure of sustainability policies. The relatively short time frame (no more than four years) of political office is blamed for this, as is that political decision making is dominated by a preoccupation with votes, to the cost of environmental concerns.

■ *No sense of urgency* – The sense of urgency with regard to sustainable development that is expressed in scientific reports and political agreements is not reflected by the actors involved in building and planning (Glasbergen, 1998). Sustainability is just one of several concerns in the design, use, management, and maintenance of the built environment (Lovell, 2005). The commitment to sustainability is just one of many commitments involved in these processes, and an indirect one at that. The lack of a sense of urgency is inherent to the concept of sustainable development. Although the concept acknowledges that the birth of a sustainable society will require revolutionary systemic chang-

es, it also emphasises that this transformation can only be achieved through a process of incremental change.

Sector-specific challenges to sustainable development

In addition to these general challenges for change towards sustainability, there are challenges with their origins in the institutional characteristics of the building and construction sector.

■ *Building sector characteristics: many small players and risk-avoiding behaviour* – The building and construction sector consists of a few major players and a large number of very minor ones. Ninety-three percent of construction companies in the European Union are small or medium-sized businesses with a workforce numbering less than ten. Together, they are responsible for 80% of construction turnover (UNEP, 2003: 6). Most of the work in the construction industry is project-based and governed by the specific requirements of the site and the customer. The resultant lack of standardisation makes it difficult to exploit economies of scale (OECD, 2003: 50-52). Because they have very limited budgets (if any) for research, development and training, small-scale companies are slow to adapt to new technologies (Pries, 1995). Dutch companies, for example, allocate an average of merely 0.5% of the available investment budget to research, technology and development. The estimates for Europe as a whole are lower still, at just 0.3%, whereas other industries have an average of 2% (Bremer and Kok, 2000: 103). When learning and innovation does take place, it often happens within project organisations. Lessons are not directly transferred to the level of the firms participating in projects (Harty, 2005); individual project team members transfer the lessons learned in a project to the next projects in which they participate (Brown and Vergragt, 2008).

Although the construction industry is largely made up of small companies, it is dominated by the few big players. These are intractable conglomerates that reap profits at several stages of the value chain. They operate through a wide range of firms, either by holding a participating interest or by owning them outright. The conglomerates are the main beneficiaries of various branch organisations, some of which play a vital role in setting the agenda for negotiations with government organisations, while others are concerned with research and development. These large conglomerates have many opportunities to innovate, but show little inclination to do so (Vermeulen and Büch, 2005).

Building and construction firms, both large and small, share a conservative outlook that is averse to risk-taking. This has resulted in a sector very resistant to change, innovation and to government interventions (including voluntary policy instruments for the promotion of change). Whenever a government requires a change, the sector prefers unambiguous policies such as clear-cut performance requirements as well as forms of self-governance. Their custom-

ers (private home owners or organisations that own or rent commercial property) are usually as averse to taking risks and are thought to be unwilling to pay for sustainability. Even if customers were to insist on sustainable housing, demand is still subject to a host of other factors, such as location, volume, and price (Lovell, 2005: 819). The development of demand is hampered by consumers' ignorance of sustainable buildings. People know what they want, but they do not want what they do not know or understand (Barlow and Ozaki, 2003: 91).

■ *Product and supply chain characteristics: unique, durable products produced by many* – Unlike other products and supply chains, buildings are expected to have long life spans, ranging from decades to centuries. These life spans have several stages, from planning and design, to construction, use, refurbishment and reuse, demolition, reuse and recycling. Different actors are involved in each of these stages, with ultimate responsibility changing hands from one stage to another. The individual stages can be very protracted, as houses are only renovated every thirty years or so, while office buildings are demolished after forty years, etc.

Coordination between these stages is hampered by uncertainties about ownership, responsibilities, usage, functional requirements, and even life span. Take the implementation of a life cycle concept such as Design for Environment, which aims to close loops in the construction industry (Kibert *et al.*, 2002). This concept depends for its success on the cooperative behaviour of many actors in various parts of the value chain. What this means is that manufacturers must produce products that can be disassembled, architects must design buildings that use products that can be disassembled, builders must construct the components so they can be disassembled, and there must be a market for products after disassembly (Van den Dobbelsteen, 2004).

The longevity of older property is also a bottleneck to the diffusion of innovations, since their application is limited to new constructions (Klunder, 2005). Even if sustainable standards are defined, the fact that buildings are constructed on-site makes it impossible to guarantee compliance (OECD, 2003: 53). In addition, users themselves can frustrate or annul the potential performance of sustainability measures. The operation of a climate control system can be disrupted by opening a window, for example. Natural purification systems for water are fine, but they require all end-users to exercise discipline when using the system (Hertz, 1996).

■ *Principal-agent problems: asymmetry of knowledge and costs and benefits* – Principal-agent problems involve the disparate goals and interests of the various actors involved in the building process. Examples include the asymmetry of information and knowledge on sustainable building, and the asymmetry of costs and benefits in this area – also known as the problem of split incentives

(cf. Jensen and Meckling, 1978; Laffont and Martimort, 2001; Barlow and Ozaki, 2003; Menkveld *et al*., 2005). Housing associations invest in energy-saving measures, but it is their tenants who benefit from the resultant reduction in energy bills. Real estate developers invest in low-maintenance materials, but it is the home owners who enjoy lower maintenance costs. Such asymmetrical allocations of the costs and benefits of investments in sustainability do not encourage actors to invest in sustainability.

In the case of incidental principals, such as people building their own homes or companies building their own offices, the projects in question are usually once-in-a lifetime experiences. Accordingly, these principals rely heavily on the knowledge of their architect and contractor (the agents). These agents may have little interest in or knowledge of sustainable building, and they often emphasise the additional costs involved in the use of sustainable technologies. In many cases, the situation is reversed. While their architect may be experienced in sustainable building, it is often the clients themselves who are averse to risk-taking – after all, they are investing their private capital. As a result, they tend to look at up-front capital costs rather than project life costs and the flexibility of structures (DTI, 2005: 6). Add to this the already high capital costs of construction, and the client is discouraged from building sustainably.

The situation is different in large building projects, such as the development of residential estates by a private property developer. Here, the developer does have the opportunity to acquire knowledge on sustainable building and to invest in it. However, the developer and the potential end-user are still worlds apart. Houses are often built for stock, before anything is known about the buyers. In cases of this kind, risk avoidance usually leads to the construction of dwellings that meet the demands of an average home owner (Barlow and Ozaki, 2003).

■ *Late agenda-setting* – The structure of the building process, from design to construction, is characterised by many stipulations, both inclusive and exclusive. For example, in northern countries, the use of passive solar energy in dwellings in a new residential area requires a parcelling plan which orientates building blocks towards the sun. Many projects only put sustainability on the agenda once decision making is well under way, which means that it may no longer be possible to incorporate sustainability measures (Van Hal, 2000).

The structure of the building process also influences the available opportunities for exploiting economies of scale. Sustainability measures implemented on higher spatial scales are often more effective than measures implemented on lower scales. For example, the availability of residual heat may mean that it is more energy efficient to connect an urban area to a heat delivery system than to use decentralised technologies such as photovoltaic panels and heat pumps. However, such assessments can only be made if sustainability

Table 2.1 Actors and the environmental impact of their decisions

Stage	Siting/design	Construction/ refurbishment	Use	Demolition/ deconstruction
Actors	Developers Owners Architects Engineers Finance institutions Government authorities	Owners Architects Engineers Contractors Material suppliers Labourers Government authorities Finance institutions	Owners Tenants Building managers Operation and maintenance personnel Government authorities	Contractors Recyclers Salvagers Landfill/incinerator managers Government authorities
Actions and inputs	Choices affecting: Land use Material use Energy and water needs Aesthetics Transport and mobility	Building materials Chemicals Energy Water Labour Equipment	Chemicals Energy Water Labour	Chemicals Energy Water Labour Equipment
Environment-related impacts and risks	Landscape alteration Transport patterns Building performance	Raw material extraction and transformation impacts Waste Run-off Noise Traffic Landscape impairment Dust Pollutant emissions and discharges	Indoor emissions Waste Wastewater Heat Greenhouse gases Soil compaction and contamination Traffic	Waste Noise Dust Release of hazardous materials Soil/water/air pollution (if landfilled/incinerated)

Source: UNEP, 2003: 8

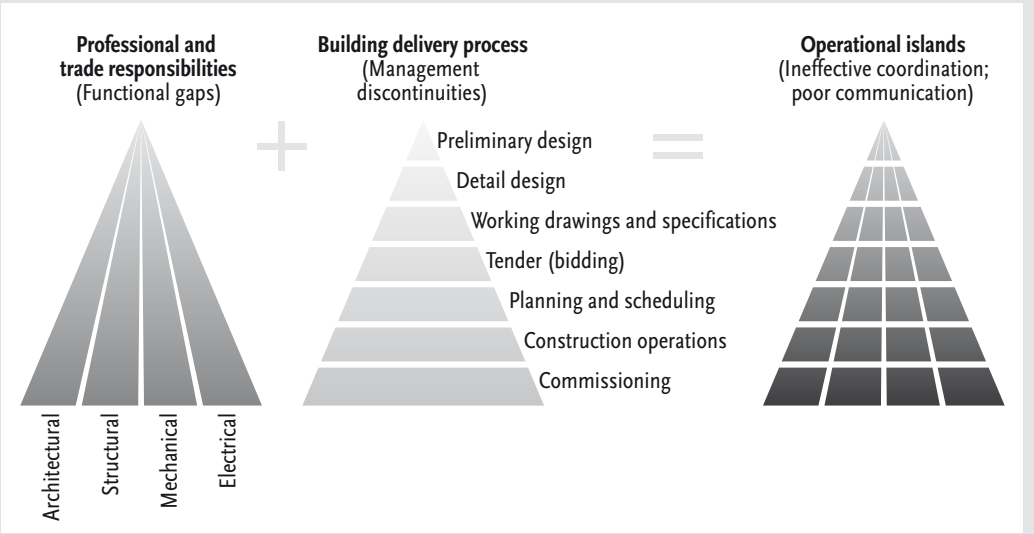
is included as a decision-making criterion from the very start of the project. Even where sustainability has been incorporated into decision making, there are often difficulties in translating abstract sustainability aims into tangible goals. This often results in a disparity between the intentions expressed at the outset and the sustainability performance ultimately achieved (Bossink, 1998).

Conclusion: decision making is highly fragmented

What these sector-specific barriers to policy success have in common is that they all contribute to a fragmentation of decision making about the built environment. While there are many small conservative players in the market (and only a few big ones), all share an aversion to risk-taking as far as sustainable building is concerned.

Product supply chain characteristics point to the longevity of the building product itself and to the involvement of different stakeholders at various stages in its life cycle. This results in principal-agent problems and agenda-setting problems. The fragmented decision-making process gives rise to coor-

Figure 2.1 Players and practices in the building market



Source: WBCSD, 2007: 15

dination issues. As Wim Bakens, the secretary-general of the International Council for Research and Innovation in Building and Construction (CIB) put it: "The application of the measures directed towards achieving sustainable building and construction requires close cooperation among various professionals, decision makers and other stakeholders." (Bakens, 2003: 9).

To illustrate the fragmentation and coordination challenge, Table 2.1 presents an overview of the actors involved in decision making in the various stages of the lifecycle of the built environment and how their actions and input in the building process affect the environmental performance of the built environment. In addition, Figure 2.1 visualises the fragmented structure of the sector in terms of 'operational islands'. The next section explores evaluation reports on sustainable building policy: what advice do they give and what do they suggest can be done to address the problem of collaborative action?

2.7 Suggested policy improvements: will they work?

The overview of challenges to a sustainable built environment shows that there is a bottleneck in the effectiveness of policies promoting sustainable development. The culprit in question is the institutionally fragmented context of design, construction, management, and maintenance in the built environment. Decisions are made by a variety of actors. Each has their own specific aims and interests, yet they depend on one another for the realisation of these individual goals. Coordination between these actors is motivated by considerations of effectiveness and efficiency that take no or little account of sustainability. This coordination is deeply rooted in various formal and in-

formal institutions, ranging from procedures for tendering and procurement to codes governing collaboration and the division of labour. Many of the implementation studies referred to in the previous section identify institutional fragmentation as the major challenge to policy making.

Suggested policy improvements

In general, the studies reviewed in Section 2.6 of this chapter point to opportunities for policy improvement at the instrument level and at policy level. At the instrument level, the recommendations are concerned with perfecting or changing the instruments used to achieve policy goals. Central to these recommendations is the need for more research, information, monitoring, assessment, and evaluation *ex ante* and *ex post*. The information and knowledge gained from these activities help to define policy targets and determine an appropriate time and place for intervention. For example, these recommendations could help to resolve such issues as determining what would be an appropriate standard for energy performance levels, or establishing whether volumes of construction and demolition waste can be more effectively reduced by a landfill tax or by subsidising reuse.

At the policy level, the recommendations acknowledge that instruments are not applied in isolation. Instead, they are part of a wider context in which the actors concerned are confronted by many different instruments and policies. The actors themselves can be addressed in many different ways. For example, legal energy performance standards could be used to encourage the reduction of energy use in housing. This can be supplemented by financial incentives for saving energy, and by informative campaigns on domestic energy-saving measures. Policy performance could be improved by using a mixture of legal, economic, and voluntary instruments. If these are to generate the intended multiplier effect, they will require careful coordination, also with adjacent policies that affect energy use in housing; some examples are energy pricing, policies regarding the development of energy efficient domestic appliances, campaigns to promote teleworking, etc.

The recommendations at the policy level acknowledge that the complexity of the problem being addressed means that it cannot be solved by a single policy or instrument. However, there is also the matter of how to coordinate the actions of a variety of actors. Those who address this issue often speak in terms of leadership, saying that effects cannot be guaranteed unless appropriate leadership is put in place. They make the point that national governments should guide society towards a sustainable built environment by the application of visionary long-term policies. Some say that public organisations could set an example for other organisations, by adopting procedures for greener procurement (e.g. OECD, 2003). At the level of municipal building projects, sustainability could be put on the agenda by hiring project managers with an understanding of sustainable building who are capable of creating

momentum in sustainable decisions (e.g. Bossink, 1998; Van Hal, 2000). The private sector, the building industry, is also in need of leaders to show the way (WBCSD, 2007).

Despite the policy improvements produced by these recommendations, sustainability gains have been disappointing. The Industry and Environment review of the United Nations Environmental Programme states that "even the most successful of existing policies geared towards sustainable building and construction are barely making headway even against basic environmental problems related to the built environment, never mind addressing the urgent issue of reducing resource use by a factor four or more in order to establish a balanced resource system. … Thus far, few policies or policy instruments aimed at the building and construction sector have stimulated progress beyond the level of building regulations." (Rovers, 2003: 29).

Will suggested improvements work?

Many of the suggestions for policy improvement are based on the development and application of expert knowledge. However, expert knowledge is also specialised knowledge, and experts approach problem solutions from a particular point of view; they make use of specific disciplinary knowledge and focus on a particular spatial scale. As a result, many of the recommendations are centred on improving the means and ends of policies. This is exemplified by numerous improvements in the field of environmental performance standards and environmental assessment methods for building and construction. Efforts to redress the fragmented institutional context of the policy process were restricted to the use of additional instruments, such as subsidies and information campaigns. These instruments were included in the policy mix used to develop support and facilitate implementation. But such improvements were mainly concerned with convincing other actors of the correctness of the policy. Less emphasis was given to the possibility that there might be different viewpoints or other, preferable ways of addressing the problem.

The leadership suggestion is not without problems. An OECD report concludes that: "The effectiveness of policy instruments is highly dependent on the decisions that policy makers take at every stage of designing and implementing environmental policies." (OECD, 2003: 170; cf. Douglas and Wildavsky, 1982). Even for a driven and committed policy entrepreneur, it is impossible to control all the decisions taken by numerous actors involved in the policy process. While leadership may help in achieving policy results, the fragmented nature of the context makes it impossible to control or guide the various processes taking place at a range of different locations.

Conclusions

The suggested policy improvements still seem to have trouble with the contested, ambiguous and dynamic nature of sustainability. Many suggestions re-

ly on the belief that research will deliver solutions, without addressing the question whether these solutions, developed by a single group of actors or from a single point of view, will be accepted by other groups of actors with different viewpoints which in turn rely on different sources of knowledge and are driven by different interests. The undertaken research shows that the multi-actor context, with its highly fragmented decision making over people, places and time, is at the heart of many of the challenges identified.

If the suggested policy improvements fall short, what other suggestions are more likely to work? The next chapter explores this question. Instead of trying to formulate instant, substantive solutions for a variety of challenges, it will focus on theoretical perspectives on policy making that acknowledge that policies supporting a sustainable built environment will be both ambiguous and dynamic, and part of a debate amongst multiple actors all claiming that their point of view is the right one. The aim is to develop a framework for policy evaluation that will encourage policy makers to take these dynamic circumstances into account.

3 Policy networks: a theoretical perspective on policy making

3.1 Introduction

Theory development on policy making has taken a great leap forward since the 1950s and 1960s. With the growing complexity of the world, or at least the perception of increased complexity and the resulting growth and complexity of government challenges, policy process theory has become more complex as well. This chapter shows how rational policy analysis has evolved into theories of collaborative governance and policy networks. The policy network approach is often used to analyse and evaluate public policy, especially when it is concerned with ambiguous, contested multi-actor problems. From the 1990s onwards, theoretical developments in policy networks evolved in tandem with real world policy making, much of which was focused on the (built) environment. Network theories inspired public policy makers to new forms of policy making, while the analysis of these empirical cases, in turn, contributed to theoretical improvements (Sørensen and Torfing, 2007: 6). This makes the policy network approach a logical candidate for studying policy making in support of a sustainable built environment. This chapter looks into the origins and background of the policy network approach (Sections 2, 3 and 4), the characteristic traits of the approach (Section 5, 6 and 7), and ends with a discussion of the suitability of the approach for studying policies supporting a sustainable built environment (Section 8).

3.2 A single-actor perspective on policy making

Development of practical and scientific theories of policy making and the policy process started at the begin of the twentieth century with the rise of the modern state and accompanying modern policy issues such as health care, housing, education and social welfare. The scientific discipline called policy analysis emerged which, as the name indicates, is concerned with the analysis of policy problems, aiming to identify cause-and-effect relationships constituting the problem and opportunities for government to intervene. In those days, policy making authority was based on hierarchical superiority which enabled policy makers to formulate, implement and enforce policies in a command-and-control-like manner. Policy analysis assumed that policy formulation and implementation were in the hands of government acting as a unitary actor, with a consistent set of goals, preferences, interests and actions, and accordingly, analysis took place from a single-actor point of view, with one actor in control of the policy process.

Policy analysis can be defined as follows: “Policy analysis is an applied social science discipline which uses multiple methods of inquiry and argument to produce and transform policy-relevant information that may be utilised in political settings to resolve policy problems.” (Dunn, 1981: 35). Lasswell

is often mentioned as one of the founding fathers of modern policy analysis, and he suggests that policy analysis should be directed at theorising about the policy process itself and at providing policy makers with intelligence, to improve the concrete content of information and interpretations available to policy makers (DeLeon, 1988; DeLeon and Vogenbeck, 2007; Wildavsky, 1987). Although policy analysis as promoted by Lasswell had a multidisciplinary character, the contributions to policy analysis soon took place from mono-disciplinary theories and methodologies, such as operations research and economic theory, and were mostly quantitative (DeLeon, 1988).

The mono-disciplinary practice of policy analysis was strongly based on a rational perception of policy making, which depicted the policy process as a process of informed decision making that took place in sequential stages: the identification of the policy problem, the formulation of possible solutions, the formulation of criteria to assess advantages and disadvantages of solutions and the allocation of weights to these criteria, the identification of the advantages and disadvantages of solutions, the assessment of these advantages and disadvantages, and the final decision, the selection of the 'best' solution (e.g. Simon, 1957; Lindblom, 1959; Dunn, 1981; DeLeon, 1988; MacRae and Whittington, 1997). This rational model is based on some important assumptions: all information is available to identify problems and solutions, the information is neutral, and a single actor can make the decision. Scientific knowledge and expert knowledge play important roles in this model; both are needed for making a 'good' policy analysis of the causes and effects constituting the problem and identifying and assessing possible solutions.

Based on the substantive analysis of the policy problem, policy makers formulated a policy theory of means and ends, which formed the basis for policy design and implementation, activities considered to be sequential (Hoogerwerf, 1992). If intended policy goals were not achieved, this could be a matter of implementation if it had not been correctly carried out, or a matter of instrumentation if the wrong instruments had been selected to implement the policy. Another factor for policy failure could be found in the policy formulation phase, if policy analysis had not correctly identified the causalities, goals or solutions, then the policy theory had to be corrected (Fischer, 1995).

This practice of policy analysis soon became a synonym for systematic analysis with an emphasis on quantitative modelling (DeLeon, 1988: 24). The model suggested that society could be governed rationally, based on scientific information, by collective decision makers (Morçöl, 2007: 5). Ideal, optimal, rational, planning, reductionist, quantitative and positivist are key words characterising this systematic approach to policy analysis; an approach that leaves no room for the irrational and dynamic nature of human interaction.

The inability of the rational model to capture the dynamics of decision making in real life was already evident in the 1950s and 1960s. Simon pointed to the impossibility of the exhaustive exploration of all policy alterna-

tives and introduced the concepts of *satisficing* and *bounded rationality*, which implied that actors investigated alternatives until they were satisfied; rationality was therefore bounded (Simon, 1957). Lindblom (1959) argued that it was impossible to know the effects of decisions in advance for complex problems and decision makers, being risk-averse, preferred decisions with predictable effects. He characterised decision making as a process of *muddling through*, consisting of a series of *incremental decisions*, each making small changes to the status quo. Allison (1969) showed how actors did not behave rationally, but had goals of their own that could be inconsistent with the formal goals they claimed to pursue. Their behaviour and preferences were influenced by other factors, such as interests, power, procedures and routines. Information was not neutral, but coloured by the perceptions of the actor providing the information and information could even be used strategically.

Cohen, March and Olsen (1972) also emphasised that policy making was not an activity that could be carried out by a single actor, from a single point of view, but one that was subject to many other forces. The policy arena, the place where groups of actors discuss and decide on issues of their concern, should be pictured as a garbage can in which policy was the accidental match between all the problems, solutions and participants that happened to be around. Wildavsky challenged the rational model by pointing to the gap between policy formulation and policy implementation, or, as he put it, "how great decisions are dashed in Oakland". Policy implementation required the decisions of a great number of actors, and every decision of each actor implied a chance that the policy may be changed, delayed or halted. This led him to conclude that it is a wonder that policies are realised at all (Pressman and Wildavsky, 1973).

The works mentioned are important landmarks in the development of policy sciences. They showed how the rational model of decision making, assuming a single actor is making the decisions, was insufficient to describe and explain empirical policy processes revolving around complex problems. This characterisation seems to turn a single-actor approach to policy making into an easily knocked over straw man. It should be emphasised that this approach is suitable for solving tame policy problems, problems that can be known and on which actors can agree the means and ends (Roe, 1998: 5). However, the single-actor approach cannot deal with complexity and ambiguity, with problems where there is disagreement about means and ends, and it is insensitive to the dynamics and sensitivities of the real world of public policy (Stone, 1988; Jasanoff, 1990; Fischer, 1995). With the growing complexity of policy problems in the second half of the twentieth century, multi-actor approaches to policy making were developed to address these problems.

3.3 Taking the multi-actor context into account

Criticism of the rational model of policy making from a single-actor perspective gave rise to the development of approaches that did take the multi-actor context of decision making and policy process into account. The influence of policy context on decision making was studied in several disciplines, such as organisational sciences and political sciences, which studied the presence of multiple actors in terms of multiple organisations and multiple political parties. This section presents an overview of several theoretical developments in thinking about the influence of the multi-actor environment on the process of decision making and policy making that form the basis of collaborative approaches to governance (Marsh and Rhodes, 1992; Klijn, 1996, 1997; Blom-Hansen, 1997; Rhodes, 1997; Bogason and Toonen, 1998).

Organisational sciences developed a contingency theory that focused on the fit between the organisation and its environment, which provided an important explanation for the structure, success and survival of organisations (e.g. Burns and Stalker, 1961; Thompson, 1967). Theories on inter-organisational coordination showed how *resource dependency* between organisations or organisational departments influenced the interactions between these actors (e.g. Levine and White, 1961; Aldrich, 1979). These organisational theories showed that there is no one best way to organise, but that the organisational structure and interactions depend on the environment in which they operates (Morgan, 1986; Alexander, 1995). In policy process theory, the insights from organisational theory have contributed to a focus on coordination between organisations that depend upon each other's resources and collaboration for formulating and implementing policies (Ansell, 2006).

Economics made a distinction between individual and collective interests with Olson's publication of *The logic of collective action* (Olson, 1965). In this book, Olsen challenged the till then leading idea that rationally self-interested individuals will not act to achieve their common or group interests (Oliver, 1993: 272). He applied this notion to the provision of public goods. The non-excludability of individuals from the benefits of a collective good leads to free-rider problems, with individuals profiting from the collective good while taking a free ride on the contribution of others. Under such circumstances, collective action would be irrational and has to be stimulated with selective incentives to reward or punish individuals. In policy process theory, this resulted in formal and informal theories of collective action, which paid attention to how individuals could be stimulated to act in a common interest, for example by developing policy mixes that employ economic and voluntary instruments in addition to coercive instruments (e.g. Hood, 1986).

In political science, *pluralist* and *corporatist theories* replaced the idea of a monist state, in which policy was the result of a government acting as a single actor, by a notion that policy was the result of interactions between actors

involved in the policy issue concerned. These theories focused especially on the representation of interests. Pluralists argued that actors could participate in issues of their concern (Dahl, 1961, in Granados and Knoke, 2005), whereas elitists and later (neo-) corporatists argued that policies were developed in stable subsystems of small groups of actors, who developed policies for a specific domain, irrespective of the specific issue that was on the agenda (Jordan, 1981). These political theories showed how the policy process took place in open or closed subsystems, where the actors' interests in the policy environment were represented or excluded (Klijn, 1996). In policy process theory, this drew attention to the agenda-setting process, which dealt with questions such as how policy issues reach the agenda, who has access to the policy agenda and how the agenda can change during the process (e.g. Cobb and Elder, 1983; Kingdon, 1984).

Renewed attention for *institutions* can be found in many social science disciplines, ranging from economics, political science and technology assessment to behavioural sciences and anthropology. The question was to what extent did institutions influence decision making, whether they are formal, such as the constitution, the state and organisations, or informal, such as traditions, behavioural patterns and social conventions. In policy process theory, the focus on institutions led roughly to two research topics. The first was directed at the design and evolution of the formal institutions of the state and their impact on the policy process (e.g. Weaver and Rockman, 1993). The second understood institutions as a relatively enduring collection of rules and organised practices, often simply referred to as 'the rules of the game' and theories were directed at understanding how these rules structure and influence perceptions, interactions and decision making (e.g. Ostrom, 1990; Weimer, 1995; Goodin, 1996; Hendriks, 1999; March and Olsen, 2006).

Finally, social constructivism is a development in social sciences that deserves mention here. Social constructivism argues that we all have different perceptions of the world out there and that we construct our understanding of the world by exchanging perceptions. Facts and values are not two separate things; values leave their marks on what facts we perceive and what meaning we give to these facts (Berger and Luckmann, 1967). In policy process theory, this drew attention to actors' perceptions and their influence on the policy process (Schneider and Ingram, 2005).

Social constructivism also had major repercussions for the role of the policy analyst and for policy evaluation. Policy analysis and evaluation were not value-free activities carried out by a neutral person and from a neutral point of view. Analysis and evaluation represented a particular perception of the policy process and outcomes at a particular moment in time, and the outcomes could be different when carried out by another person or at another point in time. Also the scope of the evaluation changed; instead of evaluating formal goal achievement, the evaluation should be sensitive to changed perceptions,

goals and conditions (Guba and Lincoln, 1989; Giddens, 1984; Rein and Schön, 1993; Fischer, 1996).

3.4 Policy networks as forms of collaborative governance

These developments contributed to the emergence of collaborative governance approaches in policy sciences, which emphasise the shifting of government towards governance. In modern societies, public policy has become a more complex and difficult process and political systems have become more and more fragmented into increasingly specialised subsystems. Thus policy making involves increasing numbers of different actors amongst whom interdependencies prevail (Blom-Hansen, 1997: 670). Policy problems have become too complex and dynamic for a single governmental actor to be able to define and solve alone. Instead, policy making has become a process of collaborative action.

The shift from the single-actor, rational-analytic manner of policy making to a multi-actor process-oriented way is often depicted as a shift from government to governance (Hajer and Wagenaar, 2003). It demarcates the shift away from the old hierarchical model of government, in which state authorities exerted sovereign control over the groups and citizens making up civil society, towards a model in which government is increasingly dependent upon all sorts of public and private actors to formulate and implement policies (Mayntz, 1993). The word governance refers to the more cooperative processes of governing, policy making, and decision making; it emphasises that the policy-making process is embedded in an institutional context of autonomous actors and inter-organisational networks (Rhodes, 1997: 53). When used in this way, governance addresses all sorts of new governmental interventions and forms of collaboration between state and non-state actors that have since come into existence besides the traditional instruments and institutions (Pierre and Guy Peters, 2000).

Networks play a prominent role in governance. The network metaphor is used to depict the complex web of relationships between actors in decision-making processes. Networks are considered an alternative coordination mechanism to hierarchies and markets (Provan and Kenis, 2007). Networks emphasise the empirical reality of policy making, where it is the result of collaborating groups of actors; an aspect that is not represented in the hierarchy and market models. Whereas the hierarchical model focused on relationships that can be characterised as one-to-many, relationships in the network model are many-to-many and recurrent (Kenis and Schneider, 1991; Ansell, 2006). By focusing on the horizontal and reciprocal relationships between actors, the network model recognised the interdependencies between govern-

ment and non-government actors. Because networks have a highly varied and differentiated structure, including state and non-state actors, multiple layers of these actors, individual agencies and representative agencies, multiple forms of accountability, and so forth, they are assumed to be better capable of addressing the multiplicity of complex and ambiguous policy problems. Compared to hierarchies and markets, networks are more contingent to the policy problems they try to resolve.

In many disciplines of the social sciences, such as sociology and anthropology, and economics, networks have become an object of study. The network approach has become one of the dominant ones in the study of policy-making processes in the UK and has gained wide usage in Europe and North America; innumerable case studies using policy network theory have been conducted in the past twenty to thirty years and leading journals have dedicated special issues to theoretical approaches based on the network metaphor (Blom-Hansen, 1997: 670; Robinson, 2006). The policy network approach has proved to be empirically relevant, and especially in the field of environmental policy making many studies have been carried out from a policy network point of view for scientific and for advisory purposes (Glasbergen, 1995; Van Tatenhove, Arts and Leroy, 2000; Ansell and Gash, 2007).

What all these studies have in common is how they understand networks. Ansell (2006: 75-76) mentions four essential elements of networks that can be found within a variety of disciplines and sub-disciplines. The first is that phenomena are explained by the relationships between actors that are not reducible to individual attributes of individuals, groups or organisations. Second, the web of networked relationships is assumed to be complex; linkages between individuals, groups and organisations overlap and cross-cut. Third, the relationships form both a resource and a constraint to collaborative action; and fourth, there are differences in how and which resources are mobilised by networks and to what purpose.

In political sciences as well, the governance model with its emphasis on networks as a coordination mechanism has gained wide acceptance amongst scholars and policy makers. Different aspects of collaborative governance have become the subject of study over the years (Hajer, Van Tatenhove and Laurent, 2004). For example, deliberative approaches focus on the legitimacy of policy making; it is considered to be the result of deliberations between governmental actors and citizens during which decisions are made by exchanging arguments in a transparent, open process. New public management focuses on improving the output of governance, by making use of instruments that have been developed by the private sector to improve the efficiency of their responses to customers' demands. Good governance focuses on the accountability of the delivery of policies, public goods and services. Finally, policy network approaches focus on the relatively stable set of interdependent relationships and interactions between multiple, interdependent actors (ibid.).

Various schools have been developed in policy network approaches, each using different methods to explain the policy process; there is no such thing as 'the' policy network approach. Roughly two strands of research can be distinguished: one that makes use of quantitative methods to understand the policy process and a second that makes use of qualitative methods (Oliver, 1993).

Quantitative network approaches employ concepts of game theory and public or rational choice. These approaches regard collaborative action as a multitude of prisoner's dilemmas in which decision making is considered to be a zero-sum game. The dilemma concerns a trade-off between individual interests versus group interests: assuming that other actors do cooperate, an individual actor is better off if he does not cooperate, but the group benefits most from the cooperation of all actors (Axelrod, 1981; French, 1986). By modelling variables as actors (nodes), actor preferences, the relationships or ties between them (absent or present, weak or strong), interactions and constraints, these theories aim to explain and predict outcomes of decision-making processes, for example by pointing to the density of relationships and interactions and by identifying holes in the network structure (Kooiman, 1993; Provan and Kenis, 2007).

These quantitative approaches focus especially on institutional structures and not on the content of the structures (Börzel, 1998: 255). Theoretical attention is not so much devoted to the purpose of collective action, but more to the social and organisational processes that make action possible (Oliver, 1993: 276). Also, analysis and explanation focuses on the nodes and relations that compromise the network rather than the network itself (Provan and Kenis, 2007: 232). The mathematical approach to problem-solving implies a certain analytical rigour, which seems in conflict with the dynamic and irrational nature of decision making. Variables such as changes and inconsistencies in actor preferences, changing coalitions, personal likes and dislikes amongst actors, interdependent relationships over time and strategic actor behaviour are difficult to model.

Informal network approaches are better capable of addressing the behavioural, irrational and dynamic aspects of decision making and emphasise that the network can be viewed as a form of governance delivering public purpose (ibid.). They help to understand and explain the policy process without reducing its complexity to a theoretical model focusing on a few variables. By explaining how a variety of actors and factors in combination led to the course and outcomes of policy processes, these informal policy network approaches offer a comprehensive understanding of how and why actors did or did not come to agree on collective action. Rhodes refers to this as follows: "The policy network concept has considerable utility for the analysis of policy making in Western democracies. Its heuristic value remains considerable, primarily because the concept directly confronts, even mirrors, the administrative and political complexity of advanced industrial societies." (Rhodes, 1990: 313).

Informal network approaches deliver explanations at the meso- or subsystem level, whereas many formal policy network approaches deliver explanations by aggregating individual preferences (Oliver, 1993). It is the comprehensive understanding at the meso-level that makes these informal approaches interesting to apply in this research. The curiosity is aimed at understanding how the multi-actor context influences the effectiveness of policy making in support of a sustainable built environment, and from this understanding deriving lessons for policy design.

For the evaluation and design of policy making in support of a sustainable built environment, which is central to the research in this book, informal policy network approaches thus offer a promising point of view. They offer a model to analyse the complex reality of the policy process, the actors involved, their relationships, and their resources, and a more normative and prescriptive model that focuses on how networks should work to deliver legitimate policy outcomes (Van Tatenhove and Leroy, 1995). The next sections of this chapter introduce the analytical and prescriptive dimensions of the policy network approach.

3.5 Analysing policy networks

In addition to the general trends that led to the development of governance and network approaches, as presented in Section 3.3, this research uses some more specific studies contributing to the development of the policy network approach. The studies expand on theories of corporatism, iron triangles and sub-governments as developed in the UK and the USA in the 1960s and 1970s. According to Ansell (2006) they are centred on the idea that "policy making and implementation were controlled by a select group of agencies, legislators, and interest groups" (Ansell, 2006: 80). With the term 'issue networks' Heclo (1974) indicated that relationships between actors in the policy process were more complex than suggested by the iron triangle and sub-government models. The Anglo-Saxon literature thus used the term policy network to describe and analyse different relationships between interest groups and the state (Börzel, 1998: 255). In Europe, especially in the Netherlands and Germany, policy networks were conceived of as a specific form of governance, as a form of public-private interaction alternative to hierarchies and markets (ibid.). Policy networks helped to deepen the understanding of the policy process as described in theories of corporatism, interest intermediation and inter-organisational relationships (Ansell, 2006: 81).

Theoretical developments on both sides of the ocean influenced one another and led to the first generation of policy network approaches (ibid., Sorensen and Torfing, 2007: 14-16). The policy network approach has been elaborated upon by such authors as Hanf and Scharpf (1978), Mandell (1988), Jordan and

Schubert (1992), Marin and Mayntz (1991), Marsh and Rhodes (1992), Glasbergen (1995), Kickert, Klijn and Koppenjan (1997) and O'Toole (1997). The first generation was concerned with presenting and developing the policy network as a response to the growing societal complexity faced by policy makers. Although it did not lead to the development of one predominant approach, network approaches of this first generation shared a number of basic theoretical assumptions about what a policy network is. Based on a literature study, Van Waarden (1992: 32-38) identified seven dimensions to policy networks, which closely resemble the defining elements of networks as stated in Sørensen and Torfing (2007: 8-11).

1. *Actors* – A network consists of a large number of participants, called actors. The needs and interests of these actors give rise to interdependencies and thus to the networks. Actors are acting units and may be formal or informal organisations or even individuals. The actors are members of a network because of their interest in the issue central to the network. Relevant actor properties that influence the role of actors in networks are their needs and interests, the structures, capacities and resources of actors, their mandates, their role conceptions and attitudes (Van Waarden, 1992: 33). Some authors emphasise that actors do not necessarily have to engage in active participation. The network remains over a long period of time, and some issues may be more interesting to some actors than others, resulting in selected activation of the network (e.g. Teisman, 1995).

2. *Function* – Networks have a bridging function between actors, by granting or denying access to decision making and by channelling interaction. Networks enable actors to achieve goals that they could not have achieved independently. Network interactions are used to communicate, exchange information, consult, negotiate, coordinate otherwise independent action and for cooperation. Because of the enduring and reciprocal character of the relationships, it is to the benefit of all network members that interactions in networks are geared towards creating mutual trust and understanding, and shared goals.

3. *Structure* – The structure of policy networks is determined by the number of actors and the relationships between them. Relationships between actors are not one-sided, with one actor dependent on another, but reciprocal, that is, actors are mutually dependent. They need each other's resources and collaboration to achieve their goals. The problem-solving capacity in the network is dispersed amongst the actors in the network that – at the operational level – act autonomously. Even in the case of hierarchical superiority, actors may find themselves dependent upon subordinate actors, for example because their collaboration is needed for implementation. Networked relationships are thus more horizontal than vertical. The resource dependencies have given rise to

an enduring pattern of interaction amongst stakeholders, that is, the actors playing a role in the policy process and affected by it. Patterns of interaction usually exist over a lengthy period of time. They are centred on a certain policy issue and are concerned with multiple policy problems that arise within this issue. Networks are self-regulating entities. Although they exist to produce a public purpose, public policy or public management in a certain area, they are not governed by a hierarchically superior actor.

Characteristic for networks is that the structure, the network of interdependent relationships, is relatively stable but there may be changes over time. Actors may enter or exit, may become more or less strongly connected, interdependencies may change, relationships may change from conflicting into competitive or cooperative, etc. Network membership may be voluntary or compulsory, depending on the role of the actor in the issue central to the network.

4. *Institutionalisation* – By definition, networks are characterised by institutionalised interdependent relationships from which interactions arise in the form of negotiations, conflicts, cooperation, etc. The stability of the interdependencies is the basis of the network. The degree of institutionalisation might differ per network. Emerging networks in the process of institutionalisation are still exploring the interdependencies, setting boundaries and developing behavioural codes. Well-established networks are characterised by a high degree of institutionalisation, implying highly stable interdependencies and predictable participant behaviour. Strongly institutionalised networks are closed, with high entry and exit barriers and relatively little room for new issues or perceptions. More open networks have more fluent boundaries (Esselbrugge, 2002). Highly institutionalised networks therefore produce highly predictable policy processes, but are less open to policy change.

5. *Rules of the game* – The rules of the game, or codes of conduct, are shared rules for interaction and are also known as institutions. Weimer defines the rules of the game as "fairly stable sets of commonly recognised formal and informal rules that coordinate or constrain the behaviour of individuals in social interactions" (Weimer, 1995: 2-3). The rules are social conventions that stem from the more general and political culture in which the network is situated. Rules are influenced by such issues as the role perceptions of actors, attitudes, and personal interests, as well as professional and educational backgrounds. The rules are inter-subjective, shared by network participants who, by acting in accordance with the rules, confirm and reconfirm them time and again. Rules of the game do not determine policy processes, but they can be very influential (cf. Ostrom, 1990). For example, rules may form an entry barrier to the network and the policy process evolving in the network. Especially when many of the rules are informal, it is very difficult for new entrants to

act according to the codes of conduct, which may soon result in misunderstandings, conflicts and distrust.

6. *Power relations* – Power is an important aspect of the interdependent relationships constituting networks. Interdependencies are influenced by the formal and informal powers of actors, such as power resulting from authority, and hierarchical and legal power. Actors can try to manipulate power relationships, for example by seeking allies and by forming coalitions.

7. *Actor strategies* – Actors need to cooperate in networks to satisfy their individual and common interests. In interaction processes, actors try to tune common interests to individual ones and vice versa. To do so, actors develop strategies to serve their own interests and try to anticipate the strategic behaviour of other actors. This gives the policy process a highly strategic character, which may affect policy outcomes and the network structure (Marsh, 1995; Daugjberg and Marsh, 1998). Strategies may aim to influence the actions of other actors directly or indirectly. Communication strategies, based on argument and persuasion, are examples of strategies trying to influence actor behaviour directly. *Structuration* strategies are those that try to exert indirect influence on actor behaviour by modifying the network characteristics. For example, actors can try to change the interdependencies, the participants, the roles of participants, the rules of the game, etc. In practice, the term strategic behaviour has acquired a negative connotation, resulting from the assumption that actor behaviour is driven by self-interest and is thus inappropriate for serving public policy goals (Kuit, 2002: 20).

These dimensions together constitute a definition of policy networks. The characteristics of policy networks mentioned above result in an approach that Klijn (1996) says "characterises the policymaking process as a pattern of interaction amongst a stable constellation of actors in a policy subsystem that is involved in making decisions in a special area of public policy" (Klijn, 1996: 33). The interactions amongst actors are influenced and structured by institutions, the formal and informal rules of the game, but are not determined by them. Policy processes are shaped in the interactions amongst actors in networks. In spite of this widely supported definition of policy networks, there is no single, dominating policy network approach. There are various approaches, each putting different emphasis on different parts of the policy network and how they influence policy processes, just as that policy network may appear in a wide variety of forms (Robinson, 2006; Ansell and Gash, 2007).

Analytical refinements

Policy network approaches have been applied many times in empirical research, and they have often been used to deliver a comprehensive descrip-

tion and analysis of single case studies. These empirical studies, the operational difficulties they ran into, and the criticism formulated in response, led to some theoretical refinements.

■ *Policy processes evolve in rounds with temporary outcomes* – Due to the influence of actor strategies and network dynamics, policy processes evolve in an unstructured and chaotic way, with stagnations and breakthroughs. The processes evolve in rounds rather than in linear, staged processes with clear beginnings and endings (Teisman, 1995). Policy outcomes are therefore temporary results at specific moments in time.

■ *Arenas are the locus of action in networks* – To add nuance to the stability and closed nature of networks, a distinction can be made between policy subsystems or networks and policy arenas (e.g. Klijn and Koppenjan, 2004). It shows that interdependencies between actors are not restricted to a single issue or moment in time, and that involvement in issues addressed in a network and network membership do not necessarily overlap. Not all problems in a certain domain require the active participation of all actors in the network, and also, many problems transcend the boundaries of networks; for problem-solving actors from different networks have to collaborate.

With the growing complexity of problems, the networks of interdependent relationships have become more complex. Networks are not mutually exclusive; actors can be included in two or more networks at the same time (Termeer, 1993). Likewise, policy problems, or various aspects of them, are subject to policy processes in more than one place and at more than one moment in time. The locus of decision making is difficult to trace with the concept of policy network (Jordan and Schubert, 1992). To make a distinction between long-lasting relationships between actors concerning a certain issue and the temporary actions they undertake to resolve a particular part of this issue, the concept of policy arena was introduced to describe the virtual places where policy problems were addressed (Klijn, 1996).

Actors can simultaneously participate in multiple arenas. In addressing a problem, actors meet each other in more than one setting where they deal with different aspects of the problem. Actors may also meet again in the future, about the same issue or other issues, and the multiple interdependencies will influence their behaviour (e.g. De Bruijn and Ten Heuvelhof, 2000).

■ *Actors are members of policy networks and professional communities* – Another interesting distinction between policy networks and policy communities shows that actors not only participate in policy networks, but they are also part of a community based on shared professional interests; a distinction that shows that actor behaviour may be influenced by interdependencies in various places (Howlett and Ramesh, 1998). Especially when an issue has substan-

tively high complexity, experts or professionals involved in policy processes are not only members of policy networks, but also of professional or expert communities (Jordan and Schubert, 1992).

Conclusion

First generation policy network approaches led to a more profound understanding of today's policy processes. Especially when policies are concerned with ambiguous and contested problems, the policy network may be difficult to distinguish since the problems surpass the boundaries of a single network. The distinction between policy networks and policy arenas gives the policy network approach opportunities to include the dynamics and the complexity of these policy processes. It shows how different aspects or dimensions of the problem are addressed in different places in different constellations of actors, and how these processes are connected through the membership and participation of actors in multiple networks, including professional communities and arenas.

3.6 Towards prescription: governing network governance

From the 1990s, the normative or prescriptive dimension of policy network approaches began receiving more attention, leading to a second generation of studies on policy networks. In the first generation, the policy network approaches matured to the extent that they were taken seriously (O'Toole, 1997); they had provided a proven framework for identifying the existence of policy networks and for analysing their main characteristics. This brought the policy network approach to the point that it became interesting to find out more about the functioning of networks. This understanding of policy networks, including questions about their formation, how they develop, the conditions for their success or failure, and how these networks are governed, formed the subject of a second generation of policy network research (Sørensen and Torfing, 2007: 14; Provan and Kenis, 2007). This second generation of policy network approaches was thus concerned with questions of meta-governance, of governing the self-governing networks.

The second generation network studies were also a response to the weak spots of policy network approaches and questioned especially their explanatory value. The approach has been criticised for being limited due to the fuzzy informality of network models, that is, they include many variables, the relationships between these variables are recursive, and it is unclear whether the variables are endogenous or exogenous. It has also been accused of lacking parsimony, that is, one cannot predict which variables are most important and under what circumstances (Lester and Bowman, 1987: 732; Dowd-

ing, 1995, 2001). Another point of criticism was that the approach was too strongly focused on continuity and stability instead of change (Dowding, 1995: 137; Marsh and Rhodes, 1992: 260; Marsh, 1998: 11-12, Pemberton, 2000: 774). Change in both networks and in policy outcomes is considered to be brought about exogenously (Salancik, 1995; Dowding, 1995, 2001; Blom-Hansen, 1997; Börzel, 1998; Marsh and Smith, 2000, 2001).

As they matured, policy network approaches tried to counter the criticism by paying explicit attention to the question of how to govern networks. These meta-governance questions built on two prescriptive notions derived from the first generation. The first is the preference for consensus-oriented decision making (e.g. Bogason and Toonen, 1998; Glasbergen, 1998). This preference does not imply that conflicts should be avoided, or that consensus is always achieved. It is used to indicate that the premise of a policy network is to deliver public purpose and this needs – because of the resource dependencies – some level of agreement between the members of the network (Ansell and Gash, 2007).

The second is the preference for reflexive rationality (e.g. Sørensen and Torfing, 2007: 12). The hierarchical model makes use of substantive rationality to define the desired policy outcomes and monitor and enforce state regulation. The market model makes use of procedural rationality to govern competitive market regulation. The policy network approach aims to resolve problems through reflexive interaction between actors. In the absence of agreement over the substance of the policy problem, procedural arrangements should avoid promoting a particular substantive point of view, and instead should facilitate and stimulate substantive deliberation about the policy problem, resulting in an agreed upon definition of the policy problem, which can include the solution that actors 'agree to disagree' (De Bruijn *et al.*, 2002).

Reinicke summarises the advantages of both preferences as follows: "The value of a consensus-building network rests not on its ability to offer quick solutions, but on its creation of an environment that enables parties in conflict to reach an eventual agreement." (Reinicke, 1999: 46). The two preferences have influenced the direction in which normative prescriptions are developed. Networks should facilitate collaborative problem-solving by smoothing the exchange of goals, interests and knowledge and thus contribute to policies and decisions that adequately address the problem concerned.

By the late 1980s and early 1990s this attention for meta-governance of networks had resulted in strongly managerial guidelines for policy design. In his book *Does social science matter?* Flyvbjerg (2001) uses the Aristotelian concept of *phronesis*, which can be understood as prudence or practical wisdom, to emphasise that the strength of social sciences is not in the formulation of explanatory and predictive theories, but in the reflexive analysis and discussion of values and interests which he considers to be crucial for the development of an enlightened society, in addition to the epistemological and tech-

nical knowledge developed by natural sciences (Flyvbjerg, 2001: 2-3). As practitioners of an applied science, policy scientists can therefore be better positioned as *reflective practitioners* than as neutral observers (Rein and Schön, 1993). Policy network authors were also attracted to the concept of the reflective practitioner. Grounded in the empirical reality of policy making, as both policy analysts and policy advisors, they added prescriptive dimensions to the policy network approach.

Initially, prescriptions focused on the structural characteristics of policy networks and how policies could be influenced by changing the network structure. This form of governance was referred to as *network management*. In the late 1990s the focus was broadened from the influence of the structural constellation of policy networks on policy to the processes that took place within these structures. The processes of interaction, negotiation and decision making could also be influenced by the design and management of the policy process, and this form of governance was called *process management*. Network management and process management are closely related activities with fluid boundaries, and are often used in synergy. For example, the creation of a platform for interaction and decision making between actors on a specific issue is a combination of network and process management strategies, having both structural and procedural implications.

In the mid-2000s characteristics of network structure and process characteristics were used to distinguish different types of network configurations and to link these configurations to the effectiveness of the outcomes delivered by policy networks. These developments in meta-governance, the governance of networks, are presented in the remainder of this chapter, followed by a discussion on the usefulness of policy network approaches for this research.

Network management

Network management, also referred to as network constitution or network structuration, concerns activities that aim to establish enduring changes to the characteristics of policy networks (e.g. Klijn, 1996: 76; De Bruijn and Ten Heuvelhof, 2000). Organisations, especially public ones, tend to solve their problems by modifying existing structures (Van Waarden, 1992: 37). By changing the setting in which policy processes evolve, network management can influence these processes. Structural changes of the network may involve changes in the interdependencies amongst actors in the network, changes to the rules of the game, such as changes to network entry or exit barriers resulting in a changed actor constellation, and changes to the roles of the actors in the network. For example, the process of privatisation and liberalisation of the Dutch social housing market changed the interdependencies between social housing associations, the Dutch Ministry of Housing and municipal and provincial governments; a drastic network change which resulted in a long search for the actors in the network to identify their roles and responsi-

bilities in the new setting (Haffner, Elsinga and Wolters, 2005).

Another example of network management is when one actor insists on the collaboration of other parties, for example by demanding a single representative organisation to negotiate with. There is an abundance of examples of central government organisations demanding one negotiation partner from private industry, which, for example, was the case with the covenants between the Dutch government and the packaging industry on the reduction of packaging material, but there are also examples where private industry forces government organisations to cooperate. An example of this is the pressure Dutch industry placed on central government to allow application for various environmental permits in one request, which in turn forces the various responsible government organisations to cooperate and coordinate their tasks.

Besides changing the structural network characteristics, network management strategies can also be aimed at using these characteristics, thus turning them into an opportunity instead of a barrier to intervention. For example, one way of dealing with actors unreceptive to government interventions is to stimulate them into taking up a form of self-governance, or to turn to a system of performance measurement. In this way, actors need only open up to the extent required to account for their performance.

Process management

Process management is concerned with facilitating the processes of interaction and negotiation amongst actors involved in policy processes in a particular arena or network, processes in which actors can develop a shared understanding of the problem and solutions by exchanging and bringing together knowledge, ideas, experiences and resources. The communicative turn in planning and decision making can clearly be recognised in process management. This turn in thinking on planning and decision making arose in the 1990s, in response to the continuing domination of the rational paradigm in planning and decision making. The communicative turn suggests that action is based on collaborative processes of knowing, discussing and deciding; processes in which such concepts as meaning, giving, argumentation and reflection play important roles (e.g. Forester, 1989; Healey, 1996). It shifts the attention from decisions to interactions as the focal object of analysis (Alexander, 1996: 51-52).

Process management is based on a reflexive rationality in contrast to a substantive or purely procedural rationality and aims to structure and facilitate the process of exchange of information and knowledge, of opinions and views, of goals and interests, resulting in interaction, negotiation and decision making. Process management is typically concerned with questions of participation (who should be involved in the process), of agenda-setting (how can the involved actors decide on the agenda), of developing an appropriate path for decision making (timing) and with developing a shared understanding of

Table 3.1 Assumptions of traditional problem solving approaches and process management (based on De Bruijn *et al.* 2002)

Factor	Traditional problem-solving methods	Process management
Relationships	Hierarchical	Interdependent, network
Decision maker	Single actor	Multiple actors
Problem analysis	Represents a single value	Represents multiple values
Decision-making process	Stable, predictable (e.g. participants and perceptions are stable)	Dynamic, unpredictable (e.g. changing participants, changing perceptions)
Course of decision-making process	Linear, structured	Rounds, unstructured
Goals and targets	Predefined	Emergent, definition of goals and targets is part of the process
Decision	Selection of best alternative	Result of interaction and negotiation process
Assessment criteria	Objective and are defined prior to decision making	Inter-subjective, i.e. shared by participants, and emerge during the decision-making process
Information	Neutral and objective	Coloured and can be used strategically by participants
Knowledge	Authoritative	Contested, to be negotiated
Tools	Decision Support Systems, models, databases, simulations, etc.	Workshops, games, expert panels, etc.

Source: Bots *et al.*, 2005: 23

the problem (framing) (e.g. De Bruijn and Ten Heuvelhof, 2000; Snellen, 1987; Termeer, 1993).

To explain and position process management, it is often contrasted with other management approaches based on a rational or single-actor paradigm of decision making (De Bruijn and Ten Heuvelhof, 2002). *Project management*, for example, assumes a control over the decision-making process that makes it possible to achieve fixed objectives within given budgets and schedules; a form of control that does not exist in a networked situation. Likewise, a *command-and-control* approach to decision making assumes that goals can be prescribed and enforced, which in the case of contested problems is particularly problematic. Table 3.1 contrasts process management with traditional problem-solving approaches.

The table shows that a process-managerial approach to problem-solving is better able to deal with the ambiguity of a contested problem and the multi-actor context in which it could be addressed. Network management and process management can be regarded as prescriptive answers to the question of how to intervene in complex policy processes.

3.7 Promises and pitfalls of meta-governance

Of course these forms of meta-governance of networks are not the definitive answer to the question of what a prescriptive account of policy network approaches should look like. The approaches have their advantages, as well as

their pitfalls. These are discussed now, followed by an account of the rules for actor behaviour developed in response to potential drawbacks. The section also includes a reflection on the role of a specific actor: the process manager, and ends with an account of recent theoretical developments of governance.

Advantages of network management and process management

Several advantages of network management and process management have been identified by various authors in the learned field of policy networks (Teisman, 1997; De Bruijn *et al.*, 2002; Edelenbos, 2000; Klijn and Koppenjan, 2004). The overall advantage is that network management and process management create support for the decision-making process and the decisions made during this process when actors, direct stakeholders and actors whose interests are indirectly affected feel that their interests have been seriously addressed in the decision-making process. This does not necessarily mean that their interests have been protected or served. It might very well be that certain interests, after careful deliberation and perhaps fierce debate have been set aside to the benefit of other interests, but as long as this is done prudently, it is considered likely that actors will respect and accept the outcome of the process, even if they do not agree with it.

A process in which a variety of interests is represented contributes to the quality of decision making, in terms of (De Bruijn and Ten Heuvelhof, 2000: 86-87):

- Democratic legitimacy of decision making, because affected interests are represented in the process.
- Increased support for the decision-making process and the decisions made, because decision making takes place in a prudent process. At the same time this might lead to a reduction or to the depolitisation of conflicts, since the process involves an open approach to different policy alternatives and emphasises procedural rationality instead of gearing towards specific substantive solutions.
- Enriched decisions, because the problem is considered from different points of view and various sources of knowledge contribute to the development of a solution to the problem.
- Reduced uncertainty, because the process enables actors to exchange and confront different sources of knowledge and points of view which allow participating actors to develop a better understanding of the problem and of the uncertainties involved.
- Increased transparency of decision making, because the process design, to a certain extent, structures the decision-making process and the roles of different actors in this process.
- Incorporation of dynamics: the dynamic character of policy making, for instance the development of new policy alternatives, the availability of new information, the entry and exit of actors, stagnations and breakthroughs in

decision making are all made part of the process and thus become less of an external disturbance to the policy process, which gives actors less reason for opportunistic behaviour.

Pitfalls of network management and process management

Besides the advantages, there are of course some pitfalls to network management and process management. The first is the risk that the overemphasis on communication and interaction leads to a far-reaching uncoupling of procedural rationality from substantive rationality, which can result in decision-making processes in which communication and interaction become the ends instead of the means of solving a particular problem. A second pitfall is that processes become unnecessarily complicated and time-consuming, setting up communication circuses that put a heavy charge on the willingness of actors to cooperate and commit to the policy process. Process management is needed in processes that suffer from some form of polarisation and stagnation to create a sense of urgency for actors to participate in a process without fixed schedules and goals. Without this sense of urgency, process management is not likely to result in fruitful results. A third pitfall is the risk of processes leading to sub-optimised solutions or, worse, to negotiated nonsense instead of negotiated knowledge, for example, when the result of the process does not solve the problem which started the process. A fourth pitfall is when a process is used by actors to slow down decision making or to further their own interests at the costs of others'. During the process, actors might turn to all sorts of strategic behaviour.

To avoid these pitfalls, several rules have been formulated for process design and process management, as well as for actor behaviour in the policy process, including for the role of the process manager in the policy process.

Rules for actor behaviour in decision-making processes

A 'good' process must meet certain conditions and requirements concerned with prudence and codes of conduct in interaction processes. Jordan and Richardson discuss the *logic of negotiation* and identify factors that encourage a strategy of mutual cooperation, which involves both sides avoiding making demands that go beyond possible resolution by bargaining. Instead, both sides should attempt to keep away from the complications of party political agendas and avoid making demands that the other side cannot meet (in Jordan and Schubert, 1992: 16). Following this logic of negotiation De Bruijn, Ten Heuvelhof and In 't Veld (2002) define rules for actor behaviour that warn actors not to make demands that endanger the core values of other actors, not to mingle in the internal affairs of others, and instead call upon actors to respect each other's autonomy and sovereignty.

The logic of negotiation also includes the tendency of actors to favour and structure stable relations, and it can be compared to a market where it is more

favourable to deal with known suppliers (Jordan and Schubert, 1992: 16). Van Waarden takes this point further by explaining the emergence and need for networks by using Williamson's *transaction costs* theory (Van Waarden, 1992: 31). Klijn and Koppenjan also refer to such transaction costs concepts as sunk costs, opportunity costs and path dependency to explain the institutionalisation of interactions (Klijn and Koppenjan, 2004). Complex and especially contested policy problems are addressed in policy arenas which involve actors from various networks possibly interacting according to different codes of conduct, which can be a source of misunderstanding, conflict and distrust. It takes time for actors to get to know each other and develop shared rules for interaction (Lundvall, 1992). Investments made in establishing shared codes of conduct can be considered as sunk costs, and for this reason actors may prefer to interact with 'familiar' actors, which may lead to the exclusion of others.

Reciprocibility is another concept that has influenced the identification of rules for actor behaviour in policy processes. In determining their behavioural strategies, actors should bear in mind the interdependent and enduring nature of their relationships. Opportunistic behaviour can lead to distrust and can obstruct decision-making processes in future when actors meet again or it can interfere with policy processes taking place in other arenas. De Bruijn and Ten Heuvelhof (2000) therefore point to the importance of the prudent management of situations with winners and losers.

The role of the process manager

Network and process management are not privileged activities. All actors may employ network and process management strategies in an attempt to create conditions favourable to the furthering of their own goals and interests in various ways, for example, by increasing or avoiding power and responsibility, by reducing or increasing uncertainty and risks, by decreasing or increasing one's own autonomy or those of others. In interaction processes, actors may show opportunistic or strategic behaviour, employ hidden agendas or show discrepancies between intentions and actions. Instead of putting a normative judgment on such strategies and behaviour, a process design should anticipate such behaviour, for example by agreeing on rules for prudent behaviour and by creating commitment to the process.

Besides the opportunities of all actors to influence processes, process management literature assumes a central process manager to bring actors together and facilitate the interactions and negotiations. The role of the network manager or the process manager seems to be inspired by the roles of the policy entrepreneur (Kingdon, 1984; Baumgartner and Jones, 1993) and the policy broker (Sabatier, 1987) and is to some extent comparable to the role of the change agent in innovation literature (Rogers, 2005).

The essence of the role of the process manager is that the person or persons performing the job should have highly developed diplomatic skills and political

feeling for opportunities that might arise or can be created in policy processes. Which actor performs the role of process manager depends on the policy issue and the actors involved. Because of the conflicting nature of decision making, it is important that the actual person performing the role of process manager is accepted by all parties. Often, the role is performed by one of the key stakeholders for whom progress in decision making is crucial. When it concerns public policy problems, it will often be a government organisation or a public agency who takes on the role. An actor can decide to let a person from the own organisation act as process manager or can hire someone else to do the job.

In their typology of governance of network governance, Provan and Kenis (2007) distinguish several forms of brokerage. When the number of participating actors is limited, when they trust each other and when there is consensus about the goals, a network can do without brokerage. However, when the number of participants increases, this will have consequences for the level of trust and goal consensus amongst participants, while the workload for maintaining the network will increase, and skills are needed that are not present amongst the participating actors. Under such circumstances, the need for brokerage increases, and this role may be fulfilled by a lead organisation, a dominating organisation within the network, or by an administrative organisation established for managing the network.

Meta-governance is thus dependent upon the situation at hand. In addition to the above-mentioned network characteristics that influence the governance of networks, Ansell and Gash (2008) conclude that it is also important to pay attention to the power imbalances in the network and the history of the collaborating actors. Process management can range from facilitative, to mediation and intervention. When power imbalances are stronger, the network needs stronger leadership and process managers must intervene in a more direct way to shape the agenda (ibid.: 12). When there is a prior history of antagonism and conflict, with participants unable to escape a vicious circle of suspicion, distrust and stereotyping, process managers should especially invest in building trust and social capital among the participants (ibid.: 11).

The above discussion of meta-governance underlines that governing networks is a delicate activity that can be designed, but that also needs to be performed by persons highly skilled in diplomacy. At the same time, when process management is delegated to a specific person or organisation, this does not imply that other actors must or will refrain from trying to influence the network and the process. Networks will always be in motion and with these dynamics, actors are likely to make use of opportunities to influence the network to their benefit.

Meta-governance of networks

In the 2000s, the prescriptive developments evolved to the point of asking the explicit question of how self-regulating networks should be regulated or gov-

erned. Whereas first generation approaches showed enthusiasm for policy networks as an alternative form of governance to hierarchies and markets, second generation approaches address the concern that governance through policy networks does not necessarily lead to policy success. Networks are not, by definition, effective and efficient forms of governance. This has led to the study of the political and institutional conditions under which specific forms of network governance are successful (Sørensen and Torfing, 2007: 15). Some authors have already started to address this meta-governance question.

For example, Provan and Kenis (2007) have tried to link the governance of networks to network effectiveness. Their typology of meta-governance is based on contingency: the way a network is governed should depend on the characteristics of the network (such as the number of actors, their interdependencies and the level of trust between them), the extent to which there is consensus on the goals the network aims to achieve, and the extent to which they are in need of a governing actor or 'network broker' to deliver the goals. Klijn and Koppenjan (2004) are more oriented towards institutional design. They conceive meta-governance as a deliberate form of guidance, not control, of processes in networks (Klijn and Edelenbos, 2007: 200). One of the important instruments for actors to guide such processes is the creation and change of the rules of the game, the rules that guide actors in the processes of interaction, negotiation and decision making (Klijn and Koppenjan, 2004). Also the game itself can be subject of change. O'Toole (2007) points to the special role that governments can play in this form of meta-governance. By formulating policies, they can help to support or facilitate networks in their delivery of public purpose, for example, by linking, segmenting or disconnecting the different games that are played in a network, or by influencing the preferences of actors by using a mixture of persuasion and incentives.

In the years to come, a considerable part of the research agenda of policy network approaches will be consumed by developing this meta-governance aspect of policy networks. This will lead to new studies, but numerous empirical case studies, often single cases documented in the past in many European and North American countries can also be used (Sørensen and Torfing, 2007).

3.8 Conclusion

In the 2000s, some thirty years after the first notions that policy processes were perhaps not as rational and straightforward as presumed, policy network approaches are more than ever alive. They have altered the thinking about how society is governed and the role of policy making therein. Policy making is no longer an activity carried out by a hierarchically superior government, but rather a process of interaction and negotiation amongst mutually dependent actors who are forced to collaborate if they want to achieve

any one of their goals. However, developments in thinking about network governance show that opportunities for government to influence these network processes have not disappeared. Hierarchical opportunities to intervene have been replaced by opportunities to govern networks, and although these opportunities are not a state privilege, non-state actors often lack the urgency or resources to make use of these opportunities.

The ability of policy networks to deal with multiple actors negotiating goals makes this approach suitable for use in this study, which aims to evaluate and improve policy making for the contested, multi-actor problem of sustainable development. Although progress in theory development of policy network approaches has soothed some of the criticasters of policy networks, some questions still need further elucidation before the approach can be used for the empirical analysis in this study. These questions concern the ability to bring about change from within networks – we do not want to wait for a crisis or natural disaster to force change in our behaviour – and the formulation of evaluation criteria: how to judge if a policy outcome is good? The next chapter shows how these issues have been addressed in policy network approaches, and this knowledge will be applied to construct a framework for evaluation suitable for use in this study.

4 Evaluating policy networks: an evolutionary perspective on learning

4.1 Introduction

How can the processes and outcomes of policy networks be evaluated? When are processes and outcomes of policy networks 'good'? Criteria for success and failure are difficult to establish for ambiguous, multi-actor problems such as sustainable development. When have policies contributed to sustainable outcomes? Depending on the goals and points of view, different actors will judge results differently. Policy network approaches are still struggling with this challenge. Evaluation is not just complicated because of the multiple perspectives to sustainable development, the problem that this study is concerned with, but also because the substantive knowledge of the problem, as used in the different perspectives to the problem, is uncertain, contested, and in development. To complicate things further, policy problems like sustainable development are not restricted to one network or addressed in one place. Instead, they are addressed in multiple arenas at a time, and actors from multiple networks participate in the various arenas.

This chapter explores how network approaches have succeded to deal with evaluation (Section 2). Learning perspectives to the policy process have been developed to include the dynamic and cognitive dimension of policy problems in policy evaluation (Section 3) but lack a clear understanding of how policy learnings leads to policy change (Section 4). To be able to use this learning perspective prescriptively, for the design of policies, policy network approaches sometimes make use of evolutionary concepts of variation, selection and/or retention (Section 5). The three concepts that together constitute evolution shed more light on how policies can support and stimulate learning and policy change (Sections 6 and 7).

4.2 Evaluation in policy network approaches

Evaluation of policy networks and their outcomes has been troublesome. Policy network approaches have been criticised for lacking substantive criteria to evaluate policy success (e.g. Berveling, 1997; Pröpper, 1996, 1997). From a rational, single-actor point of view, evaluation is rather straightforward. The formal goals of the policy, as formulated prior to the policy process, can be used to determine whether the policy has succeeded or failed, and, if considered relevant, any change of circumstances or goals during the process might be taken into account (Fischer, 1995). This evaluation takes place *ex post*; in hindsight, it assesses the outcomes of the policy.

However, in networked situations, it is often difficult to establish where the policy process started or ended and evaluation is a snapshot of a certain moment in time. The timing of evaluation is something that is often decided by the principal, sometimes in consultation with the evaluator. In addition, due to the plurality of goals and values of the actors involved, it is impossi-

ble to pick the goals of just one actor for evaluating the outcomes (Edelenbos and Van Buuren, 2005; Koppenjan, 2007). If actors had agreed upon goals, these agreed goals could have been used. However, networked decision making is also about finding out about what goals actors can agree upon. If shared goals exist, more than likely they will be the outcome of a policy process than the input of a policy process, and can therefore not be used to compare a policy issue at moment t_1 with the issue as it was before the process at t_0.

In the absence of shared participants' goals in a network it is difficult to develop a shared framework for assessment and evaluation of policies. Depending on their role, goals, background and disciplinary knowledge and training, participants will have their own evaluation criteria and methods to establish whether these criteria have been met. In addition, under the influence of new information and knowledge and changed political priorities, goals will change over time. Substantive criteria used by actors reflect policy goals at a certain time and are of little use when circumstances and even the goals themselves have changed (Fischer, 1995). How can the evaluation take account of the changing goals, knowledge and policy environment?

In the absence of useful substantive criteria, policy network approaches have developed procedural criteria to assess whether policy processes were legitimate and these criteria have also been used as a proxy for the effectiveness of outcomes. Teisman (1995) has introduced the criterion of *ex post satisfaction*. This criterion is used to establish whether the actors involved in a policy process were satisfied with the results. When these participants, representing different goals, were satisfied with the outcomes, then the policy can be considered to be effective. Also the dynamics are accounted for in this criterion. Who else but the actors involved in the process know how the goals and conditions have changed? It is assumed that these actors also weigh these contextual changes in their answer as to whether they were satisfied with the outcomes.

From a process management point of view, some conditions have been added to complement satisfaction criterion. De Bruijn, Ten Heuvelhof and In 't Veld (2002) distinguish four conditions for a 'good' process. The first has to do with the *accessibility* of the policy process. When some groups of actors were denied access, the fact that those involved actors were satisfied is of little value. Second, besides the openness of the process, the process should also be *transparent* to participants or to those willing to participate. Transparency includes the procedures to be followed, the roles played by participants, the rules by which decisions are made and how rules are agreed upon. Transparency is closely related to trust. Participants have to trust that the process is open and fair, and that it is not a cover for private backroom deals (Ansell and Gash, 2008). This will improve the legitimacy of the process and thus of its outcomes. Third, the process should aim to *protect core values* of actors. Actors cannot be asked to take part in a process that will harm their core values and

interests. This could be made explicit when the rules for interaction and decision making within a network are being formulated. Fourth, the *substantive or cognitive dimension* of policy problems should be made part of a process. Although knowledge used for problem resolution in policy networks is by definition negotiated, it should be prevented that the process results in negotiated nonsense or that relevant knowledge is left unconsidered. The inclusion of experts in the decision-making process is an example of how the role of knowledge can be made part of decision making. Joint fact-finding by participants may also be an indicator for the development or presence of negotiated knowledge.

Besides asking whether actors were satisfied, an analysis of winners and losers in a process also gives an indication of the extent to which the different goals and interests have been served in the process. This additional information will prevent two measurement problems that may occur when asking actors if they are satisfied. The first is that in retrospect actors may suggest rationalisations that mask possible loss. The second problem occurs when actors give highly diverging or inconsistent answers (Koppenjan, 2007: 183). When a process leads to mutual gains, compared to an earlier situation, or when gains and losses are more or less evenly spread over participants, processes succeed in identifying and making use of opportunities for win-wins and prevent the imbalance of win-lose results (cf. Klijn and Koppenjan, 2004). Of course these gains and losses may be spread over place and time, losers being compensated in other arenas or in future processes, which makes them difficult for researchers to establish. During the process, the chance of success can be simply improved by focusing on intermediate outcomes, such as small win-wins and strategic plans for achieving the collective purpose.

Another criterion which can be used to assess network outcomes is the achievement of *continued interactions* (Klijn and Koppenjan, 2000). This rests on the assumption in policy network theory that resource dependencies will evolve in equilibrium with coordinated resource allocation, and it is in nobody's interests to disrupt this equilibrium (cf. Howlett and Ramesh, 1998: 471). However, this by no means implies that interactions cannot be disrupted; for example, when core values are at risk it may be unavoidable that interactions are put under pressure. An interaction disruption caused by conflict may be very beneficial to show what is negotiable and what is not, and a high level of conflict may even create a strong incentive for collaboration (Ansell and Gash, 2008: 11). Continued interactions may also easily be mistaken for consensus. Overemphasis on the consensus-oriented character of decision making in networks has led to the criticism that networks only lead to time and money-wasting processes of interaction and deliberation without delivering any kind of problem resolution (Koppenjan, 2007). Also, networks do not have eternal life and may cease to exist when there is no longer a need to produce collective outcomes. However, when resource interdependencies con-

tinue to exist, actors have to collaborate to take action, and for this, they have to continue to interact.

A final evaluation criterion for policy success is when policy outcomes have been *institutionalised*; when policies have resulted in changes to the network structure, such as changes in the participating actors, in the interdependencies between actors and in the patterns of interaction. The rules of the game might also have changed. In this way, policy processes and outcomes result in lasting changes to the policy environment in which policies were designed and implemented.

However, these proxies for policy success are especially procedural. They aim to create conditions for improving the chance that processes will deliver successful outcomes. In the search for a perspective more directly capable of addressing cognition and dynamics in policy networks, many authors have turned to notions of learning. A learning perspective explicitly includes the cognitive dimension of a policy process and its substantive dynamics in the evaluation and design of policies. It offers the opportunity to pay attention to the substantive intricacies of the policy problem, which are also relevant for explaining the course and outcome of policy processes, and to the time dimension, which is particularly relevant when dealing with a problem involving contested and advancing knowledge. The next section introduces the learning dimension to policy network approaches.

4.3 Learning in policy networks

Policy learning is a theoretical approach where the focus is on cognitive factors that drive policy change. Policy learning makes it possible to include such factors as ideas and knowledge in the explanatory model of policy change in networks by coupling them to actor perceptions and preferences. By giving policy analysis, knowledge and ideas a prominent place as causes of policy learning and policy change, the policy content and role of knowledge is brought back in focus without losing the complexity of the multi-actor context, where interactions are prominent vehicles for the exchange and confrontation of perceptions (Termeer, 1993).

Many theories and approaches rest on the notion of policy learning, each having their own conception of who learns, what is learned, and what the effects of learning are (Bennett and Howlett, 1992). This book uses learning concepts that have been applied in combination with policy network approaches (e.g. Termeer, 1993; Sabatier and Jenkins-Smith, 1993; Peters, 1998; Hay, 1998). These theories are inspired by theories of the dynamics of science as developed by Kuhn and Lakatos (Howlett and Ramesh, 1998) and may even be called post-positivist in that they perceive knowledge to be socially constructed in the processes of deliberation between multiple actors (Mayer and Kleistra, 2002).

Policy learning

A similar essence can be distinguished in the writings of authors combining a learning perspective with policy network approaches. Policy learning theories are based on Heclo's notion of the policy process, which he perceives not so much as a power play, but as a process of collective puzzlement in which different groups of actors are involved in continuing analysis and deliberation in an attempt to build consensual solutions to policy problems (Heclo, 1974: 306).

Van der Knaap pointed out that policy learning "… can be understood as the processes in which policy actors strive to improve and perfect public policy and its underlying normative assumptions through the detection and correction of perceived imperfections" (Van der Knaap, 1997: 190). The human mind is used as a metaphor for learning by actors. Like the human mind, actors are considered to be capable of the process of perceiving and processing information into knowledge that is remembered and applied. All that we learn is stored in cognitive maps, frames or beliefs that structure our perceptions, which help us to make sense of what we see and tell us what is appropriate to do (e.g. Axelrod, 1973; Sabatier, 1987; Rein and Schön, 1993). Knowledge is socially constructed in processes of interaction and communication between actors. Learning in policy networks focuses on the inter-subjective understanding of the world. By communicating, actors exchange perceptions of what they think is happening. In a reciprocal process of adaptation this will result in a shared view of reality.

Policy learning refers to enduring changes of perceptions and preferences, resulting from experience, diverging or conflicting perceptions and/or new information that results in increased knowledge of the problem parameters and the factors affecting them (Sabatier, 1998: 104). Actors participating in policy processes are the agents that learn in terms of changes of perceptions, which can result in changes to policy processes and outcomes. In policy networks, interactions are considered a driving force for learning. By interacting, actors are confronted with perceptions that are different from their own and thus invite reflection and debate, which can result in a process of mutual adaptation of perceptions (Termeer, 1993; Rein and Schön, 1993).

Especially in Dutch network literature this resulted in a stronger emphasis on the consensus-seeking character of policy processes, where many issues are open to debate, including the negotiation of knowledge, and actors should negotiate till they reach agreement or at least agree to disagree. Since interactions trigger learning processes, continuation of interactions in itself is considered to be an important outcome of the process (Glasbergen, 1995; De Bruijn *et al.*, 2000; Klijn and Koppenjan, 2000). However, authors warn of overemphasising the need for consensus: the aim for consensus should not result in purposeless interactions, stalemates or 'least common denominator outcomes' (Gunton and Day, 2003; Klijn and Edelenbos, 2007).

Learning in webs of networked relationships thus typically involves the development of common ground for collective action, by converging previously diverging perceptions of the policy problem. Through processes of interaction, deliberation and joint fact-finding, actors develop a shared understanding of the policy problem and how it could be addressed.

Types of policy learning and policy change

Although it could be claimed that policy learning has an intrinsic value, there are more tangible goals of policy learning. Policies are there to make changes in the real world. Assuming that the policy problem concerned and the network environment in which it exists and should be resolved are continuously changing, policies should adapt to these changes to be or continue to be effective. When policy makers learn about the substantive and contextual changes, policy learning perspectives assume that they will change their policy as well. A strong notion of contingency and responsiveness thus underlies models of policy learning and policy change. Learning is inherently connected to change.

The roots of policy learning can be found in cybernetic control, a perspective in which policy learning is the result of feedback on the effectiveness of policies (Van der Knaap, 1997). Central heating is often mentioned as the ultimate example of a cybernetic learning system: to warm a home to a certain temperature, the thermostat turns the heater on or shuts it down until the temperature has been reached. When another temperature is desired, the temperature on the thermostat needs changing. This cybernetic learning perspective can be recognised in the different effects of learning distinguished by authors, whether they are concerned with policy learning (e.g. Sabatier and Jenkins-Smith, 1993) or organisational learning (e.g. Argyris and Schön, 1978).

Whereas the central heating example recognises two types of learning effects, some authors distinguish a third order as well:

- *First order learning* is concerned with minor changes or corrections of perceptions. In the case of policy learning, this can result in improving policy instruments or changing instrument choice.
- *Second order learning* is concerned with more fundamental changes of perceptions. In the case of policy learning this may lead to a change in the policy goals pursued within specific policy conditions.
- *Third order learning* is concerned with changes of the fundamental values, beliefs and convictions that underlie perceptions. This change is so fundamental that it is akin to religious conversion and Kuhn's paradigm shift, and thus only happens by great exception.

The terms first, second and third order learning were used by Hall (1993). Sabatier and Jenkins-Smith (1993) make a similar classification of policy learning by respectively distinguishing changes of the secondary aspects of poli-

cy beliefs, changes of the policy core beliefs and changes of the deep normative core. Argyris and Schön (1978) limit themselves to two types of organisational learning, single-loop and double-loop, to distinguish between corrective learning (first order) and more fundamental learning (second and third order). Glasbergen also uses this twofold distinction and refers to it as technical and conceptual learning (Glasbergen, 1995). Although it offers valuable insight into possible motivations behind actor behaviour, the distinction between second and third-order learning relies on assumptions that are very difficult if not impossible to measure and some authors therefore restrict themselves to distinguishing only the first two types of learning (e.g. Hajer, 1995).

Learning processes also distinguish another dimension, the subject of learning. Although the lessons apply to different domains in various learning theories (e.g. organisations, state institutions, technologies, etc.), the theories all distinguish roughly between two subjects about which lessons can be learned (Bennett and Howlett, 1992). The first is concerned with the causal relationships constituting the policy problems, and the ideas and beliefs at the base of the perceptions of these relationships. The second is about the way in which policies can be achieved, about the policy process, the process of formulating and implementing policies. Heclo classifies these two types of learning respectively as *substantive learning* and *social learning* (Heclo, 1974). Glasbergen uses the concept of social learning to focus on the interactions and communications amongst actors (Glasbergen, 1995). Klijn and Koppenjan (2004) speak of strategic learning when actors have become more aware of the interdependencies and the opportunities and constraints offered by this for goal achievement.

Social learning can be concerned with the learning process itself, such as the actors' growth of intelligence (Etheredge and Short, 1983), the growth of the absorptive capacity of actors (Cohen and Levinthal, 1990) and communicative and technical learning that respectively help actors to create a common language or tacit code that supports the learning process and helps them understand their reciprocal needs (Lundvall, 1992). Especially in literature on organisations (e.g. Argyris and Schön, 1978) and on innovation (e.g. Lundvall, 1992) the *ability of learning* to learn is explored, and questions like the organisational memory and absorptive capacity of organisations are discussed. Public policy literature also includes the ability of learning to learn, for example by giving explicit attention to the institutionalisation of evaluation (Van der Knaap, 1995) and the capability of actors to draw lessons from other situations for their own situation (Rose, 1993). Klijn and Koppenjan (2004) distinguish *institutional learning*, which reflects the ability of actors to use or develop mutual relations, rules, meanings, languages and trust that will support interactions and make interactions more stable and predictable. Cognitive and social learning by actors contributes to the building of social capital, which enlarges the institutional capacity to learn.

Summary of learning perspectives

Learning in policy networks can be summarised by four questions: who learns, what is learned, what are the effects of learning and what are the causes of learning (Bennett and Howlett, 1998; Mayer and Kleinstra, 2002).

The answer to the first question, *who learns*, is relatively simple: actors learn. Actors are the carriers of knowledge, and in this way, the learning perspective gives knowledge and ideas a central place in policy networks. However, for the effect of the learning, it is important to distinguish between lessons learned individually and those learned by multiple actors. Such inter-subjective learning contributes to the convergence of perceptions and the development of a shared understanding of a problem.

The answer to the second question, *what is learned*, is more complex. The literature makes a distinction between learning about the policy 'means' and 'ends' and between learning about policy 'substance' and 'process'. The variables distinguished in both dimensions are not entirely independent of one another; for example, fundamental learning most likely will lead to instrumental learning as well, and learning about the policy substance influences the strategies employed by actors in the policy process.

The answer to the third question, *what are the effects of learning*, follows from the second question. Learning, whether this is classified as substantive or social and whether this concerns the policy means or ends, can result in change to the policy itself, at the instrumental or at the fundamental level, in institutional change of the policy environment, and in changes of the learning capacity of actors.

The fourth and final question concerns the causes of learning. *Why have actors learned?* Based on a literature review, Mayer and Kleistra (2002: 5) distinguish four causes of learning. First, policy learning may be the result of anomalies in dominant cognitions or beliefs, or paradigms underlying existing policy. Second, it may be the result of increasing competition of plausible or acceptable alternatives to this policy. Third, conflicts between actor coalitions on beliefs, perspectives and knowledge about the causes of and solutions to problems may lead to learning and change; and fourth, mediation between various paradigms or belief systems by policy brokers or entrepreneurs.

4.4 Policy learning and policy change

The qualitative policy network approach helps to analyse and explain the course and outcome of multi-actor policy processes. Although it pays explicit attention to the multi-actor context which addresses complex policy problems, it is less capable of addressing the substantive complexity and cognitive dynamics of policy problems. A learning perspective is therefore often added to the approach. In this way, the substance of a policy problem is more prom-

inently at the centre of policy processes that take place in a complex environment. The learning dimension helps to understand policy networks as "sites for the exchange of ideas and perpetuation of social practices, which have a long impact on the content of public policies" (John, 2003: 486).

Besides a cognitive dimension, the learning dimension also brings into focus the policy process dynamics that result from interaction amongst multiple actors who belong to multiple policy networks and are active in multiple policy arenas. Learning points to absorption of new ideas and circumstances in the perceptions of actors and in the policies they pursue to achieve their perceived goals. Policy change is therefore considered an ultimate result of learning.

However, policy network approaches have often been criticised for being unable to explain change. Policy networks had limited explanatory value due to the fuzzy and informal character of network models, resulting from the focus on agents or actors, which makes it impossible to distinguish internal from external variables. It was also attacked for its focus on continuity and stability instead of change (e.g. Dowding, 2001; Marsh and Smith, 2001; see also Section 3.6). In other words, how do we know if the policy change was brought about by the policy? And with their focus on interdependencies and long-term relationships, networks have been used to model continuity, not change.

The relationship between explaining variables and policy change is a contested one in all public policy theories concerned with explaining policy change (Capano and Howlett, 2007). Different groups of theories all have their own bias. In general, a distinction can be made between two types of theories: those that focus on structure, and those that focus on agents (Mayer and Kleistra, 2002; Capano and Howlett, 2007). This focus also has repercussions for the boundaries of the policy process model, including which factors are considered to be internal or external and thus within or beyond influence of the policy makers operating with the model. In addition, it influences the methods used for analysis and the time period for which a policy is analysed. Structural models tend to be overtly deterministic in their explanations of policy change, while agency models focus on the changeability of the process studied. This makes it difficult to formulate *ex ante* propositions about how internal factors will lead policy change (Capano and Howlett, 2007). Likewise, other models explain large-scale change or, such as the network approach, focus on explaining why change is incremental. Again, the unit of analysis, the period studied and the methods used differ for the different models. The typical unit of analysis in agent-based models are the agents. These are studied in their surroundings by using qualitative approaches that can capture the full richness of variables and factors influencing the course and outcome of decision making. When the focus is on explaining large-scale changes, the unit of analysis is more focused on the structure in which the agents operate and the changes in this structure over time (ibid.).

Authors that emphasise the learning aspect in their network approach, such as Sabatier and Jenkins-Smith and their followers in their *advocacy coalition framework*, acknowledge that policy change is explained by external factors (Sabatier and Jenkins-Smith, 1993; Nilsson, 2005). The framework is capable of explaining stable periods of policy making. Once formed, coalitions seek to influence the policy process in a certain direction for a long time. As long as the glue of the coalitions holds, and the glue is formed by shared policy beliefs, that is, by shared views of policy goals, policies will develop within a relatively stable setting in a process that is characterised by continuity and incremental change. Actors in the coalition benefit from collaboration and will therefore try to avoid disruptive conflicts by suggesting radical changes. Significant policy change is therefore externally induced, by factors outside the network and beyond the influence of actors in the network, such as a crisis, a change of office in government, events in other policy networks or changes in socio-economic conditions (Mintrom and Vergari, 1996: 425).

By trying to incorporate the complexity of the policy context in the policy network approach, the policy network learning approach helps describe and explain specific policy processes *ex post* in terms that are highly recognisable for policy makers and other actors involved in the policy processes concerned. Yet that seems inadequate for delivering prescriptions for policy making in general (cf. Mayer and Kleistra, 2002). Despite the refinements and improvements of the policy network approach, the question remains whether, even when complemented by a learning perspective, this approach is able to live up to the prescriptive ambitions which may be expected from a theory. The fact that policy network authors prefer to use the term *approach* instead of *theory* already sheds light on this question. They do not try to present an all-embracing theory, but approach the policy process from a specific point of view: that of a network metaphor. They understand the processes of interaction and decision making in terms of learning within a networked environment (cf. Koppenjan, 2007). This learning process is influenced by a large number of variables, internal and external, which together explain the course and outcome of policy processes. In these explanations, dependent and independent variables alternate and change over time. Therefore 'predictions' can be characterised better as 'expectations' than as hypotheses that can be tested to be true or false, as can be done with hypotheses based on natural scientific theories.

Besides tempering the expectations of policy network approaches, authors studying learning and policy change in networks continued their efforts to improve the explanatory and predictive value of their approach; as the work on meta-governance of networks presented in Chapter 3 showed, even if this reflects an ideal that perhaps will never be accomplished in the social sciences, due to the unpredictable behaviour of humans. However, these efforts are also a response to the continuing search by policy makers for guidance in

the policy process, and policy network approaches have been widely credited by practitioners for giving valuable advice. The next sections show how evolutionary theory is increasingly being used as a source of inspiration for the elaboration of the learning perspective to explain policy change.

4.5 An evolutionary perspective to policy learning

Change and stability are central concepts in evolutionary theory, which explains biological processes. Two hundred years after Darwin published *On the Origin of Species*, evolutionary theory has become firmly rooted in our understanding of the biological world. In recent years, various disciplines have paid attention to the parallels between societal processes and biological processes. Evolutionary theory is *en vogue* in social sciences, ranging from management (e.g. Price, 1995; Aldrich, 1999) to economics (e.g. Nelson and Winter, 1982) and technology assessment (e.g. Ziman, 2000).

Evolutionary theory's long history starts with Darwin. Recent important theoretical contributions have been made by palaeontologists Eldredge and Gould (1972), who introduced the concept of punctuated equilibrium to modify the original idea that evolution was a steady process of gradual development. The development of species is a slow, continuous movement that is interrupted or punctuated by episodes of volatile change (Baumgartner and Jones, 1993). Another important contribution to evolutionary theory has been made by Dawkins (1976), the biologist who introduced the idea of the selfish gene to stress that the concept of survival of the fittest is about the survival of genes and not of species. Species, the living organisms, merely act as the carriers of genes. Dawkins also introduced the concept of *meme*, which can be regarded as an idea carried by such information carriers as the mind (John, 2003). These ideas enabled the drawing of parallels between biological evolution and cultural evolution, and opened the doors for many other disciplines to use evolutionary theory as a source of inspiration.

For example, in public policy, the punctuated equilibrium model was soon picked up by scholars who were struggling with the question whether sudden large-scale policy change existed by itself or whether it was the sum of a long process of incremental change. Whether change is evolutionary or revolutionary is a central theme in public policy. The punctuated equilibrium model showed that defenders of both models were to an extent both right (Robinson *et al.*, 2007). The policy process can be viewed as one in which relatively long periods of stability and continuity, in which actors work towards a sort of equilibrium through mutual adjustment of perceptions and goals, are alternated with relatively short periods of dynamic change, in which relationships are redefined, roles are repositioned and resources are reallocated (Mintrom and Vergari, 1996: 425).

Over the years, evolutionary theory has developed into a large and consistent constellation of theoretical concepts and mechanisms to explain the processes of development and change in populations and the periods of stability and change therein; concepts and mechanisms that perhaps could also be applied to societal processes in an attempt to understand the periods of dynamics and inertia in the social world, the world of politics, of economics, of organisation, of technological artefacts, etc.

Donald Campbell, who did groundbreaking work in applying evolutionary mechanisms to processes of cultural change, captured the essence of Darwinism as *blind variations selectively retained*: "all that is necessary for a population of variable entities to evolve is (a) a mechanism for inducing variation, (b) a consistent process of selection and (c) a means for preserving and propagating the selected variants" (Ziman, 2000: 41). Whereas in biological evolution the focus is on the survival of *genes*, through processes of variation, selection and retention of the selected variety, the focus in social evolution is on the survival of *memes*, which is an information pattern held in an individual's memory that can be copied to the memory of another individual (John 2003: 493, after Dawkins). Leaving methodological individualism behind, memes can also be stored in collectives such as organisations, and in institutions as codes of conduct, rules of thumb, conventions, etc. Actors and institutions can then be regarded as the carrier of memes, as organisms are the carriers of genes, and this gives them meaning in the policy process (Dowding, 2000: 78; Ziman, 2000: 9).

The understanding of policy processes in terms of the survival of ideas and knowledge triggered policy scientists interested in explaining policy change to study evolutionary biology more closely, to see to what extent the analogy between policy processes and biological processes holds and to what lessons this analogy leads. The analogy is also tempting from the perspective of learning in policy networks. The analogous application of evolution to the change, development and survival of ideas in the policy process enables analysts to put the cognitive dimension of the policy process, in the form of concepts and ideas and information and knowledge supporting or competing with these ideas, in the centre of the analysis, while paying equal attention to the social and institutional context in which these ideas and concepts 'compete' and 'struggle for survival'. The concept of punctuated equilibrium helps to account for periods of dynamic and revolutionary change that punctuate long periods of stability in policy making. In periods of change, perceptions that have long dominated the policy process are replaced by alternative perceptions that require institutional change as well (Baumgartner and Jones, 1993: 4). An evolutionary perspective on the policy process thus covers the conceptual side of policy learning, including the attention paid to competition between various ideas in a multi-actor context, and can serve as a meta-framework consisting of underlying mechanisms to understand and explain

the policy process (De Jong and Van der Voort, 2004: 2).

The analogy between the policy process and the evolutionary process can be taken much further. Many existing theoretical concepts and approaches include aspects that remind one of evolution (John, 2003). For example, Etzioni's mixed scanning model can be viewed as an attempt to optimise generative variation and selection, Kingdon's policy streams coming together in a window of opportunity can be viewed as an exhibit of random variation and selection, and March and Olsen's logic of appropriateness can be regarded as a selection mechanism, selecting the policy alternative that seems to be appropriate to the situation at hand. This reframing of existing theories in evolutionary terms brings up the question of what evolutionary theory contributes to existing theories (Dowding, 2000), an eligible question that has yet to be answered (John, 2003; De Jong, Van Wendel de Joode and Van der Voort, 2004).

An evolutionary approach to policy processes thus provides a rich metaphor to help understand why public decisions and their outcomes change or stay the same, and differ in their effects (John, 2003: 482). An evolutionary approach to the policy process might be able to catch this process in all its complexity, being able to pay attention to stability and change, to structures and ideas, and to the complexity of the selection environment in which policies are created and implemented. John emphasises that public policy is a far more inclusive science than other social sciences and the best that can be hoped for theories is that they "generate models, which are more restricted assumptions about social and political relationships from which hypotheses can then be derived" (ibid.).

The use of evolutionary concepts in this book should be viewed in this light. The search is for a framework for evaluation and prescription for learning in policy networks, and evolutionary theory offers the concepts that can help to structure and identify old and new assumptions on how policy design can induce policy learning and policy change. In this research, the evolutionary concepts are therefore used for developing an evaluative framework which can incorporate the various notions on when policy networks developed in the past are effective in a structured way. This first requires an exploration of how variation, selection and retention has been applied to policy learning, which forms the subject of the next section.

4.6 Learning as processes of variation, selection and retention

Campbell's understanding of evolution as a process of blind variation and selective retention has been a source of inspiration for authors attempting to develop prescriptions for policy design from a policy network perspective. Variation in evolutionary theory points to the need of generative, random or

blind variation of entities. Entities, whether these are genotypes or organisms, undergo variation by mutation and recombination of characteristic traits (Ziman, 2000: 4). The selective retention of generated variety points to the retention or storage of the entity being selected, but that is capable of generating the selected variety as well, that is, the selected variety should be preserved, duplicated or otherwise reproduced so that the selected unit will appear again in the future (Aldrich, 1999: 30). Selection is at the heart of evolutionary theory. In biological evolution, selection is a process in which the entity that survives best fits its natural environment. Mutation and adaptation processes help entities to improve their fit with their environment, and thus improve their chances for selection and survival.

Applied to policy learning, variation then refers to the variety of ideas generated in the policy process, from which one or a combination of ideas will be selected. Actors can be viewed as the carriers of ideas (John, 2003: 493). The selection environment consists of institutions and actors operating within a set of networked, interdependent relationships. Those ideas that best fit the environment have a better chance of being selected. Actors have perceptions of ideas and their perceptions are influenced by cognitive factors and capacities, as knowledge, education and capacity to store and process information, but also by institutional factors such as their role, position and interests in the policy process. A strict distinction between ideas and interests is therefore not possible, since actors have perceptions of ideas and these perceptions are also coloured by the social and institutional context in which they operate.

In the past, several authors have used the concepts of variation, selection and retention to derive prescriptions for the design of policies. Van Gunsteren used the mechanisms of variation and selection to frame the governance approach to policy making by contrasting it with a rational-analytic approach to policy making, which was based on analysis and instruction (Van Gunsteren, 1985). A policy process based on analysis and instruction presumed a single actor in command and control and the presence of neutral or authoritative knowledge. Policy design was the result of analysis of the policy problem followed by instructions on how to address the problem. A policy process taking place in a multi-actor context was served more by a model of variation and selection, in which the policy design consisted of iterative steps of creating and exploring a variety of alternative solutions followed by the selection of suitable alternatives, which could then be further elaborated and investigated.

Literature on learning in policy networks continued the line of thought of viewing the policy process as one of variation and selection, and applied the mechanism of variation and selection to perceptions. The policy process could be viewed as a process of ideas competing for attention, with actors and institutions as the vehicles of these ideas. The policy process should support the generation and confrontation of these ideas and interests that would result in

a learning process between the actors involved and that would lead to both policy and institutional change.

From this normative point of view, some practical prescriptions for the design of policies and policy processes were derived. A policy process should aim to generate and confront a wide variety of ideas and interests. From these diverging perceptions a selection would be made. Instead of selecting one idea in its original form, the process should aim to generate a learning process amongst actors through the exchange of knowledge and ideas which could lead to a convergence of ideas and a shared perception of the converged ideas. In this way, variation and selection take place in iterative steps, and the processes of variation and selection can then be considered as co-evolving processes that eventually lead to the selection of a gradually agreed upon policy view.

Retention did not receive as much attention as the other two evolutionary mechanisms. When addressed, it was understood especially as regeneration, as meta-learning. Use was made of Cohen and Levinthal's (1990) *absorptive capacity* (Edelenbos, 2000), which was concerned with the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends. The absorptive capacity is largely a function of the actor's prior level of related knowledge. Besides the capacity of an actor to absorb lessons, Klijn and Koppenjan (2004) recognise such a capacity at the network level when they speak of institutional learning.

Addressing variation and selection in policy design

The concepts of variation and selection have been used for policy advice and theoretical reflections for some time now. In contrast, explicitly framing these concepts as an evolutionary perspective has happened only fairly recently and has led to more systematic attempts to explain policy change and the role of learning with the concepts of variation, selection and retention. In a special issue of *Knowledge, Technology and Policy* on evolution in administrative sciences (Volume 4, 2004) several authors applied the concepts of generative variation and selective retention to policy processes in an attempt to identify the mechanisms that trigger processes of variation, selection and retention. The contributions of Ellerman, and De Bruijn and Ten Heuvelhof take a prescriptive stance and hone in on the optimisation of variation and selection in policy processes and the prescriptions that follow from this for the design of the policy process and for actor behaviour in the process. Both articles are concerned with the question of how to generate an optimal variety for selection.

De Bruijn and Ten Heuvelhof (2004) focus on mechanisms that ensure that the policy process stores a maximum variety for possible selection. One mechanism is to include a variety of actors in the policy process, assuming that they have diverging perceptions and interests which will lead to the develop-

ment of a variety of policy alternatives. They distinguish four groups that are indispensable for the generation of variety in a policy process: (1) actors with productive power, with the resources to produce and implement solutions; (2) actors with blocking power that can obstruct decision making; (3) actors with an interest in decision making, because the decisions will affect them, but they have no means to produce or block decisions; and (4) actors with scientific or expert knowledge.

Other mechanisms to stimulate variety are formulated in the form of process arrangements, for example by distinguishing a variety of roles in a policy process by creating a space or niche for developing alternative solutions in an early stage of the process, reframing the policy issue and thus changing the problem-solving space or coupling the policy issue to other issues and thus enlarging the search space for solutions, including opportunities to create win-win situations (ibid.). Ellerman focuses on parallel experimentation instead of series experimentation as a strategy to increase variety in the policy process. Instead of the early selection of one alternative to be elaborated and refined, he pleads for parallel trajectories which develop policy alternatives that compete for possible selection (Ellerman, 2004). Teisman (1997) suggests that researchers and advisors should develop outlines of their ideas for problem resolution in a creative competition, just like architects draw preliminary drafts to convince a jury that their design is the one deserving to win the commission and be built.

With regard to the selection process, De Bruijn and Ten Heuvelhof (2004) and Ellerman (2004) pay special attention to the creation of favourable conditions for selection. For the sake of creating maximum variety, selection should be postponed as long as possible. After all, actors want to select the best alternative available. Again, process arrangements can be used to stimulate and facilitate the retention of generative variety in the policy process as long as possible. Interaction and negotiation are important instruments for selection. By communicating and negotiating, actors can explore the differences and similarities between their perceptions, the opportunities to combine and reframe their perceptions, and the boundaries of the problem-solving space.

Iterating variation and selection in policy design

Much of the advice on how to include variation and selection in policy design is thus concerned with the optimisation of iteration in variation and selection. An important benefit of such mutually evolving variety and selection is that the understanding of the policy problem and potential solutions would be improved in a process characterised by interaction and learning. Besides cognitive learning, the process would also contribute to social learning. Actors would develop shared rules for interaction and an understanding of each other's interests and values, including the no-go areas of decision making, that is, the views and solutions unacceptable to others. In this way actors could make

out the contours of the problem-solving space framing the selection possibilities. After selection, such a shared perception would stand a better chance of survival in the remainder of the policy process, because it could count on the support of actors who recognised aspects of their own ideas in it. From both the substantive and procedural points of view, iteration of variation and selection would thus lead to improved decision making (De Bruijn *et al*., 2002).

The problem of biased variation

A specific problem with such an iterative process of variation and selection is that variety and selection become highly intertwined. It can be questioned whether this strategy postpones selection or that it advances selection and thus strengthens the effects of the selection environment on the variety generated. A well-known problem of the selection environment is namely that it casts its shadow ahead and influences the variation created (De Jong, 1999). Actors behave strategically and anticipate the selection of the variety that they generate, a phenomenon known as biased variation (Dawkins, 1986). Actors learn about the ideas appreciated by the selection environment and learn how to frame an idea to improve its environmental fit. The institutional environment thus has a reductionist effect on the variety generated.

De Jong shows how the problem of biased variation becomes explicit in the methods used for selection. When different assessment methods, used to decide which policy alternative to select and retain, converge in a harmonised method, this becomes, as De Jong puts it, "a new institutional bastion which blocks the way to further innovation" (De Jong, 1999: 81). However, this convergence increases the consistency of selection, and strongly institutionalised selection methods thus increase the anticipatory behaviour of actors.

In the literature on evolutionary processes applied to biological and cultural evolution there is substantial debate on the extent to which this anticipating effect of the selection environment is consistent with the blind and random character of variation and selection (e.g. Jablonka and Ziman, 2000: 16). The dilemma is solved by acknowledging that the selection environment does exert influence on the variation generated through the lessons learned from individual and collective experience, but these lessons are not so influential that they determine the outcome of selection (Ziman, 2000: 42). For example, Lounsbury (2001) shows that different organisations come up with different solutions for the same problem, while operating in the same meta-institutional framework. The internal variety amongst actors thus causes different actors to produce a different variety, even when they operate in the same environment. And on closer look the external environment of actors also shows some differences, for example, actors may be subjected to the same national regulations, but differences in local or regional cultures may give rise to the generation of a different variety (Aldrich, 1999: 26-30).

Although not explicitly framed in evolutionary jargon, policy network

approaches also pay attention to the anticipating effects of selection in the form of *strategic behaviour*. In the literature on policy design, for example, policy makers are explicitly warned about the learning capacities of the actors subjected to their policies, and that they should anticipate strategic behaviour in the policy design (De Bruijn *et al.*, 2000). Process management literature also pays explicit attention to strategic behaviour and gives policy makers some general advice on how to cope with it in policy processes, for example, by formulating explicit rules for interaction.

Baumgartner and Jones introduced *venue shopping*, another form of strategic behaviour, from the agenda-setting point of view (Baumgartner and Jones, 1993). Contested problems are addressed in multiple, loosely connected arenas. Actors wanting to protect their interests thus face several arenas that affect their interests and selecting one or several arenas for participation is likely to be a strategic choice, assuming that resources for participation are scarce. Some arenas might be easier to access, some might be more open to certain types of argumentation, such as scientific argumentation, and others might offer opportunities for creating package deals that extend to processes in yet other arenas as well. In evolutionary terms, the phenomenon of venue shopping is concerned with actors choosing the selection environment from which they expect to benefit the most.

Addressing retention in policy design

Retention in evolutionary biology is about the preservation or storage of the selected variety in the selection environment, including the ability to regenerate, to reproduce the selected variety. Edelenbos (1999) referred to these processes as consolidation and *doorwerking*, a Dutch concept that refers to the persisting impact of decision making on a policy process and related policy processes. He mentioned the absorptive capacity of a process as a measure for retention: did the policy process succeed in storing a large variety in the decisions made? (cf. Lundvall, 1992). He distinguished three degrees of absorption: complete, partial and no absorption. Thereby he catches the continuum of the extent to which the decisions embody the variety generated during the process; selection mechanisms can select either the full variety or filter it. *Enrichment* is mentioned as a strategy for policy design aimed at facilitating the retention of maximum variety: a policy process should be designed to retain the variety generated during the process as much as possible. Several methods and tools can be used to facilitate this, such as a 'live document' to track the variety generated during the process as well as interactively created assessment methods developed along the way to ensure that all of the generated variety is considered for selection (Edelenbos, 2000).

The literature on policy learning also offers concepts concerned with retention of learning (see Section 4.3). The distinction between first and second order learning, referred to as technical and conceptual learning respectively,

can be used to establish the degree by which actors have absorbed lessons and the extent to which these lessons have changed the networked, multi-actor context. Conceptual learning will involve institutional change, that is, of the selection environment, such as the network structure, interdependencies, patterns of interaction, rules for interaction, and rules for decision making. Technical learning will lead to improved decision making, but will not have repercussions for the institutional environment.

Social interaction supports conceptual learning (De Jong and Edelenbos, 2007). Viewing policies as the outcome of long and continuing processes of interaction and learning implies that actors involved got to know each other and can look back on a joint history, which doesnot mean that this history has to be without conflict. When actors are asked to judge the results, actors take the interaction process into account and are inclined to judge the result as the best that was in it (cf. Van Bortel *et al*., 2007). Policy change therefore is not likely to be put on the agenda as long as actors, perceptions and institutions remain the same. Although changes will come eventually, policy makers can stimulate change more pro-actively, by including incentives for change in policy.

In evolutionary theory, feedback loops are the necessary drivers of evolutionary learning. Evolution is a cyclical process involving more than one shot at trial-and-error. In a species, feedback on the fit between problem and solution is given through the survival and reproduction of individuals. In policy learning, such feedback loops are needed to provide information on how the policy works, what the effects are, direct and indirect, intended and unintended, etc. Policy designs should therefore include loops for evaluation at various *ex ante* and *ex post* points in the process of variation, selection and retention. In evolutionary terms, such loops and mechanisms for feedback and feedforward can be viewed as drivers for reproduction, giving rise to new learning processes that can help tune the selected policy option to its environment and generate the new variety put up for selection. In designing feedback loops, policy makers should again be aware of strategic behaviour. Delivering feedback is not neutral, but serves certain policy ends. In a multi-actor, networked environment characterised by varying, competing and conflicting interests, it may not be in everybody's interest to cooperate in providing feedback (Schofield and Sausman, 2004: 244).

The retention of the 'reproductive' capacity of the selected variety can be considered the capacity of actors and networks to learn, the extent to which actors and networks are able to reproduce decisions while adapting to the changing selection environment, which implies that 'reproduction' is also concerned with reproducing the process by which they succeed in generating a variety of possible policy alternatives from which to select. Actors need incentives for restarting variation and selection, because once institutionalised, selected ideas will resist modification. Once a policy has been estab-

Table 4.1 An evolutionary perspective to policy learning

Learning process	Focus	Aim	Variables for policy design	Strategies to support learning
Variety of learning	Actors' perceptions	Generate variety of lessons by confronting diverging perceptions	Actor participation, roles, development paths, niches, etc.	■ Maximise variety, e.g. by including diversity of actors, specifying a diversity of roles, coupling to other issues ■ Change variety, e.g. by reframing the issue ■ Reduce variety, e.g. by uncoupling ■ Channel variety, e.g. by creating niches and parallel tracks ■ Create redundancy
Selection of lessons	Selection mechanisms	Stimulate that learning results in converging perceptions	Methods, procedures, rules, etc.	■ Postpone selection ■ Interact and negotiate ■ Iterate variation and selection ■ Enrich decision making, e.g. by selecting the variety as generated as fully as possible
Retention of lessons	Absorptive capacity of the network	Store lessons	Institutional conditions for learning	■ Include mechanisms, methods and tools for absorption
Retention of learning	Learning capacity of the network	Continue learning	Incentives for future variation and selection in policy design	■ Include loops for feedback and feed-forward in policy design

lished, actors may consider a problem to be settled and have no incentive anymore to reconsider the selected approach.

Incentives for change in policy design are also needed from the point of view of effectiveness. Policies are subject to a contingency paradox. Networked environments rather select policies that fit than policies that are disruptive. Policies aiming for big changes will be resisted and when selected, actors will work hard to weaken the effects of the policies (Smith, 2007). Built-in regenerative incentives may 'reduce' this paradoxical effect.

Besides the inclusion of feedback loops in policy design, the learning capacity of actors and networks can be stimulated, for example, by including institutions to store or process information and knowledge or by including rewarding incentives for innovative ideas or innovative forms of cooperation. After all, once perceptions have been institutionalised, there is no need for inquiry.

Summary

To summarise, an evolutionary account of policy learning is based on the following line of reasoning. Policy learning within a networked environment can be induced by including a variety of perceptions in the policy process. The assumption is that the confrontation of diverging perceptions will lead to learning. A selection is made from the lessons learned and those selected are stored in the selection environment, which can result in an improvement to the lessons learned or in a change to this environment. Such institutional changes can be concerned with an alteration in the constellation of networked relationships, such as a change in interdependencies or patterns

of interaction, but can also be reflected in a change in the formal selection procedures. Revolutionary change to the selection environment or the institutional environment is unlikely, because lessons that diverge highly from the environment are unlikely to be selected, and this is strengthened by the phenomenon of biased variety, which minimises the chances of generating deviant variety. Table 4.1 gives an overview of the theoretical accounts on how processes of variation, selection and retention can contribute to policy design.

4.7 Discussion and reflection

This chapter began with a search for criteria for the evaluation and design of policies that must be formulated and implemented in networked environments and that aim to support ambiguous, contested policy goals. Policy network approaches have developed several procedural criteria to assess policy processes. The verdict on the process sheds a light on the extent to which outcomes can be considered legitimate and effective. However, these evaluations only very indirectly measure whether the policy has contributed to a better understanding of the intricate cause-and-effect relationships that constitute the problem. A learning perspective more closely approximates the understanding of the substance of the policy problem, and it can also be concerned with the procedural and social dimensions of the policy process, which are concerned with procedures, rules, interactions, etc.

Nevertheless, learning perspectives are unclear about how learning leads to policy change. An evolutionary perspective to policy making can help to understand more about this relationship. How can policies support, stimulate and facilitate learning, and how does learning lead to policy change? Viewing the policy process as an evolutionary process generating a variety of perceptions, from which a selection is made and retained in the institutional environment, clarifies which factors stimulate learning and which factors constrain learning, and what kind of management strategies actors can use to improve learning and increase the chances that learning will succeed in conceptual policy change.

Empirical research is used to develop an improved understanding of each process of variation, selection and retention. Research shows a strong emphasis on variation as a variable for policy design, while selection and retention processes have received far less attention. One possible explanation for this focus is that variation is the process most open to manipulation by actors; especially in the design of policy arrangements it might be easier to think about who should be involved to what extent rather than try to influence the selection environment with its highly institutionalised rules for interaction and decision making. However, any variation left unselected and retained does not contribute to policy improvement. The empirical research

therefore also focuses on acquiring more insight into the processes of selection and retention and how these processes can be influenced. In this way, the research also contributes to the 'empirical filling' of the evolutionary perspective on the policy process (De Jong and Van der Voort, 2004).

At the close of this chapter, it is time for a brief reflection on the analogy binding policy to evolutionary processes and on the theoretical value of an evolutionary perspective on the policy process. A first point for reflection concerns the contradiction between evolution and design. Evolutionary processes are unintentional, while policies are designed with a clear purpose in mind. This is an essential difference between the two processes. However, both the unintentional character of biological processes and the intentional character of policy processes have been toned down. Biologists including neo-Darwinians acknowledge both that the selection environment influences the generated variety and that selection can be viewed more as a process of repetitive selection than as a one-shot process (Houkes *et al*., 2002). Likewise, the dynamics of the networked, multi-actor context in which policy processes evolve contribute to the indeterminacy of policy outcomes, and especially when policy problems are of a contested character, it is impossible to design policies based on a strictly functional account of means and ends (cf. Pierson, 2000). These less rigorous interpretations of evolution and design thus make it possible to bridge the gap between the two. In addition, it is precisely the more indeterminate character of outcomes assumed by evolutionary theory that makes it a good alternative approach to policy making, in addition to methods that base policy design on expected outcomes, causal relationships and consequential reasoning (Aldrich, 1999: 34-35).

A second point for reflection concerns the extent to which the evolutionary perspective adds explanatory value to existing explanations, a question posed by several authors (Dowding, 2000; Van der Voort *et al*., 2004). The evolutionary approach offers a general framework to understand policy change (Aldrich, 1999: 2). The value of the evolutionary perspective is perhaps not so much in the adding of new explanations but in the fulfilment of a guiding role for prescription that can be used at different analytical levels. Whereas prescriptions for the policy process have been tailored toward actor strategies or the institutional environment in which these actors operate and in which policy processes take place, the concepts of variation, selection and retention help one to get a systematic grip on the fuzzy processes by which public policies are formed and reformed and that are influenced by institutional conditions as well as individual actor behaviour.

The next chapters apply this evolutionary approach to policy learning and use it to evaluate empirical policy process. These evaluations show whether the evolutionary perspective offers valuable and new insights into how policy making for such contested concepts as sustainable development can be improved.

5 Methodology

5.1 Introduction

This chapter sets out with how the evolutionary perspective to policy learning is empirically studied. Section 2 presents the methodological choices made for the empirical research, consisting of three qualitative case studies of policies supporting sustainable built environment. Section 3 gives a short introduction to the three selected cases and the data collection methods used. Section 4 introduces the research steps undertaken in each case. These steps also show how the evolutionary perspective to policy learning is made fit to use for evaluating empirical policy processes.

5.2 Research methodology

The exploratory character of the central research question of this book, how policies for a sustainable built environment can be improved, has repercussions for the methodological choices. A literature review has shown that the policy network approach is an appropriate multi-actor approach to study the governance of sustainable development in the built environment, but there is room for improvement in this approach. An evolutionary perspective may help to refine its explanatory and predictive value, which may lead to recommendations that could help policy makers improve their policies. Empirical research should focus on filling in the evolutionary perspective to develop an improved understanding of how evolutionary processes such as variation, selection and retention can contribute to policy learning and policy change. The qualitative case study is an appropriate research methodology for this empirical work.

The case study literature mentions two situations when case study research is an appropriate methodology (Yin, 1994; Swanborn, 1996; Gordon, 2007): when the phenomenon under study is difficult to distinguish from its environment, and when the aim is to get a better understanding of relationships between variables and processes in all their complexity, instead of trying to establish relationships in if-then formulae. In such situations, case study research offers the opportunity to both study a phenomenon in its natural environment over a longer period of time and take the specific local, social and historical context into account. A case study thus processes a wide variety of information on the phenomenon studied, whilst keeping relationships between information intact.

From another point of view this methodological choice can also be justified. In the tradition of policy network research, the case study is an accepted and frequently used research method (Ansell and Gash, 2008) leading to narrative explanatory reports of the policy processes studied. A case study report presents the research findings as an epic history that can be written from a variety of perspectives. The narrative character is well appreciated

by the subjects under study, the people involved in the policy process concerned: in hindsight it helps them understand what happened in the policy process described, enabling them to reflect on their own role and that of others (Abma, 1996). In this way, case study research is a close interpretation of reality, making research findings recognisable to the subjects studied, which contributes to the acceptance of the findings. Especially for an applied scientific discipline such as public policy, in which researchers hope to make a difference or at least a contribution, this is an important advantage.

5.3 Case selection

In qualitative case study research, the questions to be answered are theoretical; the cases studied are used to answer these theoretical questions. It is therefore important that the selected cases are indeed cases of the phenomenon under study. In this research, the cases had to be policy processes that aim to support ambiguous, contested policy goals. Since this research focuses on sustainable development in the built environment it selected three processes in which policy makers aimed at contributing to a sustainable built environment. However, the cases are not representative of all policy processes supporting a sustainable built environment. The goal of qualitative case study research is not to make empirical but theoretical generalisations. In this research, generalisations should help to improve the theory of policy learning in networks instead of drawing conclusions on, for example, sustainable building (Yin, 1994; Easterby-Smith *et al*., 2002).

The three policy processes selected for the empirical research in this book were all concerned with supporting sustainable development in the built environment in the Netherlands. This brings up the question whether the results of this study are interesting for contested policy problems in other countries. Again, the theoretical generalisation can be used as an argument to plead for the relevance of the research findings for other situations. Of course, applying the conclusions in specific policy situations requires drawing an interpretation from the general findings to the empirical reality, but this is also needed for policy problems in the Netherlands. At the same time, the study of institutional barriers to a sustainable built environment in Chapter 2 showed that these barriers can be identified in all industrialised countries, which can lead to the assumption that despite the differences between countries and cultures, there may be enough similarities between policy-making environments for the built environment to justify the choice of studying cases from just one country. The three cases are briefly presented below.

■ *Case 1: Reducing diffuse zinc emissions from buildings and constructions* – Dutch water quality policy includes norms for zinc concentrations in inland sur-

face water and aquatic sediments, but norm compliance has been a problem for decades. In the 1990s, zinc and galvanised building products were identified as an important group of diffuse sources, and several governmental and non-governmental actors in the fields of water management and sustainable building initiated communicative policies to prevent the outdoor use of these products in buildings and construction, resulting in declining turnover for the zinc industry. Besides initiating these voluntary policies, the Dutch government also successfully put the zinc problem onto the European agenda by lobbying for European water quality norms for zinc.

Whether and to what extent exceeding the norms for zinc concentrations was a problem was contested throughout the policy process, in which the main antagonists were the zinc industry and national policy makers, supported by research institutes.

■ *Case 2: Stimulating sustainable building – National Packages for Sustainable Building* were developed in the Netherlands from the mid to late 1990s. The packages contained lists of measures for sustainable building for application in the design, construction and use stages of buildings and constructions. The main goals of the packages were to harmonise and disseminate knowledge of sustainable construction amongst actors in the building and construction sector.

The packages were part of the Policy Programme for Sustainable Building formulated by the Ministry of Housing, Spatial Planning and the Environment in the 1990s. The building sector took full responsibility for the development of the packages for sustainable building, and within a couple of years, they were brought to market. To stimulate the use of the packages, authorities at various government levels developed additional communicative and financial instruments. In 2000, following a change of government, the ministry decided to no longer address sustainable building as a policy issue, but concentrate on such issues as energy use and the stimulation of consumer demand for sustainable buildings. Instruments supporting the packages were abolished and the incentive for the construction sector to maintain the packages was reduced. However, in 2007, packages were still used by local authorities and included in many voluntary covenants between public or semi-public authorities and the private sector.

The extent to which the packages were 'sustainable' was questioned throughout the process, especially by outsiders not involved in packages development. Actors who were involved negotiated a joint understanding of sustainability, a trade-off between ambitions, financial costs, and the protection of competitive interests.

■ *Case 3: Restricting urban sprawl with spatial contours* – The contour policy was introduced in the 1990s by national government to restrict urban sprawl in areas considered to be of national importance. Contours were administrative borders, similar to medieval city walls, and these were mapped around exist-

ing built-up areas of cities and towns. For areas designated by national government as of national importance, provincial authorities were legally obliged to draw border lines called state or red contours. Provincial authorities could also declare areas to be of regional importance. They were supposed to control urbanisation in these areas, but there were no prescriptions for how they should do so. Provincial authorities indicated their borders with green contours.

The contour policy aimed to protect and improve the spatial quality of urban areas and the countryside. The basic assumption of the policy was that restricting urban sprawl contributed to the compact city and protected the countryside from the pressure of urbanisation. This would enhance sustainable development of urban areas as well as the surrounding countryside. For cities and towns, the sustainability benefits would be efficient land use, reduction of car mobility for city inhabitants and improved support for public services. For the countryside, the sustainability gains consisted of extensive use of land, the preservation of open areas and an increase in biodiversity.

The red or state contours resulted in conflicts between the confronted local authorities and the Ministry of Housing, Spatial Planning and the Environment that enforced compliance. Municipalities contested the assumptions of the policy stating that contours would improve such values as spatial quality and biodiversity, and that they would reduce car mobility.

Research methods

Each analysed case involved a study period of about fifteen years. Studying policy processes over long periods of time is a requirement for analysing learning processes, since learning is not something that happens overnight and it takes time before the effects of learning become visible (Sabatier, 1987).

Chapters 6, 7, and 8 analyse the cases and give a methodological account for each one. Additional information on the respondents is presented in Appendices I, II and III. In general, all three cases are based on a triangulation of methods for collection of data and information. For all cases, document analysis and semi-structured interviews with key actors provided the main sources of information. In some cases, a workshop and questionnaire was used for information gathering and reflection on the analysis. The reconstructions of the policy processes and the analyses were also discussed with some of the key actors.

The chapters presenting case studies follow the steps presented in Section 5.2.

5.4 Research steps and operationalisation

To identify how policy learning contributes to policy change, various theoretical concepts introduced in the previous chapters need to be made measurable. This starts with a concept of the policy process. A policy process refers to

a process in which public policies are made, including formulation and implementation since these aspects cannot be clearly distinguished in the empirical reality. Although processes have no clear beginning or end, the processes were studied from the moment that an important event, such as a decision, a new white paper, new or revised regulations, or changed government priorities put the policy in the spotlight. The policy processes were studied from this event, situated in the period ranging from the early or mid-1990s to 2007. This made it possible to take a long time span, ranging from ten to fifteen years, into account in the analysis. Periods of at least ten years are recommended for studying policy change (Sabatier and Jenkins-Smith, 1993). This research studied three policy processes revolving around contested problems using the qualitative case study method. The next section relates why this method was chosen and how the processes studied were selected. This section then continues by introducing the case protocol, which specifies the steps taken in the case studies, including operationalisation.

1. *Reconstruction of the policy process* – In each of the cases, the policy process was reconstructed to show how the process evolved, who was involved, what important events happened, which decisions were made, etc. The reconstruction was based on document analysis, interviews with involved actors or stakeholders, and in some cases with a workshop with actors involved in the process and a questionnaire. Some key actors in the processes were asked to review the reconstruction of the process to correct factual mistakes. Both the reconstruction and analysis were discussed with at least two or three persons involved in the process during some portion of the period studied.

2. *Reconstruction of the issues, the arenas and the networks* – Reconstruction of the course of events was followed by a reconstruction of the issues and the networked environment in which the process took place. Issue reconstruction was concerned with identifying the main issues around which the process evolved. As noted in Chapter 2, contested problems consist of many interconnected problems with many stakeholders. To develop an understanding of what the debates in the process were about, and how the various issues affected the interests of actors, the central issues in the policy debate were identified.

The next step was to identify the arenas where these issues were addressed. Because of the multiplicity of contested issues, there is no one natural place where the issues are addressed. Instead, different issues are addressed in different arenas. An inventory of key players and the issues discussed in the arena was made for each of the arenas in which the identified issues were discussed and decided upon. Also included in the inventory of arenas are their date of establishment and governmental location (local, regional, national, European level).

Once the actors taking part in the arenas were identified, the networks to which these actors belonged could be reconstructed on the basis of knowledge of the sector (legal framework, hierarchical relationships, resource dependencies, including power and financial dependencies, the culture of the sector, etc.). This was verified with the interviewed actors or those who had been on the advisory committee set up for the case studies. In addition, one case used a questionnaire to identify relationships and patterns of interaction.

3. *Analysis of the perceptions and strategies of key players* – Based on the reconstruction of the policy process, the issues, networks and arenas, the perceptions of key players with regard to the issues at stake, and whether their perceptions had changed during the process could be reconstructed. Changes in perceptions were important indicators for learning. The changes of perception were identified by the researcher and are based on the process description and its underlying documentation and interview transcripts. The same sources were used to identify the strategies that actors had pursued during the process to achieve their goals. Strategies not only tell something about the way in which actors tried to exert influence or even manage to control the process, they are another indicator for learning. Changes in perceptions likely involve a change of strategy as well. This analysis was also explicitly addressed in the discussions with some people who had been directly or indirectly involved in each of the processes studied and had been asked to review a draft of the chapter of their concern.

4. *Identifying the lessons learned* – The lessons learned were identified on the basis of the changed perceptions, but the reconstructed policy process was also scanned for lessons, such as altered understanding of issues, the availability of new knowledge, and changed priorities for actors. Each identified lesson was analysed in terms of its content: was it a substantive lesson, about the cause-and-effect relationships constituting the problem; was it about the social processes in which the problem was addressed; or was it a meta-lesson, in which actors learned about the learning process itself? Another question to be answered was who had learned the lesson? In particular, was a lesson learned by an individual actor or was the learning inter-subjective, in that it was shared by actors. After all, a networked context implies that a shared lesson will probably have more influence on the policy process than a lesson learned by a single actor. Also, the lessons were categorised by the effect they had on the policy. Did they lead to technical changes, improvements or perfections of the policy, or to conceptual changes, were the policy goals and/or the institutional environment changed because of the lessons, or did actors learn about the learning itself, meta-learning, did they learn how they could improve their learning?

Table 5.1 Categories of lessons learned in the policy processes

What is learned?	Substantive lesson: lesson on the cause-and-effect relationships in the issue concerned	Social lesson: lesson about the policy environment in which the issue is addressed	Meta-lesson: lesson on the learning process; on how to learn
What is the effect of the learning?	Technical change: improvement or perfection of the policy	Conceptual change: change of policy goals/institutional change (of network structure or rules)	Meta-learning: improving learning skills and capacity
Who has learned?	Individual actor: the lesson is learned by a single actor	Intersubjective learning: the lesson is learned by multiple actors	Meta-learning: awareness of who learns or should learn

Table 5.2 Evolutionary framework of analysis for evaluating policy

Evolutionary process	Explanation	Questions	Operationalisation
Variation	A variety of perceptions stimulates learning; policy should stimulate variety	Which variety of perceptions has the policy process brought about?	Variety of perceptions, actors, issues, networks, arenas
Selection	Policy results from a selection from the variety of perceptions generated	Which variety/lessons were selected and how were selection decisions made?	Influence of the selection environment (networks, arenas and the rules that apply within them for interaction and decision making) on policy process
Retention: preservation	Policy leads to change through institutionalisation of the selected variety	To what extent is the selected variety/are lessons institutionalised?	Change in network structure: relationships, rules, decision making methods
Retention: regeneration	Policy leads to changes in the future through the institutionalisation of incentives for the renewal of variety	To what extent does the policy contain incentives for change in policy?	Capacity for regeneration of the policy: for example, through monitoring and evaluation, incentives to review policy, expansion of 'learning capacity'

Table 5.1 gives an overview of categories of lessons learned. It should be emphasised that these are analytical categories, to be used by the researcher in search for an understanding of policy learning and policy change. In reality, the boundaries between these different types of learning are not as explicitly present.

5. *Understanding learning as variation, selection and retention* – Variation, selection and retention processes were analysed to identify why actors learned and what the effects of the learning were. Table 5.2 presents the leading questions for each evolutionary mechanism and the variables taken into account to identify these processes. The variables selected were collected from available literature on these processes (see Chapter 4). Some of the variables are still very broadly defined, but at this point in time, theory offers no clues for more specific operationalisation. Although this might lead to only a general understanding of how each of the processes influence learning, this is considered worth the effort, since this research aims to understand how the various evolutionary processes together influence policy making.

6. *Drawing conclusions* – Each case draws conclusions on how its policies contributed to learning and policy change processes, offering suggestions for improvement of the particular policy.

Outline of following chapters

The research steps presented above form the basis for the case study presentations in Chapters 6, 7 and 8. Finally, Chapter 9 compares the learning processes across all three cases and draws generalised conclusions on how policy learning, through the processes of variation, selection and retention, influences policy change.

6 Reducing diffuse zinc emissions

6.1 Introduction to the policy

Dutch water quality policies contain norms for zinc concentrations in inland surface water and aquatic sediments, but norm compliance has been a problem for decades. Zinc emissions from point sources such as the galvanising industry and sewage water treatment plants have been successfully addressed: between 1985 and 1995 it was estimated that emissions from point sources were reduced by 80%.[10] Despite these large emission reductions, zinc concentrations remained too high[11] and the water boards, responsible for norm compliance, were faced by the consequences: the costs for disposal of polluted aquatic sediments[12].

The Ministry of Water Management identified diffuse sources, large numbers of small sources emitting zinc, as the main reason why water quality norms for zinc continued to be exceeded. Zinc and galvanised building products were identified as an important group of diffuse sources, and in the 1990s, several governmental and non-governmental actors in the field of water management and sustainable building initiated communicative policies to prevent the use of these products in outdoor buildings and constructions, with a decline in the turnover of the zinc industry as a result. Besides establishing these voluntary policies the Dutch government also put the zinc problem onto the European agenda, by pleading for European water quality norms for zinc. Table 6.1 gives an overview of policy initiatives to improve water quality with respect to zinc.

The following sections provide an analysis of Dutch policies on reducing diffuse zinc emissions of building products, starting off with a reconstruction of the policy process, the issues addressed in the process and the context, the arenas, in which the policy process unfolds. The key players are identified, as well as the networks in which they participate. The analysis focuses on how the processes of variation, selection and retention have contributed to learning. The chapter concludes with the lessons learned for the design of policies that address diffuse zinc emissions.

---

10 *Nationaal DuBo Centrum, Infoblad Zink* (National DuBo Center, Fact Sheet Zinc) (http://duurzaambouwen.senternovem.nl/infobladen/5-zink_toepassingen_in_de_bouw/print.html (text edited May 9, 2005, site visited May 21, 2006)).

11 For example, in 2001, zinc concentrations still exceeded the maximum permissible risk level in 61% of the 231 locations measured, and in 93% of these locations, the concentrations exceeded the target values for the year 2010 (V&W, 2006). In 2007, norms were exceeded in almost 40% of regional waters (LBOW, 2007).

12 In 23% of the 231 locations measured the aquatic sediments were classified as class 3 or 4, 4 being the most polluted and the most expensive to dispose of (V&W, 2006).

Table 6.1 The arrangement of policies on reducing diffuse zinc emissions

Policy	Goal	Responsible actors	Affected actors
Dutch water quality norms for zinc	Protection of aquatic and terrestrial quality	Ministry of the Environment, Ministry of Water Management, parliament, advised by Environmental Research Institute RIVM	Water boards, local governments
Voluntary guidelines advising against the use of zinc in outdoor construction	Contribution of the building sector to environmental quality	Construction industry, with the consent of Ministry of the Environment	Zinc industry
Communicative policies discouraging use of zinc in constructions	Norm compliance by reducing diffuse zinc emissions	Water sector, in collaboration with local authorities	Zinc industry
Communicative policies encouraging environmental product innovations	Norm compliance by reducing diffuse zinc emissions	Ministry of Housing, Spatial Planning and the Environment, together with zinc industry	Zinc industry
European water quality norms for zinc	Protection of water quality	Ministry of Water Management, in close collaboration with the Environmental Research Institute RIVM	Water boards in Europe, European zinc industry

6.2 Methodology

The analysis in this chapter is based on a study of the zinc policy process that was conducted for RIZA, the Netherlands Institute for Inland Water Management and Waste Water Treatment. At the time this research institute was part of the Ministry of Water Management, Transport and Public Works.[13] The study includes a literature review, interviews and a questionnaire, and was carried out by Erasmus University Rotterdam and Delft University of Technology. Led by professors Erik-Hans Klijn and Joop Koppenjan, the researchers were advised by a board which included representatives of the major actors in this policy process. An overview of the research team, the supervisor and the advisory board is presented Appendix I. This Appendix also includes an overview of the persons interviewed and the publications that reported the research. An additional document study was undertaken for the reconstruction of the policy process in this chapter. A draft of this chapter was reviewed by two professionals involved in the zinc policy process: Mr. Peter Vermij of RIZA/Waterdienst (RIZA/Water Service) and Mr. Jules Wilhelmus of Stichting Duurzaam Bouwmetaal (Foundation for Sustainable Building Metals). Also professor Joop Koppenjan, who was involved in the part of the research commissioned by RIZA, has critically reviewed the analysis in this chapter. Appendix I gives more information on the research on which this chapter is based.

13 In 2007 the Ministry and RIZA were reorganised; the *Rijkswaterstaat Waterdienst* (Water Service) is especially concerned with diffuse emissions policies.

6.3 The policy processes dealing with zinc

This section reconstructs the policy processes concerning diffuse zinc emission reduction by buildings and constructions.

Declaring zinc a prioritised substance

The foundation of the policy process on the use of zinc in outdoor constructions was laid down in 1985 when zinc received political priority at the national government level. Zinc was one of the substances that continued to exceed water quality norms and it was put on the list of prioritised substances that required special attention in policy making. Each of the prioritised substances had to be described in a 'basic document', a state-of-the-art report on the problem, its causes, effects and possible solutions.

Despite the priority status, it took seven years before the basic document on zinc was published. Meanwhile, central government confirmed the urgency of the zinc problem in its 1989 *White Paper on Water Management* (V&W Ministry, 1989), which stated that zinc emissions were stabilised at an unwanted high level and the aim was to reduce all emissions, from both point sources and diffuse sources, by 50% in 1995 in comparison to the 1985 level. In 1992, the *Basic Document on Zinc* was finally published (RIVM, 1992). This report was drawn up by RIVM (National Institute for Public Health and Environment).[14]

As a state institute, RIVM's primary aim was to give policy advice to national government and one of its main clients, the Ministry of Housing, Spatial Planning and the Environment, referred to here as the Ministry of the Environment. The basic document confirmed that the water quality norms for zinc, consisting of short-term quality norms and long-term target values for surface water and aquatic sediments, had not been achieved.

Linking water quality to sustainable building

In the absence of means to enforce water quality norms, the government in the form of the Ministry of the Environment and the Ministry of Transport, Public Works and Water Management, shortened here to Ministry of Water Management, explored other ways of improving water quality and this led to source-oriented strategies: reducing diffuse sources of zinc emissions would improve water quality. They linked the source-oriented strategy to another policy process developing in parallel to the water quality process: sustainable building.

---

14 RIVM is the Dutch abbreviation of *Rijksinstituut voor Volksgezondheid en Milieu*. The institute uses its knowledge and expertise in the fields of health, nutrition and environmental protection primarily for advising the Dutch government. With its research, monitoring, modeling and risk assessment results, the RIVM acts to underpin policy at national, but also at regional and supranational level (http://www.rivm.nl/en/, July 4, 2006).

From the late 1980s onwards, professional magazines published more and more reports and articles on diffuse emissions of zinc, copper and lead that explicitly pointed to the construction sector as the producer of these diffuse sources (e.g. Kole, 1987; H_2O, 1990; Interduct, 1995; Moors *et al.*, 1995; Stoop, 1995). In the built environment, zinc is a popular construction material. It is easy to apply, protects steel from corrosion, is completely recyclable and architects like its aesthetic qualities. In Dutch construction, zinc is traditionally used for such products as gutters, rain pipes, roof sidings and roofing. However, when applied outdoors zinc products are also considered diffuse sources of zinc emissions, especially in the windy and rainy Dutch countryside, and the salt-laden rainy areas near the coast.

In 1989, the Ministry of the Environment published its first *National Environmental Policy Plan*, which announced that environmental policies would be targeted at specific groups (VROM Ministry, 1989). One of these groups was the building and construction industry, which included actors from the production and supply chain of construction materials and components, as well as the actors involved in the design, realisation, demolition, maintenance and management of buildings and constructions in built areas, such as architects, urban planners and housing corporations. The 1990 update of this policy plan included an annex dedicated to sustainable building (VROM Ministry, 1990).

Sustainable building linked sustainable development in construction with the diffuse emissions held accountable for the troublesome water quality related to zinc. In particular, the large new residential neighbourhoods together accounting for more than half a million residential units and due to be built between 1995 and 2010, presented opportunities for the design of sustainable water management systems, in which rain water runoff would directly infiltrate the soil instead of being retrieved by the sewage system. However, the water boards who favoured such systems were concerned that the rain water runoff would contain emissions from zinc or galvanised products used in construction, the use of which they considered incompatible with the use of sustainable water systems.

Discouraging the use of zinc in construction

Being responsible for water quality and the disposal cost of polluted sediments, the water boards confronted provincial and local authorities with their problem; they argued that no sustainable water management system should be used if zinc was used in construction. The Ministry of Water Management pointed out that local authorities were also responsible for terrestrial quality, the quality of the soil, in their municipality and they had to do everything in their power to keep emissions as low as possible. Many provincial and local authorities, seeing building projects in their areas as good opportunities for achieving their sustainability ambitions, were receptive to these arguments and asked property developers and constructors not to use zinc. These actors

valued their good relationship with local authorities and responded positively to this request. The positive response was facilitated by the availability of alternatives to zinc, such as PVC. As a result, the zinc industry was suddenly confronted by cancelled orders and a sharp decline in turnover.

The call to avoid the use of zinc products in construction was supported by other instruments. In 1993, a semi-government agency known as SEV[15] published the *Sustainable Building Guide*, practical advice for municipalities, full of concrete do's and don'ts on sustainable building. It too advised against the use of zinc as a building material. The guide and its successors, *National Packages for Sustainable Construction*, did not contain formal government policy, but were published with the consent of the Ministry of the Environment and were widely used by provincial and local authorities in planning and construction projects.

Water boards, local and regional authorities, and other organisations active in sustainable building or water management were all interested in the diffuse sources problem and set up working groups, conferences, and an information campaign to advise authorities, developers, designers and constructors not to use zinc in building and construction. These initiatives stressed the harmful environmental effect of diffuse zinc emissions and damaged the reputation of zinc.

Contesting the policies

Confronted with a declining market share, the zinc industry was forced to take action on the issue of diffuse emissions, an issue to which they had previously proved to be rather indifferent. After all, they had already cleaned up the winning and processing of zinc, and considered zinc a user-friendly, durable, and above all a sustainable product, since it was purely natural and fully reusable.

In a 1995 court case, the zinc industry asked SEV to alter the negative verdict on zinc in the *Sustainable Building Guide*. The court ruled that although government was legitimised to support such initiatives such as the guide, this publication should base its judgment on more objective information.[16] In response, the SEV changed its verdict from 'prevent the use of zinc' into advice on the preferential use of other products, without mentioning zinc by name. The construction industry composed the follow up to the guide, the *National Packages for Sustainable Building* and decided to base their measures

15 SEV (The Steering Committee for Experiments in Public Housing) is an independent organisation active throughout the Netherlands, which actively supports a broad range of innovations in housing and construction. SEV receives financial support from the Dutch Ministry of Housing, Spatial Planning and the Environment.

16 *Arrondissementsrechtbank te Rotterdam, Vonnis van de President in het kort geding in de zaak onder rolnummer 648/95 en onder zaaknummer 41062* (NFI/Nedzink tegen SEV), June 27, 1995 (Judgement Court Rotterdam NFI/Nedzink vs. SEV).

on Life Cycle Analysis (LCA).[17] Initially, the packages also contained negative advice on the use of zinc, but in 1997 the zinc industry commissioned its own LCA study that showed that the environmental performance of zinc did not differ significantly from the performance of substitutes like PVC. From 1998 onwards, the packages no longer contained negative advice on the use of zinc in construction products. However, in 1999 SEV and Novem[18] published the *Package for Sustainable Urban Planning*, which – without an LCA basis – again advised against the use of zinc.

The zinc industry also tried to change the norms and target values for zinc, by challenging the assumptions and methods on which they were based. The industry expected that the continued exceeding of zinc norms would be used to criticise the environmental performance of zinc. In 1995, the industry therefore decided to publish a response to the *Basic Document on Zinc* (Van Tilborg and Van Assche, 1995). In this *Addendum* it contested the contribution of zinc building products to zinc concentrations in surface water and aquatic sediments as set out in the Basic Document, as well as the method used to determine the norms. In their report, the industry presented an alternative method that resolved the deficiencies of the method in use. The controversy resulted in a 'war of reports' with both industry and government firing off conflicting reports that considered their own point of view as right and the views of the other as wrong.[19]

Communicating in a more positive tone

Publications and campaigns depicting zinc as a harmful material continued despite the efforts of the zinc industry to contest the scientific foundations of this view. The zinc industry decided to try another, more positive route as well, in an attempt to counter the negative image of zinc. In 1996, it established the Association for Zinc and the Environment, later renamed the Foundation for Sustainable Building Metals,[20] which tried to communicate a more positive image of zinc with publications, awards and conferences. Also, industry began corresponding with the Minister of the Environment on product innovations, such as the development of a coating to reduce emissions.

---

17 The first versions of the *National Packages for Sustainable Building* were published for different sectors (for domestic buildings, non-domestic buildings, infrastructures, and urban planning) between 1996 and 1999 and have been updated regularly since. See Chapter 8.

18 Novem was a joint agency of the Ministry of Housing, Spatial Planning and the Environment and the Ministry of Economic Affairs that stimulated and subsidised initiatives in the field of energy reduction and renewable energy; after a reorganisation, it became part of SenterNovem.

19 For example, the controversy was continued in the report *A further look at zinc*, published by RIVM/RIZA in 1996, which triggered the industry to publish the report *A further look at zinc refuted* (VTBC, 1996).

20 In Dutch: *Stichting Duurzaam Bouwmetaal*.

Looking for common ground

The industry also showed its willingness to cooperate by commissioning a research initiative in collaboration with RIZA, the water research institute affiliated to the Ministry of Water Management, on the facts and figures of emissions: the volume of diffuse zinc emissions and the speed of corrosion and rinsing off of the corroded material. Data on these issues provided by industry and government showed huge differences. A previous attempt to jointly commission research into this issue had failed because the commissioning parties could not agree on the research question. However, RIZA also acknowledged that it would be worthwhile to assemble more empirical data on diffuse zinc emissions. One of the recurring issues in the debate and reports was the lack of empirical evidence to support the claim that building products emitted zinc. It therefore agreed to another joint effort. This time it worked and the results were published in 1999. The research showed that the total estimated diffuse zinc emissions resulting from construction were only 3% of the estimate in the 1992 Basic Document, only 105 tons instead of 4125 tons per annum (Korenromp and Hollander, 1999). The emissions were determined not so much by corrosion speed, but the speed at which the corroded zinc was rinsed off. The findings were accepted by both commissioning parties. In 2000, this research led to a RIZA report which advised water boards and local and provincial authorities to take note of the specific local circumstances in their water quality policies, such as differences in background concentrations, the presence of diffuse sources and the feasibility of the desired improvement of the water quality (Teunissen and Wagemaker, 2000). Other jointly commissioned studies followed. For example, in 2003 jointly conducted empirical research into the runoff speed of zinc resulted in an agreement on reference data for zinc runoff (Van Mourik *et al.*, 2003).

Extending the zinc issue to the European level

Meanwhile, national government and RIVM in particular lobbied for a European policy directive on zinc. Up till then, high zinc concentrations were only considered a problem in the Netherlands. In 1996, the European Commission asked the Dutch Ministry of the Environment to prepare a *Risk Assessment Report* (RAR) on zinc. The Ministry delegated this task to RIVM, the same research institute that had developed the Dutch norms. A RAR could conclude that further risk-reducing measures concerning the substance, beyond those already in place, were required.[21] If so, the RIVM would be asked to prepare

21 These cases need risk reduction strategy, which is developed utilising the *Technical Guidance Documents on Risk Reduction.* Directive 76/769/EEC on the restrictions in marketing and use of dangerous substances is one of the legal frameworks, which can be invoked to manage the risks identified by the risk assessment (http://ecb.jrc.it/existing-chemicals/, July 11, 2006).

a risk-reducing strategy, policy advice, which would be presented to the EU member states and the OECD.[22] The zinc industry feared that the negative image of zinc, limited to the Netherlands so far, would spread throughout Europe. Therefore it contacted its European and international competitors to start a joint lobby against the RAR.

Revising Dutch norms, not the policies

Although an exploration of a European norm did start, parties in the Netherlands were still awaiting the advice of the National Health Council, which had been requested by the Ministry of the Environment in 1995. This was the route usually followed in the case of opposing views on health policies. In 1998, the National Health Council published its advice: it decided that there were some scientific flaws in the Dutch norm-setting method, but in the absence of a better method, it considered the norms based on this method to be legitimate (Gezondheidsraad, 1998). With this verdict, the conflict continued. The zinc industry was strengthened in its criticism of the norm-setting method, while government was convinced of the importance of its reduction policies.

Following the advice, the Ministry of the Environment established a working group to study the norm-setting method. In 2000, the Dutch parliament continued zinc's status as a prioritised substance, (Staatscourant, 2000) and in 2001 it reconfirmed that reducing diffuse zinc emissions required special policy efforts (VROM, 2001). The Minister of the Environment sent a letter to parliament about the prioritised status of zinc, which stated: (1) there was still too little scientific knowledge to adjust water quality norms; (2) since metal construction products were responsible for over 10% of overall emissions, their contribution was still substantial; (3) regional differences in concentrations justified additional regional and local policies; and (4) product innovation was an indispensable part of solving the problem.[23]

In 2003 the working group presented a revised method that accounted for the omissions of the previous method. The zinc industry participated in this working group. However, the new method did not lead to fundamental changes in the zinc policies. Although the norms for surface water could be less stringent because natural background concentrations were taken into account, the growing number of buildings and constructions and the growing number of areas in which rainwater runoff was no longer coupled to the sewage system would lead to an overall rise of diffuse emissions, which justified the stringent norms (Vermij, 2003: 13).

The Minister of the Environment reported to parliament that whenever zinc

22 Organisation for Economic Co-operation and Development.

23 This letter was a response to one that the Foundation for Sustainable Building Metals sent to the Dutch parliament in 2001, which asked for a change in water quality norms for zinc.

emissions formed a threat to regional or local water quality, and when buildings and constructions substantially contributed to these emissions, local governments were authorised to take additional emission reducing measures, besides the agreements made with industry on the national level (ibid.: 10). In addition, RIZA advised authorities to use all available instruments, legal and communicative, to reduce diffuse emissions.[24]

This line of policy was supported by the 2005 draft RAR and was reconfirmed by the Ministry of Water Management in 2006 (V&W Ministry, 2006). It emphasised that local governments had legal responsibility for implementing the codes for environmental quality of water and soil and that the 'ALARA' principle should be applied: emissions should be 'as low as reasonably achievable', which implied permanently striving for making emissions to the environment as low as possible.[25]

Contesting the RAR

In December 2004, the initial draft of the RAR was presented to the EU member states and the OECD. It covered both environmental and human health. The environmental part described new methodologies to deal with the natural background of zinc, essentiality, speciation, and the use of species-sensitivity distributions. The results of the RAR identified no potential health risks to humans, but zinc and zinc compounds might incur potential environmental risks at local and regional levels in surface water, sediment, and soil (Van Straalen and Souren, 2002).

Although the RAR was based on scientific findings, it was interrelated with pragmatic considerations (ibid.). In November 2007, the Scientific Committee on Health and Environmental Risks (SCHER) criticised the RAR for this. "We regret that in general though the RAR gave careful and detailed consideration to variability in measured exposure and effects data and in partition coefficients much of this was lost in the assessments by using averages, worst cases and ranges."[26] For example, its methods did not account for the high variability of natural background concentrations in different regions. It used averages because these concentrations were very hard to establish. The background concentration value determined the risk assessment outcome, that

24 http://www.rijkswaterstaat.nl/rws/riza/wateremissies/Thema/Bouwmaterialen/gebiedsgericht_beleid_bouwmetalen.html (August 15, 2006).

25 Ministry of Water Management 2006, State Policy for Building Materials (Rijksbeleid voor Bouwmaterialen), http://www.rijkswaterstaat.nl/rws/riza/wateremissies/Thema/ Bouwmaterialen/ Rijksbeleid_voor_bouwmaterialen.html (May 29, 2006).

26 Scientific Committee on Health and Environmental Risks (SCHER), Risk Assessment Report on Zinc, Environmental Part, p. 14, adopted November 29, 2007 (http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_o_069.pdf).

is, the absence or presence of risk. Dutch data were used for the worst case scenario, which neglected the potentially great differences between regions. Despite criticising the 'not scientifically sound' method, the SCHER acknowledged that an added-risk approach might be useful for quantifying risks associated with industrial input to a particular region; in other words to quantify the zinc added by other sources, such as manure and municipal sludge.[27]

Differentiating policies at local and national level

The zinc industry took note of the RAR's criticism and also picked up on the concept of bioavailability. The proposed EU Directive for Prioritised Substances stated that bioavailability, which expresses the extent or rate at which zinc is absorbed by organisms, and variability of background concentrations should be included when judging norm-exceeding. The Union of Water Boards advised its members to do so in March 2007.[28] In 2008, a method was established that enabled water boards to decide whether or not they needed to take bioavailability into account at specific locations (Werkgroep MIR, 2008).

The issues of bioavailability and background variation were central to a joint study by some water boards, local authorities, industry and the TNO research institute. In 2007, they studied the relationship between emissions in the waste water chain and the effect on surface water. This study showed that "in contradiction with the prevailing understanding, copper and zinc hardly contribute to a poor quality of surface water through the waste water chain. […] The results of this study unambiguously show that heavy metals do not put our surface waters at risk. This means that there will be no reason to further reduce emissions from heavy metals."[29] The press release pointed out that taking note of these results would help water boards to set priorities and lead to more realistic, effective and cost-efficient measures to improve surface water quality. A few months earlier, the Union of Water Boards had asked its members to take bioavailability and background concentrations into account when judging norm non-compliance.[30]

While the concept of bioavailability and local variation of concentrations brought industry and water boards closer together, the environment and water

---

27 Scientific Committee on Health and Environmental Risks (SCHER), *Risk Assessment Report on Zinc, Environmental Part*, adopted November 29, 2007, p. 6 (http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_o_069.pdf).

28 Letter from the General Director of the Union of Water Boards to the member water boards, March 14, 2007, concerning bioavailability, reference 36128WB/EV.

29 Press Release from Aa en Maas Water Board, *Bevindingen afvalwaterketenonderzoek (AKON) spraakmakend*, 's-Hertogenbosch, June 2007 (Remarkable waste water chain research results).

30 Letter from the General Director of the Union of Water Boards to the member water boards, March 14, 2007, concerning bioavailability, reference 36128WB/EV.

management ministries and their research institutes considered this concept to be irrelevant in their campaign for emission reduction. Emission reduction was deemed necessary as a precaution; it was based less on norm compliance. Although bioavailability showed that concentrations in surface water were not always as harmful as assumed, the concept did not say anything about the accumulation of substances in groundwater and soil. The ministerial concern for groundwater and soil was based on the European Water Framework Directive, which came into force in 2000. The goal of this directive was to ensure that the quality of the surface water and groundwater in Europe reached a high standard ('good ecological status') by the year 2015.[31] For the ministries, a good ecological status implied emission prevention. National water quality policies were therefore especially concerned with the reduction and prevention of emissions and less with norm compliance. The ministries also argued that background concentrations were already included in the norm-setting method. Making the method more specific for zinc was undesirable, since the method was also used for substances other than zinc (LBOW, 2007). In other words, policies aiming to reduce zinc emissions were continued, but were based on prevention policies instead of norm compliance.

Continuing the conflict

In 2008, the end date of this study on the zinc policy process, the environmental part of the RAR still had to be officially approved. If accepted, the conclusions could provide a legal basis for source-oriented policies by local and regional authorities throughout Europe.

Using zinc in outdoor construction was also challenged from another direction. The European Construction Products Directive[32] demanded that manufacturers of building products have their products tested and provided with a CE label.[33] As from 2004, environmental aspects should be considered (Vermij, 2003: 12) but the opportunities to do so were still under investigation in 2008. In the Netherlands, the pressure on producers to provide environmental information increased through the creation of sustainable purchasing and procurement by governments, a project spearheaded by the new minister of the environment who came into office in 2007.

Meanwhile, the zinc industry has continued the fight on various battlegrounds in the Netherlands and in Europe. The industry has unceasingly challenged the policy goals, the norms and the methods used, while communicating the benefits of zinc to product users such as architects, water boards and

31 http://www.kaderrichtlijnwater.nl/service_functies/english/ (September 16, 2008). The Directive aimed to harmonise the many and varied European directives that dealt with water.

32 89/106/EEG; 93/68/EEG; 94/611/EEG.

33 CE stands for Communauté Européenne.

local governments who could influence the product choice in building and construction. Even after twenty years, the controversy around the use of zinc in outdoor construction is still awaiting resolution.

6.4 The policy issue and its environment

This section starts the analysis of zinc policies by presenting the dominant issues found in the policy process, the places or arenas in which these issues were addressed and the networks of the actors who participated in the policy arenas.

6.4.1 Issues in the policy process

Two issues dominated the interactions between the actors participating in the zinc policy process. The first concerned the eco-toxicity of zinc and centred on whether and to what extent high zinc concentrations in the environment posed a risk for biodiversity and human health. In the later stages of the policy process, the term bioavailability was added to this issue. The methods used to derive legal norms from the scientific values concerning ecological hazards and risks were also a topic in the debate.

The second issue concerned the zinc emissions of both zinc and galvanised constructions and construction parts. This issue consisted of several related topics: the volume of zinc emitted by constructions, also in relation to the zinc volume emitted by other sectors; the environmental impact of zinc construction products in comparison to alternative products; the neutrality of the lifecycle analysis method for product comparison; and the prevention of diffuse emissions by innovating zinc products.

The two issues and their assumed relationship formed the basis of the policy arrangement for zinc. Water quality norms were set with legal, but unenforceable policies. Meanwhile communicative, voluntary policies were aimed at reducing diffuse sources of emissions by decreasing the number of sources and the size of the emissions.

6.4.2 Arenas in the policy process

Reconstruction of the zinc policy processes shows that the process developed in five policy arenas with the participation of actors from three policy networks. The reconstruction is based on qualitative data derived from interviews with key players, document analysis and on quantitative data derived from a questionnaire sent to the key players. The networks, participants and main issues identified in the policy debate in these five arenas are presented in Table 6.2 and discussed below.

Table 6.2 Overview of the arenas in the zinc policy process (based on: Van Bueren *et al.*, 2003: 199)

Arenas	Norm-setting	Diffuse emissions arena	Sustainable building arena	Diffuse sources arenas	European arena
Key players	Ministry of the Environment, Ministry of Water Management, research institutes RIVM and RIZA, zinc industry	Ministry of the Environment, Ministry of Water Management, research institutes RIZA, zinc industry, research bureaus	Ministry of the Environment, Program Bureau for Sustainable Building, Committee for Experiments in Public Housing (SEV), branch organisations building industry, research bureaus, zinc industry, local governments, water boards	Ministry of Water Management, Ministry of the Environment, zinc industry, Ministry of Economic Affairs, water boards, provincial and local governments	Dutch and European zinc industry, Dutch Ministry of the Environment, RIVM, ministries and research institutes in Member States, OECD
Start date	1985 (zinc on list prioritised substances)	1985 (zinc on list prioritised substances)	1993 SEV (publication Guide for Sustainable Building)	1973 (establishment of committee to coordinate the implementation of water policies)	Mid-1990s (following first overview of zinc problem by RIVM)
Issues in relation to the zinc arrangement	Eco-toxicity of zinc: environmental risk, norm-setting method, norms and values, bioavailability and background concentrations	Volume of zinc emitted by construction products Product innovations to reduce emissions of zinc products	Methods to determine environmental performance of products Alternatives to zinc construction products Product innovations to reduce emissions of zinc products	Instruments to reduce diffuse sources Legitimacy of source reduction policies	Eco-toxicity of zinc: environmental risk, norm-setting method, norms and values, bioavailability, background concentrations
Level	National	National	National, regional/local and European	National and regional/local	European Union

■ *The norm-setting arena* – The environmental quality norms were decided upon in a national level arena. These norms are policy objectives for the assessment of environmental quality that serve to guide the prioritisation of the implementation of source point-oriented policy. The objectives were derived from scientific insights into the degree to which concentration of a certain substance in a compartment (soil, water or air) presented risks to the environment. This resulted in a maximum permissible risk (MPR) level and a target value. The MPR indicates the level of concentration at which negligible effects are expected. The target value is a value at which harm to the environment can be ignored. Translating these scientific objectives and values to environmental quality norms for land and water occurred in an administrative trajectory wherein the public research institutes RIVM and RIZA played an important role. In their perception, the industry was closely involved in the trajectory, but the industry felt their influence was very limited. Ultimately, the norms were decided by parliament.

The debate in the norm-setting arena was dominated by scientific disputes about norms for zinc. Questions were raised on whether zinc posed a risk to the environment, and the method used to determine water quality norms for zinc. The zinc industry pointed to the fact that zinc is a natural element in

the environment and essential for life. It contested the norm-setting method, which ignored the ability of species to adapt to changing levels of zinc concentrations, natural variations in background concentration and bioavailability. In response, the policy makers at the ministries and research institutes emphasised that the norms did take background concentrations into account, but perhaps not as specifically as the zinc industry desired. They emphasised that norms for different substances had to be comparable; otherwise it would be impossible for local authorities to formulate emission policies for these substances. Norm-setting methods were coordinated internationally.

The debate on norm-setting method and eco-toxicity of zinc for aquatic environments continued unabated throughout the period studied.

■ *The diffuse emissions arena* – The diffuse emissions arena was also on the national level. The Ministries of the Environment and of Water Management, the water research institute RIZA and the zinc industry discussed the emissions of zinc and galvanised building products. It was hard to determine the exact volume of zinc emissions from building materials since zinc is a natural resource and there are other sources, such as agriculture and transport. The issues here were to determine the scale of zinc emissions from building products, what share these emissions had in the total amount of zinc in the environment, and what action was required, such as product innovation and prohibition. In this arena, much research was done on these issues. Especially in the last ten years of the period studied, joint empirical research led to significant adjustments in the assumptions about construction product emissions.

■ *The sustainable building arena* – In the sustainable building arena, actors were especially concerned with formulating checklists for sustainable building, ranking products according to their impact on the environment. These checklists served as recommendations to parties involved in building projects, such as local governments, property developers, architects and contractors. The most important issue was to determine the environmental performance of products. LCA was commonly used for this purpose as it determines the relative environmental performance of products during their entire lifecycle. The outcomes, however, were highly influenced by the assumptions used in the calculations.

In the late 1990s, sustainable building expanded to the urban planning level. Guidelines for sustainable urban planning advised against the use of zinc. Although there was no scientific argumentation for this negative advice, it contributed to the continuation of the negative environmental image of zinc. The possibility of water boards and municipalities to take source-oriented measures to reduce diffuse emissions of construction products whenever these products contributed to the exceeding of zinc norms also contributed to the continued questioning of the environmental performance of zinc con-

struction products. Several LCA studies declaring the environmental performance of zinc roof gutters was not significantly worse than PVC and aluminium ones could not dispel the negative environmental image of zinc.

In future, like all supply industries, the zinc industry will most likely have to take note of the environmental aspects of its construction products. This will be one of the consequences of the implementation of the European Construction Products Directive of 2004 in member states and Dutch national policy supporting sustainable purchasing and procurement. National policy makers involved in the zinc debate also continued to emphasise that as long as construction products emitted zinc, the use of zinc products should be avoided as a precaution.

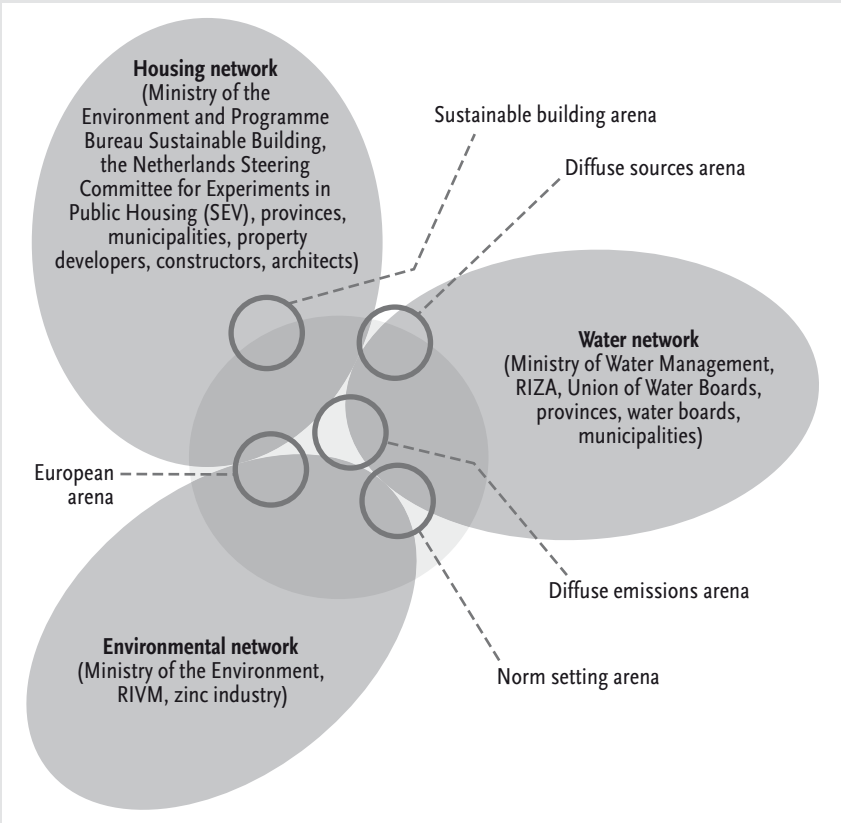
■ *The diffuse sources arenas* – In the diffuse sources arenas, national, provincial and local governments as well as water boards exchanged information and viewpoints on issues concerned with emissions to water from diffuse sources, such as zinc emissions from building materials and from pesticides and herbicides used in agriculture. Because non-compliance with zinc norms was a persistent problem, actors looked for causes and solutions. Local parties sometimes collaborated on policy measures, for instance measures focused on influencing the use of zinc in building materials and in other arenas. There were regional arenas (provinces, water boards, and municipalities) and a national arena, where the Integral Water Management Commission was an important platform. In the mid-2000s this platform became part of the National Governance Agreement Water (LBOW, 2007).[34] The regional and national arenas were linked by dual memberships and highly intensive information streams. In these arenas parties were especially concerned with governance issues: was emission reduction required? How could they achieve the lowest possible emissions of zinc to solve the problem of zinc concentrations exceeding the norms? What instruments could be used and which products and actors should be targeted? In the first years of the period studied, the building and construction sector was targeted, but more recently attention was also directed towards sectors as shipping, transport and agriculture (VROM Ministry, 2007).

■ *The European arena* – Zinc became the first natural essential element to be studied under EU Regulation 793/93 requiring the evaluation and control of risks from the production and use of existing substances in Risk Assessment Reports (RAR).[35] The Netherlands volunteered to be the 'reporter', which task was dele-

34 In Dutch: *Nationaal Bestuursakkoord Water*, in particular the Environmental Cluster of *Landelijk Bestuurlijk Overleg Water* (National Administrative Consultative Body on Water).

35 An 'existing' chemical substance is defined in the EU as any chemical substance listed in the EINECS (European Inventory of Existing Commercial chemical Substances) (http://ecb.jrc.it/existing-chemicals/, July 11, 2006).

Figure 6.1 Arenas and networks in the zinc policy process



Source: Van Bueren *et al*. 2003: 202

gated by the Ministry of the Environment to its research institute RIVM.

The issues at stake in the European arena were similar to the ones in the Dutch norm-setting arena. The Dutch zinc industry mobilised the European and international zinc industry to this arena and although the RAR led to modification of the norm-setting method, the zinc industry still contested the results with regards to the environmental risks at the local and regional scale, which legitimised additional emission-reducing strategies at local and regional level in member states.

6.4.3 Policy networks in the policy process

Three policy networks can be distinguished from the five arenas participating in the zinc policy process: the water network, which addressed water management issues, the environment network, which addressed environmental problems, and the housing and construction network, which addressed issues dealing with building and construction, including products and materials. The zinc industry belonged to this third network as a passive member.

In the case of zinc policies, the formulation and implementation of the water quality norms for zinc took place in the water network, with the par-

ticipation of regional and local actors concerned with water management. The formulation and implementation of environmental quality objectives and norms, including solutions such as product innovation, took place in the environmental network. The housing and construction network was concerned with policies for housing, construction and living and all environmental issues related to these topics, such as sustainable building and sustainable urban planning. This network was responsible for the implementation of the environmental and water quality policies in this field.

The three networks had their own agendas and consisted of both public and private organisations, including research institutes. Many of the experts working on the environmental quality norms in different networks had a similar professional background, joined the same professional networks and met each other at professional conferences and meetings. It can be argued that they belonged to the same professional community.

Figure 6.1 presents an overview of the zinc networks and arenas.

6.4.4 Some first observations

Here follow some first observations based on the analysis of the policy issues, arenas and networks.

■ *Overlap of participants between arenas* – There is a considerable overlap between the participants in the various arenas. Although participants indicated that different issues were on the agenda in each arena, the differences were not transparent for outsiders.

■ *Rules of environmental policy making dominated the policy process* – The large coherence of actors participating in the arenas led to decision making that was dominated by the rules used for environmental policy making. The experts involved in the various arenas belonged to the same professional community and this contributed to the domination of these rules.

■ *Zinc industry was new to the policy process* – Many of the actors participating in the zinc arenas knew each other or at least some of the other actors. They were part of the same policy networks and also met in other arenas where various issues relating to environmental quality, water quality or building and construction were on the agenda. Only the zinc industry was new to these arenas and networks.

■ *Weak couplings between arenas* – The arenas showed considerable overlap in terms of participation. The five arenas all addressed another aspect of zinc as a diffuse source, or addressed it at another government level. However, the processes within these arenas were not as strongly coupled as would be

Table 6.3 Key players and their perceptions in the zinc policy process

Key participants	Perceptions/positions of participants on the main issues	
	Earlier in the process (ca. 1985-1990)	**Later in the process (ca. 2005-2008)**
Ministry of the Environment	Prevention of diffuse zinc emissions was an important cornerstone of water quality policy with consequences for production and material choice. It was not responsible for local policies to discourage the use of zinc.	Changed responsibilities for water quality reinforced prevention policies.
Ministry of Water Management	As a precautionary measure, diffuse zinc emissions should be prevented, and should get high priority in environmental policies.	Changed responsibilities for water quality reinforced prevention policies.
Water boards	Some advised local governments and actors in the housing sector not to use zinc, while others set other priorities because they were awaiting national policies to address the zinc issue.	In 2007, the Union of Water Boards asked members to take background concentrations into account when judging norm exceeding. This did not interfere with precautionary policies pursued by water boards.
Environmental Research Institute RIVM	Too much zinc in water and aquatic sediments was an environmental risk. The norm setting method of the RIVM derived objectives from scientific data that showed what levels of zinc provided acceptable risks.	No change, the norms were legitimised by the precautionary principle.
Water Research Institute RIZA	As a precautionary measure, emissions from zinc and galvanised building products should be as low as possible and authorities should use all instruments available to achieve this.	Although emissions were considerably less than assumed, the precautionary principle still applied. However, research showed that the exceeding of zinc norms was not necessarily harmful.
Dutch zinc 7industry, and since the late 1990s the European zinc industry as well	Zinc is an essential, natural element. The norm-setting method and LCA (at first) failed to recognise this. Zinc and galvanised building products were modest sources of diffuse zinc emissions.	Empirical research proved that emissions were considerably less than assumed by the Ministries and not detrimental to water quality. Still, the industry recognised that it should show environmental concern and started environmental innovations.

expected from looking at the overlap of participants. Especially the groundbreaking research that was done in the diffuse emission arena failed to influence the processes in the other arenas.

■ *Isolated position from other policy issues* – The issue of diffuse zinc emissions from construction was not coupled to other issues, such as other diffuse sources of zinc including agriculture or transport, nor was it related to debates on diffuse sources of other substances; surprisingly so as there were also fierce debates on other heavy metals, including lead and copper.

6.5 Perceptions and strategies in the policy process

This section presents a reconstruction of the perceptions of the key players in the policy process as well as strategies used by actors in the policy process. Per-

Key participants	Perceptions/positions of participants on the main issues	
	Earlier in the process (ca. 1985-1990)	**Later in the process (ca. 2005-2008)**
Branch organisations construction industry	Zinc industry competed with other industries and should defend its interests by itself.	LCA showed that zinc did not differ from alternative products: there was no reason to intervene in the debate.
Dutch Commission for Housing Experiments SEV	Zinc construction products negatively affected water quality and should be banned.	On product level: LCA gave no reason for a negative advice; SEV withdrew from the debate. On urban planning level: SEV supported precautionary advice not to use zinc.
Provincial and municipal governments	Sustainable building was a top priority for some local/provincial governments; others were confused by the contradictory reports and waited for a univocal guideline from the national government.	Variety of opinions continued, but with decline of attention for sustainable building (materials), attention for zinc diminished as well.
Users of zinc construction products (architects, planners, builders)	Especially some designers (architects, urban planners) were appealed to or appalled by zinc as a construction product. Majority of users awaited a univocal advice on the use of zinc.	Variety of supporters and opponents of zinc continued to exist, while a growing majority of users was not interested in the issue.
Dutch National Health Council/ European Scientific Committee on Health and Environmental Risks (SCHER)	Dutch Health Council (1998): even though a correct norm-setting method was absent in policymaking, it was legitimate for government to set norms and to develop precautionary policies.	SCHER (2007): although the method in the RAR was not used in a 'scientifically sound' way, the SCHER acknowledged that it might be a useful tool to quantify the amount of zinc added by sources.
Environmental organisations	Environmental organisations advised against the use of zinc.	Environmental organisations had withdrawn from the debate because it was too costly to stay involved and publicity gains were small.

ceptions and strategies are indicators of the position actors hold on the various issues in the policy process and the changes therein. The reconstruction of the perceptions is made by the researcher, in hindsight, but has been verified with the reviewers who were closely involved in the policy process (see Appendix I).

6.5.1 Perceptions

Table 6.3 presents an overview of the key players and their perceptions of zinc issues at the beginning of the period studied and indicates if any perceptions had changed by the end of the period studied.

Observations
Here follow some first observations on the perceptions and the changes therein.

■ *Opposing views on the eco-toxicity of zinc* – With respect to the first key issue in the policy process, the eco-toxicity of zinc, participating actors' perceptions

were roughly divided between two opposing points of view: some actors were convinced that as long as there was no scientific certainty on the harmfulness of environmental effects, as a precaution, emissions should be kept as low as possible; other actors were convinced that diffuse zinc emissions were not of a level that would cause damage. Advocates of the potential harmfulness of zinc were mostly found in the environment and water networks: the ministries, their research institutes, some water boards and local and provincial authorities. Supporters of this perception were also in the housing and construction network: some architects and urban planners were totally convinced of the need for prevention. However, other architects and planners were very attracted to the natural aesthetic qualities of zinc, and therefore preferred using the product.

■ *Varied views on the contribution of the construction sector* – With respect to the second key issue, the contribution of the construction sector to high zinc concentrations, opinions were more divided. In each group of actors, such as water boards, users, local governments, some pointed to the need to make all emissions as low as possible. In this view, it did not matter how much zinc was emitted by construction products, since every emission unit was one too many. But other groups already took note of the volume of emissions from construction products and only wanted to take action when these products' actual contribution to high zinc levels was beyond doubt.

■ *Stability of positions despite changing perceptions* – The table shows that though groups of actors did undergo some important changes of perception, the positions they held remained roughly the same throughout the policy process. Both supporters and opponents of the use of zinc in outdoor construction continued to fight each one another's viewpoint. This is surprising because the policy process analysed here concerned a period of more than twenty years. The biggest change of position was perhaps the loss of interest in the issue in some supporters and opponents.

6.5.2 Strategies in the policy process

Using hindsight, the following strategies can be reconstructed. For analytical purposes, ministerial policy makers and research institutes' experts advising the policy makers are aggregated to 'national policy makers'. Policy makers from water boards and municipalities are aggregated to 'local policy makers'.

■ *Frame the debate in one dimension* – Throughout the process, national policy makers tried to frame the debate in one dimension: zinc emissions should be prevented because they were possibly damaging to the environment. By referring to the precautionary principle, based on 'any emitted particle is one

too many', all endeavours to frame the debate in any other dimension were rendered harmless. In 2007, the policy makers acknowledged that the precautionary principle no longer applied, since research had considerably reduced scientific uncertainty about the harmfulness of zinc. Now, however, the policy makers still emphasised the need to prevent emissions albeit no longer to achieve norm compliance, but good ecological water quality (LBOW, 2007). The call for emission reduction thus continued.

■ *Make the debate inaccessible to outsiders* – Another strategy of national policy makers identifiable in the policy process was the lack of transparency and accessibility to the debate for outsiders. The debate used technically complex arguments and made no attempt to explain these. Anyone who could not understand what the debate was about was unqualified to participate. Even the zinc industry suffered from this strategy. It hired a scientist who was not part of the professional community to which most experts active in the zinc debate belonged. His arguments were not taken seriously because he did not speak the same language and was not trained in the same way as the national policy makers. Nevertheless, for a long time, till 2006, the zinc industry continued its search for scientific arguments that would convince policy makers. After 2006, they changed strategy and hired a professional lobbyist to negotiate with policy makers instead of trying to convince them that they were wrong. Environmental organisations and the media could not keep up with the debate. They decided to spend their time and money on other issues that could better be explained to the public. Last but not least, parliament lost interest and simply approved the policy proposals.

Not only the content of the debate, but also the decision-making procedures, such as for prioritisation of substances and revision of norms, lacked transparency and were rationalised *ex post* by policy makers. During the process, transparency did improve: procedures for policy making and for participation in the policy-making process were formalised, although this could not guarantee that the efforts of the zinc industry to participate were taken seriously.

■ *Isolate the issue from other issues* – National policy makers and the zinc industry isolated the issue from other issues. Surprisingly, throughout the period studied, the zinc debate was not linked more strongly to the processes on copper and lead. The choice of national policy makers to follow this strategy might have come about because of the high specialisation of the professional experts involved in the debate. A more thoughtful explanation might be that coupling zinc to other issues would have harmed policy goals. Because the environmental risks of copper and lead emissions were uncontested, combating zinc emissions would perhaps raise more questions, especially if the costs and benefits of pursuing different policy goals were weighed.

The zinc industry also preferred not to couple the zinc debate to the debate on copper and lead. They probably did not want to be associated with the negative effects of copper and lead. Besides, for an industry it was highly unusual to join forces. Cooperation amongst competitors in the same line of business, which the zinc producers eventually engaged in, was remarkable enough, not to mention seeking cooperation with competitors from other industries as well.

Towards the end of the study period, both policy makers and the zinc industry changed strategy and started to link this debate to both emissions of other metals and other sectors. The contribution of various sectors to zinc emissions, which the zinc industry insisted on, showed that other sectors contributed equally or more to diffuse zinc emissions,[36] and agriculture was particularly identified as a sector needing to reduce its emissions (VROM Ministry, 2006: 65-69). However, the national policy makers did not think this deserved a change of strategy; after all, as a precaution all sectors including the building sector had to reduce and prevent emissions.

■ *Guerrilla strategy: make voluntary policies at different government levels* – As in all diffuse emissions problems, national policy makers had few opportunities to enforce norms for zinc. National policy makers therefore turned to voluntary instruments to advance their policy goals and encouraged decentralised policy makers to do the same. At various government levels this resulted in actions to discredit the use of zinc. The zinc industry's efforts to combat these tactics were ineffective, because the policies lacked a formal, legal basis and were voluntary – actors were free to follow the advice, or not.

A small group of local authorities was committed to fighting diffuse zinc emissions. They used their public and private powers to discourage the use of zinc, for example by signing covenants on sustainable building with the local and regional construction sector, starting promotion campaigns aimed at professionals which advised against the use of zinc, or making it part of a tendering procedure when local government commissioned a construction project. Because they wanted to prevent emissions, they considered this to be a legitimate strategy.

■ *Wait and see* – The majority of actors from various networks that possibly could be involved in the zinc debate adopted a 'wait-and-see' strategy. As long as there was no certainty amongst scientists and/or policy makers on the problem and the policy direction, they decided to dedicate their attention to other, more clear-cut issues.

---

36 The contribution of constructions to total zinc emissions to surface water is estimated at 10%; agriculture (especially feed) contributes 12%; transport (especially car tires) is responsible for 12% of emissions; shipping for 18%; and household sewage water accounts for 20% of emissions. (Vermij and De Poorter, 2007).

■ *Fight every fight* – The policy process developed in five arenas. At the start of the process, the zinc industry tried to challenge its opponents by going to court. When it appeared that the court verdict could not stop authorities from taking action against the use of zinc, the zinc industry decided to fight its opponents where they were under fire. This was a high-price strategy for the industry: it had to master the rules of the games played in various arenas and had to spread its attention over several arenas.

■ *Substantive logic vs. procedural logic* – Throughout the process in the norm-setting arena, the zinc industry tried to combat the negative image of zinc by trying to refute the substantive, scientific arguments on which it was based. This was induced by the procedural logic used by the national policy makers, who countered every attack on the norms and methods by pointing to the principles for environmental policy making applicable in cases of uncertainty. The precautionary principle was one of the fundamental principles for environmental policy making in the European Union:[37] whenever there was a threat of serious damage to the environment, lack of full scientific uncertainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. The precautionary principle permitted a lower level of proof of harm to be used in policy making whenever the consequences of waiting for higher levels of proof may be very costly or irreversible (European Commission, 2000a). In addition, the ALARA ('as low as reasonably achievable') principle argued that taking economic and social factors into account, exposure should be kept low, especially in cases where there is no scientific knowledge or proof of what the effects of low dose exposure might be. Another principle for policy making was 'standstill', which implied that the situation could not deteriorate from a certain reference situation.

These principles were put into practice in the zinc debate. The burden of proof was put in the hands of the zinc industry. Whenever the zinc industry came up with arguments that challenged an aspect of the scientific arguments on which the zinc reducing policies were based, or whenever the zinc industry questioned the legitimacy of the policies, the policy makers pointed defensively to these principles.

■ *Jointly commission research* – To escape the deadlocked debate, actors in the diffuse emissions arena tried to see if they could agree on parts of the problem. This proved to be a successful strategy, and was applied more often from the late 1990s onwards. It was successful because it demystified some of the assumptions on which policies were based. It also brought actors to speaking terms and contributed to mutual understanding. However, the jointly com-

37 Article 130r 2 of the Treaty on European Union.

missioned studies failed to affect the debate in the norm-setting arena, where the precautionary principle rendered all arguments ineffective.

Observations on strategic behaviour
When observing the strategies, it is striking how few changes of strategy took place. Throughout the process, actors stuck to the same strategies. This is in line with the perceptions observed earlier in this section: although perceptions on some issues changed, the positions actors held on the core issue of whether or not any zinc emission is acceptable did not change. The strategies did not bring actors much closer, nor did it further the goals of any of the actors. A positive exception was the joint commissioning of research. However, this strategy failed to force a breakthrough in the deadlocked debate. Also surprising is that, during most of the period studied, none of the players tried to link the processes in the various arenas, or link the process to arenas dealing with other issues than zinc. From this point of view, the strategies of national policy makers to isolate the debate and reduce the transparency and accessibility of the process succeeded; many actors lost interest in this highly specialised debate.

6.6 The lessons learned

In twenty years, important lessons about water quality and zinc concentrations were learned. The highly controversial issues on the agenda and the clashing perceptions and interests of actors involved in the debate gave rise to numerous reports which led to the revision of facts, procedures, and methods. With respect to the interactions, lessons were also learned. An overview of the substantive and social lessons learned by actors in the policy process is presented in Table 6.4. The table also includes the effect of the learning: did the learning result in policy change and was the change technical or conceptual, or did the change concern the ability to learn? The table is followed by a brief discussion of the lessons learned.

■ *Lessons about norms* – The norms and the way they were established, scientifically and procedurally, caused dismay amongst actors in the zinc industry. Although the alarm eventually subsided, the effects of the discouraging policies to combat norm-exceeding jolted all concerned. Complaints by the zinc industry led the Netherlands National Health Council to scrutinise the norms in 1998 and come to the verdict that the norm-setting method and procedure could be improved. Although this advice was followed, the learning effect is qualified as technical, since it did not lead to any substantive changes in norms or procedures. Although the procedure was formalised and stakeholder participation was included, it is questionable if this led to an opportunity for stakeholders to seriously influence the process, since their contribu-

Table 6.4 Lessons learned in the policy process

Lesson	Social or substantive?	Technical, conceptual or meta?	Individual or inter-subjective?
Norms	Substantive: norm-setting method was not correct.	Technical: the method had to be improved; nevertheless, the norms were considered legitimate.	Inter-subjective learning about method by research institutes in norm-setting and European arena.
	Substantive: local differences in background concentrations and bioavailability should be taken into account when judging norm-exceeding.	Conceptual: not all norm-exceeding necessarily harms water quality; water boards could prioritise reduction measures differently.	Inter-subjective learning by actors in diffuse sources arena and European arena.
	Social: norm-setting procedure should be transparent and involve stakeholders.	Technical: procedure was formalised and included a role for stakeholders.	Inter-subjective learning by actors in the norm-setting arena.
Diffuse emissions	Substantive: volume of emissions from zinc construction products was substantially lower than assumed.	No effect, the Ministry of Water Management continued to stress that emissions should be avoided at all cost.	Inter-subjective learning by actors in the diffuse emissions arena.
	Social: zinc industry understood that it had to communicate positive aspects of zinc.	Technical: communicative actions did not lead to changes of perceptions of policy makers or the industry about the harmfulness of zinc emissions, but did influence perceptions on local level.	Individual learning by the zinc industry.
Argumentation	Social: arguments were more readily accepted when based on accepted methods and/or empirical research.	Meta: using accepted methods and evidence-based arguments was indispensible for convincing others.	Inter-subjective learning by key players in all arenas: zinc industry, Ministries and research institutes.
	Social: research results on contested issues would only be accepted if the research was jointly commissioned or carried out.	Meta: learning processes should be a joint effort of actors with differing opinions.	Inter-subjective learning by actors in diffuse emissions and diffuse sources arenas, including RIZA research institute, zinc industry, water boards.
	Social: methods (LCA, norm-setting) were subjective.	Meta: research methods do not deliver objective knowledge and can be strategically used.	Inter-subjective learning by key-players in all arenas.

tion was disqualified by policy makers. Substantively, the ways in which the norms were set and judged were improved. Local and regional differences of background concentrations were included, and the debate in the European arena on norm-setting, in a later stage of the process, added the bioavailability argument to the debate. In 2000 the European Water Framework Directive became effective, which pushed national governments into greater collaboration in the field of norms and norm-setting. However, this particularly affected the actions undertaken by water boards to combat the exceeding of norms, and not the norms themselves. The learning amongst these actors can therefore be classified as conceptual: the lesson had a considerable impact on their actions.

■ *Lessons about diffuse emissions* – Until the 2000s, many assumptions behind the zinc-discouraging policies were not supported by empirical evidence. All key actors in the policy process, the national policy makers and the industry learned a significant lesson when empirical research showed that the emission volume of zinc construction products was only three percent of what had been assumed. Surprisingly, the lesson did not affect norms or policies discouraging the use of zinc by authorities; as a precaution, all emissions should still be prevented. The industry understood the message: it had to show its concern for the environment and thus established a foundation to communicate positively about zinc. It also suggested some product improvements. When the industry discovered that in return the ministries would not stop the discouraging policies, product innovation was given lower priority. The industry conducted several LCAs until they could show that the environmental performance of zinc roof gutters was comparable to that of competitive products. However, these LCA studies also failed to influence the opponents of zinc construction products. The lessons about diffuse emissions, however significant, thus lead only to learning on a technical level by actors. It did not change the actors' goals or beliefs.

■ *Lessons about argumentation* – During the process, national policy makers and the zinc industry learned lessons about the policy debate. The learning was on the meta-level: it was about the rules of policy debate. They learned that arguments were stronger when they were based on empirical evidence, but also that the evidence was not undisputable, even when delivered by scientists or according to scientific methods. Methods could be manipulated, scientists could be biased. The way out of this dilemma was the creation of negotiated knowledge, for example by jointly commissioning research. In the commissioning process, actors should agree on the assumptions which form the basis of the research and on the rules by which it would be carried out. This would increase the chance that actors would accept the outcome of the research.

Conclusions

Although many lessons were learned, they did not result in any significant policy changes. Surprisingly, many significant lessons on policy content and diffuse zinc emissions from constructions failed to influence the perceptions of actors on the central issues: whether too much zinc could be harmful to the environment and whether zinc construction products were responsible for the high concentrations. Even the discovery that the volume of zinc emissions from buildings and constructions was only 3% of the initial estimations did not influence actors' positions on these main issues. From the precautionary viewpoint of the policy makers, it did not matter how many zinc particles were emitted or the extent of their damage. A cost-benefit analysis of policy

Table 6.5 Variation, selection and retention in the policy process

Evolutionary process	Questions	Answers
Generation of a variety of perceptions as a condition for learning	What variety of perceptions was generated? How did networks and arenas contribute to the variety?	■ Variety of perceptions in arenas was constrained to a single dimension: zinc emissions were or were not a problem ■ Only those actors from the networks who accepted this single dimension, including experts, participated ■ Weak linkages between arenas and with other issues contributed to isolated policy processes
Selection from a variety of perceptions	How were decisions made? How were they influenced by formal and informal rules of the networks and arenas in which decisions were made?	■ Principles for environmental policy making strongly influenced selection ■ Rules of professional community constrained participation and agenda-setting ■ Expert rules for decision making were beyond doubt
Retention: preservation of lessons learned	How and to what extent were the lessons learned institutionalised?	■ Lessons about norms were strongly retained ■ Other lessons were weakly retained ■ Weak linkages between arenas hindered learning between arenas
Retention: learning to learn	How and to what extent was a regenerative capacity institutionalised?	■ One-dimensional framing of the zinc issue focused learning ■ Developing negotiated knowledge enhanced intersubjective learning at a technical level ■ Joining forces by the zinc industry helped to level the playing field

making to reduce diffuse zinc emissions from constructions and the benefits in terms of policy outcomes, that is, better water quality, seemed to be missing from the zinc policy process. The important lesson on negotiated knowledge as a means of conflict resolution could not influence the endeavour to achieve zero emissions by national policy makers, that is, the ministries and research institutes. Policy changes that did take place were therefore mostly technical.

6.7 Evaluating the learning from an evolutionary perspective

Why were the effects of the lessons learned limited to mostly technical changes? Why did they not lead to more conceptual changes of the policies? This section explores these questions by looking at the processes of variation, selection and retention. How did they take place and how did they influence learning?

Table 6.5 starts by summarising the processes of variation, selection and retention that can be identified in the policy process. This table is based on the analyses of the policy process, issues and policy environment in the previous sections. The table is followed by explanations.

Variety in the policy process

One of the assumptions in policy network learning theories is that variation in actor perceptions will lead to learning. Variation of perceptions is usually measured by the variety of actor perceptions, the number and variety of actors involved and the extent to which these actors represent varying percep-

tions. The number and variety of issues discussed is used as an indicator for variety, as well as the number of networks that actors come from, assuming that more networks involved will lead to a higher variety of actors, issues and perceptions.

■ *Actor variety did not lead to a variety of perceptions* – In the zinc policy process, actors from three networks were involved: the environment network, the water network and the housing and construction network. However, variety of perceptions between actors from the various networks was low. Actors from the environment network and the water network were all concerned with safeguarding environmental quality, with the 'dry' and the 'wet' environment respectively. From the housing and construction network, the initially participating actors showed concern for the environment and based on this concern had developed ideas on and measures for sustainable building. The actors participating from the three networks thus all represented, in essence, the same perception: diffuse emissions from zinc construction products contributed to emissions that could potentially jeopardise water quality, and these products, as sources of diffuse emissions, should therefore be limited.

The entry of the zinc industry in the arenas dealing with the various dimensions of this policy problem, introduced the other side to this perception: as an essential element, zinc emitted in such small amounts could not be harmful to the environment, and even if it were harmful, the contribution of the construction sector was very low. The zinc industry held a weak position in the network. It had no potential allies because of the isolated position of the zinc policy process. The only allies they could find were direct competitors: producers of zinc construction products or of competing products made of other materials. Perhaps the zinc industry could have made more effort to broaden or reframe the debate, which might have changed the variety of participants and issues discussed. However, the few attempts they undertook were not rewarded. For example, one might expect the Ministry of Economic Affairs to show concern for the well-being of an industry, but it showed little interest. In 2006, the zinc industry hired a lobbyist in a new attempt to reframe the debate, aiming at convergence of perceptions and stressing the need for joint fact-finding and research.

■ *Expert participation did not contribute to more varied perceptions* – The participation of several different experts, who could have contributed to a larger variety of perceptions, did not add much to the variety. The environmental experts from research institutes and the private consultants all belonged to the same small expert community and represented similar perceptions. Other experts, for example in the field of construction, were only involved when they had a clear opinion on whether or not zinc construction products were good for the environment.

The strategy pursued by actors with regards to variation seems to be concerned with minimising the variety of perceptions in the policy process. The policy makers of various governments and research institutes active in the water and environment networks, referred to once again as 'policy makers', seemed to have especially focused on minimising variety to a one-dimensional issue, which put actors either 'for or against' them. To achieve this, they applied several strategies.

■ *Weak linkages between arenas hindered learning across arenas* – The zinc issue was decoupled from other policy issues and the links between the policy processes were weak in the various arenas with zinc on the agenda. An important effect of the decoupling was that lessons learned in one arena were not transferred to other arenas. Each arena had its own agenda, and lessons learned in one arena were not considered to be directly relevant to the issue dealt with in another arena. For example, the significant lesson about the volume of zinc emissions from construction products had no influence on the process in the norm-setting arena. Here the agenda was concerned with defining water quality norms and not with the emission sources that jeopardised water quality. Lessons on diffuse sources were therefore considered irrelevant.

An advantage of the decoupling of the processes in the various arenas for the policy makers was that without formal links between water quality norms set by central government and the discouraging policies defined by decentralised governments, central government could not be held responsible for the policies of local authorities developed in the grey area beyond the formal responsibilities. For the zinc industry the lack of coupling meant they had to participate in all five arenas to try to influence decision making, resulting in high transaction costs.

By preventing the coupling of the zinc process to other processes, the solution-solving space was kept within the margins of the policy goals as intended by the policy makers concerned with environmental quality: minimise zinc emissions as far as possible. It also stopped actors from being confronted by diverging perceptions.

The strategy seems to have worked: the zinc policy process is characterised by a low variety of perceptions, contrary to what would be expected when actors and experts from three networks participate. The policy process is scattered over five arenas and played out on various levels.

Selection

Substantial lessons were learned, despite the limited variety of perceptions and the single-dimension framework of the problem. However, these lessons did not result in significant policy changes, and in this subsection the focus is on how a selection was made from the variety generated.

■ *Selection in all arenas was dominated by precautionary principle* – When looking at the selection mechanisms at work in the zinc policy process, two observations can be made. The first is that each arena had its own decision-making methods. In both the norm-setting and European arenas decision making was dominated by methods for determining maximum permissible risk levels from which policy norms could be derived. In the sustainable building arena, LCA became the dominant method for decision making, while in the diffuse sources and in the diffuse emissions arena decision making was strongly influenced by environmental policy making ALARA, precautionary and stand-still principles.

The second observation is concerned with the strong influence of these principles on the course and outcomes of the policy process in the other arenas as well. 'Precaution' and 'prevention' were considered legitimate norms, even though the methods on which they were based had flaws. In the European arena where the possibility of European norms was discussed, the precautionary principle was influential and might lead to a European policy on zinc. Again, the precautionary principle made for scientific uncertainty: prevention was justified as long as there was scientific uncertainty. These policy-making principles were thus of strong influence on four of the five arenas. In the sustainable building arena the influence was less strongly present, although especially fierce opponents of the use of zinc in constructions based their opposition on these principles as well. Together with the European Construction Products Directive and the possibility of a European zinc policy, the opponents to the use of zinc might mobilise support for their view throughout Europe and the issue will no longer be restricted to the Netherlands.

■ *Expert rules dominated decision making* – Another observation is concerned with the rules by which participation, interaction and decision making in the various arenas took place. As noted when discussing the variety of experts in this section, zinc policies were formulated and implemented by a small circle of professional experts, even though they worked for different organisations. The determining of norms for zinc concentrations in inland surface water and aquatic sediments required highly specialised knowledge. Only a small group of Dutch experts was professionally occupied with the development of scientific and policy norms for water quality. These experts had similar educational backgrounds and met regularly at professional conferences and at expert meetings. The norm-setting procedure went as follows. Experts working for the Ministry of the Environment and the Ministry of Water Management would ask their colleague experts at the research institutes to propose policy norms, which they delivered. To prepare the advice, these experts had little or no incentives to interact with actors other than their international peers who, because zinc was not (yet) considered an environmental problem in other countries, lacked knowledge on the issue. The norms were thus defined by a small and closed expert community in which participants were

seldom confronted with diverging perceptions.

The closed character of this community became manifest in 1995, when the zinc industry hired a consultant to advise on the norms. Actors from both water and environment networks either ignored this consultant or did not take his advice and arguments seriously: since his disciplinary and professional background was in another field, his contributions were classified as incorrect and irrelevant. The debate that followed between the zinc industry pitted against governmental actors and public research institutes from the water and environment networks can be characterised as a 'dialogue of the deaf', in which both sides hoped to persuade the other merely by repeating their own point of view. Only towards the end of the period studied, in 2007, did the zinc industry give up trying to convince the policy makers of the justness of their cause, and tried to negotiate pathways towards resolution. All the while, policy makers kept pointing to the changing regulatory circumstances,[38] which underlined the need for prevention of emissions.

The zinc policies were thus prepared and implemented by a closed group of experts who based their actions on principles that were beyond question. The burden of proof was put in the hands of the newcomer, the zinc industry, but every attempt the industry made to discredit these policy-making principles was in vain.

■ *Expert judgements were beyond doubt, even when based on unsatisfactory methods* – Twice in the policy process, the norm-setting methods for zinc were questioned by scientific institutes respected in Dutch and European policy making. In the Dutch process at least, the criticism had no affect on policies based on the method. The European procedure had not finished by the end of the period studied. Time will tell whether its outcome will be untouchable as well.

■ *Biased mobilisation of participants* – The dominance of the rules of the expert community participating in the zinc process cast its shadow over the generated variety by mobilising a bias: only those actors willing to work within the rules set by the experts participated. In practice, only the zinc industry took the trouble. They were forced to do so because their core business was at stake. Fighting these rules soon turned out to be useless: legally there was no case as long as discouraging policies were voluntary and uncoupled from formal policies; politically, there was little interest in the case; and from a business point of view, the case was difficult because zinc competed with other products; neither the Ministry of Economic Affairs nor branch organisations wanted to get involved in a debate that interfered with competition.

38 For example, the European Water Framework Directive, and the public sustainable purchasement and procurement policy (in preparation).

■ *Weak linkages between arenas hindered transfer of lessons* – Although the arenas overlapped considerably in both participants and issues, the processes in the various places were quite separate. For example, in one arena the Ministry of the Environment negotiated product innovations with industry while in another arena they warned industry that all zinc emissions should be banned. The separations between the arenas made it possible to pursue policy goals with different means in different places. It also explains how important lessons learned in one arena failed to influence the policy processes in other arenas.

The Dutch norm-setting arena and the European arena, however, were strongly linked. Opponents and supporters of zinc construction products looked for support of their views in Europe and the debate in the European arena was almost a copy of the debate that had taken place in the Netherlands.

Retention of the generated variety

To what extent was the generated variety, the lessons learned in the zinc policy process, retained?

■ *Strong retention of lessons about norms* – The lessons learned about norms and the norm-setting method were successfully retained. These lessons could potentially put norms and norm-setting procedures at risk. They were taken to heart by the ministries and research institutes. Norms were considered legitimate despite methodological flaws, but in the long run methods had to be improved to maintain credibility. This led to several improvements to both norms and the methods to develop them. For example, adjustments took natural differences into account, making policies more regionally specific. Water boards were asked to take local circumstances and bioavailability into account when taking action to reduce diffuse emissions.

Zinc was also put on the European agenda, making more countries aware of the potential environmental risks of high zinc concentrations and thus giving the international industry a more powerful signal that they had to innovate to reduce emissions.

■ *Other lessons were only partially retained* – Some of the social lessons learned by the policy makers seem to have been retained only superficially. For example, although the zinc industry was granted a formal position in the norm-setting procedure, and the procedure was formalised and made transparent, in the European arena the industry was initially not invited to participate and had the same fight to become involved as they had in the Dutch norm-setting arena. Another example of superficial retention is the position of LCA in the sustainable building arena. Although it had become the generally accepted method to support product claims with evidence, urban planners felt authorised to make judgements on other grounds; after all, they were concerned with urban quality and not with product quality. Also, substantive les-

sons learned did not always affect policies. For example, the lesson that high zinc concentrations did not necessarily harm water quality did affect the actions and priorities of local water boards in the diffuse sources arena. However, it did not affect the prevention policies of the ministries and research institutes in other arenas.

■ *Reinforcement of selection* – The ALARA, precautionary and standstill principles that dominantly influenced environmental policy making and the zinc process, were strongly institutionalised. Their application made their position even stronger. They had a legal basis in the Treaty on European Union and in Dutch environmental laws and/or white papers, and many of the experts involved in the zinc policy process were educated with a strong belief in these principles. At the same time, policy makers applying these principles did not have to prove whether the application was appropriate. In the zinc policy process, the zinc industry had to prove that these principles were not appropriate, but all their attempts were not taken seriously by the policy makers.

Retention of learning

Retention is also about regeneration, about the ability to generate new learning processes. To what extent was the capacity to learn institutionalised in the policy process?

■ *One-dimensional framing of the policy problem will focus future learning* – Many of the lessons learned did not challenge the selection mechanisms used, such as the norm-setting method and the precautionary principle, and it was not in the interest of the majority of actors actively involved to question these selection mechanisms. Only the slightest doubt about the environmental harmfulness of zinc justified the application of precautionary and ALARA principles. Even if another selection mechanism was institutionalised, which happened in the sustainable building arena where LCA became the method used to compare the environmental performance of products, actor behaviour in this arena continued to be influenced by precaution.

The constellation of actors is not likely to change as long as the debate remains technically framed in one dimension. It is unlikely that new participants will enter the arenas and without new participants it is unlikely that the debate will move in new directions.

■ *Developing negotiated knowledge enhanced inter-subjective learning* – Along the way, some participants in the zinc process developed the means to break out of the deadlock that considered the research results biased and untrustworthy. Especially in the diffuse sources and diffuse emissions arenas, actors came to acknowledge that a shared problem perception was a condition for successfully addressing problems like diffuse emissions; problems that can

only be tackled with the voluntary cooperation of many actors contributing to the problem. A successful initiative to develop shared knowledge on the problem diagnosis was followed by more jointly commissioned or jointly carried out studies. However, these studies could not deal with the essence of the policy: the norms, the norm-setting methods and the applicability of the principles for environmental policy making. These subjects were central to the work and knowledge of the policy makers, and they would not let others invade their core competency. It can therefore be questioned if the route of jointly commissioning research can ever lead to conceptual learning and to other changes rather than just technical ones.

■ *Joining forces will help level the playing field* – During the process, zinc producers understood that they had to collaborate to protect their market share. By joining forces, first in the Dutch zinc industry, and later in the process with other industries in and outside Europe, they tried to be an equal competitor matching the joint forces of policy makers at the local, national and European level. This led to a joint initiative for product innovations that would reduce the corrosion and emission of zinc by their products. Being competitors, this was a far-going initiative, which, however, was not valued as such by the Dutch policy makers. The industry was given no inducements rewarding these efforts, which in turn made the industry not very keen on developing and implementing these innovations any further. However, the possible implementation of zinc norms throughout Europe and the European Construction Products Directive again pressured the industry to innovate. This mechanism therefore might prove to be effective in the future, in terms of reduced emissions by construction products. However, whether this will lead to norm compliance can be questioned, especially when the construction sector is just one of the contributors to diffuse emissions.

Conclusions

Analysing the variety generated in the zinc process, the selection made and the retention of lessons and learning shows a process wherein much was learned, but lessons that fell outside the scope of the dominating selection methods failed to influence the policy process. As for the future, there seem to be few incentives for actors to learn beyond the path set out by the coalition of specialist policy makers and researchers on the national and international level.

6.8 Conclusions

How did zinc policies contribute to policy learning and what can we learn from this experience for policy design? At first sight the policy makers' strategy seemed a success: twenty years of battle had no impact on the policy goals.

Water quality norms for zinc were still in place, regional policies discouraging the use of zinc became legitimate, the zinc industry started innovations to reduce the emissions of their products and the zinc problem was put on the European agenda. The ministries' guerrilla strategy to enforce the previously unenforceable, the reduction of diffuse emissions, seemed to work. While there were no legal means to enforce emission reduction and thus norm compliance, voluntary policies were developed to challenge the zinc industry to reduce emissions voluntarily. Zinc users were asked to consider alternative products. At the same time, the debate was scaled up to the European level. In the long run, either as a result of a European directive on zinc or a European environmental product policy, the zinc industry will probably have to address the emissions of its products.

However, after twenty years of policy making, these policy successes have not as yet materialised in improved water quality. In 2008, norms were still being exceeded and the expected growth in buildings is likely to contribute to more diffuse emissions. Important allies to reduce diffuse emissions and thus achieve norm compliance, such as local governments, water boards, architects and contractors lost total interest in the debate and chose to wait for an unambiguous verdict on the environmental effects of zinc. Meanwhile, other sectors that also emit zinc, some even more than the construction sector, were kept out of the picture for a long time because they were more difficult to address. Policies to reduce emissions from these industries have only started recently compared to the policies aimed at zinc.

A further look at the zinc process thus reveals that the success of the policy is questionable. Are the results not outweighed by the efforts? Due to the limited variety of participants and subjects, learning in this policy process was limited and kept within the margins of the policy goals as set at the start of the process. Strongly institutionalised selection mechanisms and a closed professional community resulted in a policy process that represented only a limited number of perceptions. Only lessons in line with policy goals had any influence on the policy process. Incentives to enlarge the variety and thus improve the chances of future policy learning were minimal. The zinc issue is likely to continue.

Suggestions for policy improvement

Suggestions for policy improvement follow the conclusion that the course and outcomes of the policy process were strongly influenced by the closed setting of the process. The main suggestion would therefore be to broaden the scope in which the issue is addressed. This can be done in various ways, for example, by continuing the recent linking of the issue to other issues, thus facilitating the entry of new participants who might view the issue from another perspective and bring new problem-solving opportunities into focus. This would put the policy goals and efforts in perspective and bring cost-benefit analy-

sis back into the policy arenas. In addition, it may contribute to the legitimacy of the application of the precautionary principle. The zinc industry perceived its opposition to policy makers as if they were fighting windmills. Democratic control of the application of the precautionary principle during the process was weak. Opening up the debate and making it understandable to non-specialists would strengthen the legitimacy of the policy goals.

Broadening the policy issue can also enlarge the room for negotiation with industry. So far, industry has been pressured to innovate without gaining anything in return. Instead of dedicating all its energy to product innovation, the industry was forced to use parts of its resources to fight the policies and the policy makers. Some important discoveries about the emissions of zinc construction products can be considered a positive side effect of this battle. Some studies were the result of collaboration between government actors and industry. Although these studies provided input for product innovation and perhaps for the partial revision of the policies, they have not (yet) resulted in concrete actions because there are no incentives to do so for both industry and government actors.

The question is of course who can initiate such a broadening of the debate. Both Ministries of the Environment and of Water Management can play a role in this since they hold central positions in the debate and can open up the highly specialised tone of the debate. Other actors can also contribute, such as the RIZA research institute, one of the actors engaged in the joint studies. With respect to norms and norm-setting, broadening has already taken place amongst policy makers of different countries. The European Water Framework Directive has led to international cooperation for river basin management, challenging countries to harmonise norms and policies.

Broadening the issue seems to offer promising opportunities to bring the debate on zinc a step forward but this should not become a goal in itself. After all, one of the lessons to be learned from this case is that holding on to the same strategies and goals for a long time can result in deadlocks, and deadlocked policy processes do not lead to improved environmental quality.

7 Stimulating sustainable building

7.1 Introduction to the policy

The *National Packages for Sustainable Building* were developed in the Netherlands in the mid to late-1990s. The packages contained lists of measures for sustainable construction that could be applied in the design, construction and usage phases of buildings and constructions. To tend to the specific traits of buildings and the built environment, separate packages were developed for domestic buildings (SBR, 1996), for non-domestic or functional buildings (commercial and industrial buildings, offices, and public service buildings such as schools, hospitals) (SBR, 1998) and for civil infrastructures (roads, railways and waterways) (CROW *et al.*, 1999). There was also a package for sustainable urban planning (Nationaal Dubo Centrum, 1999) which included principles for sustainable urban planning and could be used by planners in the development of new plans.

The main goals of the packages were to harmonise and disseminate knowledge on sustainable construction amongst actors in the building and construction sector. The harmonisation of knowledge contributed to another goal as well; it brought uniformity in local sustainable building policies. The national packages replaced the various lists for sustainable building used by local governments to stimulate and enforce sustainable building. The Dutch building and construction industry that had faced different requirements and constraints in each municipality particularly welcomed the uniformity.

The packages were part of the Policy Programme for Sustainable Building created by the Ministry of Housing, Spatial Planning and the Environment in the 1990s (VROM Ministry, 1995). The programme aimed to formulate sustainability goals and develop instruments to help the building sector to achieve these goals. It aimed for the close involvement of the building sector in the development and implementation of the programme. The building sector took full responsibility for the development of the packages for sustainable construction and within a couple of years brought the envisaged packages to market. To promote the packages, public and private actors at various levels developed some additional communicative and financial instruments.

Table 7.1 presents an overview of the arrangement for the national packages, which aimed to harmonise and disseminate knowledge on sustainable building.

This chapter focuses on the learning that resulted from the policy arrangement for the *National Packages for Sustainable Building*. Section 2 starts with a brief account of the methodology. Section 3 describes the development and evolution of the national packages from their conception in the early to mid-1990s up to 2007. The characteristics of the policy issue addressed by the packages and the policy environment are the subject of Section 4. Section 5 presents the learning to which the packages contributed, followed in Section 6 by an explanation of the variation, selection and retention processes. Sec-

Table 7.1 Public policy arrangement: National Packages for Sustainable Building

Policy	Goal	Responsible actors	Affected actors
National Packages for Sustainable Building	Harmonise and disseminate of knowledge of sustainable building	Ministry of Housing, Spatial Planning and the Environment, building and construction industry	Local authorities, building and construction industry
Communicative instruments to encourage the use of the packages	Stimulate actors to make (maximum) use of the packages	Ministry of Housing, Spatial Planning and the Environment	Provincial and local authorities, building and construction industry
Financial incentives to encourage the use of the packages	Stimulate actors to make (maximum) use of the packages or parts thereof	Ministry of Housing, Spatial Planning and the Environment, Ministry of Finance, subsidy agencies, local authorities, etc.	Building and construction industry, building project commissioners, end users

tion 7 looks at actor behaviour and strategy in the policy process. Section 8 concludes with a reflection on what we can learn from the policy arrangement for designing policies for a sustainable built environment.

7.2 Methodology

The analysis in this chapter is based on a number of sources. An overview of these sources is listed in Appendix II.

For the process from the early 1990s till 2000, the chapter uses an analysis of sustainable building packages conducted by a multi-disciplinary team of researchers from the Delft University of Technology Interfaculty Research Centre, 'The Ecological City'.[39] The group comprised PhD students and post-doc graduates from various disciplines, such as architecture, urban planning, civil engineering and policy sciences. The group studied the aim, content and developmental processes of the packages, and using the Ecopolis strategy (Tjallingii, 1995) made a qualitative evaluation of how the packages could contribute to environmental quality, spatial quality and process quality (Van Bueren *et al.*, 2000; Van Dorst, 2005). This chapter uses the research material, interviews and publications resulting from the Ecological City project.

For the years 2000 till 2007, the chapter refers to a further study of documents and websites and additional interviews held with people who had been closely involved in the development of the packages. A draft of this chapter was reviewed by three practitioners involved in both packages development and the wider policy practice of sustainable building: Mr. Peter van Oppen of SBR (Foundation for Building Research), Mr. Rogier Goes of NVTB (Netherlands Confederation of Producers of Building Materials) and Mr. Dick Tommel, former state secretary of Housing.

39 The Ecological City Research Center of Delft University of Technology was chaired by the late Professor Charles Hendriks of the Department of Civil Engineering and Professor Kees Duijvestein of the Department of Architecture.

7.3 The policy process

The birth of a policy issue

The building sector was one of the target groups for environmental policy making addressed in the 1989 National Environmental Policy Plan (VROM Ministry, 1989). The government aimed to actively involve the target groups in the formulation and implementation of policies and instruments needed to achieve the stated policy goals. In the 1990 update of the National Environmental Policy Plan, sustainable building was identified as a policy field deserving much attention.

The update of the plan defined sustainable building as follows: "Sustainable building is directed at reducing the negative health and environmental effects resulting from the construction, restructuring and management of the built environment." (VROM Ministry, 1990). This definition of sustainable building was relatively broad compared to the policy attention given to building and the environment in the 1970s and 1980s. In this period, the emphasis lay more on considering the use of energy and materials in building and construction. The new definition of sustainable building included more aspects, and gave rise to a wide range of policy initiatives.

A diversity of policy initiatives for sustainable building

Following the attention for sustainable building in the National Environmental Policy Plan, sustainable building quickly gained ground in policy and practice in the 1990s. The knowledge and experiences of pioneers in sustainable building acquired in preceding decades was available. These pioneers could be found amongst interest groups concerned with ecological architecture and lifestyles. The policy attention for sustainable building finally created an audience for the designs, concepts and innovations of these pioneers. Their ideas were used by more established organisations, such as the Construction and Timber Union[40] and SEV, a foundation for initiatives and experiments in the fields of construction, housing and living.[41] These organisations and others started to communicate ideas on sustainable building in the form of guides and checklists for sustainable building (Bouw- en Houtbond FNV, 1992; SEV, 1993). These products were received with great interest by many actors in the built environment, including municipalities, architects, constructors, developers, and urban planners.

At the national policy-making level, the Environmental Building Coun-

40 In Dutch: *Bouw- en Houtbond FNV*.

40 An example of a Dutch pioneer is *De Kleine Aarde* in Boxtel. The Dutch name of the Union for Construction and Timber is *Bouw- en Houtbond FNV*. The full Dutch name of SEV is *Stuurgroep Experimenten Volkshuisvesting*, see also Chapter 6.

cil was established, an umbrella organisation covering the building and construction sector, which negotiated on equal footing with several Dutch ministries and the Dutch Union of Municipalities (VNG) the formulation and implementation of sustainable building policies.[42] In 1993, the negotiations resulted in the 1995 Policy Declaration on Environmental Tasks in the Construction Industry, which described policy initiatives and targets for 1995 (Milieuberaad Bouw, 1993). Following this declaration, a wide variety of initiatives, experiments and pilot projects in the field of sustainable building started, with the guides and checklists acting as important providers of knowledge on sustainable building (Haarman *et al*., 2000).

In 1995, the national government decided to intensify collaboration with the building sector and make it a partner in the development and implementation of sustainable building policies. A Programme Bureau for Sustainable Building was established at the Ministry of Housing to formulate, facilitate and monitor a programme to develop and implement sustainable building. In co-production with the building sector, the first Action Plan for Sustainable Building was formulated in 1995, which announced a multitude of actions, policies and instruments that needed to be developed and implemented to harmonise, diffuse and consolidate knowledge on sustainable building amongst actors operating in the building sector and to prepare the sector for future learning on sustainable building. Each of the actions clearly described the results to be achieved, including deadlines for achieving the results and the partners, public and private, that should at least be involved in carrying out the action (VROM Ministry, 1995).

Towards congruency in sustainable building policies

One of the actions in the 1995 Action Plan for Sustainable Building concerned the development of a package of measures for sustainable building: "The result to be achieved: a concrete and periodically updated package that will provide clarity on what sustainable building actually means. This package will form the substantial starting point for the other projects mentioned in this action plan. Annually, starting this autumn, it will be decided what the contents of the package in force will be. The sustainable building package will consist of measures for sustainable building that, from the viewpoint of construction and cost are considered widely applicable. The package will include all spatial scales (urban planning level, building level, and material level) and will be based on research and practical experiences." (VROM Ministry, 1995).

The state secretary for housing,[43] who was politically responsible for sustain-

42 The Dutch names of these organisations are: Milieuberaad Bouw (MBB) and Vereniging van Nederlandse Gemeenten (VNG), respectively.

43 A state secretary in the Netherlands reports to the minster and is responsible for specific policy terrain in the minister's territory.

able building, wanted the package for sustainable building to end the diversity in local sustainable building policies that had evolved in previous years. The diversity was the result of varying ambitions and knowledge of sustainable building amongst local policy makers and practitioners. Checklists with concrete measures and recommendations for sustainable building were especially popular instruments amongst local governments to stimulate sustainable building. However, this diversity was in contradiction with the 1992 revisions of the Housing Act and the Building Code, which substantially reduced the opportunity for local authorities to formulate local building requirements in addition to the requirements formulated at the national level.[44]

The building industry was also not happy with the diversity of local sustainable building policies, but for other reasons. Such diversity meant that constructors, developers and other building actors were confronted by different demands and requirements for sustainable building in each municipality and region. The building industry considered this inefficient and it was troubled by the absence of a scientific basis for the lists, because these lists could have a considerable economic impact on the industry. For example, Chapter 6 of this book showed how the turnover of the zinc industry dropped acutely as a result of the negative advice on the use of zinc given in the *SEV Guide for Sustainable Building*. The building industry therefore had an incentive to get involved in the development of a package that would harmonise the existing lists and guides.

Outlines for the packages

The first action plan outlined the scope of packages. It suggested having different packages for sustainable building of different types of buildings or spatial scales. For the urban planning level, it recommended that the package should be based on a report published by the Ministry in 1993. This report pre-

44 Since the introduction of the Dutch Building Code in 1992, municipalities are no longer allowed to define building requirements additional to the requirements of the Building Code, e.g. for the use of certain materials. Until 1992, municipalities were allowed to define their own building requirements, a habit abandoned only gradually in the 1990s. In addition, the revised Code stated that when public authorities acted as a private actor they were not allowed to make additional requirements for sustainability (Housing Act, art. 122). This explanation of the article was confirmed by a Dutch court in 1993. In a contract to issue land, a local authority forbade potential builders to use tropical timber. Even though the contract was based on private law, the court considered this to be in contradiction to the revised Housing Act. It would have conflicted with the deregulation intended by the revision (Pres. Rb. Amsterdam 1 July 1993 (Uithoorn), BR 1993: 981). Nevertheless, environmental (building) organisations pointed out to public authorities that when they hold a strong position in a building process, e.g. when they own land or commission a building or renovation project, they could always try to negotiate a higher level of sustainability. (see De Wit, Leen (1994): 17-18; http://duurzaambouwen.senternovem.nl/infobladen/de_nationale_pakketten_duurzaam_bouwen/markt_aspecten/, version July 19, 2007).

sented design principles for urban planning on the following themes: landscape, raw materials, water, infrastructure, nature, energy and waste (VROM Ministry, 1993a). It indicated that the package at the building and material level would be developed by the Foundation for Building Research SBR[45], the research institute financed by the construction industry already working on a similar initiative. The action plan emphasised that the packages would not present anything new, but that they should harmonise existing knowledge on sustainable building and make this knowledge accessible to a large group. To do so, the package should use existing principles and lists for sustainable building, such as a list for sustainable materials produced by SBR, and the Energy Performance Coefficient (EPC) for buildings, an indicator developed to assess the designs of buildings for their energy performance. The action plan also signalled a need to report on the sustainability options for the construction of non-domestic buildings, and a need for guidelines on the maintenance and management of existing houses and buildings.

The action plan thus laid the basis for the development of several packages, so that the measures in each package could be tailored to the characteristics of the constructions and/or the spatial scale concerned.

The National Package for Sustainable Domestic (Residential) Buildings

The action plan referred to a checklist for sustainable building materials being prepared by SBR at the request of the NVOB[46], the branch organisation for the Dutch construction industry. The NVOB hoped this list would end the diversity in the lists and principles for sustainable building used by municipalities and other actors in the building sector. It also aimed to develop an evidence-based list of measures since the economic consequences of measures could be considerable.

The aim of SBR and the NVOB was thus to draw up a list in a short period of time that would be supported and used by a large number of actors in the building sector. The guidelines would be extracted from existing documentation on sustainable building and would present nothing new or innovative other than an agreed state of the art. The format of the existing lists would be used for the list: a number of concrete measures for sustainable building, with an indication of the environmental effects and the financial consequences. For SBR and the NVOB, it was a logical decision that this list would

45 In Dutch: *Stichting Bouw Research.*

46 In Dutch: *Nederlands Verbond van Ondernemers in de Bouwnijverheid (NVOB)*. The NVOB is the largest Dutch employers' association in the construction industry and represents about 4,500 companies that construct residential and non-residential buildings and infrastructure. The goals of the association are collective interest representation and the provision of individual services to its members. In 2008, the NVOB was known as *Bouwend Nederland* (Building Netherlands).

become the package for sustainable building announced in the action plan, with a focus on the construction of new residential buildings.

Although SBR list would indeed form the basis of the *National Package for Sustainable Domestic Buildings*, the Ministry of Housing emphasised that stakeholders and future users of the package also had to be involved in its development. After all, the *National Environmental Policy Plan* assumed that target group participation in the policy process was essential for the success of the policy. Therefore, an advisory board was formed to advise and decide on the content of the package.

Rules for decision making

The measures in the packages were potential sources of conflicts, since they could harm the interests of specific actors in the construction industry. To prevent the private interests of individual firms or suppliers influencing the debate on the advisory board, participation was restricted to organisations representing groups of stakeholders, such as umbrella organisations and branch organisations. Another safeguard to prevent conflicts slowing down decision making were the rules for agenda-setting and decision making on the advisory board:

- Decisions should be unanimous.
- Measures should be economically viable.
- Product-related measures should be based on quantitative data derived from LCA, a comparative method to determine the environmental effects of products from cradle to grave.
- Product-related measures should not mention trademarks or firm names; materials or substances could only be mentioned when a comparative LCA study proved that a material or substance was significantly more environmental friendly than its commonly used substitutes.
- For measures that could not be based on quantitative data, qualitative principles, such as formulated in formal government policies, should lead decision making (SBR, 1999).

SBR acted as process manager: it organised the meetings of the advisory board and facilitated the processes of interaction and negotiation. Since SBR was funded by private firms in the building and construction industry, it could not afford to take sides in competitive disputes within the sector. It hired DHV, a large engineering and consultancy firm, to support the process with substantive knowledge and to facilitate and mediate the substantive discussions that inevitably would arise.

DHV drew up a list of some 600 potential measures for sustainable building, which was soon trimmed down to 150 measures on which the members of the advisory board agreed. Many of the measures had proven success in practice and did not give rise to much debate. The decision-making rules almost automatically excluded controversial measures from the list, for example because

they were too expensive or because they could not be supported with LCA based evidence; that incidentally did not turn out to be as neutral as expected as it used information supplied by the producer of the product it assessed. Some measures did cause great controversy on the advisory board. Especially at the beginning of the process not all competitors were represented, which meant measures based only on subjective evidence could get included. However, the excluded actors soon managed to get their interests represented, by joining one of other of the members on the board. The actors learned how to deliver the requested evidence in accordance with the decision-making rules, which had to be accepted by all members of the board. It was thus not unusual that actors conducted several LCA studies in attempts to influence the content of the package.

The transparent and strict manner of decision making contributed to the rapid success of the initiative to develop the package. The actors involved succeeded in delivering a package as requested by government within a very short period of time. In 1995, only five months after the formal approval of the *Action Plan for Sustainable Building* by the Dutch parliament, the *National Package for Sustainable Domestic Buildings* was published in a book, followed by a CD-ROM in April 1996.

Content of the package

The CD presented measures and each measure was accompanied by a specification sheet, which indicated:

- At which decision-making stage the measure could be applied, e.g. initiative, design and development, and construction.
- On which environmental theme it would have a positive effect, e.g. energy, materials, water, landscape, indoor climate.
- The criteria to assess whether a measure had been applied.
- Indicators for design and construction.
- The effect on costs: would the measure involve additional costs, save costs or would it be cost-neutral compared to the costs of the usually applied and less sustainable alternative? Only the estimated additional costs were specified.
- References to relevant literature.

The package distinguished between generic and specific measures[47]. Generic or universal measures could be applied under all circumstances and involved no additional costs. Specific or variable measures could only be applied in particular situations and/or would involve additional costs. The package emphasised that the application of generic and specific measures would result in undisputed environmental gains. Table 7.2 presents some examples of measures.

47 In Dutch, generic measures are called '*vaste maatregelen*', specific ones are called '*variabele maatregelen*'.

Table 7.2 Examples of measures of the National Package for New Housing (SBR 1996)

Measure No.	Description	Generic/Specific
S003	Realise an extra favourable energy performance	Specific
S012	Realise a thermal resistance for the ground floor of Rc≥3m²K/W	Generic
S016	Use HR+glazing with U≤1,6W/m²K in all heated rooms	Generic
S024	Use individual registration of energy use	Generic
S027	Optimise design for the access of daylight and the use of passive solar energy	Specific
S445	Install a rain barrel	Specific

The development of packages for other parts of the built environment

Following the package for domestic buildings, other packages tuned to other parts of the built environment were developed as well: one for non-domestic buildings, one for (civil) infrastructures and one for urban planning.[48] The development of these packages was announced in the *Second Action Plan for Sustainable Building* presented in 1997. This plan also announced that the *National Package for Sustainable Domestic Buildings* would be revised annually, to ensure that the package reflected the state of the art. The annual revision could provide a means to gradually raise the ambition level of the Package (VROM Ministry, 1997). For each action, the plan named the 'owners' of the actions, that is, those held responsible for carrying out the actions. The owners were preferably private sector representatives such as SBR and the NVOB, and actors who should be offered the opportunity to participate in implementing the action.

Developing the package for non-domestic buildings

The *National Package for Sustainable Non-Domestic Buildings* was the first other package to be published, in 1997. Its development process and content closely resembled that of the *National Package for Sustainable Domestic Buildings*. After all, these procedures had resulted in quick and satisfactory results, and in the Netherlands it was a common way of working in processes of normalisation and standardisation (Verheul and De Vries, 2003). Decision making amongst the organisations involved took place according to the same rules as used for domestic buildings, and it aimed for consistency with the same measures as in the domestic buildings packages, both substantively and in presentation (difference between general and specific measures, the specification of costs, use of reference buildings, etc.).

The development of the package for infrastructures

The history of the infrastructures package differed from the packages for domestic and non-domestic buildings. Infrastructural works resorted under the Ministry of Transport, Public Works and Water Management, referred to in

48 The *National Package for Non-Domestic Buildings* was announced in a 1996 supplement to the 1995 *Action Plan for Sustainable Building* dedicated to the sustainable construction and maintenance and management of non-domestic buildings. The second action plan, presented in November 1997, announced the development of packages for sustainable building for other parts of the built environment, non-domestic buildings, urban planning and civil infrastructure (VROM Ministry, 1997).

this chapter as the Ministry of Public Works. Since the beginning of the 1990s this ministry had collaborated with the knowledge networks of two organisations in civil engineering, CUR and CROW[49], to develop innovations for sustainable building in infrastructure, for example, to reduce construction waste through reusing and recycling materials. The 1997 *Second Action Plan for Sustainable Building* connected these initiatives with actions for sustainable building in other parts of the built environment. It announced the development of a package for infrastructures, and suggested that it should address the following themes: materials, products, building processes, design methods and the interaction between construction works and their surroundings. CUR and CROW were the stated owners of the action.

With relation to the materials and energy used in construction and maintenance of public works, the infrastructures package tried to follow the same setup as the packages for buildings. However, the spatial scale of infrastructures was different and so the package also addressed topics related to this greater scale, such as embedding works in the natural environment. It also addressed less technical issues, such as embedding sustainability in the organisation of the design, construction and management and maintenance of infrastructures.[50] These issues were given an introductory chapter and emphasised throughout the package was that the decision to invest in a measure should take into account the costs and cost-savings of a measure throughout the entire lifecycle of the infrastructural work. When possible, qualitative issues were captured in specific measures, such as: Ensure good coordination between actual and allowed use of an infrastructural object (G034); Use an open planning process (G057); and use maintenance materials in line with the expected life remaining to the entire construction (G035).

DHV, the consultancy firm that facilitated the development of the packages for buildings, was also hired to develop the package for infrastructures. However, this time the project organisation was different. The project was directed by a steering group and a project group representing various thematic commissions concerned with the development of sustainability measures for roads, railways, waterways and dams, green areas, and water. Unlike for the buildings packages, participation in these commissions was not restricted to representative organisations from the private sector. Infrastructural works are mainly public works, commissioned by public authorities. The representa-

49 Centre for Civil Engineering Research and Codes (CUR) and Natural Information and Technology Platform for Infrastructure, Traffic, Transport and Public Space (CROW).

50 Some examples of measures in the first version of the package were: Base the construction plan on a closed ground balance (G001); Use secondary materials in road construction (G020); Design weed-resistant green facilities and pavings (G026); In the case of PVC: use only recycle-guaranteed PVC and, if available for the application, use recycled PVC (G045).

tion of public values was therefore taken into account in the project organisation of the development of the package. Intermediary organisations representing interests other than industrial and commercial ones were allowed to participate, such as the union of cyclists and associations for landscape conservation. Representatives of public organisations also participated as well as experts from city departments and engineering firms.

Despite the differences in scope and participants between the packages for infrastructures and buildings, the rules for decision making were basically similar: decision making was based on unanimity and for product-related measures LCA was the decisive method. For measures not product-related, there was no single instrument or method that could be used to determine whether it should be part of the package or not so the steering group agreed on a number of strategies to lead and guide decision making. For example, leading strategies for energy included reducing energy needs and stimulating the use of renewable sources, while water strategies included retaining area-bound water, consolidation or improvement of ground water quality and reduction of damage to or improvement of the ground water system. Measures in accordance with these strategies could be included.

The *National Package for Sustainable Infrastructures* was developed fairly quickly. Work started upon its announcement in the *Second Action Plan for Sustainable Building* in 1997 and it was published in November 1999 (CROW *et al.*, 1999).

The National Package for Sustainable Urban Planning

Although the need for a national package for urban planning was already signalled in the first *Action Plan for Sustainable Building* published in 1995, organisations involved in urban planning only first met to discuss the development of the N*ational Package for Sustainable Urban Planning* by the end of 1997. Unlike the other packages, which were initiated by the market, the initiative for developing the urban planning package came from the public sector and was contracted out by the Programme Bureau for Sustainable Building of the Ministry of Housing, Spatial Planning and the Environment. The project was granted to a joint initiative of SEV, Novem and the National Centre for Sustainable Building, three organisations especially concerned with sustainability. However, BNSP, the National Association of Urban Planners and NIROV, a national knowledge network for professionals in planning and housing, also expressed interest in developing the package.

There were great differences between the two groups that wanted to develop the package. SEV, Novem and the National Centre for Sustainable Building were more sympathetic to the idea of developing general measures for sustainable urban planning, whereas the BNSP and NIROV were hesitant about this idea. Being representative organisations of professionals, including many designers, they did not like the idea of developing a normative package that

might restrict the freedom of the designer. They considered urban plans to be too site-specific, and thus these were useless for developing general guidelines. However, bypassing BNSP and NIROV caused considerable delay. They represented many professionals who had to work with the package and whose participation was indispensable.

Bureau Nieuwe Gracht, a small urban-planning consultancy, was hired to develop the package, and they proposed a format acceptable to all parties, including BNSP and NIROV. It was decided that the package would have a different format from the other packages. Instead of creating a list of tangible, ready-to-use measures to prevent debate on sustainable building on the drawing board level, the package would start up the debate and feed it with ideas; it would inform and inspire planners (Gelinck, 1999). This led to the 'encyclopaedic approach', as termed in the package, which much like an encyclopaedia, discussed a large number of topics relevant to sustainable urban planning. Urban planners could look up the sections of interest to them. Three different parts, entitled process, concepts and measures, discussed the design process and presented a number of concepts and measures for sustainable urban planning. Explicit attention was paid to the relationships between these three parts.

The four packages in summary

By the end of 1999 the first edition of all envisaged packages had been published and for the domestic and non-domestic buildings, a distinction had been made between new and existing buildings. Initially the packages were published on paper and/or on CD-Rom but by 2005, purchasable web licenses for the buildings and infrastructures packages were also available on the Internet. All the packages were updated and revised annually until 2005.

The urban planning package was different from all the others in that the packages for domestic buildings,[51] non-domestic buildings,[52] and infrastructures were especially concerned with the sustainable (re)design of constructions. These packages were all modelled on the *National Package for Sustainable Domestic Buildings: New Buildings* and whenever possible, had the same set-up. For example, they distinguished between generally applicable measures

51 The *National Package for Sustainable Domestic Buildings: Existing Buildings*, concerned with the sustainable renovation and maintenance of existing domestic buildings, was added as a separate module on the CD for new housing. The package was developed by the same actors, according to the same rules, as the *National Package for Domestic Buildings: New Buildings*. It did not have to be developed from scratch, but could continue on from *Sustainable Maintenance of Domestic Buildings*, a guide published by SEV and NOVEM in 1997.

52 The *National Package for Non-Domestic Buildings* distinguished between several concepts for buildings, such as the energy efficient building, the ecological building and the flexible building; and between different functions of buildings, such as schools, hospitals and offices.

and measures that could only be applied in specific circumstances; whenever possible they based measures on LCA methods; they used similar categories to specify the environmental benefits of the measures; and they specified the additional costs of the measures whenever possible. The developers tried to present the measures in a consistent format, using whenever possible an identical presentation, such as for formulation and numbering.

The development processes for the buildings and infrastructures packages were to a certain extent comparable. Decision-making rules were all based on unanimity, participation and agenda-setting. The decision-making processes for domestic and non-domestic buildings were almost identical, with considerable overlap in procedures and organisational setup. Measures were supposed to be proposed by members of the advisory boards, comprising representative organisations of the building sector. SBR, the Foundation for Building Research, facilitated decision making, and DHV, the consultancy firm, was hired to edit the publication. In reality, DHV assembled a list of measures and the advisory boards decided which ones to select.

Decision making for the infrastructures package was based on similar procedures whenever possible. However, these rules could not be applied as strictly for all topics, since this package also addressed more qualitative topics concerned with larger spatial scales, or they affected actors other than the ones represented by the organisations participating in the package advisory boards. It was even harder for the development of the urban planning package to formulate clear, neutral criteria and procedures for decision making. Instead, they decided to rely on the subjective judgement of experts.

Revision of the packages

The packages were meant to reflect the state of the art. The action plans for sustainable building therefore recommended that they should be updated and revised periodically, a task taken on by the advisory boards. Strict rules for revision of the measures were formulated for the domestic and non-domestic buildings packages to safeguard their quality and legitimacy. Requests to revise, remove or add a measure had to meet the following criteria:

- Requests should be made from the viewpoint on sustainable building used in the national packages.
- Requests should be in line with national environmental policies.
- If, in the opinion of the advisory board, two prior descriptions of a proposed measure had not convinced the board of its environmental gains, then the following procedure would be followed: the proposed measure should be supported by evidence and revised by an external auditor; the audit costs to be paid by the requesting actor. Based on the auditor's advice, the advisory board would unanimously decide on the proposal. In the event of differences in opinion, a working group would be formed to investigate the bottlenecks and to advise on possible solutions.

- The advisory board did not base its decisions solely on technical arguments, but on relevant financial and practical arguments as well.
- Measures concerned with material use and based on a comparative LCA study were valid for two years. It was up to actors themselves to file a request to continue the measure.

The more lenient rules for revising the infrastructures package were aimed at including recent developments and innovations. Besides updating the measures, the revised packages for domestic and non-domestic buildings and infrastructures improved usability by including software that could help users to determine the additional costs of the selected measures and the ambition level achieved.

A revision was foreseen for the package for urban planning but no update had been published by 2007. However, some participants in the development undertook other initiatives to up-date this package, resulting in the following products: a brochure entitled *Urban Planning: Administrative Guidance for Local Authorities*[53], a book entitled *Sustainable Urban Design*,[54] and a digitalised, web-based *Frame of Reference for Sustainable Urban Planning* developed for two provinces in the Netherlands.[55] In 2008, these publications together with the package formed the basis for local authorities and planners to develop sustainable urban plans. These products also supported authorities in the development of local and regional covenants for sustainable urban planning and design.[56]

Instruments to support the use of the packages

The introduction of the national packages was accompanied by a number of initiatives and incentives to stimulate their use. The initiative most directly linked to use was the 'Tommel yardstick' developed by the Ministry of Housing and named after the vice-minister for Housing, Dick Tommel. The yardstick helps users of the *National Package for Sustainable Domestic Buildings* to determine whether their selection of measures adds up to a residence that could be called 'sustainable'. According to this yardstick, a dwelling is sustainable if (1) generic measures, all those that can be applied in any circumstances, and all cost-neutral specific measures mentioned in the package have been imple-

53 Dutch title: *Duurzame stedenbouw, een bestuurlijke handreiking voor gemeenten*, published by SEV.

54 Dutch title: *Duurzame Stedenbouw, perspectieven en voorbeelden*, published by Stichting Beursloge Projecten and Uitgeverij Blauwdruk. The book was commissioned by BNSP (Association of Dutch Urban Planners), NVTL (Dutch Association of Town and Landscape Architects) and a joint working group on sustainable urban development.

55 www.npds.nl (July 29, 2007).

56 www.npds.nl (July 29, 2007), and http://duurzaambouwen.senternovem.nl/nieuws/voorbeeldenboek_duurzame_stedenbouw/ (July 29, 2007).

mented at an additional cost ranging between 1,500 and 2,000 Dutch guilders per dwelling; and (2) if specific measures selected from this package added up to an investment of at least 3,000 Dutch guilders.[57]

The yardstick had no formal status, it was a communicative instrument formulated by the ministry to support the introduction of the packages. It showed the building sector what was expected of them in the field of sustainable building and helped other authorities to implement sustainable building policies. For example, the yardstick could be used by local or provincial authorities as a condition for receiving subsidies. Likewise, the yardstick helped public and private actors to implement agreements laid down in covenants; for example, when signing parties had agreed upon the number of sustainable buildings to be built in an area, the yardstick made it possible to monitor and measure this. However, not all building firms appreciated the yardsticks. These could not make up for lacking consumer demand for sustainable buildings.

In the course of time, the ministry's yardstick became outdated and was not replaced[58] even though potential package users expressed a need for such a yardstick. In response, the supervisory boards of some of the packages decided to develop yardsticks for themselves. Yardsticks directly related to measures were included in the revised versions of the packages for buildings and infrastructures.[59] The *National Package for Sustainable Urban Planning* also referred to yardsticks, but these were not developed as part of the package and only applied to specifics, such as energy and water.[60]

One specific application of yardsticks from the packages for domestic buildings deserves mention. The yardsticks were part of the statutory regulation for green projects.[61] They were used to check whether (future) home-owners could apply for a green mortgage to finance their newly built or renovated

57 In 2008, 3,000 guilders equaled approximately 1,365 euros.

58 In its *Policy Programme Sustainable Building 2000-2004* the Ministry of Housing states that the yardstick became outdated because of the following reasons: (1) in building projects in the VINEX residential estates, large estates of new dwellings, it was relatively easy to implement sustainability measures that complied with the yardstick; (2) some measures of the yardstick were included in the Building Code, which made the yardstick redundant; and (3) most builders invested more in sustainability measures than the sum requested in the yardstick (VROM Ministry, 1999: 21).

59 For example, the 2005 version of the *National Package for Newly Built Domestic Buildings* included a quality selection of measures that, when applied, would lead to a sustainability performance higher than average. The measures had proven performance levels and involved no additional investments (NVTL, 2005; SenterNovem, 2008).

60 For example, the EPL (energy performance on location), the VPL (traffic performance on location) and KODUP (costs of sustainable urban expansion plans).

61 In Dutch: *Regeling groenprojecten*.

dwelling. Meeting the requirements of the yardstick entitled them to a fiscal advantage, in the form of a lower interest rate, on a part of their mortgage.[62]

The use of the packages was also stimulated with covenants. These could have a geographical basis, such as the covenants between actors working in a region in which they had committed themselves to building sustainably, or a specific focus, such as the covenant between the Ministry of Housing, Spatial Planning and the Environment and national housing associations.[63] The National Centre for Sustainable Building, founded in 1997, promoted the packages with an array of communicative instruments, such as a website, a service desk for questions about sustainable building and the packages, and with knowledge support for local public and private parties in the form of regional sustainable building counsellors. Government organisations were stimulated to set an example when commissioning building or renovation projects.

In addition, use of the packages, or parts thereof, was stimulated with financial incentives, mainly temporary subsidies that could be received for the application of specific measures, such as the installation of photovoltaic panels or solar domestic hot water systems or the replacement of lead piping. Some of these subsidies could be applied for directly by end-users, others were aimed at professional actors commissioning the building projects, such as developers or local authorities. Subsidies were also granted to 'model projects' that demonstrated the technological and financial feasibility of sustainable building. However, many of these subsidies and incentives were not specifically connected to the packages, but were included in other policy programmes at the European, national, regional or local level.[64]

Embedding the packages in policies and regulations

The action plans for sustainable building presented a clear-cut vision of the initial and future role of the packages. The national packages should serve as a first step in anchoring sustainable building in practice and should harmo-

---

62 The green mortgage (1996) is administered by SenterNovem. In 2005, the fiscal advantage was 12.5% of the mortgage. It is limited to 10,000 applications annually: half for newly built and half for renovated dwellings. (SenterNovem, *Toelichting Maatlat duurzame woningbouw 2005*, August 2005 [Explanation of the Sustainable Domestic Buildings Yardstick 2005]).

63 In the late 1990s two national housing associations, now united as Aedes, signed a convenant on sustainable housing.

64 In 1997 and 1999 the National Centre for Sustainable Building published an overview of the most important subsidies and financial incentives for sustainable building that could be acquired from governmental or non-governmental organisations at the international, national, regional and local level. (Nationaal DuBo Centrum, *Subsidieoverzicht duurzaam bouwen: De belangrijkste subsidies en stimuleringsregelingen voor duurzaam bouwen*, Best: Aeneas, 1997, 1999.)

nise and disseminate state-of-the-art knowledge and practices in sustainable building. If possible, their measures should be made part of national building regulations, such as happened with the Energy Performance Coefficient. The measures in the packages could then be tightened up to higher sustainability ambitions, which would exceed the legally prescribed ambition levels.

In general, the roles of model projects, packages and legal regulations were perceived as follows. In model or demonstration projects the leaders or innovators in sustainable building could experiment with new technologies and designs for sustainable building. Sustainable technologies and practices with proven financial and technological feasibility were then ready for use in general practice and should be incorporated in the packages. The widespread use of the packages would contribute to the voluntary implementation of sustainable building in mainstream building and construction projects. The inclusion of minimum sustainability requirements in laws and regulations would ensure that the laggards, those actors unwilling to tend to sustainability, would at least comply with the minimum ambition level. Periodical updates of the packages would ensure that they remained a reflection of state-of-the-art sustainable building.

The use of the packages

Soon after their introduction, the packages proved to be a success. The *National Package for Sustainable Domestic Buildings* was particularly widely used. In 1999, more than 80% of the actors in the target groups were familiar with the existence of this package, compared to 60% in 1996. Local authorities, housing associations, real estate developers and architects were the best informed: about 90% knew of the package. Operational organisations such as installers and contractors were the least informed: 43% and 64% respectively were acquainted with the package. About 60% of the target groups owned a copy of the package, and an estimated 50% of the actors in these groups actually used them (VROM Ministry, 1999a).

Since 1999, package usage has not been monitored. In 2000, the Ministry of Housing refocused its sustainable building policy, which resulted in a decline of the ministry's interest in the packages (VROM Ministry, 1999b). Explanations in updates and additions to the packages lead to the assumption that the packages for non-domestic buildings, infrastructures and urban planning were less well known and used less often than those for domestic buildings.

A possible explanation for the non-domestic buildings package could be found in the wide variety of buildings to which it could apply, considering that the package presented too much of an approach resembling 'one size fits all'. Later versions of the packages therefore paid more attention to reference types of buildings and performance requirements. A web-based register for sustainable non-domestic buildings that could serve as examples for other projects was also established.

By the end of 2003 some 1,000 copies of the *National Packages for Sustainable Infrastructures* had been sold, and there were about 3,000 users; presumably it was used especially in projects commissioned by the Ministry of Public Works, but this has not been monitored.

The *National Package for Sustainable Urban Planning* is considered the least known and used of the packages;[65] although monitoring data for this package are missing. Following its publication the National Centre for Sustainable Building organised courses to acquaint professionals with the package and teach them how to use it. It was also promoted with debates amongst leading professionals in the field through the country. In the years following publication, several initiatives were aimed at giving the package more practical relevance. Despite these efforts, professionals considered it only faintly interesting and did not use it in the design of urban plans.

From harmonisation to differentiation

In the 1990s and the beginning of the 2000s, the packages successfully harmonised knowledge on sustainable building and planning and disseminated it broadly throughout the Netherlands. However, as the 2000s progressed, the heterogeneity in sustainable building policies increased. Several developments contributed to this:

- Initiatives to support the further harmonisation of sustainable building foundered on the competing interests of industry. For example, initiatives that aimed to disclose quantitative environmental product information were hampered out of concern for disclosure of competitive information.[66]
- Representative and branch organisations in the boards of the packages focused on the interests of the weakest actors; they also had to be able to use the packages. Meanwhile, some big actors and forerunners in building and construction wanted to achieve higher ambitions. These could not be achieved through lists of measures, but needed integrated perspectives on design, construction and use of buildings. Developing concepts and methods themselves, and by using and testing them in demonstration projects, would give the industry a competitive advantage.
- Local authorities wanted to tune their demands for sustainable building to their ambition level and the characteristics of the plan area. If ambitions

65 http://www.dubo-centrum.nl/infodesk/veelgesteldevraag.php?recID=268, website version, June 14th, 2005.

66 For example, the development of databases with environmental profiles of building materials and products had been initiated by *Milieuberaad Bouw* in 1995. Environmental product information could further help architects, clients, constructors and other actors in the building industry to make informed choices for specific products and/or materials. This kind of information would support the advice given in the *National Packages for Sustainable Building*.

exceeded those of the packages, the authorities looked elsewhere to realise their ambitions.[67]

- The Ministry of Housing decided that from 2004 onwards the building industry no longer needed government support to develop a sustainable built environment.[68] Central policies for sustainable building were trimmed down. Regional and local authorities that still wanted to stimulate sustainable building developed initiatives of their own, but there was no longer a long term vision of national government on disseminating sustianable building in mainstream building activity in which these initiatives could be positioned.
- The development of an environmental 'pillar' in the Building Code, foreseen at the time of the introduction of this Code in 1992, did not take place. The threat of regulatory intervention, like the strict energy performance requirements for new buildings, hurried the building industry to develop alternative forms of governance, such as the packages

As a result of these developments the diversity of local sustainable building policies increased again, and a 'grey' area of policy making for sustainable development re-emerged. It was this diversity that the packages had supposed to end, since it was considered as undesirable by both public and private actors involved in building and construction. The packages had thus succeed-

67 When local authorities owned the land, there were several opportunities to do so: e.g. by demanding a minimum amount of investment in sustainability measures, by setting a higher land price in the form of a deposit returnable if builders could prove that they had achieved the required ambitions or by labeling projects as experiments, which made it legitimate to make requests additional to those in the building code. Local authorities could also use their responsibility for ground water quality to prohibit the use of certain materials. At an urban level, they could make certain legal requirements in the zoning plan. And they could ask the building sector to voluntarily build sustainably; such agreements were often formalised in a covenant signed by the parties involved. Although they used the package as a basis for their demands for sustainability, they added other demands as well. The formal status of these demands was diffuse. Sometimes, demands were based on private law, e.g. if local authorities owned the land; in other cases, they were part of the conditions for subsidy, covenants, site development plans (http://www.dubo-centrum.nl/infodesk/veelgesteldevraag.php?recID=268, June 14, 2005).

68 Instead of a third action programme, it presented a policy programme which described the policy goals and instruments to implement the goals for the period 2000-2004. The programme was trimmed down to continuation of development and implementation of knowledge and to themes requiring additional attention: stimulation of consumer demand for sustainable solutions, development of sustainable urban plans, and reduction of energy use. This was in line with a general decline in the early 2000s in political and public attention for sustainable development in the Netherlands. Deteriorating macro-economic conditions and a right-wing government coalition put the focus of policy makers on economic development as a condition for environmental investments. In 2007, rising oil prices and renewed concern for climate change put the need for energy-efficient buildings back on the agenda. Policies to stimulate a sustainable built environment were focused on reducing the use of non-renewable energy (http://duurzaambouwen.senternovem.nl/praktijk/praktijk_wat/ontstaan__toekomst_dubo/, June 2008).

ed to disseminate and harmonise knowledge of and policies for sustainable building for a limited period of time.

The end of the packages

In 2007, it was decided to stop revising the packages for infrastructures and buildings. The last revision of the buildings packages took place in 2005, but this will remain online until 2012.[69] The final revision of the infrastructures package was in December 2006.

The buildings packages were replaced by a *Catalogue for Sustainable Building*, put online in April 2008. This catalogue is more informative than prescriptive as it consists of information sheets on various sustainable building topics. The package for infrastructures has not been replaced by a specific product. CROW, the publisher of the package, expected sustainable building to become an integrated part of all future products aimed to enhance building and construction quality.[70]

The demise of the packages for buildings and infrastructures can be regarded as a response to the call of actors in the building sector for support in sustainable building on a more conceptual level. The industry still regarded the packages as lists of arbitrary specifications lacking a neutral basis (NVTB, 2005). The Union of Architects considered the packages uninspiring. The packages put sustainability on the agenda when key decisions influencing the sustainability performance of buildings had already been made (BNA, 2002). Also, they focused on the application of specific technical measures and paid little attention to contributing to the environmental quality of a building or construction. It was unclear how the improved environmental quality would relate to the improvement of other qualities, such as comfort, health and aesthetics. Potential users indicated that they needed more comprehensive concepts that would help them design and construct high quality buildings and infrastructures (Bouwmeester, 2003: 14-15). Besides the catalogue, other practical 'design tools' were developed in response to this call, such as the *Sustainable House Building Toolkit*[71] and GPR software for building professionals "suitable as a decision-making tool as it helps [you] find an optimum between reduction of environmental load along with improvement of the quality of the building".[72] Both tools use concepts, such as 'green dwelling' or 'passive house'. The tools also pay explicit attention to the process of design and deci-

---

69 http://duurzaambouwen.senternovem.nl/nieuws/dubo-catalogus_als_vervanger_nationale_pakketten_duurzaam_bouwen_online/ (press Release SenterNovem, April 16, 2008).

70 http://duurzaambouwen.senternovem.nl/infobladen/de_nationale_pakketten_duurzaam_bouwen/milieu_aspecten/#Actualiteit (April 21, 2008).

71 In Dutch: *Toolkit Duurzame Woningbouw.*

72 www.gprgebouw.nl/english (June 2008).

sion making that should lead to the realisation of the concepts. The successors of the buildings packages thus aim to show what concrete sustainable building concepts can be about, and support tool users implementing the concepts. Although packages are no longer updated, their publisher, SBR, expects that if stakeholders agree, they will still be used in local building projects.

The urban planning package was never revised. It had a more conceptual and comprehensive setup than the other packages, and other products had already been developed to support the implementation of the concepts it introduced.

7.4 The policy issue and its environment

This section starts by analysing the process which developed and disseminated the *National Packages for Sustainable Building*. First, it identifies the issues that dominated the policy process. Second, it explores the policy environment in which these issues were addressed. Which policy networks were involved? And in which policy arenas were these issues discussed and decided upon?

7.4.1 Issues in the policy process

Three issues dominated the policy process around the formulation and implementation of the national packages.

■ *Assessment method* – Measures in the packages could have far-reaching consequences for producers of certain materials or products. In the 1980s and the early 1990s, products were labelled as sustainable or non-sustainable on subjective grounds. This resulted in disputes amongst opponents and proponents of products. In these debates, opinions were often used as legal arguments and were not always supported by scientific evidence. For building sector acceptance, it was therefore of utmost importance that the package measures were based on a widely accepted method to assess the comparative sustainability performance of products and materials.

The advisory boards of the buildings and infrastructures packages regarded LCA as a method that met the requirements of being scientific, neutral and accepted. Selecting LCA as the assessment method ensured that the development of the packages was not delayed by ill-conceived disputes. However, LCA was only suitable for the assessment of products, whereas other possible measures were not concerned with products but, for example, with spatial design. For these measures, there was no decisive method available and despite being included in the packages, they could not shake off their controversial character.

■ *Ambition level* – What level of sustainability should the packages aim to achieve? The packages were created to reflect the 'state of the art'. Howev-

er, this gave rise to debates centred on the question of when a building or a plan could be called sustainable. When was something sustainable or when was it just a quality that should be met anyway? And if a practice was almost business-as-usual, did it still deserve to be labelled as a sustainability measure?

The advisory boards of the packages for buildings and infrastructures resolved the debate in two ways. First, by making a distinction between generic and specific measures: specific measures could be applied when appropriate and when the actors involved wanted to achieve higher sustainability ambitions. The yardsticks were used as a reference point to distinguish between different levels of realised ambitions; this was expressed in monetary value. Second, by deciding unanimously on the content of the packages: all actors involved agreed on the measures. On the advisory board of the urban planning package, the debate had a different outcome; the package should reflect high sustainability ambitions.

■ *Form and function* – One of the central goals was that the packages would facilitate mainstream building practices to apply sustainability measures. To achieve this goal, the packages should be designed so that actors in the building sector would find them easy to use. How could the form and function of the packages best support goal achievement?

The advisory boards focused strongly on form and function during package development. The presentation format of the advice given on sustainable building was influenced by how the actors thought the packages would be used. At the construction level, it was considered important that the packages could fit easily in with existing practices. For example, if possible, the measures and yardsticks were made compatible with design software. Usability was considered less important in the development of the urban planning package, since urban plans were too diverse to be standardised in simple do's and don'ts. In the years following the publication, however, usability turned out to be important as well, and following publications paid special attention to this topic.

7.4.2 Networks in the policy process

Policy networks evolve from the long-lasting patterns of interaction between actors in a policy field. Two networks dominated the policy process that formulated and implemented the five national packages: (1) the housing and construction network and (2) the civil engineering network, both described briefly as follows.

■ *Housing and construction network* – This network consisted of all actors involved in processes of housing and construction, ranging from real estate de-

velopers, contractors, suppliers and installers to housing associations, architects, urban planners, and decision makers at various government levels. The Ministry of Housing, Spatial Planning and the Environment held a prominent role in this network. It was responsible for policy and regulations in the field of housing, urban planning and the environment.

Sustainable building cut across these three fields. It had been on the agenda of various arenas in this network since the beginning of the 1990s. While the Directorate-General for the Environment set the environmental targets which partly formed the basis of sustainable building policies, these were primarily formulated from the perspective of housing and spatial planning. The Government Building Agency,[73] previously part of the ministry, was responsible for the construction, renovation, management and maintenance of many buildings owned and used by government organisations. In this role, they initiated innovative demonstration projects in the field of sustainable building. The directorates for both housing and spatial planning supported the sustainable building policy programme with covenants, experiments and subsidies.

■ *Civil engineering network* – Actors in this network were concerned with the construction, management and maintenance of public works in the field of infrastructure, such as roads, flyovers, bridges and dams. The Department of Public Works of the Directorate-General for Public Works and Water Management was particularly concerned with infrastructure and the realisation of sustainability goals in this field. Because of its central role the department could set an example to other actors in the network. Other government organisations in this network were provincial governments, who were responsible for the management and maintenance of provincial roads and bridges. Water boards and municipalities were also members, activated whenever public works within their jurisdiction were on the agenda.

Private actors in the network were mainly engineering firms and constructors. The large private players were especially active members. Because of the amount of work contracted out, it was in their best interest to be involved in policy debates which discussed such issues as norms, standards, procedures and contracts. Other private actors came from the supply industry. Specific professions, such as planners and landscape architects, were also part of the network, as well as the professional knowledge organisations such as CUR and CROW. In these institutes public and private partners developed and shared knowledge in the field of civil engineering. The Ministry of Housing, Spatial Planning and the Environment also played a role, by formulating the environmental targets for the 'dry' civil engineering works.

73 In Dutch: *Rijksgebouwendienst*.

There is some overlap between the networks. Public works, buildings and other constructions are all part of the built environment, thus actors from these networks have to coordinate their activities. However, interaction is often on a project basis. Long-lasting relationships exist especially between actors concerned with the same object and profession: either infrastructures and civil engineering or housing and construction. That is why this analysis distinguishes these two main networks.[74]

7.4.3 Arenas in the policy process

Policy arenas are places where specific issues are discussed. Distinguishing policy arenas in addition to policy networks permits a closer look at specific interactions between actors involved in a policy process. Often, an issue is discussed and decided upon by various actors in various arenas. Distinguishing the arenas helps make the policy process more transparent, at least in hindsight, which is helpful for anyone wanting to understand the course and outcome of a process.

The packages for sustainable construction were developed and implemented in national arenas. The sector-specific packages were developed in four arenas: (1) domestic buildings; (2) non-domestic buildings; (3) infrastructure; and (4) urban planning. Besides these, a fifth arena for sustainable building can be distinguished. Since the 1970s this was where actors interested in sustainable building explored opportunities and exchanged experiences. The participants shared a belief in the need for sustainable development in the built environment. The focus of this fifth arena was on research, innovation and experiments whereas the focus of the arenas established for the packages was geared towards delivering the specific policy product: the packages. Because of the growing interest in sustainable building, the sustainable building arena was expanding in the years of the packages. Firms, research institutes, local and provincial authorities and all sorts of other interested actors joined the arena.

The analysis of this case study focuses on these national arenas. Although developments in sustainable building obviously took place at the international and local levels well, their influence on the decision making in the packages arenas was limited. In the period studied, from 1995-2005, the Netherlands was among the world leaders in sustainable building and Dutch sustainable building represented the international state of the art. European policy making for sustainable building was limited. From the mid-2000s, European influ-

74 In a more detailed analysis, it might be useful to distinguish sub-networks within networks, such as a social housing network within the housing and construction network, and to distinguish individual actors, instead of groups of actors. This might give a more precise view of how evolutionary processes take place.

Table 7.3 Overview of the national arenas in developing the National Packages for Sustainable Building

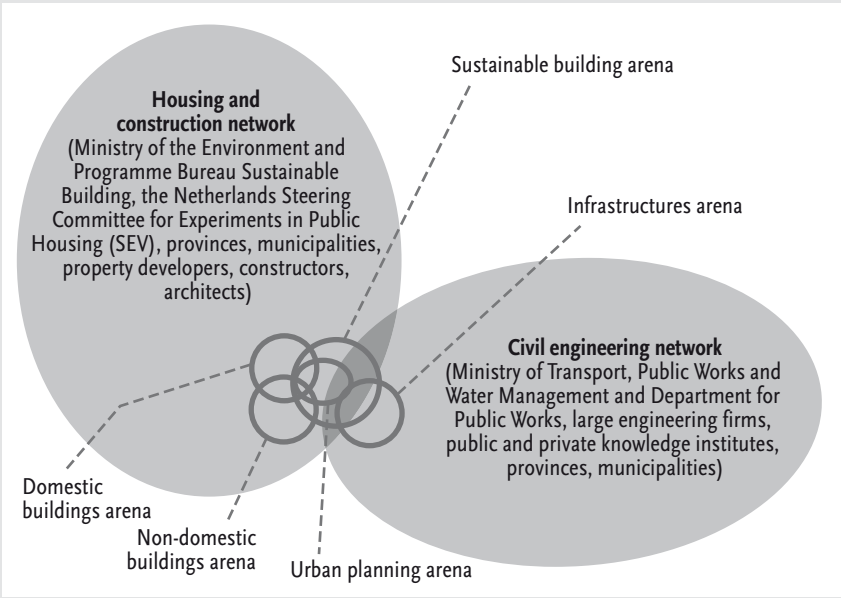
Arena	Domestic buildings arena	Non-domestic buildings arena	Infrastructure arena	Urban planning arena	Sustainable building arena
Key players	■ Branch organisations for housing and construction ■ Union of Architects ■ Public and private knowledge institutes in the field of construction, housing and energy ■ Association of Netherlands Municipalities	■ Branch organisations for construction and exploitation of non-domestic property ■ Union of Architects ■ Public and private knowledge institutes in the field of construction and energy ■ Association of Netherlands Municipalities ■ Government Building Agency	■ Department of Public Works ■ Branch organisations for construction of infrastructure ■ Professional urban planners association ■ Private knowledge institutes in the field of infrastructure ■ Associations of provincial governments and of water boards	■ Professional associations (architects, urban planners, etc) ■ Public and private knowledge institutes in energy, housing, water and infrastructure ■ Interest organisations of groups of end-users ■ Branch organisations for housing and construction ■ Associations of municipal and of provincial governments and water boards	■ Public and private organisations (or departments) pioneering in sustainable building (funding or research) (e.g. SEV, Kleine Aarde, VIBA, Ministry of Housing, water boards, National Center for Sustainable Building) ■ Private enterprise (sustainable construction products) ■ Consultants ■ International networks (e.g. CIB, ICLEI)
Start date	1995: developing SBR list	1996: formulating package	1997: formulating package	1997: formulating package	1970s
Issues	■ Assessment methods ■ Form and function	■ Assessment methods ■ Form and function	■ Assessment methods ■ Ambition level ■ Form and function (after 1st publication)	■ Ambition level ■ Form and function	■ Ambition level
Level	National	National	National	National	National, international

ence on Dutch sustainable building policies increased, seemingly as a result of the decline in Dutch policy ambition and the increasing ambition of European policy.[75]

Local level processes had an indirect influence on the package development arenas. Local building projects had to use the packages. These projects demonstrated the extent to which sustainability ambitions were considered feasible in day-to-day practice and why actors decided whether or not to use the packages. The form and function of packages and the extent to which actors were willing to accept their measures were factors that influenced this decision. Therefore these factors were taken into account in the national arenas delivering the packages.

75 For example, the European Performance of Buildings Directive, implemented in the Netherlands in 2008, provided an incentive for the Dutch building practice to focus on the energy performance of buildings during usage.

Figure 7.1 Networks and arenas



Source: Van Bueren *et al.* 2003: 202

An overview of the national arenas is presented in Table 7.3. Figure 7.1 shows the relation between the networks and arenas involved in package development.

7.4.4 Some first observations

Here follow some first observations on the policy process based on the analyses of the issues, networks and arenas.

■ *Quick establishment of the arenas* – The arenas emerged in a relatively short period of time, and succeeded in delivering the intended products soon after. A first explanation can be found in the threat of government intervention, this could prevented by voluntary compliance. A second explanation for the quick results can be found in the network relationships. Actors were used to cooperating and negotiating and could use existing rules and routines to develop the packages for sustainable building. Key actors in the networks took the initiative to develop the packages, as was the case for the buildings and infrastructures packages. The establishment of the urban planning package arena took longer. Development of this package was far more a government initiative, facilitated by relative outsiders to the urban planning community, actors especially involved in sustainability issues and less in ordinary urban planning practice. The mainstream actors in this arena were often represented by sustainability experts.

■ *Overlap of the arenas* – Although most actors participated in one arena, some actors held key positions in more arenas. SBR and DHV played important

roles in the packages for domestic buildings and non-domestic buildings as publisher and editor, respectively. DHV also edited the package for infrastructures. Not surprisingly, these packages had a similar setup and content.

The four package development arenas all showed some overlap with the sustainable building arena: some pioneers in sustainable building participated in all arenas. The urban planning arena showed the biggest overlap: many of the actors here were represented by people with a background in sustainable development.

■ *Product orientation of the arenas* – Delivering these packages was the sole goal of the package development arenas. This narrow scope facilitated decision making. Other arising issues could be addressed in many other places in the network where the actors met one another.

■ *Differing ambition levels of the arenas* – How ambitious should the packages be with respect to sustainable development? This question was answered differently in the various arenas. Actors in the urban planning arena had especially high ambitions in this field. Unsurprisingly, this arena also had the biggest overlap with the sustainable building arena. In the other arenas, ambitions were more concerned with the wide usability of the packages than with the sustainability level promoted in them.

7.5 Perceptions and strategies in the policy process

This section reconstructs the perceptions of the key players as well as actor strategies that dominated the policy process. Together with the analyses of the issues, networks and arenas, the reconstructions deliver information that helps to establish the learning processes that took place in the policy process.

Perceptions

Table 7.4 presents an overview of the groups of key players and an impression of their dominant perceptions of the packages both at the start of development and once the packages were developed and in use.

Observations on the perceptions

There are some eye-catchers in these perceptions and changes of perceptions. To begin with, at the start of the policy process, most actors stood by the instrumental short term goal of the packages: to harmonise and disseminate sustainable building knowledge. Then there is the change in central government perceptions: sustainable building no longer required full governmental support. The Ministry of Housing decided that the building sector could con-

Table 7.4 Key players and their perceptions of the National Packages for Sustainable Building before and after establishment of the packages

Key participants	Perceptions of the participants on the main issues	
	Before and during package development	**After package establishment**
Ministry of Housing, Spatial Planning and the Environment/Programme Bureau for Sustainable Building/ SenterNovem	The packages were important instruments for harmonising and disseminating knowledge, a first step to large-scale implementation of sustainable building in the building sector. It was important that the building sector was responsible for the packages.	Sustainable building no longer required strong government intervention; market could do the job from here on. The packages were an example of self regulation by the building sector. Specific goals, e.g. energy reduction, could still receive government support.
Branch organisations for building and construction	It was in everyone's interest that government and industry developed policies together. The packages should: ■ End differences between requirements for sustainable building set by different government organisations. ■ Not harm the interests of the member organisations (no extra costs, no forging competition). ■ Be simple to use.	Packages were instruments for implementing sustainable building. They are an example of what industry could voluntarily contribute to sustainable building. Higher ambitions should be facilitated by more comprehensive decision-support tools driven by government regulation or customer demand.
Public knowledge institutes (e.g. for housing, energy)	The packages were an opportunity for implementing proven methods, products and technologies for sustainable building on a large scale and could offer suggestions on how to achieve higher sustainability ambitions.	Packages were a means of ensuring a minimum level of sustainability in housing and construction. To achieve higher ambitions, other experiments and tools should be developed.
Private knowledge institutes (e.g. for construction, infrastructure)	The packages should aim for a sustainable building standards acceptable to members.	Packages were a means of ensuring a minimum level of sustainability in housing and construction. To achieve higher ambitions, other experiments and instruments should be developed.
Professional associations of architects, of urban planners, of landscape architects	The packages should not restrict the freedom of the designer, but should feed the design process with creative ideas and/or practical information on sustainable building.	The packages were used especially when use was rewarded or when use was required by commissioning actor(s).
Publishers of the packages	The packages should be widely accepted and used by the target groups.	The packages were successful products and deserved putting in effort to continue success.
Decentralised governments (associations of municipalities, provinces, water boards)	The packages should be useful instruments for local or regional policy making (formulation, implementation and control) for sustainable building.	The packages and supporting instruments were useful tools for implementing sustainable building in local projects.
Representatives of the interests od end-users (e.g. house owners, tenants, cyclists)	Sustainable building should improve the position of (specific groups of) end users in the built environment.	The packages did not succeed in bridging the gap between sustainable building and end-users. End-users' interests should be served by other instruments.

tinue the development started by the public sustainable building programme. As a consequence, the packages were no longer included in programme strategy, but became independent products. This revised perception was welcomed by the branch organisations for building and construction and by the decentralised governments, who perceived the packages as a satisfying answer to the central government call for sustainable building, rather than just being a first step towards a sustainable built environment. However, when involved in actual building projects, developers, planners, architects, construction companies and local government soon discovered that the packages led to only a modest level of sustainability. They were not the instrument to support higher sustainability ambitions. Therefore, in the sustainable building arena, actors continued to experiment and develop other instruments and consequently the gap between forerunners in sustainable building and the majority of the actors in the sector widened again, and the variety of local government demands for sustainability increased. This was welcomed by some of these forerunners; uniform instruments being absent, they the freedom to develop their own concepts and methodologies which would give them a competitive advantage.

Strategies

As mentioned above, besides reconstructing actor perceptions, it is also interesting to reconstruct the actors' strategies that influenced the process. Together, the changes of perception and the strategies employed during (parts of) the policy process, give information on the lessons learned in the policy process.

■ *Strategy: make use of the self-governing capacity of the sector* – The Ministry of Housing knew that regulating sustainable building was strongly dependent upon the cooperation of the private sector. It was thus a sensible move to make the sector responsible for producing the packages. Not the government, but the sector had to work out how to deal with the contested character of sustainable building. It was the sector's problem to get the packages accepted and used by a large number of actors. For this, however, the sector could make use of existing resources, such as research institutes and information channels. When the sectors' support for the packages declined, the packages were replaced by instruments that responded better to the sectors' needs.

This strategy was not followed in the urban planning package as it was initiated on the express request of central government. It was much harder to get this package developed, disseminated and accepted.

■ *Strategy: set the rules of the game at an early stage* – The actors initiating the packages for domestic buildings, represented by SBR, set the game rules for developing the packages, formulating clear and transparent rules for participation and decision making, and thus setting boundaries for participation

and discussion. This was an explicit strategy. Too many perceptions would lead to conflicts and delays in decision making and could jeopardise the legitimacy of the packages. Conditions for quick package development were created by excluding representation of individual interests (only actors' group interests were allowed) and narrowing down the space for decision making (e.g. maximum additional costs allowed, protection of core interests, and requirement of LCA based evidence).

The benefits of this strategy were that the sector showed the government that it was capable of addressing the issue of sustainable building without government intervention, and it legitimised the taking of decisions by a small group of actors, thus improving the chance of success for the initiative. Formulating rules for future revisions of the packages secured their future as well: the content was to a certain extent predictable and less subject to political dynamics. It was therefore relatively safe for actors to invest in the development and use of sustainable building measures that already were or could be included in the packages.

This successful strategy was also applied to the development of the packages for non-domestic buildings and – whenever applicable – for infrastructures but not for the urban planning package. The rules were especially good at preventing or resolving conflicts based on product-related, quantifiable prescriptive measures. In contrast, the urban planning measures were more conditional and qualitative but no alternative rules were defined or made explicit for them.

■ *Strategy: Reward playing by the rules* – There were incentives for acting according to the formulated rules. On the sector level the reward was that government refrained from further intervention. Industrial actors, such as producers and suppliers, could count on the protection of their interests. On the individual level, actors could also count on a certain level of protection of their interests. The example of the zinc industry is again illustrative: once the industry learned how to play the game, it succeeded in getting the negative measure on zinc removed from the package. Users of the packages were rewarded as well, either financially (e.g. subsidies or fiscal advantages) or non-financially (e.g. positive image, improved acquisition position).

Observations on strategic behaviour

Particularly in the buildings and infrastructures arenas, it was a game of strategy. Interest protection was an important driver of actor behaviour, and there were many potential conflicts between these interests and sustainability. Actors therefore tried to minimise the conflict between their interests and the packages, supported by the arenas' rules for decision-making, rules more concerned with the protection of actors' interests than with the protection of sustainability interests.

In the urban planning arena, actors were more concerned with the sub-

Table 7.5 The lessons learned in decision making for the packages

Lesson	Social or substantive?	Technical, conceptual or meta?	Individual or inter-subjective?
How to agree on the substance of the packages	Social	Conceptual	Inter-subjective: actors in arenas for buildings and infrastructures
How to present a product as sustainable	Social	Technical	Individual: producers of construction products
How to build sustainably	Substantive	Technical	Individual and/or inter-subjective: users of the packages
How to meet for sustainable building yardsticks	Social	Technical	Individual: users of the packages
How to facilitate use of the packages	Social	Technical	Inter-subjective: actors involved in arenas for for buildings and infrastructures packages

stance of sustainable planning and there was more alignment between the individual interests of the participating actors and sustainability. This difference with the other arenas, however, also shows in the different decision-making conditions. The networks for housing and construction and civil engineering were well-organised with many representative bodies giving structure to this fragmented sector. These networks could operate efficiently due to the strong asymmetries in the interdependencies between actors. They formed the foundation of the arenas that developed the buildings and infrastructures packages.

The urban planning arena was based more on a shared profession and the participants' shared professional norms, rather than shared commercial interests. These actors considered urban plans to be more complex and unique than buildings and infrastructures, which made it difficult to formulate and enforce unambiguous measures. In sum, the incentives for behaviour aimed at protecting individual interests were far stronger in the arenas for buildings and constructions than in the urban planning arena, because there was much more at stake for actors.

7.6 The lessons learned

A description and analysis of the policy process can identify the lessons learned by actors in the policy process. Table 7.5 sums up and classifies the lessons: What did actors learn about the social environment, its interactions and the substance of the policy issue? Did individual actors learn a lesson or was it learned at a group level? What was the impact of the learning: did it lead to minor (technical) or major (conceptual) changes in actor strategy (in the case of individual learning) or policy (in the case of inter-subjective learning)? And did actors improve their ability to learn (meta-learning) on the individual or the group level?

■ *Lesson: How to agree on the substance of the packages* – The mid-1990s saw a window of opportunity for the building sector to harmonise sustainable build-

ing knowledge and present it once and for all in an unambiguous list of measures. The actors leading the initiative to develop the buildings packages, SBR and DHV, realised that they would only succeed if the package contents were accepted by the majority of actors in the sector. Experience with previous lists for sustainable building had shown that the lists were highly contested and that the stakes were high for the affected actors, who would contest any measures that could harm the interests of a firm or industry. Too much controversy over the measures would lead to general mistrust of the package. Therefore, to enhance transparency and create trust in the decision-making process they formulated strict rules for both decision making and participation. Although the negotiations on the advisory boards were sometimes fierce, the actors learned to play the game by the set rules. All the actors in the arenas, including laggards and leaders in sustainable building, learned this lesson and accepted that decision-making rules constrained the process and outcomes of a decision. As a result, within a short time span the arenas successfully developed packages that were generally accepted by actors in the sector. The subsequent arenas for infrastructures and non-domestic buildings learned from the success of the domestic buildings arena and when possible, their decisions were made according to similar rules.

Instead of following a transparent decision-making procedure, the urban planning arena adopted a non-intervention principle. The work was split up amongst groups of experts, whose professional judgment led to the decisions made. The various groups respected each other's judgments.

This lesson is called 'social', since it concerned the rules for decision making and not the subject of the decisions. Acceptance of these rules by the participating actors indicates that the lesson was shared amongst them; it was inter-subjective. The lesson can be classified as 'conceptual', since it caused great changes in the perceptions of both the forerunners in sustainable building and the mainstream building industry. The forerunners realised that they had to tone down their ambitions and accept that the packages would be a first step towards a sustainable built environment. The mainstream industry realised that they had to take action on sustainability; if they did not, then government would force them to act. The packages offered them the opportunity to tend to sustainability on their own terms.

■ *Lesson: How to present a product as sustainable* – Individual actors learned how they could get their product listed as sustainable or how to prevent other products from being called more sustainable than theirs. First, they had to get access to decision making, and second, they had to learn how to play by the decision-making rules. For example, the zinc industry disagreed with the verdict that PVC was preferable to zinc for roof gutters. In contesting this verdict, they learned that they could not complain to the ministry or go to court, but that they had to join a representative organisation participating in the de-

velopment of the packages. This organisation then taught them that they had to deliver an LCA study to prove the lack of difference between both materials. The next lesson the zinc industry learned was that even LCAs could be contested according to the assumptions on which they were based. The first study they conducted did not convince the advisory board of the packages. So they hired DHV, the same consultant holding a central position in the decision-making process, to conduct a second study. This time, the board accepted the outcome.

This lesson is mainly of a technical, social nature: actors did not learn so much about the sustainability of their products, but about how to present them as sustainable compared to other products, and who they needed to succeed at this.

■ *Lesson: How to build sustainably* – The packages contained lessons on how to build sustainably. On an individual level, package users unfamiliar with sustainable building learned about a range of possible measures that they could apply during design, construction or usage to make a construction more sustainable. On an inter-subjective level, users of the packages learned what a minimum level of sustainable building was. This lesson, at the individual and at the shared level, was substantive. The impact of the lesson was considerable. The package for domestic buildings became synonymous for sustainable building in the sector, instead of representing a minimum level for sustainable building as intended. Ten years after its first publication, this package is still an important instrument for sustainable building. However, its use does not require a different approach to building and construction. The packages transferred technical lessons without the conceptual framework within which these lessons were learned (cf. Smith, 2007). The underlying concepts of integrated design were not part of the packages, and many users did not understand how the measures would contribute to sustainability. The learning effect is thus classified as technical.

■ *Lesson: How to meet the sustainable building yardsticks* – More strategic is the lesson on how to meet the yardsticks for sustainable building, which individual actors learned, especially those interested in how to apply the package just to get a green label, and not so much in learning about opportunities for reducing the environmental load caused by building and construction. Illustrative for this lesson is that package-using actors were more concerned with applying the measures in the packages, and not so much in monitoring the environmental effects of the applied measures. This lesson lead to no major changes in actor perceptions and is thus classified as technical.

■ *Lesson: How to facilitate package use* – Monitoring reveals that use increased when the packages were easy to use in daily practice and when use was re-

warded. This observation was shared amongst actors in the arenas. Based on user feedback, the publishers and editors and governments wanting to encourage package use improved the packages on this point.[76] Improvements were technical; the content, goals and ambitions were not changed.

Observations on learning

Here follow some observations based on the description of these lessons. First is that the development and implementation of the packages gave rise to technical learning in particular. The conceptual learning that took place was that actors, from leaders to laggards, agreed that the majority of the building sector should be allowed to address the issue of sustainable building in a way that suited the sector. The sector did this successfully with the packages, which became an accepted norm for sustainable building, whereas they were only meant to represent the minimum ambitions for sustainable building. The urban planning package did aim to transfer measures together with the concepts on which they were based, but the package was criticised for being too conceptual to be understood. There thus seems to be a tension between the level of learning that the packages aim to achieve and the extent to which lessons are selected. The sustainable building packages became and example of wider diffusion of more shallow sustainability, whereas the urban planning package was an example of small diffusion of 'deep green' sustainability (Smith, 2007: 446).

A second observation is that many of the lessons learned concerned the social context of the policy process rather than the substance, namely, sustainable building. Actors certainly learned to protect their interests. On an individual level, actors learned how to present themselves or their products as sustainable. On an inter-subjective level, the building industry learned to protect its common interests in developing the packages. This evidence of self-governance capability contributed to national government's withdrawal in this policy field.

7.7 Evaluating the learning from an evolutionary perspective

A pressing question is how to explain the lessons learned. Why were these technical lessons more concerned with the social environment of the pack-

76 Examples of improvements in the packages for buildings and infrastructures were the web-based publications of the packages and the interfaces developed to make a package compatible with design software. To facilitate use of the *National Package in Sustainable Urban Planning*, the package was unchanged, but it was supported by activities such as instructive workshops on how to use the package and the publication of demonstration projects.

Table 7.6 Variation, selection and retention in the policy process

Evolutionary p7rocess	Questions	Answers
Generation of a variety of perceptions	What variety of perceptions was generated? How did networks and arenas contribute to the variety?	■ Relatively low variety of perceptions was generated, despite having actors from two networks interacting in five heterogeneous arenas. ■ Arenas for domestic, non-domestic buildings and infrastructures were strongly coupled. During the process, the gap between these arenas and the sustainable building arena widened. There was hardly a connection with the urban planning arena. ■ Arenas for urban planning and to some extent infrastructures were stronger connected to the sustainable building arena than other arenas: sustainability experts participated.
Selection from a variety of perceptions	How were decisions made? How were they influenced by formal and informal rules of the networks and arenas in which decisions were made?	■ Decision making in arenas for buildings and - to some extent - infrastructures were strongly influenced by rules used in networks involved. Rules were formalised and reconfirmed in the policy process, with a prominent place for LCA method. ■ Decision making in the urban planning arena and to some extent the arena for infrastructures felt the strong influence of unwritten rules in the professional community; expert knowledge was paramount.
Retention: preservation of selected variety	How and to what extent was the selected variety institutionalised?	■ A selection from the wide variety of knowledge on sustainable buildings has been codified in the packages. ■ Particularly the package for domestic buildings was strongly institutionalised. Local authorities used the package as reference for sustainable building requirements. ■ LCA became accepted method for comparative product assessment. ■ The packages for infrastructures and urban planning did not get institutionalised. ■ Actors, private and public, agreed that other instruments than lists of measures are needed to achieve higher sustainability ambitions.
Retention: regeneration of variety and selective retention	How and to what extent was a regenerative capacity institutionalised?	■ The packages for buildings and infrastructures included procedures for revising the content; these procedures stipulated the permissible variety. ■ The broader sustainable building strategy of central government of which the packages were part failed to institutionalise.

ages' establishment and not so much with their content? And how should these lessons be valued? Evaluative criteria are needed for the answers. Lacking unambiguous substantive criteria, theories on policy learning and on networked decision making have developed procedural criteria to evaluate learning. Analogous to biological evolutionary theory, they point to the need to include a variety of actors in the policy process as a condition for policy success. They also point to the influence of the selection environment of the policy processes wherein a selection is made from the variety of policy alternatives.

This section takes the analogy a step further and also explores how processes of variety and selection contributed to the retention of lessons and to the retention of learning in the policy environment. To what extent were the lessons learned and the learning itself institutionalised? In answering these

questions, this section aims to develop an evaluative judgment of the packages.

Table 7.6 summarises and identifies the processes of variation, selection and retention that are based on analyses of the policy process, issues and policy environment in the previous sections. The table has the following explanations.

■ *A great variety of actors did not lead to a great variety of perceptions* – The social environment in which the sustainable building packages were developed held a great variety of actors from two networks. Decisions were made in four arenas. Another arena, sustainable building, was also involved and some of its members also participated in the package development arenas. There was thus a large pool of actors that potentially could feed decision making with a variety of ideas. However, the description of the policy process showed that the variety of perceptions expressed and exchanged in decision making was lower than might be expected from the great variety of actors present. Explanations for this can be found by looking at the selection mechanisms.

■ *Selection mechanisms reduced variety ex ante* – The formulation of strict rules for participation and decision making in an early stage of the process constrained the variety of perceptions expressed in decision making beforehand. The rules clearly demarcated the boundaries for participation and limited the measures allowed in the packages, reducing variety beforehand.

■ *Selection mechanisms encouraged self-selection* – The early formulation of selection mechanisms had another effect as well: actors who could not recognise their interests in the packages decided not to participate actively in the package development arenas. Forerunners in sustainable building, for example, who could have contributed their knowledge and experiences to decision making, considered the ambition level of the packages too low to be of interest to them. Therefore, they did not participate or if they did, they decided to keep their perceptions to themselves, since much of their knowledge was rendered irrelevant by the selection mechanisms. This self-selection was also based on the knowledge that the package would be a first step in getting the building industry involved in sustainable building. However, a change of government and the packages' own success contributed to the withdrawal of the government's interest in the field of sustainable building.

A form of self-selection can also be recognised in the urban planning arena. Precisely the absence of decision-making procedures and the high ambitions stopped actors from participating, or they left their interests to be represented by sustainability experts. The frontrunners in sustainable planning did participate, even so, they had no incentive to confront each other with diverging perceptions. The work was split up amongst the various participat-

ing experts so that the package was more a varied collection of ideas rather than a selection of these ideas.

■ *Protection of interests influenced variation and selection* – An important motivation for actors to participate, directly or indirectly, in package development was the potential effect of the packages on their business. In the arenas for buildings and for infrastructures, the actors primarily participated out of concern for their commercial interests, and not out of environmental concerns. Selection mechanisms were therefore largely tuned to prevent and resolve conflicting commercial interests and not so much to safeguard sustainability.

■ *Existing rules and relationships facilitated and legitimised interaction* – Interactions in the development arenas for buildings and infrastructures packages were guided by the rules of the respective networks belonging to these arenas. These rules reflected the power relationships within the networks and, though not explicitly, they were concerned with interaction and decision making. Acting according to these rules enabled the quick establishment of both arenas and packages. The rules formed the basis of the way in which the selection mechanisms were formulated and also contributed to the acceptance of the packages. The importance of these existing rules and relationships for the success of the packages is confirmed by the processes in the urban planning arena, where the interaction rules were based more on professional codes of conduct rather than being the result of power relationships. The actors in this arena therefore had to invest more time and effort in developing rules for interaction and decision making. These rules evolved slowly. However, they were shared only amongst the participants actively involved in package development, and not with the uninvolved actors. As a result, this package lacked the authority of the other packages.

■ *Selection mechanisms rewarded technical learning* – The explicit and strict formulation of selection mechanisms rewarded learning at a technical level. Producers who invested in learning how to play by the rules were often rewarded in the sense that their interests were not negatively, and in some cases even positively affected by the packages. For example, the zinc industry was rewarded with the removal of the measure that advised negatively on the use of zinc. Also, additional arrangements to support the use of the package, such as yardsticks or covenants, stimulated users to show that they had applied measures that represented a minimum amount of additional investments. Additional efforts above the minimal requirements were not rewarded.

■ *Retention was enhanced by the high usability of the packages* – The packages for buildings and infrastructures were easily retained in the building sector: to some extent, they became part of building practice. Several factors contribut-

ed to this institutionalisation. First, the accessible and easy-to-use format of the packages facilitated usage. Second, actors in the sector trusted the package since they themselves had developed the product. They were also aware that if they did not use the package, government might intervene in another way less beneficial to them. Third, supportive tools, such as yardsticks and covenants, stimulated the sector to use the packages. Fourth, the unambiguous character of the packages contributed to the retention: many actors had been waiting for clear instructions on how to build sustainably. The packages offered this clarity; at least they were far less contested than previous instructions. And finally, the position of the packages was strengthened when government retreated from the policy field. Packages were considered as tangible and usable products that the Policy Programme for Sustainable Building had delivered.

■ *Rules for revision focus on future learning* – Rules for revising and updating the packages were formulated in the buildings arenas. These rules contributed to the legitimacy of the packages, but they also strongly narrowed the actors' potential future learning on sustainable building. The rules took an existing package as point of reference for revision and by adhering to the selection mechanisms, with a preference for using LCA as the decisive method for attaining quantifiable measures and a low tolerance for additional short term investments, created a highly narrow but incremental path for innovation. It was therefore not surprising that after a couple of years, the influence of the packages diminished and other initiatives to stimulate sustainable building re-emerged. Thus, strict selection contributed to the rapid success of the packages in the short and medium term, but implied the end of the packages in the long run. The policy goals of the packages could have benefitted from an explicit end-of-life scenario. As long as the packages formally existed, there was no need for actors to formulate new policies that perhaps were better capable of addressing sustainable building. Ending the packages could have created a need for a new, joint policy initiative.

Conclusions

These explanations of the learning gained show that the presence of a variety of perceptions is no guarantee for a rich learning process. The learning that did take place was channelled by the selection procedures formulated at the start of the process. These procedures also strongly influenced future learning: only measures that fell within the limits set by the procedures were taken into account. However, the clarity of the procedures also contributed to the retention of the generated variety. The packages presented unambiguous and accessible knowledge of sustainable building. Especially the *National Package for Sustainable Domestic Buildings* became an important instrument to implement sustainable building.

This conclusion is comparable to the findings of Smith (2007) on the diffusion of sustainable building through niche management. The sustainable building arena can be considered to be a green niche or place where innovations are developed and diffused. When niches try to influence 'incumbent' selection environments, in this case the main stream building actors that developed the packages, the incumbent actors will try to impose their selection environment on the products developed in the niches. When incumbent systems are stable and niches are unstable, the selection environment of the incumbent is likely to dominate. In the case of the packages, the well organised building sector proved to be very stable, while the lack of national policy support destabalised the sustainable building arena. The building sector was especially interested in measures that would not disrupt their practices too much, while being able to show to the Ministry that they were taking sufficient action. To legitimise their decisions, they involved actors from the sustainable building. The building sector seemed less interested in substantive lessons to be learned from the actors from the sustainable building arena. However, the actors of the sustainable building arena were pleased that the building sector finally got interested in their issues and accepted that their knowledge was transferred in a simplified way that corresponded to the rules and behaviour of the actors in the building sector.

7.8 Conclusions

The *National Packages for Sustainable Building* aimed to bridge the gap between innovators in sustainable building and day-to-day practices in the building and construction industry that paid little attention to sustainable development. National government invited the building sector to formulate the packages, an opportunity the sector seized. The idea was that sector involvement would create commitment and support for the packages. The packages would lead particularly to technical learning: it was all about harmonisation and dissemination of existing knowledge. The packages would be the prelude to learning at a more conceptual level.

The choice of the Ministry of Housing to strongly involve the sector in the development of the *National Packages for Sustainable Building* was a logical one, given the policy goals, to harmonise and spread existing knowledge, and the strong dependencies upon the private sector. The sector successfully took this opportunity for self regulation. They too felt a need for an instrument like the packages and were glad that they could draw up the instrument themselves, having been confronted by many contested lists in the past. However, the conditions that made the packages for buildings and infrastructures successful in the short and medium term could be less favourable for sustainable building on a long term. The urban planning arena felt no need for such an instru-

ment, and this is perhaps the most important explanation for the limited success of this package.

To facilitate package development, the building sector formulated strict rules for participation and decision making, narrowing down the potential for conflicts, but also the potential for learning. The effect of this was that the packages contained highly negotiated knowledge and a big gap remained between existing knowledge and the knowledge presented in the packages. The rules also concerned the revision of the packages, and thus directed future debate and learning about sustainable building.

The strict selection contributed to the quick retention of the packages in the building practice. The selection procedures legitimised the packages and paid attention to the operational level of implementation: packages had to be easy to use. But this retention in building practice also made it more difficult to raise ambitions beyond negotiated level, as the Ministry had intended with its Policy Programme for Sustainable Building. The minimum ambition level for sustainability in building processes that the packages aimed to secure was achieved, but there were no incentives for building sector actors to achieve higher ambitions than the ones targeted in the packages.

The policy process missed several opportunities that could have contributed to more sector-wide conceptual learning. The first concerned the revision of the packages. The rules to revise the substance of the packages aimed to improve the packages on a technical level but did not facilitate improvement on a more conceptual level. For example, there was no empirical evaluation of the environmental performance of measures. Also, there were no evaluations of the substance and functioning of the package as a whole. Second, although there was a growing need for more integrated concepts for sustainable building, no attempt was made to draw links between the packages. The consistency aimed for between the packages was, again, merely procedural; for example, using a similar format and rules for decision making.

Then, the role of innovators or forerunners in sustainable building was poorly designed. Although they could participate, they were not given the opportunity to influence decision making and their knowledge was not used in package development. These missed opportunities can be explained by looking at the character of the building and construction sector: it is a closed, fragmented, conservative, and risk-averse sector. In these terms the packages are quite an achievement.

Central government was the one actor that could have pressed for more substantive revisions of the packages in the medium and long term. At the start of the process, the Programme Bureau for Sustainable Building was created to take up the role of process manager of the Policy Programme for Sustainable Building. As part of the programme, this Bureau initiated and began monitoring the packages, which had been envisaged as a first step towards harmonisation and dissemination of sustainable building knowledge; more

steps would follow in the future. The Programme Bureau for Sustainable Building did not seem to have taken into account the possibility that it would be marginalised soon after its conception, leaving no opportunity for monitoring or evaluation or formulating the next step.

The lesson for future programme management is that incentives for conceptual learning should be included on the programme and on instrument level, in the form of monitoring, evaluation and revision of instruments, but also extended to coordination between instruments and including innovators in the policy processes.

8 Restricting urban sprawl

8.1 Introduction to the policy

"Urban sprawl is one of the most important types of land-use changes affecting Europe. It increasingly creates major impacts on the environment (via surface sealing, emissions by transport and ecosystem fragmentation); on the social structure of an area (by segregation, lifestyle changes and neglecting urban centres); and on the economy (via distributed production, land prices, and issues of scale)." (Couch *et al.,* 2007). In many countries, controlling urban sprawl is considered a key governance challenge.

In such a small and densely populated country as the Netherlands, urban sprawl has received much attention in policies and plans aiming to regulate and control land use. One of the primary goals of national spatial planning policies since World War II has been safeguarding the contrast between urbanised areas and the countryside (Faludi and Van der Valk, 1994; WRR, 1998). The 1993 *National Spatial Strategy Paper* entitled *VINEX* introduced spatial contours as an instrument to restrict and control urbanisation (VROM Ministry, 1993b). Local authorities were required to encircle built up cores with red contours and all urban growth had to be accommodated inside these mapped lines. This would protect the countryside from urbanisation ensuring that open areas would remain open.

The spatial contours caused severe conflict between local, provincial and national government. The direct intervention of national government in local spatial planning policies was especially contested, as well as the rigidity with which the instrument was implemented. In 2005, *VINEX* was followed by *Space*, the next National Spatial Strategy Paper. *Space* presented a fundamental change in urban compaction policies. Whereas *VINEX* (1993) aimed to maximise central control on strategic planning decisions, Space aimed to decentralise spatial planning decisions, including those decisions influencing the urban sprawl. In this way, planning would change from prescriptive to development planning, with room for planning authorities to join in with emerging spatial developments (De Roo and Schwartz, 2001: 25-29). The contours were no longer a part of national physical planning policies.

Soon after the publication of *Space*, various actors, ranging from professional planners to the building industry and environmental interest groups, questioned the ability of local authorities to resist the pressure for urban expansion. Protests were voiced against cluttering the landscape and this was supported by the Minister of Housing, Spatial Planning and the Environment.[77] Calls for strong protection of open areas by central government were heard

77 When Mrs. Jacqueline Cramer came into office in 2007 as Minister of the Environment and Spatial Planning, she promised to combat 'landscape cluttering' and made it one of her priorities (http://international.vrom.nl/pagina.html?id=10739, October 10, 2007).

Figure 8.1 Red contours around the urban core of Berkenwoude

Source: Provincie Zuid-Holland, Streekplan Zuid-Holland Oost, 1993

more often. The contour instrument as such was a token of hierarchical leadership, and thus it is interesting to see whether and how it succeeded in controlling urban sprawl and which lessons can be learned from it for the future governance of urban sprawl.

Description of the contour instrument

Strictly speaking, the spatial contours were an instrument of national policies to restrict urbanisation. However, because of the turmoil caused by the instrument and its considerable impact on local planning policies, local authorities often referred to it as a policy that aimed to restrict urbanisation in 'open areas of national importance'. These 'state-restricted areas' were indicated on a map in *VINEX*. According to *VINEX*, contours would be implemented by making them part of local and regional land use plans.[78] The municipalities and provinces had a legal obligation, as stated in the Physical Planning Act, to develop such plans and to revise or at least update them every ten years. When plans were ready for revision, the contours would be included. Although municipalities had considerable autonomy in local spatial planning, the provincial authorities had to formally approve of the local land use plans. In particular, the provincial authorities checked whether the local plan was not in contradiction with national and provincial land use policy.

Local governments in state-restricted areas were instructed to draw administrative border lines around their built-up areas. Outside these borders every form of urbanisation was strictly forbidden. These administrative borders were called red contours as they had to be indicated by red lines on maps depicting local and provincial spatial development plans. This gave the contours a legal status that could be enforced by provincial and municipal authorities (VROM Ministry, 1993b, 1996). Figure 8.1 gives an example of a red contour, as presented in a provincial spatial plan.

VINEX also introduced provincial contours. Provinces could determine which open areas they considered of regional importance. They had to restrict urbanisation as much as possible within these areas and concentrate developments in those urban cores that had been assigned a growth status in the provincial spatial plans. The provinces were given the liberty to implement this

78 Local spatial plans, or land use plans, are named *bestemmingsplannen* in Dutch and regional spatial plans with a legal basis are named *streekplannen*. Besides these formal plans, local authorities or collaborating local authorities can make other spatial development plans, but these have no legal status.

Table 8.1 The contour policy

Policy	Goal	Actors responsible	Actors affected
Red contours	To protect open areas from urbanisation by restricting the urban sprawl	National, provincial and local authorities	Local authorities, property developers, house hunters, local communities
Green contours	To guide controlled urban developments in open areas	Provincial, regional and local authorities	Regional and local authorities, property developers, nature conservers, local communities

policy with the instrument of their choice. However, the instrument had to meet the same conditions as the contours, that is, it had to be implemented and motivated in such a way that the instrument could be enforced and evaluated unambiguously (VROM Ministry, 1993b, 1996). Many provinces implemented this policy by drawing green lines on the maps of provincial plans, and the provincial restriction policies were therefore also known as *green contours*. Table 8.1 points out the difference between red and green contours.

This chapter uses 'municipalities' instead of the more usual terms 'cities', 'towns' or 'villages'. In the past thirty years, the Netherlands has seen an ongoing trend in scaling up local government by merging two or more authorities. As a result many rural municipalities comprised multiple urban cores, all former towns and villages, so local authorities had to draw several contours within their area of jurisdiction.

8.2 Methodology

The analysis of the contour policy in this chapter is based on research material assembled for an *ex ante* evaluation of the contour policy in 1997-1998. Contour development and implementation was studied in four of the twelve Dutch provinces: Zuid-Holland, Utrecht, Gelderland, and Noord-Brabant. The first three provinces contained state-restricted areas as well as provincially restricted areas. The fourth, Noord-Brabant, had only provincially restricted areas. In the first three provinces, four municipalities were selected for inclusion in the study while two municipalities were selected in Noord-Brabant. In this last province, the instrument to restrict the urban sprawl was still being developed at the time of the research. Both municipalities studied were involved in this development.

The selection of provinces, municipalities and persons to be interviewed was made in consultation with the advisory board of the research, which represented various stakeholders. The respondents included civil servants, aldermen and mayors. The interviewees included two civil servants from the Ministry of Housing, Spatial Planning and the Environment who had been closely involved in the development of contour policy. Also interviewed were inspectors from the three regional Spatial Planning Inspectorates that had to monitor and control the implementation of contour policy by the provincial authorities. In sum, twenty-two interviews were conducted with twenty-eight respondents. The selected provinces, municipalities, inspectorates and respondents are presented in Appendix III.

The research findings were discussed with the advisory commission. A workshop was held to verify and discuss the conclusions and recommendations. The fourteen workshop participants represented local and provincial authorities and regional collaborations, including those with provinces other than the selected ones. Other stakeholders, not interviewed, also participated in the workshop: a regional environmental interest group, a representative from the Ministry of Agriculture, and a consultant and a representative from the VNG Association of Netherlands Municipalities. A list of participants is included in Appendix III.

The analysis in this chapter is based on the analysis as reported to the Ministry (De Bruijn *et al.*, 1998) and published in learned journals[79] as well as a study of the original data and an additional document study. The literature included relevant policy documents from national and provincial authorities, as well as professional and learned publications on the issue. The secondary analysis and additional document study made it possible – in hindsight – to reconstruct the lessons learned during the policy process and explain the learning in terms of processes of variation, selection and retention. To verify the findings in this chapter, a draft has been reviewed by the following persons who were involved directly or indirectly in the contour debate: Mr. Kees Vriesman of the Programme Bureau Town-Countryside in the Randstad and, former director-general of Spatial Planning at the Ministry of Housing, Spatial Planning and the Environment; Mrs. Rianne Zandee and Mr. Douwe Tiermersma of *Stichting Natuur en Milieu* (The Netherlands Society for Nature and Environment) and Mr. Andreas Faludi, professor of spatial planning systems at Delft University of Technology.

8.3 Reconstruction of the policy process

After World War II, spatial planning efforts by the Dutch central government were aimed at controlling and directing the growing and competing claims on land in its small and densely populated country. It introduced a spatial planning system, in which local and provincial authorities developed planning policies within the boundaries set by national planning policies (Faludi and Van der Valk, 1994; Korthals Altes, 1995). The following decades were characterised by a population boom, an increasing number of households and an increasing demand for higher quality housing: larger and more comfortable dwellings with a garden.

Many of the policies aimed to channel suburbanisation, out of concern that the encroaching suburbanisation would swallow open areas. The concept of

79 See Appendix III.

urban compaction led these policies (Zandee, 2006). This was also considered to be an efficient way to accommodate the housing need. The strategies to implement urban compaction differed over the years: from 'clustered dispersal' (*Second National Spatial Strategy Paper*, 1966), through 'growth centres' and 'growth towns' (*Second and Third National Spatial Strategy Papers*), to 'compact cities' (*Third National Spatial Strategy Paper*, 1973), and '*VINEX* estates': major urban extension areas at the fringes of existing urban areas (*Supplement to the Fourth National Spatial Strategy Paper VINEX*, 1993); even the *National Spatial Strategy Paper Space* (2005) continued urban compaction policies in the form of concentration areas.

Urban compaction policy in VINEX: bundling urban activities

The spatial policies published in *VINEX* (*Fourth National Spatial Strategy Paper*,[80]) were concerned with controlling and directing urbanisation primarily from a spatial planning point of view; before, spatial planning had been guided by housing policies. Despite the successful accommodation of growth in cities and towns designated a growth function in the 1970s and 1980s, other cities and towns continued to expand with residential suburbs and office parks as well (Korthals Altes, 1995). *VINEX* aimed to end this scattered growth by concentrating it in urban agglomerations. The bundling of urban activities would contribute to the following policy goals: (1) strengthening the competitive position of Dutch urban regions in Europe; (2) reducing the need for mobility, since people would live, work and recreate in the same town; and (3) strengthening support for metropolitan facilities in the urban agglomerations, which require large numbers of users (VROM Ministry, 1993b). To implement this 'bundling policy', large-scale locations where in sum about 650,000 residential dwellings had to be constructed between 1995 and 2010 were pointed out on the map (VROM Ministry, DGR/DGW, 2004). Some of these locations were situated within urban cores, but most were situated in the countryside adjacent to urban cores and would form new suburbs on the outer fringes of existing cities and towns.

Implementing VINEX: new challenges for local authorities

The municipalities assigned a building task in *VINEX* were also responsible for balancing the budget. This was a challenging task. In 1986, housing prices on the real estate market had reached an all-time low. In the early 1990s, when implementation of *VINEX* commenced, the real estate market was still

80 Following the elections of 1989, Hans Alders took office as new Minister of Housing, Spatial Planning and the Environment and decided to improve the 1988 *National Spatial Strategy Paper* by formulating stricter policy goals and targets. The improved policies were first published as a supplement in 1989, and formally approved by parliament in 1993.

recovering and prices had not yet reached the level of the 1970s. It would be the first time that such a large quantity of private property would be brought to market. Before *VINEX* the social housing sector of the Dutch housing market had been dominated by rented dwellings. New estates consisted of about 30% owner-occupied dwellings and 70% rented dwellings. The construction of rented dwellings was heavily subsidised. The *VINEX* estates aimed to change the ratio into 70% private property against 30% rented property (VROM Ministry, 2006: 13). Moreover, the construction of the rented property was no longer subsidised. Realisation of the *VINEX* estates was thus strongly dependent upon the market, new for both public and private actors (ibid.).

VINEX municipalities requested restrictive policies

Out of concern that the dwellings in the *VINEX* estates, which would become available in large numbers at a time, would not be sold, the *VINEX* municipalities asked the Minister of Housing, Spatial Planning and the Environment for additional policies to ensure demand. They were especially anxious about real estate developments in small towns and villages in the vicinity of the *VINEX* estates. The *VINEX* estates would be large-scale developments with a high density of dwellings. They were going to be situated on the outer fringes of cities, far away from urban facilities and sometimes cut off from the existing city or town by highways and railways. These estates could not compete with the small-scale, wide and green residential neighbourhoods constructed in small towns and villages.

The municipalities in which the *VINEX* estates were to be realised, referred to as 'the *VINEX* municipalities', asked the Minister to prevent large numbers of dwellings from being constructed outside the *VINEX* estates. Not only would this ensure demand for the *VINEX* dwellings, it would also drive up land prices in the *VINEX* estates and reduce financial risks for local authorities and market parties developing the estates (ibid.: 14). The ministry responded to the *VINEX* municipalities' request and restriction policies were made part of *VINEX* covenants negotiated and signed between 1991 and 1995. In these covenants, national and local authorities agreed upon the implementation of *VINEX*.

VINEX was a national policy strategy paper formally approved by parliament. In the Dutch spatial planning system, provincial and local authorities have great autonomy in spatial planning, as long as planning decisions do not conflict with national policies. Provincial and local authorities are expected to help to implement national policy goals. In the *VINEX* case, this meant they were made responsible for the construction of the numbers of dwellings mentioned in *VINEX*, at the indicated locations. *VINEX* was a strategy paper, and operational agreements between national, provincial and local authorities were laid down in covenants. Covenants are agreements between two or more actors. Their voluntary basis underlines the interdependency and

horizontality of relationships between the actors involved. In Dutch policy-making processes, often characterised as consensual, covenants are a popular instrument, also because they avoid lengthy legal or administrative procedures (Glasbergen, 1995). The *VINEX* covenants between the different state, provincial and local authorities agreed on the number of dwellings to be built, the state contributions to the development of the estates and the infrastructure and the allocation of costs and benefits on a regional level (ibid.: 11). The minister promised to restrict the urban sprawl of non-*VINEX* municipalities more stringently than before. The contours would be the leading instrument for this, and thus it was included in the *VINEX* document presented to parliament.

Existing instruments to restrict the urban sprawl

In the early 1990s, when the first covenants were agreed, there were already two other policy instruments that had an impact on urban sprawl: state buffer zones and housing contingencies.

The concept of state buffer zones was introduced in national spatial planning policies in 1958.[81] Since then, the buffer zones had been included in National Spatial Strategy Papers. These zones were open areas between large urban agglomerations intended to keep the agglomerations from growing together. To implement the buffer zones, land was bought with state capital, and no urban functions were allowed in these zones. The buffer zones proved to be a success: they were able to resist the pressure to urbanise. Land ownership contributed particularly to this success. Over the years these zones turned out to be more robust when they accommodated other functions, such as nature or recreation (Bervaes *et al.,* 2001).

Housing contingencies were introduced in the early 1980s. These were quotas for residential units that could be constructed in certain areas. The quotas were based on local housing needs and the central budget available for housing (Van der Schaar and Hereijgers, 1991). Until the 1990s housing in the Netherlands had been heavily subsidised, which legitimised state intervention in the local housing markets. In line with national spatial policies, provincial authorities determined the housing needs of the province and allocated to local authorities the maximum numbers of units to be added to the housing stock. Often, housing quotas were allocated to inter municipal collaborations,[82] which enabled the collaborating municipalities to spend the hous-

81 The buffer zones were introduced in the 1958 *Spatial Planning Strategy Paper for the Western Part of the Netherlands*, a predecessor of the *National Spatial Planning Strategy Paper*.

82 Intermunicipal collaboration (in Dutch: *intergemeentelijk samenwerkingsverband*) was made possible by a legal code established in 1984 (in Dutch: *Wet Gemeenschappelijke Regelingen*). Based on this Code, provincial authorities identified regions in which municipalities should cooperate in the field of regional planning.

ing contingencies according to their regional planning policies. As an instrument, housing contingencies were a success: the provincial authorities strictly monitored and controlled the local authorities and sanctioned local authorities who exceeded their contingency.

Although the two instruments were successful for the goals they were targeted at, their contribution to the restriction of urban sprawl was limited. There were only a few state buffer zones while many more open areas were subjected to urban expansion. The housing contingencies restricted urban sprawl only indirectly. The instrument could not prevent contingencies from being spent on low density, green field developments. Such developments reaped high profits, while risks were low. In terms of risks and returns, inner town developments could not compete with these green field developments. There were no incentives to geographically restrict urban expansion so another instrument was needed.

Authorities negotiated the contour instrument

Spatial contours would restrict the space used by municipalities. The municipalities likely to be restricted by contours were not pleased with the instrument. The restrictions prevented them from developing new residential estates and business areas, one of the few means for local authorities to earn money. They felt that they had to suffer while the municipalities that had been allocated a building task in *VINEX* would benefit from the operation. *VINEX* municipalities received more attention and financial support from the state, provinces and other institutions. The small, non-*VINEX* municipalities considered the agreements in the covenants another intrusion on their local autonomy.

The spatially restricted municipalities, labelled 'contour municipalities' in this book, mobilised the Association of Netherlands Municipalities VNG[83] to represent their interests in the policy process. Although the VNG formally represented the interests of all municipalities, including *VINEX* municipalities, in practice it represented the special interests of smaller municipalities. The larger cities felt that their interests were specific to their size, and formed their own alliances to represent them.[84] In the contour policy process, the VNG was especially involved in protecting the interests of the small municipalities. The contour municipalities also tried to mobilise IPO, the association

83 VNG is the abbreviation of *Vereniging van Nederlandse Gemeenten* (in English: Association of Dutch Municipalities).

84 Examples of alliances are G27, an association of the twenty-seven largest cities established to represent these cities' interests at national government level; and G4, a collaboration of the four largest Dutch cities which also represents their interests at national and European level.

85 IPO is an abbreviation of *Interprovinciaal Overleg* (inter-provincial consultation).

of Dutch provincial authorities.[85] However, this did not lead to a strongly articulated and shared viewpoint on the contours. The provinces found it hard to implement the agreements as laid down by the covenants. They were responsible for the financial housekeeping of the cities within their jurisdiction and thus were accountable not only for the risky *VINEX* operation, but also for the financial well-being of the small municipalities, whose risks, however, were substantially lower than the risks involved in the development of the *VINEX* programme. The provinces thus represented partly conflicting interests. Differences in the political colour and culture of the provincial authorities also contributed to different responses to the contours.[86] IPO was nevertheless involved in the debate about the implementation of the contours.

Contour instrument negotiations between the VNG, IPO and the Ministry of Housing, Spatial Planning and the Environment resulted in a distinction between 'state restricted areas', given red contour lines and 'provincial restricted areas' given green contour lines. The *VINEX* paper formally approved by national government in 1993 included this distinction. The open areas where red and green contours had to be developed were indicated on a map included in the paper.

Implementing the contours: conflict between provinces and inspectorates

In 1994, the first provincial plans appeared that included the spatial contours. The provinces had assumed that the contours would be similar to the lines already used by some provinces to indicate the maximum borders for the urban expansion of municipalities. Provincial authorities thus assumed that the contours were nothing new and some of them drew loose contours around the urban fringes of these regions the way they always had done.

Meanwhile, the provinces continued to limit the building capacity of municipalities through housing contingencies which were, however, no longer based on national policies. Since the housing market was liberalised in the early 1990s there was no longer any legal basis for provincial authorities to determine housing contingencies. Nevertheless, provincial authorities continued to use this instrument and legitimised its continued use with their financial responsibility for the *VINEX* operation. They were concerned that without these restrictions, municipalities would build too many dwellings, which would make them compete with the *VINEX* developments.

According to legal procedures for developing a regional plan, the Inspectorate of the Ministry of Housing, Spatial Planning and the Environment had to inspect whether a regional plan was in line with national spatial strategy. The inspectorates concerned – four in various parts of the country – considered

86 For example, the provincial authorities of Utrecht were governed by Liberal-Democrats who tried to respect the autonomy of local authorities as much as possible.

the revised regional plans had not implemented the red contours properly. The contours had to be drawn more concisely around urban cores in state restricted areas. The inspectorates pointed out that red contours were intended as strict and tight borders within which municipalities were free to act as they saw fit. Housing contingencies were then no longer needed to restrict the building capacity.

The provinces did not agree with the inspectorates. Mainly, they did not want to interfere with local autonomy in the field of spatial planning. Tight contours would influence local planning to a considerable extent. Also, the provincial authorities did not believe that the contours could stop the small municipalities' drive to build new dwellings. Even when drawn concisely around urban cores, the contours would still leave enough space for building, and this could endanger the demand for *VINEX* dwellings.

Implementing the contours: angry contour municipalities

The municipalities in state restricted areas were furious about the proposed rigid implementation of the red contours. They perceived the combination of tight contours and housing contingencies as a double interference in their autonomy. They were also greatly concerned for the well-being of their municipality and supported their concern with several arguments.

The loss of opportunity to build would be a severe financial disadvantage. Selling land for the construction of dwellings was very lucrative for local authorities and provided additional income. This income was partly allocated to finance the redevelopment of derelict or declined inner town sites, which was far more expensive than green field developments.[87] In addition, the tight contours would raise the price of land within the contour boundaries. This would make it even more expensive to redevelop land inside the contours. A final financial concern had to do with local authorities' public funding. Population size was an important indicator for the allocation of state funding to local authorities. The absence of a growth potential for the population implied a stationary financial situation.

Local authorities were greatly concerned with the 'liveability' of communities. Spatial and housing restrictions would lead to an unbalanced demography, especially in the small towns and villages. The renewed and liberalised Housing Act of 1993 no longer gave local citizens a privileged position in housing allocation. The contours implied a further reduction of opportunities

87 In general, the redevelopment of inner city locations is costlier and more complicated to manage than green field developments because such sites are not on land owned by the municipality. There are multiple landowners and other stakeholders. The cost of making the site ready for redevelopment is high, e.g. because of requirements to purify any contaminated land. There are no economies of scale to reduce the cost of developing such small projects.

for locals, especially starters, to find affordable dwellings in their home town. This would contribute to the further decline of services in towns and villages, such as public transport, schools and basic shopping facilities. Waning support for these services had already led to the disappearance of many services, and the small municipalities particularly feared that the proposed restrictions would be the end of their communities. They also pointed to the upward impact on car transport, if citizens were forced to travel to other towns for all services.

A final concern for the municipalities concerned the urban quality of their towns and villages. The contours would force them to develop the open places that were characteristic to their urban structures, for example, the historical ribbon layout of villages could get lost. All in all, the small municipalities considered the red contours to be the kiss of death.[88] The municipalities that had used space very carefully in the past felt that they especially were being punished for their good behaviour: the tight contours left hardly any room for new developments.

A heated debate between government layers

The attempts to implement contours led to a long-lasting, heated debate between the provinces, inspectorate and contour municipalities. Also involved was the National Physical Planning Department (*Rijksplanologische Dienst*[89]) from the Ministry of Housing, Spatial Planning and the Environment. This staff department had played an important role in *VINEX* development, and the inspectorates, provincial authorities and contour municipalities sought the department's support to help them understand the contour instrument. The debate began with the inspectorates' censure of regional plans in 1994. It would last a decade, until in 2003 it became clear that the next spatial strategy document would liberalise the restrictive policies on urbanisation.

The debate concentrated on various issues raised by the provincial and local authorities as well as two procedural questions. What would be the contours' term of operation? *VINEX* mentioned no term. However, the maximum term of operation of regional and municipal spatial plans was ten years, and *VINEX* was likely to be revised in a similar period. What would happen if local authorities used up the space inside the contours? Could the contours be stretched? In some provinces, the experience with the housing contingencies showed that when a contingency had been fully spent, local authorities tried to negotiate an additional contingency, sometimes with success.

88 Some interview respondents (local civil servants, aldermen or mayors) called the tight contours literally a kiss of death (in Dutch: *de dood in de pot*).

89 In 2001, this department was put at a distance from the Ministry and in 2008 became part of the *Planbureau voor de Leefomgeving*.

These questions were partly answered in the update of *VINEX*, referred to by the acronym VINAC, approved by parliament in 1996. *VINAC* was the basis for renewing the covenants between the ministry, the provinces and the *VINEX* municipalities about the implementation of the *VINEX* programme. *VINAC* stated that the contours would be valid until 2015. Municipalities had to accept that the red contours offered a lump sum of space, at least till 2015. The provincial authorities pointed out that this could result in opportunistic behaviour in municipalities and to support their concern, they referred to their experiences with the housing contingencies.

Power play by the ministry

The ministry decided to force a breakthrough by threatening to use its hierarchical powers. The Physical Planning Act offered the minister the opportunity to enforce compliance by provincial authorities in the case of non-cooperation. The minister would replace the regional plans with plans that did implement the contours as intended. However, in Dutch intergovernmental relationships this opportunity was rarely used; it conflicted with the Dutch, consensual form of decision making and was considered a last resort as it would severely disturb existing relationships.

Nevertheless, the minister threatened to use this power, and with result. The provinces complied and drew tight red contours on their maps, showing in detail which parcels were included in the contour and which parcels were not. However, the provincial authorities were still convinced that the contours would risk leaving too many opportunities to build and that municipalities would use up the space inside the contours all at once. To the outrage of the contour municipalities, they continued to restrict the municipal housing policies with housing contingencies.

Mediation by the National Physical Planning Department

The National Physical Planning Department took note of the growing and fierce opposition to contours. It could somewhat understand the concerns of the local authorities, whose autonomy in housing and spatial planning policies was being trespassed. However, as part of the ministry, the department had to support the contour instrument, but it stressed that it disagreed with provincial interference in local housing policies: with spatial contours, housing contingencies would no longer be needed.

Besides this moral support for the municipalities' autonomy in the field of housing, the planning department tried to communicate a more positive point of view on the contours. Instead of presenting them as a means to restrict urban development to the benefit of the *VINEX* municipalities, the contours were presented as an opportunity to improve spatial quality. They could help local authorities upgrade the quality of their urban cores and surrounding open areas: both red and green qualities could be enhanced. The contours

would create a window of opportunity for the development of derelict spaces in the urban cores. Such developments used to be considered too expensive; the contours would create scarcity of land which would contribute to the feasibility of inner-town developments. And in the open areas, green qualities such as biodiversity could be enhanced, as had happened in the buffer zones.

The restriction policies behind the contours were supposed to conserve and strengthen the contrast between urban and non-urban areas. To underline the new policy goal, the planning department moved this policy from the urban areas unit to the countryside unit.

Red contour municipalities continued to oppose the contours

The new rationale for the restriction policies could not convince the red contour municipalities of the need for such tight spatial restrictions. They considered the contours to be inconsistent with other policy: while restricting municipalities, the state was initiating and supporting activities that threatened the open character of the areas that they sought to preserve with the contours, for example, all sorts of developments in the 'Green Heart' of the Netherlands. Situated in the centre of a strongly urbanised ring of cities, towns and infrastructure, the Green Heart had successfully maintained its open and agricultural character. Over the years, the area had become a symbol for the success of the Dutch spatial planning system. However, while local authorities in this Green Heart had to draw the red contours, at the same time national and provincial governments made various decisions that reduced the openness of this area. An industrial greenhouse complex of 250 hectares, country estates – as synergetic mixes of green and red functions – and a railway line were just two of the new constructions located in the Green Heart.

The municipalities also questioned the green qualities of open areas. Ecological values were hard to find especially on the fringes of cities, towns and villages. Areas were not as open as the name implied; much of the land was used for agriculture, infrastructure, bungalow parks, and other recreational activities.

If the state did not behave according to its own restriction policy goals, why should local authorities have to do so? The red contour municipalities received no satisfactory answer to this question, which strengthened their suspicion that they were being bled for the benefit of the *VINEX* municipalities.

Implementing the green contours: a more positive experience

The municipalities subjected to the provincial, green contour regime reacted more positively to the reframing of contours as an opportunity for spatial quality. The new goals for the instrument were more in line with the variety of approaches to green contours developed in the various provinces. First the provinces had to mark which areas they wanted to restrict with green contours in their regional plans. As *VINEX* indicated restricted provincial ar-

eas only roughly, the authorities had to define these areas more precisely and could add to the areas if necessary. Once the areas were defined, the municipalities were invited to suggest how they would implement the green contours. After all, *VINEX* did not stipulate precisely how to prevent urban sprawl in these areas. The green contours were thus implemented differently in the various provinces.

The Brabant authorities invited its municipalities to suggest improvements to spatial quality in both urbanised and non-urbanised parts inside their borders. They were also asked to think about how they could stimulate the more efficient use of space. Municipalities that made a serious effort to develop ideas were rewarded with a small additional housing contingency. The suggestions and the reward were intended to change municipal attitudes to space not used very efficiently in the past.

In the province of Utrecht, green contours resembled the red ones, but they were broader and more flexible. Local authorities were only allowed to change the borders of red contours as long as the surface area within the contour remained the same. The borders of the green contours were granted more elasticity, similar to a rubber band, provided that developments did not harm ecological values.

Each province developed its own green contours. Where municipalities were surrounded by physical borders, such as roads, rivers and railways, or in areas in which the municipalities were visibly surrounded by ecologically or culturally valuable landscapes, the contours were accepted as natural borders that should not be crossed. In areas where the borders were not so clear, the provinces stimulated municipalities to reflect on the desired, long-term developments of their municipality, relative to the development of the surrounding countryside and the other municipalities in the region.

In many regions subjected to the provincial restriction regime, implementation of the green contours was included in policy debates that took place in platforms for inter-municipal cooperation. These platforms, which had a legal basis, had become active in coordinating problems in housing, regional economic development, and the provision of public services that no longer could be solved on the municipal level but could be addressed more effectively on a regional level. The green contours added another spatial dimension to these platforms and were implemented in relative harmony.

The end of the red contour controversy: an anti-climax

By the end of the 1990s, the policy debate on contours took a surprising turn. It became evident that local spatial plans – already operational or following the legal procedure to become operational – offered municipalities sufficient space and housing contingencies to fulfil their housing needs for the next five to ten years, although some experts argue that without the contours municipalities would have produced many more houses than the already

planned quota (VROM Ministry, 2006). The red contour municipalities' ability to achieve their planned developments more or less ended the political debate. Local spatial plans had a ten-year term of operation. The expected scarcity of space, essential to the effectiveness of the policy, was unlikely to happen in the years to come.

Another factor that contributed to the end of the debate was the overwhelming success of the *VINEX* estates. The high demand for housing in the Netherlands continued and houses sold without a problem. The great demand had an upward effect on house prices so the estates turned out to be a big financial success (ibid.: 22-26). The *VINEX* municipalities no longer needed to push for tight spatial restrictions in neighbouring municipalities.

Political uncertainty about contour policy

Meanwhile, preparations for the *Fifth National Spatial Strategy Paper* had begun. The plan was almost ready for approval, when the new minister who had come into office following the national elections of 1998, Mr. Jan Pronk, decided to change the paper. A first draft was finally presented in 2001. The red and green contours were still included but they applied to a smaller number of areas. Municipalities had to encircle the sites planned for development with red contours, beyond which they would not be allowed to build. Green contours had to encircle areas of outstanding ecological or cultural importance, inside of which all urban development was strictly forbidden. About half the country would be subjected to either a red or green contour regime. The ministry characterised the other half as balancing areas where "developments were not meant to take place, unless…" (VROM Ministry, 2002). The procedures for drawing contours remained roughly the same. However, it was emphasised that municipalities should take more initiative in the development process, proposing a contour and its term of operation to the provincial authorities. The initial drafts of the *Fifth National Spatial Strategy Paper* mentioned a term of operation of twenty to thirty years, but in the final draft the term was reduced to ten years, with a possibility for revision after five years (ibid.).

The debate on suggested changes in the contour instrument centred on the extent to which these contours would restrict urban sprawl, and this was questioned, especially for the balancing areas (De Vuyst, 2004). To be effective, it was essential that the contours were positioned so that that they offered enough space to make developments possible, not too much space, otherwise there would be no incentive to use the space efficiently (VROM-raad, 2001; Milieu en Natuur Planbureau, 2001). The instrument was considered as belonging to the old way of planning and not the newly emergent planning. After all, central government still played a role in positioning the contours, their lengthy duration made the instrument inflexible and that made it impossible for municipalities to adjust their land use to emerging developments (Van der Velden, 2001; Vos, 2001). In addition, the Netherlands Council

of Housing, Spatial Planning and the Environment stressed that the contours could only be successful if they were backed by strong visionary policies and instruments on local and regional levels that could actually improve spatial quality inside and outside the contour (VROM-raad, 2001). The SER, the Social and Economic Council of the Netherlands,[90] pointed out that the incentives for local authorities to develop land were much stronger than the incentives offered by the red contours to spare land. It expected the contours to discourage collaboration amongst municipalities in regional developments and therefore advised negatively on the contour instrument as suggested (SER, 2001). Members of SER who represented environmental organisations disagreed with this advice and pleaded for concise, long-term red contours. These tight contours could be the starting point of inter-municipal planning processes.[91] Provincial authorities were more positive about the suggested contours, especially since they expected that 'hard' contours would turn out 'softer' in actual practice.

Due to turbulent developments in national politics – a government resignation was followed by national elections in two succeeding years – the *Fifth National Spatial Strategy Paper* was never approved. In 2002, a coalition dominated by the Liberals and Christian-Democrats came into office. The new, Liberal Minister of Housing put the fifth paper aside and developed an alternative National Spatial Strategy Paper entitled *Space (Nota Ruimte*) which was approved by parliament in 2005 (VROM Ministry, 2004). The main difference with *VINEX* and the draft of the fifth document was the change in governance philosophy. Spatial planning was strongly decentralised in *Space*. Only those spatial policies considered to be of national importance, for the physical quality of the country or the well-being of all its inhabitants were included in the document. Red contours did not fit in this approach and were no longer part of national spatial planning policies.

The continued effect of the contours

In the year 2007, at the end of the analysed period, contours were still part of provincial and municipal land use plans and could thus potentially influence spatial developments. *Space* resolved some of the issues that had been highly contested by local authorities. For example, local authorities were now allowed to build dwellings to accommodate their natural population growth,[92]

90 As an advisory and consultative body of employers' representatives, union representatives and independent experts, the Social and Economic Council of the Netherlands (SER) aims to help create social consensus on national and international socio-economic issues (http://www.ser.nl/en/home.aspx, July 24, 2008).

91 The environmental organisations were *Milieudefensie* (Dutch Friends of the Earth) and *Stichting Natuur en Milieu* (The Dutch Society for Nature and Environment) (SER, 2001: 98).

92 *Migratiesaldo nul beleid – Nota Ruimte* (Balanced migration policy, White Paper *Space*),

and were allowed to legalise permanent residency of holiday homes.

Now there was no rigid national red contour regime, contours became popular with provincial authorities (IPO, 2001).[93] The contours gave them an opportunity to direct land use and especially to protect valuable landscapes from urbanisation. The provinces grasped the opportunity to make the policy more flexible and use it to actively stimulate the improvement of spatial quality. Important for gaining the support of municipalities for the new style contours was the opportunity to adapt them. The provinces formulated conditions in their spatial plans which meant municipalities could change contours provided that the inner surface area remained the same. A distinction was made between functions in non-urbanised areas. This not only acknowledged the diversity of functions present in these areas, it made it possible to accept that 'open' areas also contained buildings and constructions. This facilitated the exchange between red (urban) and green (non-urban) functions in an area.[94] For example, 'space for space' arrangements made it possible to replace agricultural buildings with residential ones in an operation financed by the sale of the houses.[95] Such exchanges were considered highly inappropriate under the *VINEX* doctrine. Last but not least, provincial authorities no longer allocated housing contingencies. The provincial plans still included figures for the number of houses to be built, but these figures were supposed to be indicative and not strictly managed or audited by the provinces.[96]

At the same time, provinces often used green contours to encircle areas with important green values, such as cultural or natural landscapes, biodiversity, and openness. A regime that seldom permitted exceptions was formulated for these areas. A similarly strict regime was also applied to urban cores in the vicinity of these green contour areas.

Provincial authorities provided more clarity about the implementation of the new style contours, addressing in their plans such questions as how wide or tight the contour should be, which functions should be included or excluded in the contour,[97] and under which conditions exceptions would be accept-

93 Utrecht provincial authorities considered their contours successful: development had seldom taken place outside the contours (Province of Utrecht, *Streekplan 2005-2015:* 58). Their municipalities widely supported red contours, provided that they were applied with some flexibility (ibid: 198).

94 *EHS Saldo-benadering.*

95 http://library.wur.nl/wasp/bestanden/LUWPUBRD_00332733_A502_001.pdf.

96 Other developments importantly influenced this decision. Due to a variety of circumstances, such as higher prices for building materials, wage rises, and longer decision-making processes, Dutch housing production was far behind schedule in the mid-2000s. National government urged provincial and especially local authorities to speed up and increase their production.

97 One of the issues in the red contour debate was whether or not sports facilities and parks with cottages and allotments should be included in the contour.

Table 8.2 Summary of the old style and new style contours

Contour policy	Type	Goal	Implementation	Results
Old style (national/ VINEX)	Red contours	To protect open areas from urbanisation by restricting urban sprawl, to ensure demand for VINEX estates.	Tight red contours drawn on detailed maps; strict monitoring by the province and national inspectorates	No developments outside contours: the contours offered enough space for planned developments and thus offered no incentive to use space more efficiently
	Provincial/ green contours	To protect open areas from urbanisation by restricting urban sprawl	Green contours drawn around urban cores to contribute to the spatial quality of both red and green areas, often on an inter-municipal level	The development of knowledge and awareness of existing qualities by local actors, and of plans on how to secure and improve these qualities
New style (provincial/ post-VINEX)	Red contours	To protect green areas, and spatially restrict urban growth	Strict regime for urban cores in valuable green areas, more flexible regime for other urban cores	No results to date. Decentralisation of physical planning might challenge regime
	Green contours	To protect green areas from urbanisation	Strict regime to protect green areas from urban functions	No results to date. Decentralisation of physical planning might challenge regime

ed by local and provincial authorities. However, the attempts of the provinces to formulate unambiguous contour policy did not prevent new disputes flaring up between local and provincial governments and between governments and citizens. For example, provincial authorities and environmental interest groups often questioned the natural growth figures presented by local governments, and citizens complained about inequalities in justice, because of the wide variety in local regimes (RIGO, 2006).

More fundamental was the wide criticism by professionals in land use planning as well as building and construction who argued that the decentralisation of physical planning would support urban sprawl, since incentives for municipalities to expand were very strong.[98] The future will show whether the new style contours succeed in restricting urban sprawl while contributing to spatial quality in green and red areas.

Summary

Although contour policy was highly contested from its national government launch in the early 1990s to its abolishment in the mid 2000s, it gained a second chance on the provincial level. Table 8.2 summarises both the old style and new style of contour policies.

98 For example, the television documentary by landscape architect Adriaan Geuze *New Orleans in de Polder. De eenmansoorlog van een landschapsarchitect* (New Orleans in the polder. One man's war of a landscape architect) broadcasted by VPRO on March 26, 2006, made an important contribution to the debate by showing an overview of the intricacies of Dutch spatial planning politics and policies (http://www.vpro.nl/programma/tegenlicht/afleveringen/27615611/).

8.4 The policy issue and its environment

This section presents the central issues of the policy process described above. It makes a distinction between the various arenas in which the policy debates were held and identifies the participants in these debates. The section ends with some initial observations about the policy and the policy environment.

8.4.1 Issues in the policy process

Several issues were subjected to heated debate in the contour policy process, including the following three distinguishable issues.

■ *Contribution to spatial quality* – One of the controversies in the policy debate was the extent to which red contours would contribute to spatial quality. The *VINEX* strategy paper formulated the contours as a national spatial policy instrument for urban compaction. In line with this idea was the development of new suburban estates on existing urban fringes as well as urban estates in existing cities. The contour instrument was created to restrict developments in vulnerable areas, while supporting the development of the *VINEX* estates. From a national viewpoint, it was a consistent policy. However, the drawbacks of urban compaction were felt at a local level, especially in small towns and villages. While contours were aimed to contribute to spatial quality on regional and national levels, the red contour municipalities were, of course, especially interested in safeguarding and improving local spatial qualities. These municipalities argued that at the local level, spatial quality was not at all served by tight borders creating sharp contrasts between built up zones and open land.

■ *Instrumental questions* – Many instrumental questions were raised in the policy process. The National Spatial Strategy Paper *VINEX* provided little information on such questions as how broadly or concisely a contour should be drawn, what criteria it should be based on, what activities it should include, how rigid it would have to be, how long its term of operation would be, and finally, how it should be enforced. *VINEX* and ministerial policy makers had no answers to any of these questions when idea of contours was introduced. They all had to be answered during the implementation. In the late 1990s, when it became evident that even tight contours left sufficient space to realise planned developments, local authority interest in these questions declined. However, in the next decade, when provincial authorities discovered contours could be used as a physical instrument to influence municipal land use, the questions were put back on the agenda. The provincial authorities addressed these questions in their designs for red provincial contours, aiming at a less rigid instrument that would be more acceptable to local authorities.

■ *Coherence with other policies and developments* – Part of the debate focused on how the contour policy was related to other *VINEX* instruments, other policies and autonomous projects that influenced spatial developments. Whereas the national policy makers at the Physical Planning Department assumed that the contours would no longer require housing contingencies, provincial authorities continued to allocate them. The 'criticasters' of red contours pointed to other policies and developments that seemed to contradict contour policy, such as including mansions in the creation of new estates and establishing industrial glasshouses in open areas. Other arguments in the debate included: the Dutch Council of Housing, Spatial Planning and the Environment pointed out that the contours should be embedded in related policies and needed supporting instruments to achieve the suggested spatial quality. Experiences with spatial developments in recent years had shown that spatial developments were difficult to plan, control and enforce. This national intervention in local spatial planning contradicted the decentralisation of public policy making.

Particularly during the *VINEX* regime, these issues fed controversies in the policy process with some persisting dichotomies in Dutch spatial planning and intergovernmental relationships: the dichotomy between red and green, with urban and non-urban functions competing for space in zero-sum games; the dichotomy between small and large municipalities, both competing for public finances and political attention; and the dichotomy between Randstad and the rest of the Netherlands. Randstad is the highly urbanised area in the mid-west of the country where the competition between *VINEX* and non-*VINEX* municipalities was the most pressing. Provincial and local authorities outside the area often felt that they had to pay for the Randstad's problems.

The debates ceased when it appeared that the municipalities were not restricted in their building plans for the coming ten years. In the post-*VINEX* period, the instrument was reformulated at a provincial level and became less controversial.

8.4.2 Arenas in the policy process

Three types of arenas were involved in developing the policy process: the *VINEX* arenas, red contour arenas and regional arenas.

■ VINEX *arenas* – In the *VINEX* arenas, interactions were dominated by the relationship between contour policy and realisation of the *VINEX* estates. In these arenas, the Ministry of Housing negotiated with *VINEX* municipalities, often on a bilateral basis, about the development of the estates. The goals (number of dwellings to be constructed) and the conditions (ratio of owner-occupied housing and rental housing, state subsidies, compactness of the urban plan) were central to the covenants which would formalise the agree-

ments. Part of the deal was that national government would restrict urban sprawl in non-*VINEX* municipalities to ensure that *VINEX* estates would not have to compete with non-*VINEX* developments.

■ *Red contour arenas* – In the red contour arenas, interactions took place on various levels. Participatory planning processes were set up in municipalities, which discussed the geographical position of the future contours, sometimes in an interactive or participatory setting. Participants in these processes were local government, local administrative departments, experts, researchers and consultants in various fields of spatial development hired by the municipality for knowledge and advice on the contours, and sometimes local (environmental) interest groups and local citizens. However, many of these processes were stopped when it appeared that the lines would have to be drawn so tightly that only one contour was possible.

Before this point was reached, local authorities discussed progress reports on their investigations with their provincial authorities and planning departments. In some cases, the Inspectorate for Spatial Planning was also involved in debates with municipalities and provincial authorities on the correct interpretation of contours. However, the inspectorate interacted mostly on a bilateral level with each of the provinces. Meetings were held to discuss the contours of individual municipalities, sometimes attended by ministry civil servants as well. In turn, the provinces informed the municipalities on the outcomes of these debates.

These red contour arenas also debated the new style contours dating from the post-*VINEX* period. However, due to the increased adaptability of these contours, the debates were not as polarised as under the *VINEX* regime. The ministry and the inspectorate no longer participated in these arenas, since the contours had become a matter of provincial policy.

■ *Regional arenas* – In regional arenas, local authorities situated in the same region coordinated their policies, especially in fields such as housing, transport and economic development. The need to develop provincial contours drove local authorities to reflect on the spatial qualities on an inter-municipal level. The provincial contours were discussed internally by municipalities, but also in the regional arenas. These arenas discussed how the green contours could be located from various viewpoints of spatial quality. For example, some questions addressed included: which ecological values should be protected and strengthened by contours, how could they be combined with accommodating regional housing needs, what was the potential for sharing public services, how could contours be used to improve water management in the region? Participation in these regional arena debates was not restricted to local authorities but included other actors such as water boards, park boards, agricultural interest organisations, regional environmental interest

Table 8.3 Overview of the arenas in the contour policy process

Arena	VINEX arenas	Red-contour arenas	Regional arenas
Key players	VINEX municipalities, and organisations to represent their interests; Ministry of Housing, Spatial Planning and the Environment: the Minister, the Physical Planning Department and the Housing Department; provincial authorities; Association of Dutch Municipalities (VNG); (association of) real estate developers; (association of) housing corporations	Red-contour municipalities; provincial authorities and provincial departments for housing and for spatial planning; Inspectorate for Spatial Planning; Minister of Housing, Spatial Planning and the Environment; Physical Planning Department, experts/consultants, local (environmental) interest groups	Provincial/green-contour municipalities, inter-municipal platforms, provinces, water boards, park boards, research institutes, consultants, agricultural organisations, and other local or regional actors, including environmental interest groups
Start date	Early 1990s (when VINEX was in preparation)	Early 1990s (when first contours were in preparation)	1994 (with the Framework Act on Public Administration which defines areas for inter-municipal coordination, also in the field of housing and land use planning)*
Issues related to contour policy	Contribution to spatial quality	Contribution to spatial quality; instrumental questions; coherence with other policies and developments.	Contribution to spatial quality; coherence with other policies and developments
Level	Inter-governmental (agreements between Minister and VINEX municipalities)	Inter-governmental (especially between provincial and local authorities and between national and provincial authorities)	Regional/inter-municipal

*) The Framework Act on Public Administration (in Dutch: *Kaderwet Bestuur*). Municipalities also cooperate on the basis of the 1984 *Wet Gemeenschappelijke Regelingen* (Act for Joint Cooperation). However, inter-municipal cooperation dates back to the early 20th century and has taken place in many and various forms.

groups. The meetings were often prepared by consultants and research institutes, specialists in the various fields; provincial contour development was often assisted by town and country planners.

Many new style provincial contours did not emphasize a regional perspective. All local authorities were requested to indicate in writing or on maps the maximum borders of their urban cores. The future will show whether contours will still be addressed in regional arenas or be resolved independently by local authorities. Table 8.3 presents an overview of the arenas.

8.4.3 Networks in the policy process

The actors participating in the arenas distinguished in the previous section were part of networked relationships in three particular fields: spatial planning, housing and construction, and intergovernmental coordination.

■ *The spatial planning network* – National, provincial and municipal authorities and administrations planned and implemented spatial policies in the spa-

tial planning network. Spatial development policies in the Netherlands were based on a technocratic planning doctrine, which assumed a certain form of government control over developments (Faludi and Van der Valk, 1994). Dutch spatial developments were governed by a system of national, provincial and local plans, according to the Dutch Physical Planning Act, and the accompanying Code for Spatial Planning of 1985.[99]

The 1985 revision of the code clearly envisaged a fine-tuning of the plans at the different government levels. National government prescribed the desired long-term spatial developments in the National Spatial Strategy Papers. Strategy papers used to be prepared and implemented by the RPD, the National Physical Planning Department – then under the remit of the Ministry of Housing, Spatial Planning and the Environment – and were approved by Dutch parliament. The provincial and municipal authorities could formulate their own spatial plans, but these had to be in line with the national strategy paper. The Inspectorate for Spatial Planning of the Ministry of Housing, Spatial Planning and the Environment controlled the compliance of provincial and municipal spatial plans with the *Strategy Paper*.[100]

Besides governmental actors, many consultants and experts in the field of town and country planning were also part of the network and played an important role in the development of policies and plans. Other actors included in the network were university planning departments and research institutes in the field of spatial planning as well as environmental interest groups. They participated at the national, the regional and/or the local level. Some of the interest groups operated as pressure groups, others were more institutionally embedded in the network as land owners.[101] The pressure groups were especially concerned with the open areas.

Many people working in spatial planning, whether in public or private organisations, shared a similar professional background. Although their education varied from such studies as spatial planning, geography and public administration to more design-oriented studies such as architecture and town and country planning, they shared certain values and norms about what 'good planning' ought to be. Often, they joined the same professional net-

99 The next revision took place in January 2008, but it is not included in this analysis.

100 During the *VINEX* regime, there were four Inspectorates for Spatial Planning, one for each part of the country. There were also separate inspectorates for housing and the environment. In the 2000s, these inspectorates were merged in one inspectorate.

101 *Stichting Milieudefensie* (Dutch Friends of the Earth) was one of the environmental organisations especially concerned with the preservation of open areas in the Netherlands. The owners of land and estates targeted at nature conservation, such as the *Vereniging Natuurmonumenten* (Association of Nature Monuments) were less involved in the debate. The value of the nature and ownership of their land were beyond dispute and had already been very well secured in provincial and local spatial plans.

works, read the same professional literature and met each other at conferences and on field trips.

In the contour policy process, actors from the spatial planning network were involved in interactions taking place at various levels. The provincial and municipal spatial planning departments were especially concerned with the formulation and implementation of the contours; they were often consulted as external experts. These highly substantive interactions dealt with how the contours could make a maximum contribution to spatial quality. The ministry's Physical Planning Department and the inspectorate were also involved in these substantive debates about spatial quality. However, since they operated at the national level and considered spatial quality at that level, they considered the contours an important tool for implementing policy goals with regards to urban compaction and the bundling of infrastructures.

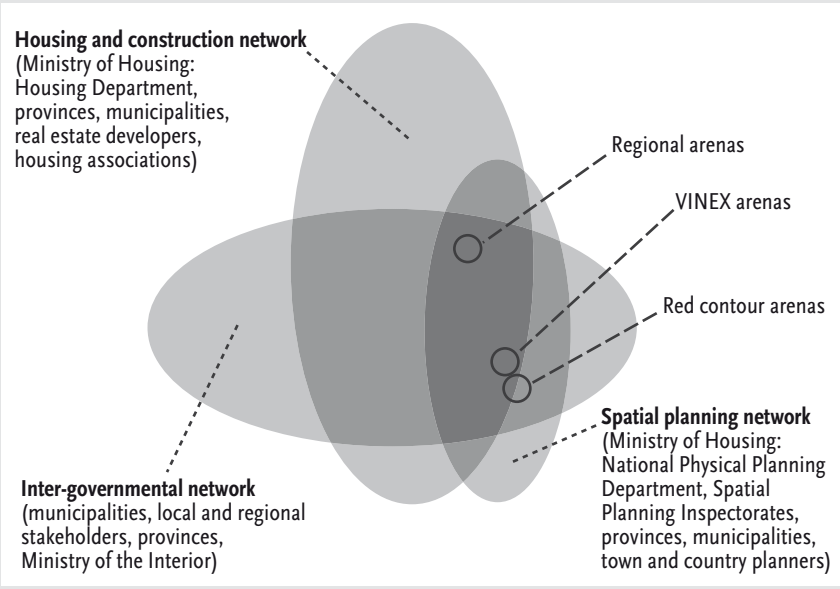
■ *The housing and construction network* – Actors from the housing and construction network[102] were indirectly involved in the contour policy process, but its housing policies strongly influenced the process. Many public and private actors in this network were stakeholders in the development and construction of the *VINEX* estates, often in some kind of collaboration or partnership between public and private organisations, such as local authorities, housing associations, real-estate developers and long-term investors. Development of the *VINEX* estates was considered – at the time – very risky. Provincial authorities were responsible for the financial well-being of local authorities and were also stakeholders. The Housing Department at the Ministry of Housing, Spatial Planning and the Environment co-authored the *VINEX* Spatial Strategy Paper which laid the basis for development of new estates and suburbs.

Out of concern for the success of these *VINEX* projects, stakeholders asked central government to ensure favourable conditions for the projects. Besides being an instrument of national spatial planning policies, the contour policy and the rigidity of its implementation were thus the result of pressure from actors in the housing and construction network. During formulation and implementation of the contours, actors from the housing and construction network continued to influence the process. Provincial authorities, responsible for regional housing policies and the financial well-being of local authorities, decided to go on allocating housing contingencies to local authorities to direct and control housing production.

■ *The inter-governmental network* – The spatial planning and housing policy domains were the responsibility of the national, provincial and local level authorities. Policies and decision making in these fields were part of these au-

102 See also Chapter 6 on zinc-reducing policies.

Figure 8.2 Networks and arenas in the contour policy process



thorities' wider policy-making processes, which had elected politicians and their administrations responsible for governing the interior. The division of responsibilities and tasks between the government layers was laid down in the constitution and in additional laws.

From the 1970s onwards, further decentralisation took place by merging municipalities and thus increasing the administrative capacity of the enlarged municipality. By the end of the 1980s, it became clear that the role of the provinces needed to be adjusted to the greater autonomy of these municipalities. The provinces turned from their instructing and controlling role to a more facilitating and coordinating role. Actors at all levels needed time to adjust to their new roles. The reluctance of provincial authorities to relinquish housing contingencies can be seen in this light.

The municipal, provincial and national authorities met on all sorts of platforms to discuss and negotiate the various aspects of governing the interior, including housing and spatial planning. The platform associations of provincial and municipal authorities were part of this network and represented their members' interests in the debates on the contours and other implementation questions about *VINEX*. The inter-municipal platforms as well as other forms of regional and local collaboration were also in this network. Contour policy and related issues were thus included in debates and formed a part of the established, ongoing relationships between governments.

Figure 8.2 shows the positions of networks and arenas.

8.4.4 Some observations about the policy environment

Here follow some observations, based on the overview of the issues, arenas and networks.

■ *Trade-offs between interests at different spatial scales* – The contours were a national policy instrument ensuring spatial quality at the national or regional level. However, spatial quality on these two levels could conflict with spatial quality on the local level. Open areas were considered an enhancement to spatial quality and were thus protected from urbanisation by the contours, but at the local level, these same contours could harm spatial quality. The assessment of the housing needs showed a similar trade-off between spatial scales. *The National Spatial Strategy Paper* explicitly stated that housing should be addressed on regional level, while local authorities wanted to house their local off-spring in their own towns or villages.

■ *The* VINEX *arenas conditioned the process in red contour arenas* – The trade-off in spatial scales was decided to the advantage of the national scale. In the *VINEX* arenas, actors were mainly concerned with ensuring demand for the large numbers of dwellings to be constructed. The red contours were invented to limit the development of competing estates. The red contour municipalities tried to implement the instrument so that it would also contribute to local spatial quality. In theory, the rigid implementation of the contours as requested by the *VINEX* municipalities left no room for this. However, in reality, the contours offered enough space for municipalities to realise the developments as planned. With sufficient space available inside the contours, municipalities would not have to change their behaviour until 2015, the end of the operational period set for the contours. This became clear in the late 1990s. At the same time, there was a boom in Dutch real estate market. Houses on the *VINEX* estates were selling like hot cakes so *VINEX* municipalities did not press for further restrictions to competing markets.

The municipalities developing provincial or green contours did not undergo the same pressure as *VINEX* arenas. In these green contour arenas there was more room to match the contours to local needs and circumstances.

■ *Arenas were indirectly coupled* – Although the arenas were linked, the couplings were indirect and procedural. The *VINEX* arenas set the agenda for the red contour arenas. The connection between regional and red contour arenas was also indirect. The red contours had to serve as an example of how provincial authorities could fill in the provincial contours. However, the chance that national government would implement a red contour-like instrument in provincial restricted areas if the provincial authorities did not succeed in formulating an instrument of their own was perhaps the strongest incentive for these authorities to come up with an effective instrument. After all, who really wanted to repeat the experience of the red contour arena?

■ *Interactions on red contours were often bilateral and procedural* – The contour policy affected many actors at the provincial and local levels. Many of the interac-

Table 8.4 Key players and their perceptions of the contours during and after the VINEX regime

Key players	Perceptions/positions of the key players concerning the main issues	
	during the VINEX regime	after the VINEX regime
Ministry of Housing, Spatial Planning and the Environment (in cluding Physical Planning Department RPD)	Contours were needed to restrict the urban sprawl, which was in the best interest of the VINEX municipalities and the restricted municipalities. In case of non-compliance, the Minister was legitimised to personally intervene to enforce the contours.	Urban restriction policies should only be formulated nationally if national values were at stake, in all other cases local or provincial authorities should make spatial planning policy.
Inspectorate for Spatial Planning	The Inspectorate understood the resistance of the red contour municipalities and the provinces, but had no choice but to implement the contours as formulated.	The role of the Inspectorate was reduced to check whether the green contours areas were sufficiently protected by provincial policies and plans.
Provinces (authorities and departments for spatial planning and for housing)	Red contours interfered with local spatial planning, but the Ministry forced provinces to draw them anyway. To restrict the housing production of non-VINEX municipalities, continuation of the housing contingents was required. The provincial/green contour regime was taken as an opportunity to stimulate municipalities to formulate regional spatial policies.	The improved adaptability of the contours enabled use of the contour as an instrument to improve spatial quality. The values in the green contour areas, and thus the strict regime for these areas, were not contested.
Red contour municipalities and Association of Dutch Municipalities (VNG)	The red contours implied another reduction of municipal autonomy and were the kiss of death in every way possible, to the benefit of large municipalities. However, by mapping the contours, municipalities became aware of the spatial qualities inside and outside the contours.	The improved adaptability of the contours enabled use of the contour as an instrument to improve local spatial quality. When important values (ecology, landscape) were involved, tight contours were accepted.
Provincially restricted municipalities	Provincial or green contours turned out to be an opportunity to explore the 'green' and 'red' spatial qualities present in the municipality and the region. They thus added another dimension to inter-municipal cooperation; spatial quality was served by regional cooperation.	The provincial 'new style' contours were developed in close collaboration with the municipalities and were less rigid than the old red contours. The contours were more an instrument of provincial and local spatial policy than of national spatial policies.
VINEX municipalities	Restriction of housing production outside the VINEX estates was necessary, preferably by contours and contingents.	The development of the VINEX estates was a success and no longer required restrictive policies.
Environmental interest groups	Restriction of urbanisation by contours was positively valued. They questioned whether contours alone could preserve open areas.	Open areas gradually diminished; relaxation of the regime would further weaken the open areas in their resistance to urbanisation.

tions in the policy process, however, especially in the red contour arenas, were bilateral. The ministry and the inspectorate negotiated bilaterally with various provinces, and the provinces discussed the policy with each of the municipalities separately. The VNG Association of Dutch Municipalities discussed red contours with the ministry and provinces as well, but these interactions coexisted with the bilateral interactions resulting from the formal planning procedures that made the contours part of the provincial and municipal plans. These interactions did not leave much room for substantive debates.

The regional arenas interactions were more multilateral. The contours were often on the agenda of established arenas, and the debates concentrated on contour implementation and their contribution to spatial quality.

8.5 Perceptions and strategies in the policy process

This section analyses whether actors in the policy process learned anything, by reconstructing the perceptions of key players in the policy process at different moments in time. Changes, if any, in actors' perceptions help to identify which lessons were learned.

Perceptions

Table 8.4 presents an overview of the key players involved in the contour policy process and their perceptions of the instrument during and after the *VINEX* period, when the contour instrument was reformulated. The *ex post* reconstruction of perceptions of actors on the contours during the *VINEX* period is based on interviews with participants in the policy process. the perceptions were confirmed in a workshop with stakeholders at the time of the *VINEX* regime (see Appendix III). The reconstruction of the perceptions of actors on the contours after the *VINEX* period is based on a document study.

Two observations can be made from the table. The first is that both during and after the *VINEX* period, actors' perception remained relatively stable. The second, related observation is that only two actors showed a change of perception when the regime changed: the ministry and – of course – the inspectorate. These national government level actors no longer saw the prescription of local urban restriction policies as their task. The provinces were not only delegated the task to formulate restriction policies, but were also given more freedom in the choice of instrument. In cases of national importance that did require contours, there was also more room to adapt the instrument to local circumstances.

Strategies

Besides reconstructing the actor perceptions, it is also relevant to reconstruct the strategies actors used to influence the policy process. Combining the changes in perception and strategies employed during parts of the policy process provides information on the lessons learned during the policy process. The next subsection therefore focuses on the strategies actors employed in the policy process. The following strategies can be recognised *ex post* in the policy process.

■ *Stick to procedural logic* – The Ministry of Housing, Spatial Planning and the Environment followed a highly procedural line of reasoning in the debate

with the red contour municipalities. It considered the decision to implement the contour instrument as irreversible. After all, the instrument was part of a national policy paper approved by parliament. The instrument must be implemented as suggested. In the debate with the red contour municipalities, the ministry persisted in its procedural logic. The instrument had to be implemented as intended; this was beyond discussion. In response to substantive arguments against the contours voiced by red contour municipalities, the ministry stuck to this procedural logic, merely repeating the stated goals and the way in which the instrument should be implemented.

■ *Stick to substantive logic* – In contrast to the procedural logic of the ministry, the red contour municipalities persisted in their substantive line of reasoning. They brought up many substantive arguments against red contours. To the surprise of the red contour municipalities, the ministry seemed deaf to these arguments, even while interactions in the spatial planning network were usually highly substantive. Perhaps because of this, the red contour municipalities tried to add even more substance to their arguments, hoping this would make their arguments more persuasive. The more persuasive the arguments became, the more disappointing it was for red contour municipalities that the ministry proved to be unreceptive.

■ *Reframe policy goals* – In 1997, there was a slight movement in ministerial strategy. It reframed the goals of the contour instrument, in an attempt to respond to the substantive issues raised by the red contour municipalities. Whereas the ministry first emphasised that the contours were an instrument supporting urban compaction, in this case of the *VINEX* municipalities, it tried to change the rationale somewhat by pointing out that the instrument would support the spatial quality of the countryside. Instead of emphasising the negative effects of the instrument, which dominated the debate, it underlined the positive effects. To support this argument, implementation of the contour policy was assigned to the Countryside Unit instead of the Urban Areas Unit. Thus the ministry tried to give its side of the debate a substantive turn. However, any discussion of the instrument itself was impossible, even while all the substantive arguments by the red contour municipalities were pleading for changes to the instrument. Meanwhile, debates in the red contour arenas were focused on whether the suggested contours in provincial plans were concise enough. This did not contribute to the credibility of the ministry's attempt to reframe the instrument.

■ *Emphasise risks and responsibilities* – The *VINEX* municipalities played an important role in setting the tone of the debate. Together with real-estate developers and housing associations, they emphasised the risks for private and public stakeholders involved in the development and construction of the

VINEX estates. They also stressed the responsibilities of public authorities for the successful realisation of the estates and pointed out that provincial and national authorities should try to facilitate the operation as much as possible. The *VINEX* operation, including its finances and risks, were of a scale unknown to these public authorities; they were receptive to these arguments. The Ministry of Housing responded with the contour instrument. The provincial authorities used the risks to justify their continued allocations of housing contingencies.

■ *Collaborate to achieve optimised contours* – Municipalities that had to draw provincial contours aimed to develop them in such a way that they would contribute positively to the red and green qualities in their municipalities. These green contour municipalities were relatively free to shape the instrument, as long as it upheld urban compaction. Perhaps deterred by the fierce debate going on in the red contour arena, these municipalities made a serious attempt to develop contours for themselves. They felt the regional level was appropriate for determining contours and did so in a process of inter-municipal collaboration.

Observations on strategic behaviour

As in the zinc case, the asymmetrical and argumentative interactions led to a dialogue of the deaf. In essence, the debate was about local autonomy in the field of spatial planning. With the spatial contours and the housing contingencies, the red contour municipalities felt that the autonomy, to which they were legally entitled, was infringed upon twice: both by these formal rules and their informal rules as well. Whereas substantive arguments in spatial planning usually played an important role in interactions in debates amongst planning professionals, the ministry did not take the substantive arguments into account. The refusal to discuss any of the substantive arguments can perhaps be explained by the ministry's concern for the consequences of such a debate. Acknowledgement of one of the arguments could have repercussions for the contour instrument, and this was the one thing that could not be changed.

Conclusion

The strategies employed by the main groups of actors during the policy process were as static as their positions and perceptions. Changes in perceptions and strategies are indicators for learning. The next section will show if the actors, despite this inertia, actually learned anything during the process.

8.6 The lessons learned

Here follows some conclusions about the learning that took place in the policy process based on the perceptions, strategies and changes therein. As in the

Table 8.5 Lessons learned in the policy process

Lessons	Social or substantive?	Technical, conceptual or meta?	Individual or inter-subjective?
Spatial quality	Substantive	Red contours: no effect	Red contour arenas: individual by some municipalities
		Provincial contours: technical and conceptual	Regional arenas: inter-subjective by members of inter-governmental co-operations
Positioning the contours	Substantive	Red contours: no effect	Red contour arenas: individual by some municipalities
		Provincial contours: technical	Regional arenas: inter-subjective by provincial and local authorities
Appropriate level of intervention	Social	Red contours: conceptual	Red contour arenas: inter-subjective, and individual by the ministry and inspectorate
		Provincial contours: technical	Regional arenas: inter-subjective learning, especially by provincial and local authorities
Collaboration	Social and substantive	Red contours: no effect	Red contour arenas: no learning
		Provincial contours: conceptual	Regional arenas: inter-subjective learning by collaborating municipalities

other empirical chapters in this book, the lessons are classified along three dimensions: was the lesson substantive or social; did it lead to technical, conceptual or meta-learning; and was the lesson learned on an individual or inter-subjective level?

Lessons about spatial quality

Although both red and green contour municipalities did not like being restricted in their land use, some did take the request to draw contours seriously: if there had to be contours, then the contours had to be drawn correctly. The necessity to draw the contours led municipalities into a reflective process, which made them aware of the scarcity of land. They explored the implications of restriction on their policies and plans from various points of view, such as its impact on housing, economics, agriculture, nature and recreation. This is how the contours created momentum in learning about spatial qualities from an integrated, long term point of view. Both red and green contours municipalities were supported in this learning process by expert knowledge delivered by their own organisations and hired researchers and consultants. This way of reflecting and learning contrasted with the dynamics of the daily activities of local governments, which offered few incentives for integrated, long-term reflection.

Learning about spatial qualities by red contour municipalities came to an abrupt end in the late 1990s when the ministry insisted on rigid implementation of contour policy. This left no room for the municipalities' suggestions or for other interpretations of the contours even though these were based on convincing, scientific arguments. Red contour policy remained unchanged during the *VINEX* regime but afterwards was abolished as an instrument of national spatial policy.

On the provincial level, the contour regime was less strictly formulated and the authorities welcomed the lessons learned about spatial qualities by actors

involved in the regional contour development arenas. Based on positive experiences, and pleased by the opportunity to govern spatial development with a spatial instrument that could influence land use, some provincial authorities decided to continue the contour instrument in their spatial policies, not just for municipalities in specific areas, but for all municipalities. The policies included the lessons learned on the technical level and specified how the contours should be drawn. Complaints about the rigidity of the contours were taken into account and the provincial instrument gave municipalities more freedom to adapt the contours to specific needs.

Lessons about positioning the contours

The municipalities in restricted provincial areas sought the appropriate positioning of contours in collaboration with neighbouring municipalities and other relevant authorities and actors in their region. Many of the red contour municipalities walked this path alone. However, they did ask for support or guidance from the ministry in drawing the contours. The request could range from support on very technical questions, such as whether sports facilities should be inside or outside the contours, to more profound questions, such as whether spatial quality was served by a sharp contrast between built up land and open areas or by a more gradual transition from 'red' to 'green'. The ministry did not respond to requests for technical assistance in drawing contours; this was not their task. The provinces were more receptive. The new style contour policies developed at the provincial level included drawing guidelines.

Lessons about the appropriate level of intervention

The red contours were an instrument of national policy that directly intervened in local spatial planning policies. This caused resistance amongst local and provincial authorities, who perceived it as interference in their legal tasks and responsibilities. Although the Ministry acknowledged that central intervention in local policy making was inappropriate, it also pointed to the necessity of strict implementation of contours. The intervention was intended to show provincial and local authorities what was expected of them, whereupon provincial authorities could take over the job. However, provincial authorities were still convinced that for them too it was inappropriate to direct municipal spatial developments on such a detailed scale. Thus the contours they developed themselves granted municipalities more freedom to implement the contours. As the provincial contour instruments were developed after the *VINEX* regime, more attention was given to freeing local government to develop their own local spatial policy and plans, and municipalities were given greater responsibility for developing contours. *Space*, the National Spatial Strategy Paper that succeeded *VINEX*, stated that contours were no longer part of national spatial policies since national government no longer felt it appropriate to intervene in local spatial policies.

Lessons about collaboration

Local governments in the regional arenas discovered the benefits of jointly drawing the contours. Green functions could be better supported on this inter-municipal level as, for example, ecological values are not bound to administrative borders. By approaching the contours from a regional perspective, there was also more room to accommodate such red functions as housing and recreational facilities inside the red borders. Provincial authorities learned that municipalities should be given leeway in this process and also learned how they could facilitate the process, for example by developing best practices.

Actors in the red contour arena did not learn that collaboration was necessary to achieve policy results. Their interactions were concerned with the contours of individual municipalities; horizontal cooperation between municipalities was absent. In the interactions between national, provincial and local authorities, the ministry and inspectorate emphasised the hierarchical relationships.

Conclusion

Despite the controversies and inertia in the policy process, actors learned some important lessons about spatial quality and how it could be improved by a physical instrument such as the contours. The new style provincial contours seemed to have taken these lessons to heart. Once reluctant to learn, the ministry, too, seems to have learned in abandoning the contours as an instrument of national spatial policy. However, it is questionable whether the end of national contours came about through any learning during the policy process. It may have been the result of changed external circumstances, since the newly elected government preferred decentralised intervention more than centralised intervention.

8.7 Evaluating the learning from an evolutionary perspective

Why did the policy process result in the lessons learned as identified in the previous section? How to explain that actors learned, even on a conceptual level, despite the inertia in perceptions? And how can the learned lessons be valued? Evaluative criteria are needed to answer these questions. Lacking unambiguous substantive criteria to evaluate learning, theories on policy learning and networked decision making have developed procedural criteria. Analogous to biological evolutionary theory, these point to the need to include a variety of actors in the policy process as a condition for policy success. They also point to the influence of the policy process' selection environment in which a selection is made from a variety of policy alternatives.

Table 8.6 Variation, selection and retention in the policy process

Evolutionary process	Questions	Answers
Generation of a variety of perceptions	What variety of perceptions was generated? How did networks and arenas contribute to the variety?	■ Relatively low variety of perceptions was generated in the red contour arenas. Procedural rigidity of the Ministry halted initial substantive learning by red contour municipalities. ■ VINEX arenas influenced the position of national and provincial authorities in red contour arenas. ■ In regional arenas multilateral interactions contributed to a higher variety of perceptions.
Selection from a variety of perceptions	How were decisions made? How were they influenced by formal and informal rules of the networks and arenas in which decisions were made?	■ Decision making in the red contour arenas was conditioned by decision making in VINEX arenas. ■ Substantive variety generated in red contour arenas was not taken into account in decision making. ■ Network rules for decision making were violated in red contour arenas. ■ In regional arenas there was room to attune decision making to other decision-making processes.
Retention: preservation of selected variety	How and to what extent was the selected variety institutionalised?	■ The red contours were made part of legally binding spatial plans, but failed to influence local authorities' land use: they left sufficient space for developments, the duration of the contours was unclear for a long time; abolishing contours from national policy undermined institutionalisation. ■ Green contours were made part of intermunicipal interactions. ■ New style provincial contours took the instrumental lessons learned from the red contours into account, but seem to offer little incentive for intermunicipal collaboration.
Retention: regeneration of variety and selective retention	How and to what extent was a regenerative capacity institutionalised?	■ Provincial authorities tried to support development of the new style contours by municipalities on a technical level, through the exchange of information and experiences with drawing the contours.

This section takes the analogy a step further and also explores how variety and selection processes contributed to the retention of both lessons and learning in the policy environment. To what extent were lessons learned and was the learning itself institutionalised? By answering these questions, this section aims to develop an evaluative judgment about the contour instrument.

Table 8.6 summarises the processes of variation, selection and retention that can be identified in the policy process. This table is based on the analyses of the policy process, issues and policy environment in the previous sections and is followed by explanations.

Variety in the policy process

Although the contour policy process took place in several arenas, with members from different policy networks, little variety of perceptions was generated in the process. Debates in the red contour arenas were conditioned by the demands made in the *VINEX* arenas. This became all the more apparent when the dwellings in *VINEX* estates sold easily. *VINEX* municipalities no longer deemed it necessary to restrict the building capacity of non-*VINEX* municipal-

ities. Red contours were abolished as an instrument of national spatial policy without complaint from the *VINEX* municipalities.

Policy processes in regional arenas showed more variety in perceptions. Here, neither outcome nor form of the instrument was predetermined. Implementation was coupled to a wider policy debate including other issues and this also increased the variety of both actors and perceptions expressed in the policy process. The following factors contributed and constrained the variety of perceptions generated, and thus the potential to learn.

■ *Rigidity reduced the variety of perceptions in the red contour arenas* – Initially, the need to draw red contours started a learning process in municipalities about spatial quality and how the contours could best contribute to spatial quality. These learning processes abruptly ended in the late 1990s, when the ministry and inspectorate said that the instrument had to be implemented more rigidly than the provinces and municipalities proposed. The ministry and inspectorate refused to listen to pleas for wider contours, even when research showed that they would contribute to values that were otherwise central to ministry policy makers. At the same time, the municipalities were squabbling with the provincial authorities about restrictions on housing production. The rigidity of both ministry and provincial authorities led to passivity in red contour municipalities. Since contours had to be drawn tightly around built up places, this left little room for the input of expert knowledge. The debate was forced onto a single dimension, with actors strongly supporting or opposing the contours. Some municipalities withdrew from the debate, deciding to wait for the outcome of the conflict.

■ *Multi-lateral interactions in the regional arenas supported inter-subjective learning* – The interactions in the red contour arenas were often bilateral, between local and provincial authorities and between provincial and national authorities. The agenda for these interactions was limited to technical questions on contour implementation and soon reduced the debate to a digital format. Interaction was often multilateral in the regional arenas developing provincial contours. The contours were included in a wider policy debate involving multiple stakeholders. This offered the opportunity to exchange different views on the contours, and to couple them to other policy issues in search of win-win situations.

Selection in the policy process

How were decisions made? What was the influence of formal and informal rules? These are essential questions in an analysis of the policy selection processes.

Under the *VINEX* regime, the position of the red contours was based on existing urban cores and planned developments that were already in the pipeline. The strict application of this selection mechanism left no room for

debate. In the regional arenas, the selection mechanism was not predefined, but could be formed by the actors involved. It was up to the provincial authorities to decide how they would restrict urban sprawl in restricted provincial areas. The provincial authorities decided to develop such an instrument in collaboration with the municipalities.

■ *Asymmetry of selection* – The red contour municipalities discussed the contours and spatial quality from a local or regional point of view. However, the ministry had formulated the contours as a policy instrument serving spatial quality at the national level. There was thus asymmetry in actors' perceptions of how contours should be drawn. The contours made the trade-offs visible between spatial quality at the national and local levels. Municipalities had to suffer for the benefit of national urban compaction policy. The municipalities felt this was an unjust infringement of their autonomy.

■ *Substantive variety generated was ignored for selection* – From a national policy point of view, the strict implementation of the contours demanded by the ministry was understandable. However, the ministry refused to help municipalities solve the resulting problems, stating that it was not up to the national government to interact directly with municipalities. Lessons that the municipalities had learned on local spatial quality were ignored, because in the eyes of the ministry the selection had already been made. Drawing the contours was a mere matter of implementation. The goals the instrument served could not be changed, because the ministry was committed to them by agreements with the *VINEX* municipalities on the development of new residential estates.

■ *Red contours violated core values of the networks* – With the rigid implementation of the red contours, the ministry and inspectorate violated values at the core of the interactions and relationships in the networks.

The hard line on red contours implied central government intervention in local policies. This conflicted with the general concept of local autonomy laid down in the constitution which was the basis for intergovernmental cooperation. Local autonomy was a core value, especially in the spatial planning network. This was underlined by the legal status of local spatial plans: these were the only type of spatial plans directly binding for citizens.

In the housing network, central intervention was more common. In the decades after World War II, central and provincial governments were closely involved in the planning, financing and control of local housing production. The allocation of housing contingencies by the provinces was left over from this era. However, the housing market was liberalised and semi-privatised in the early 1990s. The actors in this network were just getting used to their new roles when the contours were introduced.

In the field of intergovernmental relationships in general, the division of

roles and responsibilities of the different government layers was reconfirmed in the early 1990s, ending a debate on the organisation of the interior that had lasted several decades. The conclusion was that the structure of the interior could stay as it was: municipalities and provinces should take up their assigned roles in the constitution more unambiguously; municipalities should play a strong role at the local level; and the provinces should concentrate on the general direction and facilitation of local policy making.

The ministry and inspectorate's distrust of local and provincial authorities implied a further breach of the interaction rules in the networks involved. The ministry and inspectorate deemed the rigid implementation of the contours necessary out of concern for strategic behaviour by the municipalities. Based on past experience, they were worried that municipalities would use the space within the contours opportunistically and present provincial authorities and the ministry with a fait accompli if they used up all the space inside the contours before their term of operation was due to end. This distrust was not limited to the contours. Provincial authorities were similarly distrustful of municipal housing production and so decided to continue allocating housing contingencies.

The final violation of values resulted from the ministry's refusal to discuss the goal of red contour policy substantively. Interactions in the spatial planning network were strongly based on shared professional norms, and debates were usually based on substantive arguments. The red contour municipalities assembled substantive arguments, supported by research from experts, to justify their claim for more space. The ministry and inspectorate acknowledged the problems faced by the municipalities, but also told them that they had to solve these problems in the space allocated to them by the contours.

The conflict between municipal and provincial authorities on the housing contingencies was comparable to the conflict between the state and local authorities on the red contours. Municipalities had a number of legitimate reasons to ask for a larger contingency, but the provinces refused to discuss these. However, because municipalities were accustomed to housing contingencies, they experienced them as less intrusive than the contours. The figurative distance between provincial and local authorities was smaller than that between national and local authorities.

Retention in the policy process: preservation

Retention concerns preservation of the selected variety in the policy process and the capacity to regenerate variety. This subsection first explores preservation: how much variety was generated and how much of the selected was institutionalised?

Although red contours were intended to institutionalise spatial restrictions to urban sprawl more firmly than the green provincial contours, they seem to have had the opposite effect. Red contours were made part of provincial and

local spatial plans, but with the abolition of the contours as an instrument of national policy, they seem to have lost much of their potential institutional robustness. The provincial, green contours were embedded in inter-municipal relationships, policies and plans, and although these had no formal legal status, green contours were much more 'alive' than the red ones. The following factors contributed to this.

■ *Indistinctness of the red contour instrument undermined institutionalisation* – Although the red contours were made part of local and provincial spatial plans with a ten-year term of operation, there was much uncertainty about how the instrument would work. This undermined the institutionalisation of the instrument; it was included in plans, but failed to influence local authority planning decisions. The contour instrument aimed to offer a lump sum of space to local authorities to accommodate urban growth. The strength of such lump sum instruments is that they set clear boundaries, but within these boundaries actors are relatively free to act. The boundaries must be set in such a way that forces actors to change their behaviour. In the case of red contours, none of these conditions were met. It took a long time before it became clear how contours should be drawn and for how long they would be valid. Municipalities were also confronted with the continuation of housing contingencies by the provinces. The combination did not seem to give municipalities much freedom to decide how to use the space inside the contours. However, soon after the contours were established, it became clear that they would not lead to any scarcity of space for the next ten to fifteen years and therefore they did not provide the intended incentive for more efficient use of space. Meanwhile, national policy had changed and contours were no longer an instrument of spatial policy. This contributed to the uncertainty of the status of the contours, already challenged in several court cases. All in all, implementation of the instrument failed to achieve the intended effect.

■ *Green contours offered an action perspective* – Whereas red contours were regarded as a restrictive instrument, provincial contours were seen as opportunities to protect and improve red and green spatial qualities on a regional level. The tone of the provincial instrument was much more positive and cooperative. Provinces and municipalities were given the opportunity to tune the instrument to their own situations. They included the contours in their inter-municipal interactions. The existence of the red contour regime might have provided an extra incentive for provinces and municipalities to make their contours work. Given the opportunity to develop an instrument that would restrict the urban sprawl just like the red contours did, it was in the interests of both provincial and local authorities to develop something that did meet this demand, otherwise the ministry would intervene.

■ *New style provincial contours used lessons left unselected in the red contour process* – The new style contours applied many of the lessons learned in the red contour processes. During development of the red contours, municipalities asked various questions on the best way of drawing the contours. Provincial authorities responded to the call for help and specified how lines should be drawn in the new style contours. The provincial authorities also took the lesson to heart that too much rigidity would lead to opportunistic behaviour by municipalities instead of responsible land use. Therefore to a certain extent new style contours were made adaptable to local physical circumstances, political priorities and preferences.

■ *The contour instrument became part of provincial spatial policies* – The substantive lessons learned in the red contour policy process were used to develop the contour instrument on a provincial level. The contour instrument seems to have been institutionalised on the provincial level, as many stakeholders considered this level more appropriate for such an instrument. The question is whether new style contours can sustain the action perspective offered by the provincial contours under the *VINEX* regime. The instrument has crystallised and is no longer under threat of national government intervention. Every municipality is obliged to determine some form of contour. The need to establish contours on an inter-municipal level no longer seems to be present, whereas it was precisely the inter-municipal platform that contributed considerably to the variety of the debate.

Retention in the policy process: regeneration

Retention is also about regeneration: to what extent is capacity to continue learning institutionalised?

The development of *VINEX* locations created a sense of urgency for an instrument that would spatially restrict municipalities. One consequence of the fast development of the contour instrument was that it was not fully thought through at the time of implementation. No thought had been given to its future, and there were no incentives to facilitate or stimulate learning during its term of operation.

The red contour policy process had the momentum to facilitate learning by actors. At the time of implementation, not much thought had been given to detailed questions that nonetheless turned out to be important for the instrument to work. Local authorities asked for help in drawing the contours. They thought that many of the implementation questions were not unique to them, and suggested that the ministry should collate all the municipal experiences to communicate general guidelines on best practice. The ministry felt this was not its task. No other actor took on the initiative to publish such a guideline.

The new style contours put this question back on the agenda. This time, the provincial authorities paid more attention to formulating guidelines for draw-

ing contours. However, more research and further exchanges of experiences on improving urban and non-urban qualities inside the contours could help local authorities make strategic decisions on the best use of space provided by the contours. For provincial authorities it could offer information and knowledge on how to proceed with the contours in the future.

8.8 Conclusions

Contours put urban sprawl on the 1990s agenda. The question is whether they did this successfully. As a lump sum instrument creating land scarcity and forcing actors to innovate land use, the contours failed. Within their term of operation, the contours offered local authorities sufficient space for their planned developments. During the studied period, municipalities remained inside the contour boundaries and did not develop plans for new extensions. Demand for new housing continues unabated and dwellings on the *VINEX* estates sell easily. To date, the contours have thus succeeded in their goal to concentrate urban sprawl.

The contours were the spatial instrument to control land use, previously missing from the governmental toolbox of land regulations. Provincial authorities appreciated this aspect and also had positive experiences with the provincial green contours. When contours were dropped from national spatial planning policy, many provincial authorities decided to keep them on. The provincial level was acknowledged as the more appropriate level for government intervention in local spatial planning.

Making the contours an instrument of provincial policy reduced the asymmetry in selection processes at different spatial scales. There were no more trade-offs between national and local values, but between provincial or regional and local values. At the inter-municipal level, it was easier to search for win-wins and opportunities to compensate actors. The experience with the red contours showed that when municipalities bordered open areas with uncontested values, the municipalities concerned accepted the contour-protected areas more easily. In these cases, open areas of national importance are expected to remain well protected.

The contours caused dismay especially in areas where natural values were not taken for granted. In these cases, the unspecified character of ‘open space’ was used to argue that urbanisation would not necessarily harm values present in these areas and could even improve them. It is questionable whether the new style provincial contours will be able to protect these areas from the urban sprawl. In their design of the contour instruments, provincial authorities removed those aspects that led to the negative experience with red contours, such as their rigidity and top-down imposition. Provincial new style contours are more flexible than the national red contours, providing

opportunities to swap red values for green and vice versa, and shift or revise the contours on demand.

Two other policy changes put the contour protection of open areas at risk. An important benefit of the old-style provincial contours was their implementation on the inter-municipal level to protect open areas of regional importance. This increased variety in the process and led to more robust contours. Now that every single municipality has to determine its own contours, it is questionable whether an incentive remains for the municipalities to keep on doing this on the inter-municipal level. It is likely that municipalities will develop the contours from a purely local viewpoint, whereas the regional or sub-regional level gave the opportunity to resolve conflicts of scale and trade-offs were decided with more commensurate compensation, perhaps, for the actors' interests. Decentralisation of spatial planning policy removed the threat that national government would intervene if the contours did not adequately restrict urban sprawl. This threat was another important incentive for municipalities to make provincial contour restrictions work.

Suggestions for policy improvement

Provincial contours at least made provincial and local authorities aware of the problem of uncontrolled urban sprawl. The extent to which the instrument will be able to restrict urban sprawl or at least lead to intelligent urban sprawl – that is, consider urban sprawl in terms of various quality dimensions, including transport, liveability, urban quality, biodiversity and nature – depends on several factors. The following suggestions might improve the provincial contours' chance of success. First, the values of to-be-protected open areas should be strengthened or made more explicit. Experience with buffer zones, as well as the contours, has shown that if values are explicit, they can be better safeguarded and represented in decision making. Second, the contours should be decided on in inter-municipal or regional arenas. Open area values are often present at a regional scale, and can therefore be better formulated and represented at this level. Implementation of the contour instrument on a regional scale would thus create a level playing field for the green and red values to be protected and improved on both sides of the contours. The third suggestion concerns the facilitation and stimulation of learning on all sorts of issues encountered by local authorities implementing contours as well as resulting from the contours themselves. During the *VINEX* regime, local authorities pointed to the need for support in the development and exchange of knowledge and best practices. Provincial authorities and the Dutch Association of Municipalities could investigate who could develop and provide such support.

Desirability of strong central government intervention?

This chapter ends by returning to the public call for strong central government intervention to combat careless use of open areas and fringe areas

of towns, cities and alongside infrastructure. The contours case shows that such intervention causes turmoil and generates a great deal of attention in the short term, but it is difficult to sustain this level and ultimately support for the intervention declines. Regional arenas are better placed to protect these interests, provided that the values to be protected are explicit and given a voice, by giving the areas concrete functions, representatives or owners. Strong government intervention can thus be a sensible strategy for putting an issue on the agenda, but it should be followed up at a more appropriate government level. The government can use the period of great interest in the issue to strengthen the values they seek to protect, so that these values stand a better chance of surviving in urban and regional planning processes.

9 Greening governance: lessons for policy design

9.1 Introduction

How can public policies in support of a sustainable built environment be evaluated and improved? That question was posed at the start of the book. This chapter answers it in several steps. Section 2 recapitulates on the search for an appropriate evaluation perspective and presents why the perspective on policy learning in networks is deemed appropriate, which aspects should be improved and how the perspective might benefit from understanding learning as an evolutionary process of variation, selection and retention. Section 3 presents an overview of the learning that took place in the reported case studies. Sections 4, 5, 6 and 7 present respectively how variation and selection have contributed to learning and retention of learning, in terms of institutionalisation of the lessons learned and of the learning process itself. Section 8 analyses how an evolutionary perspective on policy learning improves the chance of successful policy making for such an ambiguous policy goal as sustainable development. The chapter's concluding Section 9 reflects on the theoretical implications of this research: can the evolutionary approach contribute to the greening of governance and how can it be further developed? A learning-by-doing approach, used in games and experiments, is promising. Allied to this but on a more practical level, Appendix IV describes the sustainable urban renewal decision making levels and suggests how lessons on variation and selection can be used to design and facilitate decision making for a sustainable built environment.

9.2 An evolutionary perspective to learning in policy networks

Four sub-questions (see Chapter 1) were formulated to answer the main research question. The answers to the first three questions are summarised in this section; the fourth one will be answered in Sections 3 to 7. Sections 8 and 9 answer and reflect on the main research question.

1. What kinds of policies have been developed in the past to support sustainable development in the built environment and how did these policies address the ambiguity, dynamics and multi-actor context of sustainability?
In response to this first question, Chapter 2 presented an overview of past developments in policy making for sustainable development, and for the built environment in particular. The turn from 'government' to 'governance' is clearly recognisable in these policies. Policy makers were aware of the multi-actor environment wherein they had to formulate and implement policy, and acknowledged the need to collaborate with those actors that addressed or were affected by the policy. Policy makers acknowledged that policy mak-

ing was a process of interaction and negotiation amongst multiple actors and that they were not in the position to formulate and enforce policy goals singlehandedly. Nevertheless, it was difficult for policy makers – often trained in a single discipline – to adopt a governance approach to policy making. The institutional structure of the built environment is highly fragmented and does not encourage actors, including government organisations, to look beyond their direct roles and responsibilities. Policy makers are especially trained in reducing the substantive and social complexity of sustainability challenges, for example, by developing labels and certificates for products and formulating energy standards for buildings. They did so in collaboration with the industry and actors concerned. However, they seemed to lack approaches that could help them to develop policies that acknowledge the ambiguity, multiplicity and dynamics of the concept of sustainable development.

The search for such an approach was addressed by sub-question 2. A framework for the evaluation and design of governance should be able to address the ambiguity and dynamics involved in the concept of sustainable development, also when applied to the built environment. Because of the ambiguity of the concept of sustainable development, multiple definitions of the concept are possible; there is no unequivocal, authoritative one. Multiple problem definitions are thus likely, and each definition mobilises different stakeholders. Because of the multiplicity of the concept, different aspects are addressed simultaneously, in various places, involving changing constellations of participants in the webs of networked relationships.

2. What is a suitable theoretical approach for evaluating an ambiguous problem that needs to be resolved in a multi-actor context?

In answer to sub-question 2, Chapters 3 and 4 explored evaluative perspectives for governance that could deal with the characteristics of sustainability and of the social and institutional context in which decisions for the built environment were made. Network perspectives to the policy process were especially promising. A network perspective takes the interdependencies between actors as point of departure for the analysis of policy processes and was therefore used in this research. Network perspectives are often combined with the notion of learning, to account for the substantive progress – or lack thereof – in policy processes. The learning perspective shows that for ambiguous problems, actors can develop a shared and improved understanding of what constitutes policy problems and how they can be alleviated. However, evaluative criteria used in such network-learning perspectives strongly rely on the judgement of actors involved in a policy process, possibly leading to a bias towards *ex post* satisfaction. These criteria do not explain the learning process itself: which factors contributed to the learning? To be able to improve the policy performance, it is important to reveal such explanatory factors. An evaluative approach focused on learning in policy networks is suitable for

evaluating sustainable built environment policies, but it needs additional concepts to be able to explain the relationship between policy and learning.

3. How can this approach be used to evaluate existing public policies in support of a sustainable built environment?
Evolutionary concepts of variation and selection are sometimes used to explain learning and policy change. To answer question 3, Chapter 4 explored the theory on how to use an evolutionary perspective to policy making for policy evaluation. Evolutionary processes consist of variation, selection and retention and together these three mechanisms explain change or inertia. By looking at these or, in other words, at processes of interaction, decision making and institutionalisation, the learning processes can be better understood. Instead of just observing which lessons were learned, it helps to analyse which factors contributed to the learning and the extent to which the learning actually mattered in that it influenced the policy process. The aim of this evolutionary approach is thus to systematically shed a light on the fuzzy relationships between policy, learning and policy change, and in so doing proffer some advice for improving policy design.

Variety points to the presence of a variety of perceptions, which may give rise to conflicts but also to debate and deliberation; processes in which fact-finding and knowledge development are likely to play roles. Ultimately, this can lead to a more profound and shared understanding of the policy problem and how it can be addressed. The problem perception selected is expected to be of a higher quality than the initial perceptions present at an earlier stage of the process. That is why learning perspectives advise involving a variety of actors in the policy process.

Learning perspectives are less outspoken on the processes of selection and retention. In this research, selection is understood as decision making; the process of selecting a problem perception from the variety of perceptions that emerged during the process. As in evolutionary theory, the selection environment is expected to influence the selection made. In the processes studied, the selection environment consisted of actors belonging to webs of networked relationships, the arenas in which processes took place and decisions were made, and the formal and informal rules, including any methods used to support decision making that guided interaction and decision making in these arenas. The selection environment casts its shadow ahead, when actors fine-tune the variety that they have developed to the selection environment and thus improve the chance that their alternative will be selected. This anticipation can induce strategic behaviour in actors, and can even influence the choice of arenas in which the issue is addressed. Actors tend to put the problem on the agenda of the arena that will best serve their interests.

The timing of selection also influences the extent to which variety is generated. Actors tend to make selections too early, when the consequenc-

es of a decision are unknown. Early selection is often undesirable because it leads to premature closure of decision making and sub-optimised results. To improve the quality and heterogeneity of the variety generated, variation and selection should take place in iterative steps. The number of alternatives to choose from reduces over time, while the quality of the remaining alternatives improves. They will reflect processes of interaction, negotiation and joint learning. Variation and selection could take place in several parallel processes to create maximum variety for the final selection.

In evolutionary theory, retention includes preservation of the selected variety and the ability of this selected variety to regenerate. Preservation can be understood as institutionalisation: the absorption of the selected variety in the selection environment. To improve the quality of decisions, policy processes should facilitate the absorption of the variety as fully as possible; they should try to absorb all the lessons learned during the process. Regeneration refers to the extent to which policies induce new processes of variation and selection. Both the policy problem and the policy environment change over time and selected policy alternatives have to be reproduced and reinvented to be able to provide a solution to the changed circumstances and challenges. Policy makers have to keep on learning to provide appropriate answers to the problems they face. Feedback and evaluation are prominent drivers of regeneration. They provide information on the extent to which policies adequately address problems or that policies need to change on a technical or conceptual level.

This evolutionary approach to learning in policy networks differs fundamentally from biological evolution where variation, selection and retention are random processes; change does not necessarily involve progress. However, in policy making, variation, selection and to a lesser extent retention are intentional processes. The purpose of this research is to identify how policy design can influence, stimulate and facilitate processes of variation and selection and how they can contribute to learning about the policy problem concerned, which, in turn, may result in policy change.

This theoretical exploration of the evolutionary approach to policy making was followed by empirical study. Chapters 4 and 5 of the book explored how the evolutionary approach to policy learning could be applied in empirical research, to evaluate existing policy processes. An analysis of the issues, networks and arenas that together set the stage of a policy process was followed by an analysis of the learning by actors involved in each case. In particular, it explored how various actors and a variety of their perceptions represented in the policy process contributed to learning, how selection processes took place and influenced learning, and whether the lessons and learning were retained. The results of this exploration are reported in the following sections, and they also form the answer to the final sub-question 4: *which lessons can be learned from an evolutionary approach to improve policies for a sustainable built environment?*

9.3 Learning in the policy processes

In the cases, actors learned a number of lessons about the content of the issues, the social process which addressed these issues and the learning process itself.

Summary of learning in the cases

In the zinc case actors learned about the content of the issues central to the process: the eco-toxicity of zinc, the volume of emissions, the norms and methods to define norms. Most of these lessons were inter-subjective; they were accepted by the key actors in the process. As a newcomer in the arenas, the zinc industry had to learn social lessons. They learned how to play by the policy makers' rules. On a meta-level, both the industry and policy makers learned lessons. Actors learned to give their arguments credibility and discovered the value of joint research. They also learned to accept that knowledge and methods were subjective. However, these lessons failed to influence the policy process. The lessons did not change the perceptions of ministerial policy makers or research institutes experts that dominated decision making in the arenas; all held on to the view that all zinc emissions should be prevented. The effect of the lessons in terms of policy change was merely technical; for example, an improved norm-setting method did not lead to changed norms; and the significant downward adjustment of zinc emission estimations for construction products did not lead to changed priorities in environmental policy making.

In the case of the *National Packages for Sustainable Building*, the lessons were of a social nature, leading to technical policy changes. This is understandable since the aim of the policy was to diffuse harmonised knowledge. Harmonisation and dissemination took place according to rules formulated by the building and construction industry. Actors unfamiliar with these rules, such as private firms in the supply industry and actors from the urban planning sector had to learn how to play by them. Once familiar with them, they became better at safeguarding their interests. These rules also stipulated the scope of possible revisions to the package contents, the sustainable building measures. In developing the packages, industry avoided further government intervention. On the local level, packages continued to influence development projects. Local authorities used them to formulate sustainability ambitions for projects and make voluntary agreements with local or regional actors on sustainable building and housing.

The policy processes for state or red spatial contours and green or provincial spatial contours show different results in terms of learning and policy change. The red contours aroused such conflict between actors that initial learning about the policy content was halted and the policy was abolished as an instrument of national spatial planning, although one may ques-

tion whether this came about through the policy process or because of external developments (new government). Instead, the instrument was retained in a less stringent form at the provincial level where policy processes were more successful; learning about the process of protecting open areas went hand in hand with learning about the values represented in these areas. The contours were included in spatial policy making at both provincial and inter-municipal levels.

The cases contributed to different kinds of learning

In all three cases, a number of lessons were learned. Some distinctions can be made between the contributions of the cases to the various lessons learned. In the case of the packages for sustainable building, actors learned about the social process in which the packages were developed and implemented. These lessons resulted in technical changes; both the content and the content development procedures of the packages were improved inside the goals formulated by the ministry and the conditions agreed upon by the supervising boards of the packages. In the case of the diffuse zinc emissions, many lessons were learned about the content of the policy issues and the development of mutually accepted methods and knowledge. Despite the lessons' inter-subjective character, conceptual change to the policy was limited: policy goals were largely untouched by these lessons. This also happened in the red contour policy process. Some conceptual lessons about how contours could contribute to spatial quality failed to have any impact on policy at all. Nevertheless, of the three cases, the contour policy showed the largest conceptual change; contours were abolished as an instrument of national spatial planning policy, but this could well be the result of changing external circumstances and not of learning.

Actors learned about the policy content and the policy process

The policy issues addressed in all three cases were ambiguous. Cause-and-effect relationships were unclear. For example, in the zinc case there were questions about the eco-toxicity of zinc, in the red contour case there was uncertainty about whether spatial quality could better be served with rigid or flexible borders. In the case of the packages there were questions about the relationship between product characteristics and environmental performance. In this last case, ambiguity was reduced early in the decision making by focusing on communicating negotiated knowledge, that is, commonly accepted sustainable building measures. The emphasis in this case was therefore on learning in the policy process. Actors wanting to influence the verdict on their product in the packages had to play by the rules of the game. Actors already familiar with the rules, since they were involved in other processes in the building and construction network which used similar rules, had an advantage over the actors new to these arenas.

In the provincial contours case, the contours were made a part of pre-existing inter-municipal collaboration processes. As a result, the investment in setting up new relationships and rules for interaction, the transaction costs, were low and actors could devote their resources to the issue content.

Some actors had to learn more than others

Individual learning that resulted in no change in policy was done by actors who had to catch up with other actors with regards to substantive or procedural knowledge. The arenas or venues that addressed the issues influenced the way in which the issues were framed and the rules by which they were addressed. Actors who were already familiar with these venues, perceptions and/or rules had a clear advantage over newcomers on the scene. In the zinc case, for example, the zinc industry had to invest much time and resources to get acquainted with theoretical concepts and methodology of norms and norm-setting. They also had to learn about the networked relationships between actors and the roles and responsibilities of actors with regards to norms, enforcement and communicative policies. Until they hired a professional lobbyist who was at home in these policy-making networks, their efforts to influence the policy process had had little effect. In the packages case, actors unfamiliar with representation of interests in building and construction or unfamiliar with LCA, were at a considerable disadvantage.

Thus some actors had to learn more than others, and the examples show that the place where the issue was addressed put some actors at a disadvantage while favouring others. This is in line with the findings of Baumgartner and Jones (1993), who emphasised the effect of venue choice on the policy process, and they even speak of venue shopping by policy actors to indicate that the place where issues are decided may favour some actors over others. However, the term venue shopping seems to suggest that the choice of an arena is deliberate, while the cases show that this choice is more emergent than deliberate.

Actors acknowledged inter-subjective learning as a condition for policy change

The analysis made a distinction between lessons learned by individual actors and lessons shared by multiple actors involved in the process. Of course, inter-subjective learning in many cases involved individual learning as well. The nature and content of these individual lessons differed per actor, depending on the background and knowledge present. As expected, the learning at an inter-subjective level created better opportunities for policy change than individual learning, and can thus be considered a condition for learning. The cases show that actors were aware of this condition. In the green contours case, they knew this from the start, while in the zinc case, they learned this during the process, when time and again individual lessons failed to make a difference.

Changes resulting from inter-subjective learning took place on both technical and conceptual levels. When actor perceptions converged, this almost inevitably led to a change of policy to bring the policy in line with the agreed upon understanding of the policy. Only the lesson in the zinc case, when actors learned about the volume of diffuse zinc emissions from construction products, did not lead to a change of policy, since this did not affect its basic principles of precaution and prevention.

Individual learning can lead to technical change

Although probably not all individual lessons learned have been noted in the empirical research, since the focus was on policy-oriented learning, a number of lessons learned by individual actors have nevertheless been observed. As described, many of these lessons had to do with catching up with the other actors in the arenas. As expected, this did not affect the policy, but sometimes individual learning did result in technical changes to the policy. For example, the questions of red contour municipalities concerning the positioning of contours led to more specific guidelines in the new style contours. Sometimes the policy effect was more indirect, resulting from a change of actor behaviour or – more deliberately – a change in actor strategy. For example, the zinc industry learned to communicate the advantages of using zinc. Although this did not lead to a policy change on the national level, it did affect local authorities or water boards, who decided to halt their discouragement of the use of zinc in construction. It also forced national policy makers to improve the argumentation supporting their goals. This example shows that technical learning was sometimes closely related to a change of strategy by one or more actors.

Meta-learning was limited

On the meta-level, learning was limited, while developing learning capabilities and capacity is important to create common ground for collaborative action. Learning capacity is important to be able to adapt policies and strategies to changing perceptions of problems, knowledge and circumstances, especially when addressing ambiguous policy issues such as sustainable development. Only in the zinc case did actors learn very important lessons on the learning process itself. For example, they learned that methods, regardless of their scientific soundness, were not neutral, and they learned how to develop negotiated knowledge. Despite the improved learning skills, there was no room for policy change and the meta-lessons failed to give the process any new impetus. In the other two cases, meta-learning was absent. In the case of red contours, conflicts prevented any learning. Municipalities explicitly asked for guidance in positioning the contours and for an exchange of best practices, but the ministry refused to respond to this request. In the case of the national packages, learning was constrained to what Heclo has framed as 'nor-

mal everyday policy making' (1974: 315). In the case of the provincial contours, there was perhaps less need for meta-learning, since actors were satisfied with both process and results. However, during the development of the provincial contours there was some reflection on the process. The provincial authorities monitored the extent to which the instruments under development met the conditions imposed by the ministry.

Conclusions

The case studies show that the policies gave rise to a number of technical and conceptual learning processes. At a first glance, the cases could be judged fairly positively with regards to the learning that took place. But why were these lessons learned? How did the policies set learning process in motion and how did they stimulate and support the learning? These questions are relevant to a policy design point of view. If learning is considered an important goal of the policy processes that address ambiguous problems, then it is highly relevant to explore how learning takes place. The following sections distinguish the factors that stimulated and constrained processes of variety, selection and retention in the policy process.

9.4 Variety in the policy process

What variety of perceptions was generated in the policy processes and which factors contributed or constrained the variety generated? In the policy processes studied an analysis was made of the participating actors and their perceptions, including those of experts, the networks to which they belonged, the issues that were on the agenda and the arenas where the issues were discussed.

The three cases showed that a variety of actors participated in the policy process. In all cases, the processes took place in various arenas, each with their own agenda and participants. The participants belonged to two or three different networks and the issues were discussed simultaneously in several arenas situated at different levels of government. Experts played a role in many of the arenas. At a first glance, this would lead to the conclusion that variety in the policy process was sufficiently guaranteed. The following observations amend this conclusion.

Policy processes were more homogeneous than suggested by the variety of participants

The cases showed that actors who participated in a policy process did not always express their opinions and views on an issue if these perceptions diverged from the dominant, strongly supported perception. The cases identify several reasons for this 'self-censorship'. In the case of the national packages,

frontrunners and experts in sustainable building considered their knowledge, experience and ambitions were beyond the scope of the packages. They had other places where their knowledge, experience and ambitions would be useful. The confrontation with a variety of perceptions, considered to be a main driver for learning, did not take place. In both the zinc and packages cases, actors decided not to share their views because they thought that these would not stand a chance in the selection process.

Another constraining factor for the variety can be found in the simplicity of the instruments, enforced by the selection environment. This was present in the case of the packages. The measures had to be ready-to-use by the industry. As a result, the packages only contained lessons of a technical, instrumental nature. The underlying conceptual lessons were left out and not transferred to the users. This contributed to measures being ill understood and wrongly used. Environmental gains were smaller then they could be and this contributed to the ending of the packages (cf. Smith, 2006).

The cases also revealed examples where reduction of variety was more explicitly imposed. In the red contour and zinc cases, the agendas were strongly controlled by national policy makers who refused to discuss issues that did not match the agenda. In the zinc case, actors who wanted to take part in the debate about norms were not taken seriously by the other actors. In the packages case, only those measures that could be framed according to the actors' previously agreed upon rules were taken into consideration for inclusion in the packages.

Experts were more homogeneous than suggested by their organisational variety

The conclusion that actor variety is not a sufficient indicator for heterogeneity of a process also applies to the participation of experts. Experts are considered to contribute to a variety of perceptions generated in a policy process. They legitimise the generated variety. All cases inevitably involved experts due to the complexity and the ambiguity of the issues in the case studies. Many actors involved in the processes, ranging from ministries to consultants and environmental groups, employed experts. The zinc case showed that there was sometimes a thin line between the role of an expert as a policy analyst or advisor and as a stakeholder. In addition, these experts, although they represented different actors and belonged to different networks, were part of the same professional community, sharing disciplinary backgrounds and speaking the same language. In the case of the urban planning package, the participating experts held a shared belief in sustainability. In the setup of the packages each expert delivered his or her own chapter independently and there was no need for the experts to be confronted by their different and perhaps divergent views.

The arenas where issues were addressed contributed to the mobilisation of bias

In 1960 Schattschneider pointed to the phenomenon of the mobilisation of bias: only those actors who share the same interests or goals tend to participate in democratic processes, while others refrain from participation out of lack of interest or simply because they see no connection between their interests and the policy at stake. To some extent, there will always be some kind of bias among the mobilised actors, but the cases show that the arenas where the issues were addressed contributed to the mobilisation of bias.

In the zinc case, the debate was framed in highly specialist, technical terms. The process lacked transparency and was difficult to access by outsiders. As a result, participation was limited to specialists trained in this field. The zinc industry needed to enter the process, since their key interests were at stake, and they had to invest in mastering the language and tone of the debate as well as the scientific references. Other actors, such as environmental interest groups, chose to invest resources in more accessible issues easier to explain to the media and their constituency.

In the case of the urban planning package, actors were represented by people who shared a strong concern for sustainability. In contrast to the other packages, which were initiated by mainstream building industry and had moderate ambitions, the actors initiating the urban planning package were used to supporting innovation and held high ambitions. As a result, actors who strongly supported this initiative and shared its ambitions were mobilised to take part in the process.

The arenas where issues are addressed thus influence the way a policy problem is framed and the extent to which actors are encouraged or discouraged to participate.

Rigidity in the policy process reinforced the mobilisation of bias

The cases showed that the mobilisation of bias was strengthened when the policy process was rigid, for example, when there was little room for diverging views on the content of the problem, when the process left little room to explore alternatives outside the scope of the debate as framed by dominant stakeholders, or when procedures could not be discussed.

In both the zinc and red contour cases, rigidity led to a bipolarly framed debate which mobilised outspoken proponents and opponents. This increased the conflict and reduced space for problem-solving. In the packages case, procedures clearly demarcated the scope that rewarded learning: if a proposed measure met the formulated conditions, it would be included in the package.

Substantive and procedural rigidity thus reduced the variety and richness of the perceptions generated in the policy process. Actors with views that did not fall within the scope defined by dominant participants, did not express these views, withdrew from the debate, or did not participate in the first place.

Horizontal and vertical differentiation of arenas contributed to variety

In all cases the policy evolved in multiple arenas, and often in parallel processes. The extent to which these processes were coupled, formally or more informally, differed per process. Of course a process is expected to generate more variety when an issue is addressed in multiple arenas, each with its own focus on the issue. But the cases also showed that especially the arenas at different government levels contributed to a variety of the policy process. In the zinc case and in the case of the packages, vertical differentiation of arenas turned out to be an opportunity for actors to overcome the rigidity of the policy. The impasse between actors on one government level did not block processes on another level. In the zinc case, water boards and local authorities formulated their own priorities with regards to the enforcement of water quality norms. In their decision whether or not to take action in case of exceeding norms they took into account the latest information on the eco-toxicity of zinc and natural variations of zinc concentrations. This information was considered irrelevant for the policy process in the norm-setting arenas, but did offer appropriate information for decision making at another government level. In the case of the packages, local authorities who wanted to raise ambitions beyond the sustainability level requested in the packages developed their own arrangements based on the packages. At this level, they were not stuck to the procedural rigidity of the packages, and they could change the content and ambitions as they wished, provided that compliance to these arrangements was voluntary.

Conclusion and lessons for policy design

Based on the case studies it can be concluded that the presence of multiple actors and experts belonging to different networks and representing different organisations does not automatically mean that these actors will express a diversity of perceptions and seek confrontation. But without this, learning is limited to the path already laid out at the start of a policy process.

How to support and increase the variety of perceptions in the policy process? The recommendation that logically follows from this conclusion is that policies addressing ambiguous problems should not just facilitate, but stimulate the exchange and confrontation of diverging perceptions. Substantive and procedural rigor will inhibit such exchange. Although policy problems will have to be framed more tangibly at some point in the policy process, this should be prevented in an early stage. A one-dimensional, polarised framing of the policy problem should be avoided; the cases showed that this reduced variety and thus hindered learning.

Policy makers should be aware of the bias that will be mobilised by their policy. The urban planning packages showed how bias led to the establishment of an arena in which likeminded experts participated in the development of a highly ambitious package that ended up not being used by the plan-

ning sector. The zinc case showed how bias contributed to a closed policy process that succeeded in upholding norms that continued to be exceeded and could not be enforced. By making policy issues part of processes in various arenas, preferably at various government levels, bias in the problem formulation may become less determining for the course and outcome of the policy process; actors are more likely to find a place where they can bring in their views on the policy issue.

9.5 Selection in the policy process

How did the selection process influence learning in the cases? How did selection take place in the cases and how did the selection environment, the networks and arenas, influence selection? The previous subsection showed the shadow cast ahead by the selection environment, consisting of the arenas in which decisions were made, the networks to which actors participating in the arenas belonged and the rules that guided interaction and decision making. The variety that the actors had created anticipated the selection and this led to bias in the variety. This subsection delves deeper into this phenomenon to explore how different parts of the selection environment contributed to biased variety in the cases. It also explores the mechanisms present in the selection environment that stimulated the development of a variety of perceptions.

Venue choice gave 'home players' a strategic advantage

As noted in Section 2 of this chapter, actors already familiar with the setting, those involved and their relations as well as the formal and informal rules for interaction and decision making, had an advantage over actors new to the setting. In the zinc case, the process evolved in pre-existing arenas where only the zinc industry was new. It had to master the rules for interaction and decision making, which were already in place. In the packages case, building packages were developed in arenas especially established for the purpose, but they were based on the rules and relations common to the building and construction sector. Actors not acquainted with these rules and relations first had to learn them before they could participate effectively. The arena which addresses the issues, develops the variety and takes the decisions thus influences the substance of the variety generated and the way in which a selection is made from this variety. Clearly, the goals and interests of actors playing a 'home game' are more likely to be served than those of actors new to the selection environment for they are faced with the high transaction costs of catching up with the other actors. These high transaction costs may even lead certain actors to refrain from participation, as was the case with the environmental movement in the zinc case. The places where issues are

addressed and framed can thus give some actors an important strategic advantage over other actors.

Early and one-sided definition of selection rules stimulated technical learning

When the actors unfamiliar with the going rules found out that these rules had already been set and could not be influenced or changed, they stopped trying to learn on the conceptual level about the policy issue concerned and resumed their learning efforts on a more technical level, where they tried to maximise their goals within the set rules. This is what happened in the packages case. When actors mastered the LCA method, which compared the environmental performance of their products with substitutes, they knew how they could improve their chances of getting a positive assessment for their products. Some red contour municipalities showed a similar pattern. Some local authorities stopped their learning about spatial quality when they discovered that it had no influence on selection: contours had to be drawn as concisely as possible; therefore these actors put their efforts into trying to persuade provincial authorities that they needed more space.

Asymmetry of selection rules led to unselected lessons

When actors behaved according to different rules for selection, this resulted in misunderstandings and distrust. This was also related to the actors' expectations. When actors expected to address a new policy issue, it came as an unpleasant surprise to find out that the new issue was going to be addressed according to pre-existing rules. In some cases, as described above, this led actors to strategic learning in an attempt to maximise their benefits. Other actors responded differently. Some decided to either leave the process or not participate actively. Sustainable building experts and environmental organisations, for example, took no active part in building packages development; nor did the planners association participate actively in the development of the urban planning package.

There were also actors whose core values were threatened by the rules in use, and could either not afford to exit or accept the rules. This happened to the zinc industry and to some of the red contour municipalities. Both groups felt threatened in their existence and saw no other option but to contest the rules. The paradox is that in their search for persuasive arguments to change the rules of selection, these actors were stimulated to learn on the conceptual and substantive level about the policy problem at hand as well as the decision-making rules and methods, but the resulting lessons could not be considered for selection because acceptance of these lessons would have jeopardised the core values of the other group of actors. For example, in the zinc case, the research institute experts considered it highly inappropriate and offensive for the zinc industry to try to contest and improve a methodology that

the experts themselves had mastered, worked with and improved throughout their careers. The rules by which a selection was made reflected the core values of the other actors and were therefore not negotiable. In polarised policy processes, actors from both sides will engage in learning processes about the policy issue in an attempt to try to persuade each other with substantive arguments. However, acceptance of the lessons learned would imply a change of core values and is unlikely to happen.

Selection methods that offered room for discussion contributed to the legitimacy of the policy

In the red contour and zinc cases, the methods used and their outcomes were not negotiable; there was no room for debate and inter-subjective learning. The case of the building packages showed that acceptance of selection methods formulated by one side increased if the methods left some room for debate and if they offered actors the chance, however small, that one day their perceptions might be selected. Actors who invested in getting acquainted with LCA methodology could be rewarded for this by gaining a positive score for their product. And if there was no positive outcome the first time, they could always try it another time. They could improve their skills in conducting an LCA test, and they could change their product or production process, which could positively influence the LCA score. Although the LCA method was criticised for being susceptible to manipulation, the opportunity to discuss the meaning of results also contributed to the acceptance of this method by the actors it affected. In addition, the case of the green contours also shows that when an issue is included in existing arenas, there may be time to develop new methods for selection within the framework of the set rules. The green contour instrument emerged from the participants' interactions and it reflected the lessons learned about the values that green contours were aimed to support, as well as how these and competing values could be weighed.

Environmental principles for policy making suffer from a democratic deficit

In the case studies, several principles for environmental policy making played a role. In the zinc case, explicit reference was made to the precautionary principle. The red contours were also based on a sort of precautionary principle suggesting that urbanisation is an irreversible process that should be prevented whenever possible. In urban planning, this has led to the preference for 'smart growth', where urbanisation is led by efficient land use and concerns for the environment. The principle applies when there is convincing doubt that effects might be irreversible. Once the decision is made that the smart principle applies, the burden of proof is in the hands of those who contest the suitability of applying the principle to a certain policy problem. However, it is difficult to prove that there is no risk whatsoever of a problem leading to an irreversible process. Actors contesting the applicability of the principle are of-

ten stakeholders who are harmed by the policies. Their arguments and evidence are considered prejudiced.

The cases show that environmental principles for policy making can be used dogmatically; they become goals in themselves and are no longer balanced with other goals and values, even if information, knowledge and perceptions have changed and sets the applicability of the principles in a different perspective. The decision is especially difficult to control democratically when the choice whether to apply a principles is left in the hands of a small and closed community of experts, due to a lack of resources, knowledge and both public and political attention.

Conclusion and lessons for policy design

The cases confirm that the rules governing selection strongly influence the variety generated, and thus the scope and substance of the learning that takes place. In particular, the timing and place of selection are influential, as well as the methods used for selection. Timing and place of selection are related. The first selection is made in choosing which arena or arenas will put the issue on the agenda. Timing and place of selection also focus the learning process and influence the chances that actors will attain their goals in a policy process.

Decisions about timing and place of selection are often not explicitly part of a policy design, but implicit and emergent. This will likely result in an early fixation of selection from a specific point of view, if the involved actors instinctively set the stage in an early stage of the process. Such premature closure of decision making enhances bias in the variety generated and may contribute to sub-optimal results. One-sided formulation can lead to clashing regimes of rules used by various actors, leading in turn to the exit of actors, distrust and deadlocks, and to the non-selection of lessons that matter strongly and could lead to conceptual changes. Selection rules or methods that can be somewhat influenced by actors are more likely to be accepted, but learning is more likely to be restricted to a technical level. Ideally, the development of selection rules should be part of a policy process, but in practice this is difficult to achieve because no policy process ever starts from scratch.

9.6 Retention in the policy process: preservation

To what extent was the variety generated and selected institutionalised? This question guided the search for signs of preservation in the policy processes studied. Learning in policy processes is especially useful if it matters, that is, when it changes the policy and its institutional environment. As we have seen, in all the cases lessons learned on the technical level led to several policy improvements. On the conceptual level lessons were also learned. The

question is whether and to what extent were these lessons absorbed by the institutional environment. After all, lessons on the conceptual level are expected to have repercussions on the web of networked relationships, the rules used in these networks, and the setting of the policy proceedings. The following conclusions can be drawn.

Path-dependent learning reinforced institutions
Lessons in line with the selection environment were more readily accepted and selected. Sometimes, these lessons led to changes at the technical level, but conceptually they did not create any need for change. Instead, they reinforced the selection environment and resulting policies. Especially methods used in support of decision making were reinforced through their use. For example, using the LCA method to select measures for the packages confirmed the reputation of LCA as an appropriate method for assessing the sustainability performance of products, a reputation that was not restricted to the arenas of the packages, but extended to other processes of construction, product development and assessment as well.

Criticising selection methods gave these methods a stronger position
Actors who dared to openly criticise methods achieved the opposite to what they intended. To counter criticism, forces were mobilised in support of the methods under fire. This mobilisation was led by the experts who used the method and who had often played a role in the development of the method. In the packages and zinc cases, neutral actors were asked to judge the methods used. These neutral actors concluded that in the absence of alternatives, the methods and their outcomes were considered to be legitimate, even though there were methodological flaws. This led stakeholders to invest not in developing alternatives but in improving the existing methods and correcting the identified flaws.

Multi-level governance created opportunities to absorb lessons at another level
In some cases, lessons were learned that were not selected and retained in the arena or the group of arenas central to the policy process, even when the lessons were highly relevant to the issues addressed in the process. The subsection on selection (9.5) has already explained why. However, some of these lessons were retained in other arenas, at other levels; arenas where selection was made on different grounds. For example, lessons about the volume and harmfulness of diffuse zinc emissions could not change the norms, which were based on the precautionary principle. However, these lessons were relevant for water boards that had to set priorities in the enforcement and control of water quality. Likewise, the initial lessons on how spatial restrictions could contribute to spatial quality resulted in the establishment of a provin-

cial contour instrument when the contours had been abolished as an instrument of national spatial policy. In the packages case, lessons were absorbed at another level than where they were learned. When the packages had lost their value as national policy instruments in the eyes of the actors involved in development and implementation, local authorities continued to use them as part of their local sustainable building policies. In doing so, they modified the scope and content of the packages to make them fit their own purposes. In this way, packages continued to influence decision making at the level of building projects even after the formal end of their lifespan.

Acknowledgement of ambiguity supported absorption

To make policies fit for use in a different setting than where they were developed, it was important to cease hostilities around the policies concerned. Local authorities achieved this by sidestepping the contested character of the policies. To give the instrument legitimacy and authority, they had to cut through the controversy that had paralysed the policy process in the arenas that had developed them. Although they did not contest the policies as formulated in these arenas, they applied them less rigidly, creating room to negotiate the goals and use of the policies and policy instruments in particular cases. Whereas the national policy debate revolved around the search to find the ultimate truth to queries such as, 'are all zinc emissions harmful?', 'is urban sprawl restriction a pre-condition for sustainability?' and, 'what are minimum standards for sustainable building', local policy makers were looking for guidance on the day-to-day decisions they had to make in the effort to contribute to sustainable development. For practical purposes, policies were used as if they gave unequivocal answers to contested questions. Local governments needed policy instruments that could help them to negotiate the trade-offs that were part of the issues that they addressed in their day-to-day decision making; difficult trade-offs for which they lacked the time and knowledge to make informed decisions themselves. The value of these policy instruments for setting priorities and guiding actions was considered to be more important than the potential flaws of these instruments.

Thus, the policies became part of local guidelines (guidelines for enforcement of zinc norms), covenants (regional or local agreements on sustainable planning and construction) or provincial and local spatial plans (the contours), but the policies were applied less rigorously than at the national level. The affected actors could negotiate how these policy instruments were used. Local real estate developers could discuss with the municipality and the water board the conditions under which they could use zinc; a municipality could propose a spatial contour that suited its own wishes and demands; and local real estate developers could negotiate with local authorities the sustainability ambitions for a specific project by using the ambition level of the packages as a benchmark.

Loosely coupled arenas facilitated institutionalisation of lessons

The institutionalisation of lessons was facilitated in arenas other than the ones where the lessons were learned if these arenas were connected. The connections could not be too tight, because this would reduce the autonomy of actors in the other arenas to adapt the policies to their own needs and specific environment. But the connections should not be too loose either for the transfer of lessons to other arenas. For example, relations between actors involved in the development of the packages at the national level and the participants in local building and construction projects facilitated the institutionalisation of the packages in local arenas. The development of the packages for both urban planning and infrastructure were based on the specific wishes of a small group of actors to have a package similar to the one central government promoted for residential buildings. Although these packages were praised for their quality and ambition, they failed to become part of either urban or infrastructure planning processes. The link between the package development arenas and the arenas where they had to be applied was too loose.

Connecting niches can facilitate transition

Niche management can be a risky strategy to start the transition to sustainability. In studies of technology development and innovation, niche management is a well accepted approach for launching products and conquering markets (e.g. Levinthal, 1998). A niche is a part of the market where the selection environment differs from the rest of the market. This niche will therefore give rise to the generation of a different variety. Such niches are known for sustainable products, for example hybrid cars and solar panels are bought by people who have internalised environmental costs. Technology has been developed that can fill such niches, or it can penetrate other niches, where it adds to or merges with other technology.

In environmental policy making as well, strategic niche management is often applied (e.g. Huber, 2004) and an important strategy of transition management (Rotmans *et al*., 2001). The packages for sustainable building can be regarded as an example of niche management. For those actors in the building sector willing to spend resources on sustainable building, a selection could be made from the available packages. However, these packages were also used by the building sector to demonstrate their attention to sustainability. That these packages were voluntary and had modest ambitions was difficult to pinpoint for such actors as sustainable building experts, government departments and the environmental movement. After all, these actors had encouraged the development of the packages and some had even taken part in the process.

The risk of using niche management as a strategy to start transformation processes towards sustainability is that the policy will be confined to the niche it occupies, and that it will fail to penetrate other niches (cf. Smith, 2007). If a

niche is weakly linked to other niches or arenas, it will be difficult to influence processes in these other places. If niches are isolated, there is also the chance that a sector, when it is asked for more sustainable behaviour, will use the niche to show how much is going on already. Especially when government must rely on the voluntary cooperation of a group of actors for achieving policy goals, the existence of voluntary arrangements that already address the issue will reduce the government's opportunity to push for other arrangements. Again, the ambiguity of the goals can be used strategically; it is hard to measure the effects of the arrangements and the value of the ambitions.

Choosing between command-and-control or consensual policy making?

Policy learning perspectives argue that for policies to be effective, actors involved should engage in joint learning to develop a shared action perspective that addresses the particular part of the problem that they are facing. Because of the ambiguity of the policy problem, and the dynamics of the web of networked relations between actors in the policy process, including strategic behaviour, it is impossible for a single actor to command and control policy goals. Meanwhile calls for strong government intervention are widespread; calls underlined by apocalyptic scenarios of climate change.

The road of consensual and thus incremental change has not yet brought about the changes needed to turn the tide. For example, the Kyoto goals, even if they were achieved, will not be able to reduce emissions in time to stop climate change. However, theories and experience with command-and-control policies have shown that this approach will not work in the case of multi-actor, multi-value and multi-dimensional problems. This is underlined by the experiences with command-and-control policies studied in this book; red contours were abolished soon after they were established, zinc norms were upheld, but continued to be exceeded. However, the cases also show that the existence of these command-and-control policies stimulated collaborative action processes at other levels. The threat posed by the red contour regime resulted in voluntary compliance with a green contour regime on the regional level. The zinc norms gave rise to environmental innovation by the zinc industry and zinc emissions were put on the agenda of local actors, and on this local level, the risks of high zinc concentrations could be balanced with the risks of other substances that jeopardised water quality.

Indirectly, command-and-control policies can thus give rise to more consensual policy processes. They can create an incentive for voluntary policies. The threat of hierarchical government intervention creates an incentive for actors to formulate their own policies. It guides these voluntary initiatives by giving an unequivocal and tangible definition of the policy goal to be achieved. In the voluntary process, this goal will of course be negotiated and modified. Nevertheless, it creates a different starting point for voluntary policy processes. Without hierarchical intervention, these policies may not have

been formulated, or they may have contributed to different goals, and they may have had lower ambitions.

Conclusion and lessons for policy design

The cases showed that many of the lessons learned did not lead to significant institutional changes in the arenas where the lessons were learned. The institutional resistance to change was fortified by lessons that supported existing institutions. The cases thus show that path dependency of learning is high and leads to the reinforcement of institutions. So far, this conclusion is in line with what could be expected from studying literature on institutional change.

However, the cases also show that reinforcement of methods used for making a selection contributed to increased path dependency, especially when one bears in mind that these methods cast their shadow ahead on the variety generated. Such methods are often taken for granted in policy design, they are considered a technical detail that can be left in the hands of experts. The cases show that the methodology used had a strong impact on which lessons were learned and absorbed.

Another interesting conclusion of these cases is that polarisation of perceptions and interests, as happened in both the zinc and red contours cases, gave rise to intensive learning processes. However, because of the polarised views, the actors involved were unwilling to modify their perceptions and the lessons learned failed to affect the policy process that gave rise to the learning in the first place. Nevertheless, some of these lessons did affect decision making at other policy levels. A condition for lessons to affect processes elsewhere is that there should be some link with the process in which the lessons were learned. These links are needed for the transfer of lessons. They give the lessons enough authority to be applied in a different setting or at another time.

9.7 Retention in the policy process: regeneration

To what extent was learning made part of the policy process? From an evolutionary point of view, the retention of mechanisms that initiate and support regeneration is important for policies to survive. The policy issues addressed and the context in which they are addressed changes over time. Policy process dynamics, such as new information and knowledge about the issue and changed macro-economic conditions, may render policies outdated and ineffective. Lessons learned therefore tend to expire and need to be renewed. To uphold effectiveness, policies need to adapt to changed circumstances. Feedback is needed to inform the policy makers whether their policies are still appropriate and effective. In addition, policies need to be able to reproduce the processes of variation and selection, to reproduce policies that

match the changed problem perceptions and selection environment. To provide adequate policies for changing policy problems and environments, reproduction should be aimed at reproducing the process which produces suitable policies, in other words, instead of updating and adapting the variety selected and retained, processes of variety and selection should be restarted.

Policies included few mechanisms for feedback

The three cases show that there was little attention for evaluation and feedback in the policy processes. In the zinc case, feedback was provided at a general level. Monitoring of water quality showed the concentrations of zinc and whether these were within the norms. However, these monitoring data were not related to diffuse zinc emitted by construction, while the policies specifically targeted this sector.

In the contours case, evaluative information fed back into the policy process was especially strategic and conceptual, and most of it was not generated by the policy itself. The responsible ministry initiated one early evaluation of the expected effect of the contours. This evaluation emphasised that the achievement of the policy goals would require a strict and long term application of the contours, but by the time of the evaluation it had already been noted that the intended scarcity of land would not be achieved due to the many plans that were already in procedure. Shortly afterwards, influenced by a new government that preferred decentralised over centralised intervention, the debate began on abolishing contours as an instrument of national spatial planning. This further reduced the potential effect of the contours because local authorities anticipated the abolishment in their land use planning. Pressure from the *VINEX* arenas for strict enforcement of contours also ceased when the new residential developments turned out to be a success. Only in 2008, after contours had been abolished from national policies was the sprawl of towns and villages measured and the contours were considered to have contributed to the result. While the contours were being implemented, the municipalities asked for evaluative information on how a contour could best contribute to spatial quality, but evaluative information on this kind of substantive questions was not generated during the process.

In the national packages case, evaluative information was limited and procedural. For example, the number of subscribers was known, and the extent to which the target group was familiar with the packages. On a project level, the estimated extra cost of the applied measures was known. In the first years after the packages were introduced, the Ministry of Housing assembled this kind of information as part of its annual evaluation of the Policy Programme for Sustainable Building. When this programme stopped, the evaluations stopped as well. Evaluations of a more substantive nature, for example, which reviewed whether the measures applied in a building had achieved the intended effects, did not take place.

Policies would be revised without changing variety and/or selection
All three policies studied included formal moments for revision. The zinc norms had to be reconfirmed after a number of years and the measures in the packages had to be resubmitted every two years. The red contours were part of spatial plans that had to be revised every ten years, but there was no intention to revise the contours, since the instrument would offer a lump sum of space to the municipalities, at least till 2015. However, the revision procedures for zinc norms and the packages did not envisage a change in the variety of actors involved, nor of the selection procedures and methods used. The revision of norms and measures would therefore not likely to lead to conceptual changes in the policies. Only the revision of the green contours, which were also part of spatial plans, could perhaps lead to changed outcomes. Neither form nor procedures for this instrument were formalised, which created considerable room for change.

Policy evaluation should use ex post satisfaction together with other indicators
Analysis of the cases shows that policy processes were more closed than might be assumed from the variety of actors and experts participating in the process. Even if these actors were satisfied, this did not mean that their goals were met. For example, experts in sustainable building and the environmental movement were satisfied with the packages for sustainable building. They considered them a worthwhile result, given the modest knowledge and ambitions of the actors involved and the promise that the packages would be followed by future policies that would raise the level of ambition. If the *ex post* satisfaction of actors were used as the single criterion to evaluate the quality of a process, this would lead to a distorted, or at least a partial image of the policy process and its results. It is therefore advisable to use *ex post* satisfaction only in addition to other evaluation criteria. Researchers, who rely on interviews for their data with actors involved in the process, should be especially aware of this pitfall.

Policy makers should take the policy lifecycle into account in the design
The concept of thinking in terms of lifecycles or 'cradle to cradle' can be applied to policy. Given the dynamics of the policy process, both the lessons learned in the process and the policies themselves are perishable. Most policies are designed without an explicit end-of-life scenario, assuming that as long as the policy problem is not solved, there will be a need for the policy. It has already been noted in the past that policies tend to persist even long after a policy problem has ceased to exist. However, this research shows that there are also policies that disappear before the problems are solved. Spatial contours were abolished as an instrument of national policy making even while the pressures of urban sprawl in cities and towns remained high. The *Nation-*

al Packages for Sustainable Building stopped being updated although sustainable measures were not commonly used in mainstream building practices. Ending policies might send out a contrary message; as if the problems addressed by the policies had been solved. Giving explicit thought to policy lifecycle in the design phase might help to prevent policies from getting abolished prematurely or from becoming outdated; the timing of regeneration may be part of the policy design.

Conclusions and lessons for policy design

The policies studied included only a few loops for feedback and evaluation. The limited feedback generated during the processes was especially negative; it gave no incentive to change the constellation of actors involved in the policy process and the procedures and method for selection and thus reinforced the status quo. The only exception was the red contour policy, which was affected by positive feedback from other, related policy processes. The *VINEX* estates were successful and no longer required the support of the contour policy. In addition, a new government preferred decentralised over centralised government interventions.

The absence of incentives that could potentially create positive feedback is understandable. Positive feedback will start a process of accelerating change, where one change leads to another. The course and outcome of this change process is unknown, which makes the future uncertain. However, in the policies studied, the policies had already compromised the ambitions of the policy makers. Zinc norms did not reflect the zero-emission ambition of the policy makers, the packages were seen as a first step in the scaling up of sustainable building, and soon after the contour policy was formulated, it became apparent that even tight spatial contours would not create the intended scarcity of land that would change local authorities' planning decisions.

These experiences include an important message for policy makers aiming to stimulate the transition towards sustainability. Especially when policies are regarded as a first step in the transition process, it is important to include incentives for change in the policy design. Although there is no guarantee for the direction and speed of change, it will prevent policies from being fixed prematurely, supporting sub-optimised goals. Chances are that actors will be satisfied with this first step and will have no incentive to take next steps.

9.8 Conclusions for policy making

When policy makers address dynamic and ambiguous policy problems, they are confronted with the contested, multi-value and multi-actor character of such problems. There is no single best way to solve the problem but several, each based on different disciplinary bodies of knowledge and serving dif-

ferent goals and interests. There are no neutral, authoritative criteria upon which basis a selection from the many policy alternatives can be made. Policy learning is an adaptive approach to policy making that can deal with ambiguity. By communicating and exchanging views on competing values, interests and bodies of knowledge, actors can engage in a joint learning process in which they can discover more about the complex cause-and-effect relationships constituting the problem and on which parts of the problem they agree or disagree. Learning can lead to a temporary and partial reduction of ambiguity and complexity of policy problems, which creates an action perspective, a window of opportunity for collaborative action. Learning is an adaptive approach to policy making, since it underlines its goal-seeking character. Policies should not be designed behind a desk, but in a process in which policy makers and affected actors adapt their knowledge, ambitions, goals and interests to one another.

In the adaptation process, policy ambitions seem to get sacrificed to the benefit of achievable goals, and this may explain part of the dismay with the effectiveness of governance for sustainable development. Learning approaches to policy making are criticised for being consensual; if all actors have to agree, policy goals will result in incremental changes, especially since the institutional context is often considered *ceteris paribus* ('all other things being equal') in normal, everyday policy making where actors address problems to the best of their abilities, but within the given constraints. Goals considered to be minimally feasible reificate into goals that contribute to sustainable development, which forgets that these goals reflect small steps towards sustainability that are appropriate under a certain constellation of actors at a certain moment of time. This may also explain the many negative evaluations of environmental policies. 'Too little, too late', is the verdict cast upon many of these policies. However, these evaluations often judge policies from a 'distance-to-target' point of view, which takes the overall goal of sustainability as point of reference. These evaluations also tend to forget that the policies under consideration are temporary answers to partial problems. Learning approaches do take this aspect into account, and often come to a milder judgement of policies, by showing whether actors have succeeded in creating a space for problem-solving. However, learning perspectives are less outspoken on the extent to which actors succeed in making use of this space, and whether the space will be adapted to the ever-changing policy problem and policy environment.

An evolutionary perspective to policy learning provides a systematic pair of concepts which bring together multiple actors, the institutional context in which they operate and the dynamics of the policy process. The concepts of variation, selection and retention offer a way to systematically analyse and value policy learning. This enables consideration for the constraints of everyday policy making, while keeping the need for continuing change into focus as well.

Based on the case studies, it can be concluded that in designing policies, policy makers should pay more attention to the variety of perceptions represented in a policy process. Policy processes can be more closed than seems to be suggested by the number of participants and the variety of networks to which they belong, especially when decision making is supported by technical and strongly institutionalised decision-making methods. In designing policies, policy makers should not just focus on process transparency and accessibility, but stimulate and facilitate the exchange of perceptions, including divergent ones. After all, the confrontation of diverging perceptions is one of the important drivers of learning.

Policy makers should also be aware of the anticipatory effect of selection methods. Although bias is unavoidable, some ways of selection will generate a stronger bias than others. For example, when decision making strongly relies on a technical method or disciplinary knowledge, this will inevitably put some actors at a strategic advantage. The choice of selection methods and procedures should be given explicit attention; if possible, it should be made part of the policy process, and if this is impossible, selection procedures and methods should at least be made transparent and accessible to actors unfamiliar with the procedures. After all, selection significantly influences the variety generated and retained, and actors involved in a policy process should learn about the selection, the rules, procedures and methods used as well, besides the possible variety. By bringing the selection methods into the focus of policy makers, the constraints within which decision making takes place become more explicit and less taken for granted. Perhaps in following policy rounds, the selection process might be put on the agenda, thus enabling a next step towards sustainable development.

In policy design, more attention should be paid to iterative loops for feedback and evaluation. While this conclusion has been drawn many times before, the cases in this research once again show limited attention for this aspect of policy making; it is essential for learning. In policy design, a distinction could be made between feedback on a technical level and on a conceptual level. Technical feedback is important for allowing a policy to achieve its full potential during its lifetime. However, the cases show that this feedback is often negative, that is, it merely reconfirms the policy. This leads to reinforcement of institutions and contributes to path dependency. Feedback on a conceptual level is important for the regeneration of learning, which may lead to regeneration of the policy. These renewed variation and selection processes may give rise to new lessons from which other selections may be made, also because the selection environment will have changed.

An evolutionary perspective to policy learning thus gives several suggestions that policy makers can use to improve policies. The theoretical implications of this perspective are discussed in the next and final section.

9.9 Theoretical reflection and future research

This book aimed to develop a governance perspective helping policy makers to deal with the essentially contested character of sustainable development, particularly in the built environment. By starting with an analysis of the problem characteristics and its multi-actor context, this research got on track of policy process theories focusing on contingent policy design, with policy network theory as a highly refined perspective. Policy network theory has mastered to understand policy processes in all their complexity by studying them closely in qualitative case studies. In this perspective, learning is crucial for capturing the dynamics of problems and the actor networks in which they are addressed. Many of these qualitatively and in-depth case studies were looking for theoretical insights in the policy process rather than representative empirical insights, and they have contributed to a detailed understanding of policy processes and the many interfering variables. At the same time, these single case studies fail to draw conclusions on a general level that could direct governance, or, in other words: "… replicability is as good as 0" (De Jong and Edelenbos, 2007: 702).

This book has taken a first step to fill this void by developing a governance approach that helps policy makers to improve policies *ex ante*. Evolutionary theory offered a promising perspective. Many previous attempts at prescription make use of one or several concepts of evolutionary theory. The governance perspective in this book has also taken this road and made use of valuable, already available insights. However, whereas many of these existing prescriptions focus only one or two of the evolutionary processes, the perspective in this book includes all three evolutionary processes: generative variety, selective retention and regeneration. Especially the regeneration concept has not received much attention to date, even though Van der Voort *et al.* (2004: 113) rightfully state that the focus on the survival of ideas might neglect the changing, dynamic character of the selection environment, which may result in the quick expiry of selected ideas.

How to operationalise and measure evolutionary concepts?

A challenge in the evolutionary approach was, and still is, the operationalisation. 'Generative variety' and 'selective retention' already express the intertwinement of these concepts. Nevertheless, they have been analysed separately in this research. Without this separation, the research would deliver another complex web of factors explaining policy effectiveness, which gives few clues for policy design. The conclusions of the empirical case studies show that this attempt is not without problems. For example, the selection environment strongly biases the variety generated. Already the choice where to put a problem on the agenda influences the form and substance of the policy process. For purpose of prescription, I have nevertheless attempted to operationalise the evolutionary concepts. The first step was distinguishing between

variation, selection, preservation and regeneration. Second, for each of these concepts representative variables were identified. The remaining challenges for measurement for each of the concepts are shortly discussed:

■ *Operationalising 'variety'*– Variation was fairly easy to operationalise, since this process has received much attention in theories on process management, interactive decision making and participatory planning. The choice was made to take the variety of actor perceptions as a unit of measurement. The number and variety of networks, arenas, and issues were used as indicators for variety. Even though the assessment of the variety of perceptions is qualitatively and open to debate, the variable served well to identify policy design opportunities for increasing the variety of actor perceptions.

■ *Operationalising 'selection'* – The other variables were more broadly defined. Selection was operationalised as the influence of the selection environment, of the formal and informal rules on interaction and decision making. This variable is not very precise when it comes to measurement. Not surprisingly, the informal rules posed problems. Because these rules are taken for granted by actors involved, outsiders have difficulty observing them. But also the formal rules were less clear-cut than expected. For example, in the zinc case they were absent or formalised *ex post* by policy makers; and in the case of the red contours they lost their influence because actors anticipated a change of rules. Also, processes where different rule regimes blended were difficult to understand by outsiders, and perhaps also by insiders, who no longer could rely on the rules by which they used to operate (cf. Smith, 2007). This happened to some extent in the case of the sustainable building packages. Sustainable building pioneers and environmental interest organisations had to adjust their way of working, including knowledge transfer, to the building sector. For these actors, it was difficult to influence and judge the outcomes, because their own rule regime could not be used as a frame of reference. When rule regimes collided, rules became more visible for actors involved and for observers. To support their arguments, actors referred to their rules-in-use, the formal and informal ones. This is perhaps why the zinc case and the red contour case are the most telling cases. Actors involved in these cases explicitly referred to their rules, thus manifesting the influence of the different rule regimes on variety and on selection.

■ *Operationalising 'preservation'* – Retention of the learning or preservation was understood as institutionalisation. In policy network theory, there are various indicators for institutionalisation: change of network structure or network rules, the selection environment; they are usually taken as groups of indicators. Use was made of these indicators, but measurement proved to be difficult. Although a description of the selection environment was given in the

form of descriptions of networks, arenas and selection methods, these descriptions – as stated above- could not be very precise. The selection environments where policies for contested concepts are discussed are not clearly defined and subject to change. Another difficulty was establishing the relationship between learning and institutionalisation of the lessons and the underlying mechanisms. For example, in the red contours case it was difficult to establish whether learning or changed external factors caused institutional change.

■ *Operationalising 'regeneration'* – The concept of regeneration was also difficult to measure. What could be assessed was whether policies included incentives that could stimulate regeneration, a reconsideration of the variety generated and selectively retained, such as monitoring and evaluation. The presence of these incentives could be established, but the presence or absence of such incentives still says little about the effect of these incentives. Recent evaluation literature therefore has a strong fsocus on evaluation utilisation that could be useful in the search for a more precise operationalisation. Four types of utilisation are usually distinguished (Mark and Henry, 2004). The first two are concerned with the effect of utilisation on policies and policy makers: instrumental and conceptual utilisation, a distinction similar to this books understanding of technical and conceptual learning. A third type is symbolic utilisation, which refers to a more strategic use of evaluation by policy makers, to support their own goals, which often include a desire for policy continuation. Process utilisation is the fourth type of utilisation, which resembles the understanding of how social interaction supports conceptual learning (cf. De Jong and Edelenbos, 2007). The evaluation process itself already contributes to interaction and reflection, which may contribute to learning and open up new policy perspectives.

Improving the evolutionary perspective with games and experiments

Having noticed the difficulties with operationalising this perspective coins the question whether it is worthwhile to continue this road. Does an evolutionary perspective have anything to add to existing governance perspectives? The policy design lessons drawn in this book, even though produced with a far from perfect operationalisation of the evolutionary process, justify a positive answer. It has exposed several lessons that were not explicitly known before. In particular, the evolutionary perspective brings the relationships between these various policy-making components into focus. Policy network authors have already identified governance of networks as a research issue, since networks not necessarily produce effective outcomes (see Section 3.7). Attempts thus far have focused on network constellations, network rules or changes of the games played in networks. A perspective that aims to understand how these different variables are connected and influence each other is still missing, and the evolutionary perspective seems capable of taking these linkages

Box 9.1 A policy design exercise: a serious game for sustainable urban renewal

Between 2001 and 2007, the DUBES game was played to train professionals and students to improve decision making for sustainable urban renewal. A serious game simulates real-life situations. The game design aimed to create conditions for optimising generative variety and selection. The design was based on the lessons on variation and selection that were developed during the research presented in this book.

In the game, the players were asked to develop a programme for the sustainable renewal of a neighbourhood. Gameplay lasted a day, which induced a pressure-cooker effect. The game involved role play with such actors as a local housing association, a real estate developer, various municipal departments, an energy provider, a water board, and a residents' organisation.

The first part of the game focused on generating a variety of perceptions of the problems and solutions in the neighbourhood concerned. Actors had to formulate an agenda of issues to be decided on in the second part of the game. Participants could freely explore the problems and possible solutions, supported by a simple tool disclosing state-of-the-art solutions. Also the social interaction contributed to variety. Participants got to know and understand each other's goals and interests and learned about the decision making context of urban renewal on the way. In this way, social interaction supported social and substantive learning.

In the second part of the game, actors had to make decisions in order to draw up a programme for the renewal of the neighbourhood. A Decision-Support System (DSS) supplied information on the consequences of their decisions and possible conflicts. The DSS employs various methods and tools to show how decisions at one spatial scale conditioned or constrained decisions at other scales. Participants became aware of the various viewpoints related to their role and disciplinary background from which they could select their decisions. The DSS also gave feedback on the feasibility of the programme.

Overall, participants evaluated the game positively. Both students and professionals learned to understand the ambiguity and complexity of sustainable development and were handed a method to cope with these characteristics, without simplifying sustainability beforehand or getting lost in abstract ambitions. Also, participants said that they would try to use their insights in other projects they were working on now and in future.

A detailed description and results of the game are discussed in Appendix IV.

into account. However, this still requires more work; the concepts should be operationalised and made fit for use in policy design before they can be further integrated in policy network theory.

In addition to the more traditional route of *ex post* evaluation of policy making for identifying design variables, a route of *ex ante* evaluation is worth trying. De Jong and Edelenbos (2007: 702) suggested that gaming might tackle the replicability problem of single case studies. Developments in the field of serious gaming and simulation enable social researchers to create some control over policy environments and make it possible to experiment with policy designs. When games are replicated, with different participants playing the same roles and games, more robust outcomes linking context variables, social interactions and policy outcomes, can be expected (ibid.). Such games make it possible to develop a more precise understanding of the mechanisms that generate variety, selective retention and regeneration. The replication of games can also improve the understanding of the influence of individuals and group dynamics. Whereas we intuitively assume that these factors make

a difference, policy-making theories have few methodological means to distinguish between the influence of (groups) of individuals, organisational contexts and system conditions. Box 9.1 gives an example of how variation and selection can be used in a gaming-simulation exercise. A detailed description of this game research and results are discussed in Appendix IV.

Besides gaming in simulated environments, real-life experiments may also provide valuable information for operationalising the evolutionary perspective. Such experiments are already taken place, such as the many demonstration projects in sustainable building, and are usually analysed from a perspective of innovation diffusion (Van Hal, 2000), transition management (Rotmans *et al*., 2001), strategic niche management (Huber, 2004) or socio-technical changes (Brown and Vergragt, 2009). These analyses focus on the extent to which practices developed in green niches succeed to transform existing practices and institutions of the 'incumbent regimes' which form the selection environment for mainstream activities (Smith, 2007). There is a growing attention for the niche-incumbent regime nexus, where it is interesting to see how the regimes interact and possibly adapt to each other and which selection regime dominates and thus influences the variety generated and selectively retained (ibid.; cf. Van Hal, 2009).

Both forms of experiments, simulated and real-life, may offer valuable information for the development of an evolutionary governance approach. At the same time, they offer the opportunity to make use of theoretical insights which are not fully crystallised yet. Such a learning-by-doing approach fits well in times when governments are called upon to actively address challenging, contested problems as climate change.

References

Abma, T. (1996), *Responsief evalueren*, Delft: Eburon.

Aldrich, Howard. (1979), *Organizations and environments*, Englewood Cliffs, N.J.: Prentice-Hall.

Alexander, E.R. (1995), *How Organizations act together. Interorganizational Coordination in Theory and Practice*, Amsterdam: Overseas Publishers Association.

Alexander, E.R. (1996), After rationality: Toward a contingency theory for planning, Mandelbaum, S.J., L. Mazza, and R.W. Burchell (eds.), *Explorations in Planning Theory*, New Brunswick, N.J.: Center for Urban Policy Research, Rutgers, pp. 45-64.

Aldrich, R. (1999), *Organizations Evolving*, London: Sage.

Allison, G. (1969), Conceptual Models and the Cuban Missile Crisis, *The American Political Science Review, LXIII* (3), pp. 689-718.

Ansell, C. (2006), Network Institutionalism, Rhodes, R.A.W., S. Binder and B. Rockman (eds.), *The Oxford handbook of Political Institutions*, Oxford: Oxford University Press.

Ansell, C. and A. Gash (2008), Collaborative Governance in Theory and Practice, *Journal of Public Administration Research and Theory, 18*, pp. 543-571.

Argyris, C. and D. Schön (1978), *Organizational Learning: A Theory of Action Perspective*, Reading: Addison-Wesley.

Atriensis (2009), *Rapport Perspectief energiebesparing sociale voorraad*, Atriensis/Vabi.

Axelrod, S. (1973), Comparison of individual and group contingencies in two special classes, *Behavior Therapy,* 4, pp. 83-90.

Bakens, W. (2003), Realising the sector's potential for contributing to sustainable development, *UNEP Industry and Environment, Theme Issue, Sustainable Building and Construction*, Paris: UNEP, April-September, pp. 9-12.

Barlow, J. and R. Ozaki (2003), Achieving "customer focus" in private house building: Current practice and lessons from other industries, *Housing Studies, 18* (1), pp. 87-101.

Baumgartner, F.R. and B.D. Jones (1993), *Agendas and instability in American politics*, Chicago: The University Press of Chicago.

Beekman, V. (2001), *A Green Third Way? Philosophical Reflections on Government Intervention in Non-Sustainable Lifestyles*, Thesis Wageningen University.

Bell, M. and R. Lowe (2000), Building regulation and sustainable housing. Part III: Setting and implementing standards, *Structural Survey, 19* (1), pp. 27-37.

Bennett, C.J. and M. Howlett (1992), The Lessons of Learning: Reconciling Theories on Policy Learning and Policy Change, *Policy Sciences, 25*, pp. 275-294.

Berger, Peter L. and Thomas Luckmann (1967), *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*, New York: Anchor Books.

Bervaes, J.C.A.M., W. Kuindersma and J. Onderstal (2001), *Rijksbufferzones: verleden, heden, toekomst*, Wageningen: Alterra, report number 360.

Berveling, J. (1997), De beleidsnetwerkbenadering: Wel gegroeid, nog niet volwassen, *Beleidswetenschap, 11* (2), pp. 168-173.

Blaauw, K. and H. Priemus (2000), Obstacles and perspectives for sustainable building, *Journal of Environmental Sciences, Special Issue, Sustainable Building in the Netherlands, 2* (15), pp. 111-115.

Blom-Hansen, Jens (1997), A new 'Institutional' Perspective on Policy Networks, *Public Administration, 75* (4), pp. 669-693.

Bogason, P. and Th.A.J. Toonen (1998), Introduction: Networks in Public Administration, *Public Administration, 76* (2), pp. 205-227.

Bon, R. and K. Hutchinson (2000), Sustainable construction: Some economic challenges, *Building Research and Information, 28* (5/6), pp. 310-314.

Börzel, T. A. (1998), Organizing Babylon: On the different conceptions of policy networks, *Public Administration, 76* (Summer), pp. 253-273.

Bossink, B.A.G. (1998), *Duurzaam bouwen in interactie: doelontwikkeling in de woningbouw*, Universiteit Twente: Enschede.

Bots, P., E. van Bueren, E. ten Heuvelhof and I. Mayer (2005), *Communicative tools in sustainable urban planning and building*, Sustainable Urban Areas Series no. 5, Delft: DUP Science.

Bouw- en Houtbond FNV (1992), *Gezond bouwen aan een beter milieu*, Woerden: FNV.

Bouwmeester, Henk (2003), Heeft DUBO het convenant overleefd?, *Pro Magazine, NEPROM, March*, pp. 14-15 (magazine of the Netherlands Association of Real Estate Developers).

Bressers, J.TH.A. and P.-J. Klok (1996), Ontwikkelingen in het Nederlandse milieubeleid: Doelrationaliteit of cultuurverschuiving?, *Beleidswetenschap, 10* (5), pp. 445-460.

Bremer, W. and K. Kok (2000), The Dutch construction industry: A combination of competition and corporatism, *Building Research and Information, 28* (2), pp. 98-108.

Bresnen, M., A. Goussevskaia, and J. Swan (2005), Implementing change in construction project organisations: Exploring the interplay between structure and agency, *Building Research and Information 33* (6), pp. 547-560.

Brezet, J.C. (1994), *Van prototype tot standaard; de diffusie van energiebesparende technologie*, Denhatex BV: Rotterdam.

Brown, H.S. and P.J. Vergragt (2008), Bounded socio-technical experiments as agents of systemic change: The case of a zero-energy residential building, *Technological Forecasting and Social Change, 75* (1), pp. 107-130.

Brown, H.S. and P.J. Vergragt (2009), *Socio-technical experiments as agents of transition in the residential housing system: The case of Worcester*, Massachusetts, paper for Urban Transitions Workshop, Manchester UK, May 7th-8th.

Buckingham-Hatfield, S. and B. Evans (eds.) (1996), *Environmental planning and sustainability*, Chichester (United Kingdom): John Wiley & Sons Ltd.

Burns, T. and G.M. Stalker (1961), *The Management of Innovation*, London: Tavistock.

Capano, G. and M. Howlett (2007), *The determinants of policy change: advancing the debate*, ECPR Workshop, Helsinki.

Carson, R. (1962), *Silent Spring*, Boston: Houghton Mifflin.

Couch, Chr., G. Petschel-Held and L. Leontidou (eds.) (2007), *Urban Sprawl in Europe: Landscape, Land-Use Change & Policy*, Oxford: Blackwell Publishers.

Chau, C.K., W.L. Lee, F.W.H. Yik, and J. Burnett (2000), Towards a successful voluntary building environmental assessment scheme, *Construction Management and Economics, 18* (8), pp. 959-968.

Christensen, K.S. (1985), Coping with Uncertainty in Planning, *Journal of the American Planning Association,* 51 (1), pp. 63-73.

Clark, B. (2003), Ebenezer Howard and the Marriage of Town and Country: An Introduction to Howard's Garden Cities of To-morrow (Selections), *Organization & Environment,* 16 (1), pp. 87-97.

Cobb, R.W. and C.D. Elder (1983), *Participation in American Politics: The Dynamics of Agenda-Building*, (2nd edition), Baltimore: The Johns Hopkins University Press.

Cohen, W.M. and D.A. Levinthal (1990), Absorptive capacity: a new perspective on learning and innovation, *Administrative Science Quarterly, Special Issue: Technology, Organizations, and Innovation,* 35 (1), pp. 128-152.

Cole, R. (2004), Changing context for environmental knowledge, *Building Research and Information,* 32 (2), pp. 91-109.

Cohen, M.D., J.G. March and J.P. Olsen (1972), A Garbage Can Model of Organizational Choice, *Administrative Science Quarterly,* 17 (1), pp. 1-25.

Cohen, W. M. and D. A. Levinthal (1990), Absorptive capacity: A new perspective on learning and innovation, *Administrative Science Quarterly,* 35 (1), pp. 128-152.

Connolly, W.E. (1983), *The terms of political discourse*, Oxford: Robertson (2nd edition, 1st edition 1974).

CROW, CUR and NDC (1999), *Nationaal Pakket Duurzaam Bouwen Grond-, Weg- en Waterbouw*, Ede: CROW.

Dahl, R.A. (1961), *Who Governs? Democracy and Power in an American city*, New Haven: Yale University Press.

Daugbjerg, C. and D. Marsh (1998), Explaining policy outcomes: integrating the policy network approach with macro-level and micro-level analysis, Marsh, D. (ed.), *Comparing Policy Networks*, Buckingham: Open University Press, pp. 52-71.

Dawkins, Richard (1976), *The Selfish Gene*, Oxford: Oxford University Press (2nd edition 1989).

De Bruijn, J.A., E.M. van Bueren en E.F. ten Heuvelhof (1998), *Grenzen aan Contouren*, Delft.

De Bruijn, J.A. and E.F. ten Heuvelhof (2000), *Networks and Decision making*, Utrecht: Lemma.

De Bruijn, Hans, Ernst ten Heuvelhof and Roel in 't Veld (2002), *Process Management: Why project management fails in complex decision-making processes*, Kluwer Academic Publishers: Dordrecht.

De Geus, M. (1996), *Ecologische Utopieën, Ecotopia's en het milieudebat*, Utrecht: Jan van Arkel.

De Jong, W.M. (1999), *Institutional Transplantation: How to Adopt Good Transport Infrastructure Decision making Ideas from other Countries?*, Delft: Eburon.

De Jong, M. and H. van der Voort (2004), Evolutionary Theory in the Administrative Sciences: Introduction, *Knowledge, Technology, & Policy, 16* (4), pp. 16-29.

De Jong, M. and J. Edelenbos (2007), An Insider's Look into Policy Transfer in Transnational Expert Networks, *European Planning Studies, 15* (5), pp. 687-706.

DeLeon, P. (1988), *Advice and Consent: The Development of the Policy Sciences*, New York: Russell Sage Foundation.

DeLeon, P. and D.M. Vogenbeck (2007), Back to Square One: The History and Promise of the Policy Sciences, Rabin, J., W. Bartley Hildreth and G. Miller, *Handbook of Public Administration*, Boca Raton: CRC Press, Taylor and Francis, 3rd edition, pp. 503-539.

De Roo, G. and M. Schwartz (2001), Omgevingsplanning: Een niet meer weg te denken begrip, *Stedebouw en Ruimtelijke Ordening, 82* (6), pp. 25-29.

De Vuyst, Sander (2004), *Nederland en Vlaanderen op één lijn? Een verkennend onderzoek naar mogelijkheden om te leren van afbakening van de stedelijke gebieden in Vlaanderen*, Master thesis Planologie, Katholieke Universiteit Nijmegen.

De Wit, Leen (1994), *Duurzaam Bouwen. Aanbevelingen voor Effectief Rijksbeleid*, Utrecht: Stichting Natuur en Milieu, pp. 17-18.

Ding, G.K.C. (2005), Developing a multicriteria approach for the measurement of sustainable performance, *Building Research and Information, 33* (1), pp. 3-16.

Douglas, M. and A. Wildavsky (1982), *Risk and Culture: An essay on the selection of technical and environmental dangers*, University of California Press: Berkeley.

Dowding, K. (1995), Model or Metaphor? A Critical Review of the Policy Network Approach, *Political Studies, XLIII*, pp. 136-158.

Dowding, K. (2000), How not to use evolutionary theory in politics: A critique of Peter John, *British Journal of Politics and International Relations, 2* (1), pp. 72-80.

Dowding, K. (2001), There Must Be End to Confusion: Policy Networks, Intellectual Fatigue, and the Need for Political Science Methods Courses in British Universities, *Political Studies, 49* (1), pp. 89-105.

Driessen, P.P.J. and Glasbergen, P. (eds.), *Greening Society: The Paradigm Shift in Dutch Environmental Politics*, Dordrecht: Kluwer Academic Publishers.

Dryzek, J. S. (1997), *The Politics of the Earth: Environmental Discourses*, Oxford: Oxford University Press.

DTI – Department of Trade and Industry, The Construction Sector Innovation and Research Team (2005), *Technology strategy for the built environment*, May 2005, http://www.dti.gov.uk/construction/research/techstrategy.pdf.

Duijvestein, A. and F. Feddes (2008), *The Almere Principles*, Bussum: Thoth.

Dunn W.E. (1981), *Public policy analysis: an introduction*, Englewood Cliffs, N.J.: Prentice-Hall.

Easterby-Smith, M., R. Thorpe and A. Lowe (2002), *Management Research: An Introduction* (2nd edition), London: Sage.

Edelenbos, J. (2000), *Proces in vorm: procesbegeleiding van interactieve beleidsvorming over lokale ruimtelijke projecten* (Proefschrift), Lemma Uitgeverij BV: Utrecht.

Edelenbos, J. and A. Van Buuren (2005), The learning evaluation: A theoretical and empirical exploration, *Evaluation Review, 29* (6), pp. 591-612.

Edelman, M. (1964), *The Symbolic Uses of Politics*, Urbana: University of Illinois Press.

Eldredge, N. and Stephen J. Gould (1972), Punctuated Equilibria: An Alternative to Phyletic Gradualism, Schopf, T.J.M. (ed.), *Models in Paleobiology*, San Francisco: Freeman, Cooper and Co., pp. 82-115.

Elkington, J. (1994), Towards the sustainable corporation: Win-win-win business strategies for sustainable development, *California Management Review, 36* (2), pp. 90-100.

Ellerman, D.P. (2004), Parallel Experimentation and the Problem of Variation, *Knowledge, Technology, & Policy, 16* (4), pp. 77-90.

Esselbrugge, M. (2002), *Openheid en geslotenheid. Een kwestie van combineren*, Delft: Eburon.

Etheredge, L.M. and J. Short (1983), Thinking about Government Learning, *Journal of Management Studies, 20* (1), pp. 41-58.

European Commission, Expert Group on the Urban Environment (1996), *European sustainable cities*, Luxembourg: European Commission.

European Commission (2000), *Management of construction and demolition waste: Working document no. 1*, Directorate E-Industry and Environment, ENV.E.3 Waste Management – DG ENV.E.3 Brussels.

European Commission (2000a), *Communication from the Commission on the precautionary principle*, Brussels: European Commission.

Faludi, A. and A. van der Valk (1994), *Rule and Order: Dutch Planning Doctrine in the Twentieth Century*, Dordrecht: Kluwer Academic Publishers.

Fischer, F. and J. Forester (eds.) (1993), *The argumentative turn in policy analysis and planning*, Durham, NC: Duke University Press.

Fischer, F. (1995), *Evaluating Public Policy*, Chicago: Nelson-Hall Publishers.

Fischer, F. (2000), *Citizens, experts, and the environment: The politics of local knowledge*, Durham, NC: Duke University Press.

Flyvbjerg, B. (2001), *Making Social Science Matter: Why social inquiry fails and how it can succeed again*, Cambridge: Cambridge University Press.

Forester, J. (1989), *Planning in the Public Domain*, Berkeley, CA: University of California Press.

Gallie, W.B. (1956), Essentially Contested Concepts, *Proceedings of the Aristotelian Society, 56,* pp. 167-198.

Gelinck, S. (1999), Informeren en inspireren. NPDS focust op proces, *Bouw, 39* (6), pp. 8-9.

Gezondheidsraad, Commissie Risico-evaluatie van stoffen (1998), *Zink*, Rijswijk: Gezondheidsraad.

Giddens, A. (1984), *The Constitution of Society. Outline of the Theory of Structuration*, Cambridge: Polity.

Glasbergen, P. (1995), *Managing Environmental Disputes: Network Management as an Alternative*, Dordrecht: Kluwer.

Glasbergen, P. (1998), *Cooperative Environmental Governance: Public-Private Agreements as a Policy Strategy*, Dordrecht: Kluwer.

Gore, Al (2006), *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It*, Rodale: Melcher Media.

Graedel, Thomas E. (1999), Environmentally superior buildings from birth to death, in: Kibert, C. (ed.), *Reshaping the built environment: Ecology, ethics and economics*, Washington D.C./Covelo California: Island Press, pp. 259-275.

Graedel, T.E. and B.R. Allenby (2002), *Industrial Ecology*, Englewood Cliffs, NJ: Prentice Hall (2nd edition).

Granados, F.J. and D. Knoke (2005), Organized Interest Groups and Policy Networks, Janoski, T., R. Alford, A. Hicks and M.A. Schwartz (ed.), *The Handbook of Political Sociology*, pp. 287-309.

Goodin, R.E. (1996), *The Theory of Institutional Design*, Cambridge: Cambridge University Press.

Grin, J. and R. Hoppe (2000), Cultural Bias and Framing Wicked Problems. A comparative analysis of structuring the car mobility problem by three institutes for parliamentarian technology assessment, Wagenaar, H. (ed.), *Government Institutions: Effects, Changes and Normative Foundations*, Kluwer Academic Publishers: Dordrecht/Boston/London, pp. 179-199.

Grin, John, Henk van de Graaf and Philip Vergragt (2003), Een derde generatie milieubeleid: een sociologisch perspectief en een beleidswetenschappelijk programma, *Beleidswetenschap, 17* (1), pp. 51-72.

Guba, E.G. and Y. Lincoln (1989), *Fourth Generation Evaluation*, Newbury Park, CA: Sage.

Gunton, T.I. and J.C. Day (2003), The Theory and Practice of Collaborative Planning in Resource and Environmental Management, *Environments, 31* (2), pp. 5-19.

Haarman, H.R., E.N. van Leeuwen and M.A.R. de Haan (2000), Sustainable Building Policy in the Netherlands, Milieu, *Journal of Environmental Sciences, Special Issue Sustainable Building in the Netherlands, 15* (2), pp. 62-70.

Haffner, M, M. Elsinga and A. Wolters (2005), *Het stedelijke vernieuwingsnetwerk: Verkenning in theorie en praktijk*, Gouda: Habiforum.

Hajer, M.A. (1995), *The Politics of Environmental Discourse. Ecological Modernization and the Policy Process*, Oxford: Oxford University Press.

Hajer, M. A. and H. Wagenaar (eds.) (2003), *Deliberative Policy Analysis: Understanding Governance in the Network Society*, Cambridge: Cambridge University Press.

Hajer, M.A., J.P.M. van Tatenhove and C. Laurent (2004), *Nieuwe vormen van governance*, RIVM: Bilthoven.

Hall, P. (1980), *Great planning disasters*, London: Weidenfeld.

Hall P. (1993), Policy Paradigms, Social Learning and the State, *Comparative Politics, 25* (3), pp. 275-296.

Hanf, K. and F. Scharpf (1978), *Interorganizational Policy making. Limits to Coordination and Central Control*, London/Beverly Hills: Sage.

Hay, C. (1998), The tangled webs we weave: the discourse, strategy and practice of networking, Marsh, D. (ed.), *Comparing Policy Networks*, Buckingham: Open University Press.

Hardin, G. (1968), The Tragedy of the Commons, *Science, 162* (3859), pp. 1243-1248.

Harty, Chris (2005), Innovation in construction: a sociology of technology approach, *Building Research & Information 33* (6), pp. 512–522.

Healey, P. (1996), The communicative turn in planning theory and its implications for spatial strategy formation, *Environment and Planning B: Planning and Design, 23* (2), pp. 217-234.

Healey, P. (1997), *Collaborative Planning: Shaping Places in Fragmented Societies*, Vancouver: University of British Columbia Press.

Heclo, H. (1974), *Modern Social Politics in Britain and Sweden: From Relief to Income Maintenance*, New Haven: Yale University Press.

Heclo, H. (1978), Issue Networks and the Executive Establishment. Anthony King (ed.), *The New American Political System*, American Enterprise Institute.

Hendriks, Frank (1999), *Public Policy and Political Institutions: The Role of Culture in Traffic Policy*, Cheltenham: Elgar.

Hendriks, C.F. (2004), *A new vision on the building cycle*, Boxtel: Aeneas.

Hertwich, E.G. (2005), Consumption and the rebound effect: An industrial ecology perspective, *Journal of Industrial Ecology 9* (1-2), pp. 85-98.

Hertz, B. (1996), Bewonersgedrag in duurzaam bouwen-projecten, *Milieu, 4*, pp. 161-169.

Hood, C.C. (1986), *The tools of government*, Chatham, N.J.: Chatham House.

Hoogerwerf, A. (1992), *Het ontwerpen van beleid: Een handleiding voor de praktijk en resultaten van onderzoek*, Alphen aan den Rijn: Samsom HD Tjeenk Willink.

Howlett, M. and Ramesh, M. (1998), Policy Subsystem Configurations and Policy Change: Operationalizing the Postpositivist Analysis of the Politics of the Policy Process, *Policy Studies Journal, 26* (3), pp. 466-481.

Houkes, W.N., P.E. Vermaas, C.H. Dorst, and M.J. de Vries (2002), Design and use as plans: an action-theoretical account, *Design Studies, 23* (3), pp. 303-320.

Huber, J. (2004), *New Technologies and Environmental Innovation*, Cheltenham, UK: Edward Elgar Publishing.

H_20 (1990), Zware metalen in onttrokken grondwater, *H_20, 21*, October 11.

IEA International Energy Agency (2008), *Energy Efficiency Policy Recommendations: Worldwide Implementation Now*, Paris: International Energy Agency.

Interduct (1995), *Technologische mogelijkheden voor een doelmatiger beheer van primaire en secundaire grondstoffen*, Report nr. 17- Zinc, Delft: Interduct.

IPCC (Intergovernmental Panel on Climate Change) (2007), *Climate Change 2007: Synthesis Report Summary for Policy makers*, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf (April 28, 2009).

IPO, Interprovinciaal Overleg (2001), *Van Ordenen naar Ontwikkelen: Provincies investeren in de kwaliteit van de ruimte*, Den Haag: IPO.

Jablonka, E. and J. Ziman (2000), Biological evolution: processes and phenomena, Ziman, J. (ed.), *Technological Innovation as an Evolutionary Process*, Cambridge: Cambridge University Press, pp. 13-27.

Janus, J.A., P. van Beelen, M.A. Vaal, H.A.J. Senhorst and C. van de Guchte (1996), *A further look at zinc: A response to the Industry Addendum to the Integrated Criteria Document Zinc*, Bilthoven: RIVM/Lelystad: RIZA (report number RIVM-601014012/RIZA-96.038).

Jasanoff, S. (1990), *The Fifth Branch: Science Advisers as Policymakers*, Cambridge, MA: Harvard University Press.

Jensen, M.C. and W.H. Meckling (1976), The theory of the firm: Managerial behaviour, agency costs and ownership structure, *Journal of financial economics, 3*, pp. 305-360.

John, P. (2003), Is there life after policy streams, advocacy coalitions, and punctuations: using evolutionary theory to explain policy change, *The Policy Studies Journal, 31* (4) pp. 481-498.

Johnson, K.L., A.F. Raybould, M.D. Hudson and G.M. Poppy (2007), How does scientific risk assessment of GM crops fit within the wider risk analysis?, *Trends in Plant Science, 12* (1), pp. 1-5.

Jordan, A. Grant (1981), Iron Triangles, Woolly Corporatism and Elastic Nets: Images of the Policy Process, *Journal of Public Policy, 1*, pp. 95-123.

Jordan, A.G. and K. Schubert (1992), A preliminary ordering of policy network labels, *European Journal of Political Research, 21* (1-2), pp. 7-27.

Kenis, P. and V. Schneider (1991), Policy Networks and Policy Analysis: Scrutinizing a New Analytical Toolbox, Marin, B. and R. Mayntz (eds.), *Policy Networks: Empirical Evidence and Theoretical Considerations*, Boulder, CO: Westview Press, pp. 25-59.

Kibert, C.J. (2002), Policy instruments for a sustainable built environment, *Journal of land use and environmental law, 17* (2), pp. 379-394.

Kibert, C.J., J. Sendzimir, and G. Bradley Guy (2002), Defining an ecology of construction, Kibert, Ch.J., J. Sendzimir, and G. Bradley Guy (eds.), *Construction Ecology: Nature as the basis for green buildings*, London, New York: Spon Press, pp. 7-28.

Kickert, W.J.M., E.H. Klijn and J.F.M. Koppenjan (1997), *Managing Complex Networks,* London: Sage.

Kingdon, J.W. (1984), *Agendas, Alternatives and Public Policies*, New York: Harper Collins.

Klijn, E.H. (1996), *Regels en Sturing in Netwerken. De invloed van netwerkregels op de herstructurering van naoorlogse wijken*, Delft: Eburon.

Klijn, E.H. (1997), Policy Networks: An Overview, Kickert, W.J.M., H. Klijn and J.F.M. Koppenjan (eds.), *Managing Complex Networks: Strategies for the Public Sector*, London: Sage, pp. 34.

Klijn, E.H. and J.F.M. Koppenjan (2000), Public Management and Policy Networks: Foundations of a network approach to governance, *Public Management Review, 2* (2), pp. 135-158.

Klijn, E.H. and J. Koppenjan (2004), *Managing uncertainties in networks: A network approach to problem-solving and decision making*, London: Routledge.

Klijn, E.H. and J. Edelenbos (2007), Meta-governance as Network Management. Sørensen, E. and J. Torfing (eds.), *Theories of Democratic Network Governance*, New York: Palgrave MacMillan, pp. 199-214.

Klunder, G. (2005), *Sustainable solutions for Dutch housing. Reducing the environmental impacts of new and existing houses*, Sustainable Urban Areas 4, Delft: Delft University Press.

Kole, H.A. (1987), Lood, zink en koper als dakbedekking en gevelbekleding, *Materialen, nr. 7*.

Kooiman, J. (1993), *Modern Governance: New Government-Society Interactions*, London: Sage.

Koppenjan, J.F.M. (2007), Consensus and Conflict in Policy Networks: Too Much or Too Little, Sørensen, E. and J. Torfing (eds.), *Theories of Democratic Network Governance*, New York: Palgrave MacMillan, pp. 133-166.

Korenromp, R. and K. Hollander, (1999), *Diffusive emissions of zinc due to atmospheric corrosion of zinc and zinc coated (galvanised) materials*, TNO-MEP – R 99/441, TNO: Apeldoorn.

Korthals Altes, Willem (1995), *De Nederlandse Planningsdoctrine in het Fin de Siècle. Voorbereiding en doorwerking van de Vierde Nota over de Ruimtelijke Ordening (Extra)*, Assen: Van Gorcum.

Kuit, M. (2002), *Strategic behavior and regulatory styles in the Netherlands energy industry*, Delft: Eburon.

Laffont, J.-J. and D. Martimort (2001), *The Theory of Incentives*, Princeton, New Jersey: Princeton University Press.

LBOW, Landelijk Bestuurlijk Overleg Water (2007), *Omgaan met metalen bouwmaterialen*, Lelystad: LBOW/Cabri, also www.helpdeskwater.nl (National Governmental Platform Water (Dealing with metal construction materials).

Leroy, P. and J. van Tatenhove (2000), Political Modernization Theory and Environmental Politics, Spaargaren, G., A. P. J. Mol and Frederick H. Buttel (eds.), *Environment and Global Modernity*, London: Sage, pp. 187-208.

Lester, J.P. and A. Bowman (1989), Implementing Intergovernmental Policy: A Test of the Sabatier-Mazmanian Model, *Polity, 21*, pp. 731-753.

Lindblom, Ch.E. (1959), The science of muddling through, *Public Administration Review, 19*, pp. 79-88.

Lombardi, P.L. and P.S. Brandon (2002), Sustainability in the built environment: A new holistic taxonomy of aspects for decision making, *International Journal of Environmental Technology and Management, 2* (1/2/3), pp. 22-37.

Lounsbury (2001), Institutional sources of practice variation: Staffing college and university recycling programs, *Administrative Science Quarterly, 46* (1), pp. 29-56.

Lovell, H. (2005), Supply and demand for low energy housing in the UK: Insights from a science and technology studies approach, *Housing studies, 20* (5), pp. 815-829.

Lowe, E.A. (1999), Sustainable New Towns and industrial ecology, Kibert, C. (ed.), *Reshaping the built environment: Ecology, ethics and economics*, Washington D.C./Covelo California: Island Press, pp. 310-339.

Lunch, William M. (2004), *Science, Civil Rights & Environmental Policy: A Political Mystery in Three Acts*, Western Political Science Association Annual Meeting, Portland, Oregon.

Lundvall (1992), *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Pinter Publishers.

MacRae, D. and D. Whittington (1997), *Expert Advice for Policy Choice*, Washington, DC: Georgetown University Press.

March, J.G. and J.P. Olsen (2006), Elaborating the "New Institutionalism", Rhodes, R.A.W, S. Binder and B. Rockman (eds.), *The Oxford handbook of Political Institutions*, Oxford: Oxford University Press, pp. 3-22.

Marco, G.J., R.M. Hollingworth and W. Durham (eds.) (1987), *Silent Spring Revisited*, Washington DC: American Chemical Society.

Mandell, M.P. (1988), Intergovernmental Management in Interorganizational Networks: A Revised Perspective, *International Journal of Public Administration, 11* (4), pp. 393-416.

Mark, M.E. and G.T. Henry (2004), The Mechanisms and Outcomes of Evaluation Influence, *Evaluation, 10* (1), pp. 35-57.

Marsh, D. and R.A.W. Rhodes (eds.) (1992), *Policy networks in British government*, Oxford: Clarendon Press.

Marsh, D. (1995), *State theory and the policy network model*, Strathclyde Papers on Government and Politics No. 102, Glasgow: University of Strathclyde.

Marsh, D. (1998), The Utility and Future of Policy Network Analysis, Marsh, D. (ed.), *Comparing Policy Networks*, Buckingham: Open University Press.

Marsh, D. and M. Smith (2000), Understanding Policy Networks: Towards a Dialectical Approach, *Political Studies, 48* (1), pp. 4-21.

Marsh, D. and M. Smith (2001), There is More than One Way to Do Political Science: on Different Ways to Study Policy Network, *Political Studies*, 49 (3), pp. 528-541.

Mayer, I. and Y. Kleistra (2002), *System and learning models of policy change: same interest, different starting points, complementary questions?*, EGPA conference Institutional crisis and policy change, Potsdam, September.

Mayntz, R. (1993), Modernization and the Logic of Interorganizational Networks, Child, J., M. Crozier and R. Mayntz (eds.), *Societal Change between Market and Organization*, Avebury: Aldershot, pp. 3-18.

Mazer, M. S. (1988), A knowledge theoretic account of recovery in distributed systems: the case of negotiated commitment, Vardi. M.Y. (ed.), *Theoretical aspects of rationality and knowledge*, San Francisco: Morgan Kaufmann Publishers, pp. 309-323.

McDonough, William and Michael Braungart (2002), *Cradle to Cradle: Remaking the Way We Make Things*, New York: North Point Press.

Meacham, B., R. Bowen, J. Trow and A. Moore (2005), Performance-based building regulation: current situation and future needs, *Building Research & Information, 33* (2), pp. 91-106.

Meadows, D.H., D.L. Meadows and J. Randers (1972), *Limits to growth: A report by the Club of Rome's project on the predicament of mankind*, New York: New American Library.

Menkveld, M., B. Daniels, Y. Boerakker, H. Jeeninga, P. Kroon, A. Seebregts and H. de Wilde (2005), *Het onbenut rendabel potentieel voor energiebesparing*, ECN-C--05-062, Petten: ECN.

Meppem, T. and S. Bourke (1999), Different ways of knowing: A communicative turn towards sustainability, *Ecological Economics, 30*, pp. 389-404.

Milieuberaad Bouw (1993), *Beleidsverklaring Milieutaakstellingen Bouw 1995*, Den Haag: VROM.

Milieu en Natuur Planbureau (2001), *Who is afraid of red, green and blue? Toets van de Vijfde Nota Ruimtelijke Ordening op ecologische effecten*, RIVM report number 711931 005, Bilthoven: RIVM.

Mintrom, Michael and Sandra Vergari (1996), Advocacy coalitions, policy entrepreneurs, and policy change, *Policy Studies Journal, 24* (3), pp. 420-434.

Mol, A.P.J. and G. Spaargaren (2000), Ecological Modernisation in Theory: A Review, Mol, A.P.J. and D.A. Sonnenfeld (eds.), *Ecological Modernisation around the World: Perspectives and Critical Debates*, London: Frank Cass, pp. 17-49.

Mollison, Bill and David Holmgren (1978), *Permaculture One*, Australia: Transworld Publishers.

Moors, E.H.M., K.F. Mulder and P.J. Vergragt (1995), *Transformation Strategies Towards more Sustainable Industrial Production Systems: A Case-Study of the Zinc Production Industry*, Paper for the 4S Meeting, Charlottesville, Virginia, USA, October 18-22, 1995.

Morçöl, G. (2007), Decision making: An Overview of Theories, Contexts and Methods. Morçöl, G. (ed.), *Handbook of Decision making*, Boca Raton: CRC Press, Taylor and Francis, pp. 3-18.

Morgan, G. (1986), *Images of Organization*, London: Sage.

Nationaal DuBo Centrum (1997, 1999), *Subsidieoverzicht duurzaam bouwen: De belangrijkste subsidies en stimuleringsregelingen voor duurzaam bouwen*, Best: Aeneas.

Nationaal Dubo Centrum (1999), *Nationaal Pakket Duurzame Stedenbouw*, Utrecht: Nationaal Dubo Centrum.

Nelissen, N.J.M. (1998), Environmental Policy Instrumentation in The Netherlands: Comments on Three Decades of Development, *Greener Management International, 22*, pp. 30-45.

Nelson, R.R. and S. Winter (1982), *An Evolutionary Theory of Economic Change*, London: The Belknap Press of Harvard University.

Newman, P. and J. Kenworthy (2000), Sustainable urban form: The big picture, Williams, K., E. Burton and M. Jenks (eds.), *Achieving sustainable form*, London/ New York: E&FN Spon, pp. 109-120.

Nilsson, M. (2005), The role of assessments and institutions for policy learning: A study on Swedish climate and nuclear policy formation, *Policy Sciences, 38* (4), pp. 225-249.

OECD, Organisation for Economic Development and Cooperation (2003), *Environmentally sustainable buildings: Challenges and policies*, Paris: OECD Publications Service.

Oliver, Pamela E. (1993), Formal Models of Collective Action, *Annual Review of Sociology, 19*, pp. 271-300.

Olson, Mancur (1965), *The logic of collective action*, Cambridge: Harvard University Press.

O'Riordan, T. and A. Jordan (1994), *The precautionary Principle: Science, Politics and Ethics*, CSERGE Working Paper PA 95-02, Norwich: Centre for Social and Economic Research on the Global Environment.

Ostrom, E. (1990), *Governing the Commons. The Evolution of Institutions for Collective Action*, Cambridge University Press: Cambridge.

O'Toole, L.J. Jr. (1997), Treating Networks Seriously, *Public Administration Review* 57 (1), pp. 45-52.

O'Toole L.J. Jr. (2007), Governing Outputs and Outcomes of Governance Networks, Sørensen, E. and J. Torfing (eds.), *Theories of Democratic Network Governance,* New York: Palgrave MacMillan, pp. 215-230.

Pemberton, H. (2000), Policy networks and policy learning: UK economic policy in the 1960s and 1970s, *Public Administration, 78* (4), pp. 771-792.

Peters, B. G. (1998), Managing horizontal government: The politics of co-ordination, P*ublic Administration, 76* (2), pp. 295-311.

Pierre, J. and B. Guy Peters (2000), *Governance, Politics and The State*, New York: Palgrave MacMillan.

Pierson, P. (2000), Increasing returns, path dependence, and the study of politics, *The American political science review, 94* (2), pp. 251-267.

Planbureau voor de Leefomgeving (2009), *Realisatie Milieudoelen: Voortgangsrapport 2009*, Bilthoven: Planbureau voor de Leefomgeving.

Pressman, J.L. and A.B. Wildavsky (1973), *Implementation. How great expectations in Washington are dashed in Oakland*, Berkeley/Los Angeles: California Press (3rd edition, 1984).

Priemus, H. (2005), How to make housing sustainable: the Dutch experience, *Environment and Planning B: Planning and Design, 32* (1), pp. 5-19.

Pries, F. (1995), *Innovatie in de bouwnijverheid*, Delft: Eburon.

Provan, K.G. and P. Kenis (2007), Modes of Network Governance: Structure, Management, and Effectiveness, *Journal of Public Administration Research and Theory, 18* (2), pp. 229-252.

Pröpper, I.M.A.M. (1996), Succes en falen van sturing in beleidsnetwerken: Enkele lessen ten behoeve van een theoretisch model, *Beleidswetenschap,* 4, pp. 345-365.

Pröpper, I.M.A.M. (1997), Succes- en faalfactoren voor repliek: De discussie over beleidsnetwerken, *Beleidswetenschap, 2*, pp. 174-178.

Redclift, M. (1991), The multiple dimensions of sustainable development, *Geography, 76*, pp. 36-42.

Rein, M. and D. Schön (1993), Reframing Policy Discourse, Fischer, F. and J. Forrester (eds.), *The Argumentative Turn in Policy Analysis and Planning*, Durham: Duke University Press, 145-167.

Reinicke, W.H. (1999), The other World Wide Web: Global public policy networks, *Foreign Policy, 117*, pp. 44-57.

Rhodes, R.A.W. (1990), Policy Networks: a British perspective, *Journal of Theoretical Politics, 2* (3), pp. 292-316.

Rhodes, R.A.W. (1997), *Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability*, Buckingham/Philadelphia: Open University Press.

RIGO (2006), *Migratiesaldo 0 in het Groene Hart*, RIGO.

Rittel, H.J.W. and M.M. Webber (1973), Dilemmas in a General Theory of Planning, *Policy Sciences,* 4, pp. 155-169.

RIVM (1992), *Basisdocument Zink*, De Bilt: RIVM.

Robinson, S. E. (2006), A decade of treating networks seriously, *Policy Studies Journal, 34* (4), pp. 589-598.

Robinson, S.E., F. Caver, K.J. Meier and L.J. O'Toole (2007), Explaining policy punctuations: Bureaucratization and budget change, *American Journal of Political Science, 51* (1), pp. 140-150.

Roe, E. (1998), *Taking complexity seriously: policy analysis, triangulation and sustainable development*, Boston: Kluwer.

Rogers (2005), *Diffusion of Innovations*, New York: Free Press (5th edition).

Rose, R. (1993), *Lesson-Drawing in Public Policy: A Guide to Learning Across Time and Space*, Chatham NJ: Chatham House.

Rotmans, J., R. Kemp and M. van Asselt (2001), More Evolution than revolution: Transition Management in Public Policy, *Foresight, 3*, pp. 15-31.

Rovers, R. (2003), *The role of policies in promoting sustainable practices, UNEP Industry and Environment*, Theme Issue, Sustainable Building and Construction, April-September 2003, pp. 29-32.

Sabatier, P.A. (1987), Knowledge, policy-oriented learning and policy change, an advocacy coalition framework, *Knowledge: creation, diffusion, utilization, 8* (4), pp. 649-692.

Sabatier, P.A. and H.C. Jenkins-Smith (eds.) (1993), *Policy Change and Learning: An Advocacy Coalition Approach*, Boulder, CO: Westview Press.

Sabatier, P.A. (1998), The advocacy coalition framework: Revisions and relevance for Europe, *Journal of European public policy, 5* (1), pp. 93-130.

Salancik, G. R. (1995), Wanted: A good network theory of organization, *Administrative Science Quarterly, 40*, pp. 345-349.

SBR (1996), *Nationaal Pakket Duurzaam Bouwen Woningbouw, Nieuwbouw en Beheer*, Rotterdam: SBR.

SBR (1998), *Nationaal Pakket Duurzaam Bouwen Utiliteitsbouw, Nieuwbouw en Beheer*, Rotterdam: SBR.

SBR (1999), *Protocol Duurzaam Bouwen, Internal memo* (Sustainable Building Protocol).

Schattschneider, E.E. (1960), *The Semisovereign People: A Realist's View of Democracy in America*, New York: Holt, Rinehart and Winston, Inc.

Schneider, A. and H. Ingram (2005), A Response to Peter DeLeon: Social Construction and Public Policy, *Public Administration Review, 65* (5), pp. 638-640.

Schofield, J. and C. Sausman (2004), Symposium on implementing public policy: Learning from theory and practice – Introduction, *Public Administration, 82* (2), 235-248.

Schön, D.A. and M. Rein (1994), *Frame Reflection: Toward the Resolution of Intractable Policy Controversies*, New York: Basic Books.

SenterNovem, *Toelichting Maatlat duurzame woningbouw 2005*, August.

SER (2001), *Advies over de Vijfde Nota Ruimtelijke Ordening 2000/2020*, Publicatienummer 7, Den Haag: SER, pp. 96-99.

Sexton, M. and P. Barrett (2005), Performance based building and innovation: Balancing client and industry need, *Building Research & Information, 33* (2), pp. 142-148.

SEV (1993), *Handleiding Duurzame Woningbouw*, Rotterdam: SEV.

SEV and NOVEM (1997), *DUWON, Duurzaam Woningbeheer*, Utrecht: NOVEM.

Shorrock, L.D. and J.I. Utley (2003), *Domestic energy fact file 2003*, London: BRE Bookshop.

Simon, H.A. (1957), *Administrative Behaviour: a study of Decision-making processes in Administrative Organization*, New York: MacMillan.

Smith, A. (2006), Governance lessons from green niches: the case of eco-housing,. Murphy, J. (ed.), *Framing the Present, Shaping the Future: Contemporary Governance of Sustainable Technologies*, London: Earthscan, pp. 89-109.

Smith, A. (2007), Translating Sustainabilities between Green Niches and Socio-Technical Regimes, *Technology Analysis & Strategic Management, 19* (4), pp. 427-450.

Snellen, I. (1987), *Boeiend en geboeid: Ambivalenties en ambities in de bestuurskunde*, Alphen.

Sørensen, E. and J. Torfing (2007), Introduction: Governance Network Research: Towards a Second Generation, Sørensen, E. and J. Torfing (eds.), *Theories of Democratic Network Governance*, New York: Palgrave MacMillan, pp. 1-21.

Stern, Nicholas (2007), *The Economics of Climate Change: The Stern Review*, Cambridge: Cambridge University Press.

Stone, D.A. (1988), *Policy paradox and political reason*, HarperCollins.

Stoop, B.T.J. (1995), *Beoordeling enkele milieuaspecten van zink als bouwmateriaal*, TNO-report, Delft: TNO.

Symonds Group Ltd. (1999), *Construction and demolition waste management practices, and their economic impacts*, Report to DGXI European Commission, London: Symonds Group Ltd.

Teisman, G.R. (1995), *Complexe Besluitvorming. Een Pluricentrisch Perspectief op Besluitvorming over Ruimtelijke Investeringen*, Den Haag: Vuga.

Teisman, G.R. (1997), *Sturen via creatieve concurrentie*, Nijmegen: Katholieke Universiteit Nijmegen.

Termeer, C.J.A.M. (1993), *Dynamiek en inertie rondom het mestbeleid*, Leiden: Universiteit Leiden.

Teunissen, R.J.M. and F.H. Wagemaker (2000), *Gebiedsgericht Emissiebeleid*, Lelystad: RIZA.

Thompson, J.D. (1967), *Organizations in action*, New York: McGraw-Hill.

Tirone, Livia (2004), *Working group sustainable construction methods and techniques*, final report, ENV.B3/SER/2003/0007r, Brussels.

Tjallingii, Sybrand (1995), *Ecopolis, Strategies for Ecologically Sound Urban Development*, Leiden: Backhuys Publishers.

Tjallingii, S.P. (1996), *Ecological Conditions: Strategies and Structures in Environmental Planning*, Wageningen: DLO Institute for Forestry and Nature Research (IBN-DLO).

UNEP, United Nations Environment Programme (2003), *Sustainable building and construction: Facts and figures, UNEP Industry and Environment*, Theme Issue, Sustainable Building and Construction, April-September, pp. 5-8.

UNEP, United Nations Environment Programme (2007), *Buildings and Climate Change: Status, Challenges, and Opportunities*, Paris: UNEP DTIE.

V&W Ministry of Water Management (1989), *Derde Nota Waterhuishouding: Water voor nu en later*, Den Haag: Ministerie van Verkeer en Waterstaat.

V&W Ministry of Water Management (2006), *Milieubelasting en risico's van zink, koper en lood*, Den Haag: Ministerie van Verkeer en Waterstaat.

Van Bortel, G., E. van Bueren, M. van Eeten, M. Elsinga and E. Kerpershoek (2007), *Rhetoric of success in Dutch urban renewal: the role of personal chemistry and trust in networks*. Paper presented at the European Network for Housing Research Conference, Rotterdam, June 25-28.

Van Bueren, E., E. van Keeken and K. Canters (2000), *De Nationale Pakketten Nader Bekeken: Duurzaam Bouwen Nu en in de Toekomst*, Delft: DIOC The Ecological City.

Van Bueren E.M. and H. Priemus (2002), Institutional Barriers to Sustainable Construction, *Environment and Planning B: Planning and Design, 29* (1), pp. 75-86.

Van Bueren, E.M., E.H. Klijn and J.F.M. Koppenjan (2003), Dealing with wicked problems in networks: Analyzing an environmental debate from a network perspective, *Journal of Public Administration Research and Theory, 13* (2), pp. 193-212.

Van Bueren, E. and J. de Jong (2007), Establishing Sustainability: Policy Successes and Failures, *Building Research & Information, 35* (5), pp. 543-556.

Van de Graaf, H. and R. Hoppe (1992), *Beleid en politiek: Een inleiding tot de beleidswetenschap en de beleidskunde*, Muiderberg: Coutinho.

Van den Dobbelsteen, A.A.J.F. (2004), *The sustainable office: An exploration of the potential for factor 20 environmental improvement of office accommodation*, Delft: TU Delft.

Van der Velden, B. (2001), Ruimte voor Contouren? Contouren als opmaat voor ruimtelijke kwaliteit, *Stedebouw & Ruimtelijke Ordening, 82* (2), pp. 46-49.

Van Dorst, M. (2005), *Een duurzaam leefbare woonomgeving: Fysieke voorwaarden voor privacyregulering*, Delft: Eburon.

Van der Knaap, P. (1995), Policy evaluation and learning; feedback, enlightenment or argumentation?, *Evaluation, 1* (2), pp. 189-216.

Van der Knaap, P. (1997), *Lerende Overheid, intelligent beleid: De lessen van beleidsevaluatie en beleidsadvisering voor de structuurfondsen van de Europese Unie*, Den Haag: Phaedrus.

Van der Schaar, J. and A. Hereijgers (1991), *Volkshuisvesting: een zaak van beleid*, Utrecht: Het Spectrum BV.

Van der Voort, H., R. Van Wendel de Joode and M. de Jong (2004), Epilogue, *Knowledge, Technology, & Policy, 16* (4), pp. 109-113.

Van der Waals, J. (2001), *CO_2-reduction in housing. Experiences in building and urban renewal projects in the Netherlands*, Amsterdam: Rozenberg Publishers.

Van Gunsteren, H.R. (1985), Het leervermogen van de overheid, Bovens, M.A.P. and W.J. Witteveen (eds.), *Het schip van staat*, Zwolle: Tjeenk Willink, pp. 53-74.

Van Hal, A. (2000), *Beyond the demonstration project: The diffusion of environmental innovations in housing*, Best: Aeneas.

Van Hal, A. (2009), *The Merger of Interests. On Sustainability and Benefits in the Construction Sector*, Breukelen: Nyenrode Business University.

Van Mourik, W., H.J. van der Mijle Meijer, W.J.M. van Tilborg and R.J.M. Teunissen (2003), *Emissies van Bouwmaterialen. Vaststelling van afspoelsnelheden op basis van metingen aan proefopstellingen*, Lelystad: RIZA, in cooperation with Afvalwater Services, TNO, VTBC and RIZA.

Van Straalen, N.M. and A.F.M.M. Souren (2002), Life-cycle interactions between science and policy: The case of risk assessment for zinc, *Australasian Journal of Ecotoxicology, 8*, pp. 27-33.

Van Tatenhove, J. and P. Leroy (1995), Beleidsnetwerken: Een kritische analyse, *Beleidswetenschap, 9* (2), pp. 128-145.

Van Tatenhove, J., B. Arts and P. Leroy (eds.) (2000), *Political Modernization and the Environment. The Renewal of Policy Arrangements*, Dordrecht: Kluwer Academic Publishers, pp. 53-70.

Van Tilborg, W.J.M. and F. van Assche (1995), *Basisdocument Zink, Addendum Industrie, Rozendaal: VTBC*, Van Tilborg Business Consultancy, in cooperation with European Zinc Institute, Brussels.

Van Tilborg Business Consultancy (VTBC) (1996), *A further look at zinc refuted*, Rozendaal: VTBC, report number 9601.

Van Timmeren, A. (2006), *Autonomie en Heteronomie: Integratie en verduurzaming van essentiële stromen in de gebouwde omgeving*, Delft: Eburon.

Van Waarden, F. (1992), Dimensions and Types of Policy Networks, *European Journal of Political Research, 21*, pp. 29-52.

Verheul, H. and H. de Vries (2003), *Verbetering Formele Normalisatieproces*, Delft: NEN/Delft University of Technology.

Vermij, P.H.M. (ed.) (2003), *Fact Sheets Diffuse Bronnen, VI Bouwmaterialen: metalen*, Lelystad: RIZA.

Vermij, P.H.M. and L.R.M. de Poorter (2007), *Stofselectie, bronnen en belasting; Bronnen van belasting van het oppervlaktewater*, Lelystad: RIZA/Ministry of Water Management, October 26.

Vermeulen, P.A.M. and R.H.M. Büch (2005), De invloed van institutionele krachten op overheidsbeleid: een casestudie naar innovatie in de betonindustrie, *Management en Organisatie,* 59 (2), pp. 5-29.

Vos, Anna (2001), Contouren als garantie op kleurechtheid?, *Rooilijn,* 4, pp. 172-177.

VROM Ministry of Housing, Spatial Planning and the Environment (1989), *Nationaal Milieubeleidsplan: Kiezen of Verliezen*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1990), *Nationaal Milieubeleidsplan Plus*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1993a), *Ontwerpprincipes Duurzame Stedebouw*, Den Haag: VROM (Design Principles for Sustainable Urban Planning).

VROM Ministry of Housing, Spatial Planning and the Environment (1993b), *Vierde Nota Ruimtelijke Ordening Extra: VINEX*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1995), *Plan van Aanpak Duurzaam Bouwen: Investeren in de Toekomst*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1996), *Actualisatie Vierde Nota Ruimtelijke Ordening: VINAC*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1997), *Tweede Plan van Aanpak Duurzaam Bouwen*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1999a), *Duurzaam Bouwen Monitoring: Resultaten Plannen van Aanpak 1995-1999*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (1999b), *Beleidsprogramma Duurzaam Bouwen 2000-2004: Verankeren in Beleid en Praktijk*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (2001), *Emissiereductiedoelstellingen prioritaire stoffen (met bijlagenrapport); Notitie in het kader van NMP 4, thema verspreiding*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (2002), *Ruimte maken, ruimte delen. Vijfde Nota over de Ruimtelijke Ordening 2000-2020, PKB Deel 3, Kabinetsstandpunt*, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (2004), *Nota Ruimte: Ruimte voor Ontwikkeling*, Den Haag: VROM (Space: Space for Development, White Paper).

VROM Ministry, DGR/DGW (2004), *Voortgang Verstedelijking VINEX 2003, Jaarlijkse voortgangsrapportage 1995-2002 VINEX Uitvoeringsconvenanten*, p. 6 (Annual monitoring report).

VROM Ministry of Housing, Spatial Planning and the Environment (2006), *Evaluatie Verstedelijking VINEX 1995 tot 2005 Onderzoeksrapport Deel III: VINEX instrumenten*, Den Haag, p. 25. (Evaluation Urbanisation VINEX 1995-2005, Research Report Part III: VINEX Instruments).

VROM Ministry of Housing, Spatial Planning and the Environment (2006), *Evaluatie Verstedelijking VINEX 1995 tot 2005: Onderzoeksrapport Deel III: Vinexinstrumenten*, p. 13 (Evaluation of VINEX Urbanisation 1995-2005).

VROM Ministry of Housing, Spatial Planning and the Environment (2006), *Toekomstagenda Milieu: Schoon, Slim en Sterk*, Publieksedítie, Den Haag: VROM.

VROM Ministry of Housing, Spatial Planning and the Environment (2007), *Uitvoeringsprogramma diffuse bronnen waterverontreiniging*, Den Haag: VROM, pp. 28-31.

VROM-raad (2001), *Kwaliteit in Ontwikkeling: Interimadvies over de Vijfde Nota Ruimtelijke Ordening*, Advies 026, Den Haag: VROM-raad.

WBCSD, World Business Council for Sustainable Development (2007), *Energy Efficiency in Buildings: Business Realities and Opportunities. Facts and Trends. Summary Report*, Geneva, Washington, DC: WBCSD.

WCED, World Commission on Environment and Development (1987), *Our Common Future*, Oxford: Oxford University Press.

Weaver, R. en B. Rockman (1993), *Do institutions matter: Government capabilities in the United States and abroad*, Washington, DC: The Brookings Institution.

Weimer, D.L. (1995), Institutional Design: Overview, Weimer, D.L. (ed.), *Institutional Design*, Boston/Dordrecht/London: Kluwer Academic Publishers.

Werkgroep MIR (2008), *Protocol toetsen en beoordelen voor de operationele monitoring en toestand- en trendmonitoring toetsjaar 2007*, Arcadis (ref. 110305/OF7/1Q3/000373/MR) & LBOW-wgMIR 200701.

Wildavsky, A.B. (1987), *Speaking truth to power: the Art and Craft of Policy Analysis*, New Brunswick, USA: Transaction Books.

Winch, G.M. (2002), *Managing Construction Projects*, Oxford: Blackwell.

Winsemius, P. (1986), *Gast in Eigen Huis*, Alphen aan den Rijn: Samsom H.D. Tjeenk Willink.

World Watch Institute, (2007), *State of the World 2007: Our Urban Future*, Washington DC: The World Watch Institute.

WRR, Wetenschappelijke Raad voor het Regeringsbeleid (1998), *Ruimtelijke Ontwikkelingspolitiek*, Den Haag: Sdu Uitgevers.

Yiftachel, Oren and Margo Huxley (2000), Debating dominance and relevance: Notes on the "communicative turn" in planning theory, *International Journal of Urban and Regional Research, 24* (4), pp. 907-913.

Yin, R.K. (1994), *Case study research: Design and methods*, Newbury Park: Sage (2nd edition).

Zandee, R. (ed.) (2006), *Bundeling: Een gouden greep? De betekenis van bundeling van verstedelijking en infrastructuur in verleden, heden en toekomst*, Rotterdam: Kennisplatform Verkeer en Vervoer.

Ziman, J. (ed.), (2000), *Technological Innovation as an Evolutionary Process*, Cambridge: Cambridge University Press.

Appendix I Methodology for Chapter 6

Aspects of the policy process analysis presented in Chapter 6 were published in:

- Klijn, E.H., E. Van Bueren and J. Koppenjan (2000), *Spelen met Onzekerheid. Over diffuse besluitvorming in beleidsnetwerken en mogelijkheden voor management*, Delft: Eburon.
- Van Bueren, E.M., E.H. Klijn and J.F.M. Koppenjan (2003), Dealing with wicked problems in networks: Analyzing an environmental debate from a network perspective, *Journal of Public Administration Research and Theory, 13* (2): 193-212.

These people were interviewed for the case study reported in these publications:

- W.F. de Boer, Bouwfonds Woningbouw
- J.H.M. de Bruijn, RIVM
- Ir. J. Coppoolse, Rijkswaterstaat
- Drs. J.W. Dogger, Gezondheidsraad
- Drs. F.O. Dorgeloo, Ministrie van VROM, Milieubeheer
- Drs. ing. P. Fraanje, IVAM/Universiteit van Amsterdam
- Drs. S. Gelinck, SEV
- Ing. F.J. de Groot, VNO-NCW
- Prof. dr. ir. Ch.F. Hendriks †, Delft University of Technology
- T. Lycklama, Stichting Reinwater
- Ir. J.P. Mook, Ministry of Economic Affairs
- H. Overbeek, Provincie Noord-Holland, Afdeling Water en Groen
- H.H. Rombout, Nedzink BV
- Ing. W.J. Schotten, Gemeente Purmerend
- L.A.J.F.M. Smulders, Hoogheemraadschap Amstel, Gooi en Vecht
- Drs. R.J.M. Teunissen, RIZA
- Dr. W.J.M. van Tilborg, Van Tilborg Business Consultancy BV
- Ir. S.M. Toenbreker, ProCap Projectmanagement BV
- Ing. A.H.M. Verheggen, FME/CWM
- Ir. J.J. Vingerling, SBR
- H. Waetersloot, Union Minière, Environment, Health and Safety Department

A draft of Chapter 6 was reviewed by and discussed with:

- Peter Vermij, former RIZA institute now renamed as the Waterdienst of Rijkswaterstaat, the Agency for Waterways and Public Works (October 2008).
- Jules Wilhelmus, Foundation for Sustainable Building Metals (Stichting Duurzaam Bouw Metaal) in the Netherlands (November 2008).
- Dr. Joop Koppenjan, Associate Professor at Delft University of Technology and co-author of the case study research carried out in 1999-2000 (March 2008).

Appendix II Methodology for Chapter 7

For the analysis of the *National Packages for Sustainable Building* use was made of the research conducted for the project 'A Closer Look at the National Packages for Sustainable Building', by DIOC, the Ecological City of Delft University of Technology.

Parts of the findings in this chapter were presented in or discussed at:

- Van Bueren, Ellen, Ellen van Keeken and Kees Canters, *De Nationale Pakketten Nader Bekeken: Duurzaam Bouwen Nu en in de Toekomst*, Delft: DIOC, The Ecological City, 2000. (A Closer Look at the National Packages: Sustainable Building Now and in the Future).
- International Conference Sustainable Building, CIB, Maastricht, the Netherlands, October 22-25, 2000.
- Nationale DuBo Dag (National Day for Sustainable Building), Rotterdam, November 23, 2000.

The 'Packages' research team consisted of:

- Ellen van Bueren
- Kees Canters
- Machiel van Dorst
- Bart te Dorsthorst
- Maaike Kaiser
- Ellen van Keeken
- Hans Pietersen
- Evert de Ruiter
- Robin Seijdel
- Mario Willems

The following persons were interviewed in preparation of the case study analysis:

- Hans Vingerling, SBR, 1999.
- Erik Zinger, Bureau Nieuwe Gracht, editor of the *National Package for Sustainable Urban Planning*, June 2004.
- Sander Gelinck, SEV, programme coordinator, Development and Construction, June 2004.

The following websites proved to be valuable sources of information on the history and development of the *National Packages for Sustainable Building*:

- duurzaambouwen.senternovem.nl
- www.sbr.nl
- www.sev.nl.

A draft of Chapter 7 was reviewed by and discussed with:

- Peter van Oppen, SBR, the Netherlands Foundation for Building Research (August 2008).

- Rogier Goes, managing director of NVTB, the Netherlands Confederation of Producers of Building Materials (August 2008).
- Dick Tommel, state secretary of Housing at the time that the packages were developed and implemented (December 2008).

Appendix III Methodology for Chapter 8

For the analysis of the spatial contour policy process use was made of the *ex ante* evaluation of the contour instrument assigned by the Ministry of Housing, Spatial Planning and the Environment in 1997-1998. At that time, the research findings were published or discussed in:

- De Bruijn, J.A., E.M. van Bueren and E.F. ten Heuvelhof (1998), *Grenzen aan Contouren*, report in assignment of Rijksplanologische Dienst of the Ministry of Housing, Spatial Planning and the Environment, Delft: Delft University of Technology (Bordering Contours).
- Van Bueren, E.M. (1998), *Contouren en Ruimtelijke Kwaliteit, Stedebouw en Ruimtelijke Ordening, 79* (5): 38-43, (Contours and Spatial Quality, Urban Design and Spatial Planning).
- Van Bueren, E.M. (1998), *De contourenbenadering als instrument ter bevordering van ruimtelijke kwaliteit, Planologisch Nieuws, 18* (4): 300-308 (Contours as an instrument to enhance spatial quality, Spatial Planning News).
- Plannen met Water, *Planologische Diskussiebijdragen 1998*, Rotterdam (Planning with Water, Planners Discussion Days 1998).

The research was supervised by:

- Mrs. A.G.M. Bijvoet, Ministry of Housing, Spatial Planning and the Environment, Directorate Implementation and Co-ordination Spatial Policy, Unit Countryside.
- Mrs. D.R. van den Hout Dos Santos Barbosa, Ministry of Housing, Spatial Planning and the Environment, Directorate Implementation and Co-ordination Spatial Policy, Unit Countryside.
- Mrs. E.J.E. Modderman, Ministry of, Housing, Spatial Planning and the Environment, Directorate Spatial Development and Planning, Unit Future Studies and Policy Evaluation.

Members of the advisory commission of the research:

- J.H. Eigeman, Municipality of Culemborg, Alderman Town Development
- W. van den Haak, Green Heart Team
- Dhr. Kamma, Province of Zuid-Holland, Spatial Planning Department
- H. Spoelstra, Province of Noord-Brabant, Department of Space, Economic Affairs and Well-being
- R. Tepe, Inspectorate for Spatial Planning West

Interviews held for the research:

Ministry of Housing, Spatial Planning and the Environment

- Mrs. A.G.M. Bijvoet, State Planning Department RPD, Unit Countryside
- E. Hüner, State Planning Department RPD, Unit Countryside
- R. Tepe, Inspectorate for Spatial Planning West
- T. Dijkstra, Inspectorate for Spatial Planning East
- J. van den Brink, L. Verhees and W. Hoogendoorn, Inspectorate for Spatial Planning South

Provinces

- Province of Zuid-Holland, Space and Green Department, P.P. van der Kooy, W. Blok
- Province of Utrecht, Space and Green Department, Plan Development Unit, Chr.H. Rademaker
- Province of Gelderland, H.Th.G. Geurtz and J.P. Henst (Department of Space, Economic Affairs and Well-being) and G.A.W. Jacobse (Spatial Planning Unit)
- Province of Noord-Brabant, RNV Department, Mrs. M. Greidanus

Municipalities

- Zuid-Holland:
  - Mrs. M.K. de Wit-Roukes, Alphen aan den Rijn, Urban Development Department, Spatial Planning Unit
  - H.J. Beumer, alderman, Leerdam
  - H.J. Lingeman, Liesveld, Department of Spatial Planning
  - H.P. Verweij, Vlist, Department of Housing and Spatial Planning/Legal Affairs
- Utrecht
  - F.J. Vos, alderman, Bunnik
  - J.H. Burger, mayor, Harmelen
  - J.C. van Kats, Land Department, Montfoort
  - G. de Man, Veenendaal, Administrative Department
- Gelderland
  - E. Komdeur, Brummen, Department of Housing, Spatial Planning and Environment
  - F.C. Moree, mayor, Kesteren
  - K.C. Tammes, mayor, Lienden
  - Mrs. A. Koopman, Renkum, Spatial Planning Department
- Noord-Brabant
  - P. van der Made, Zevenbergen, Department of Housing and Spatial Planning
  - A.M.M. van der Kloot, alderman, Zundert

Workshop participants:

- M. Groen, Zuid-Hollandse Milieufederatie (Environmental Federation South-Holland)
- J. Monster, Province of Zuid-Holland, Spatial Planning Department
- M. Viegen, Province of Limburg
- Mrs. M. Greidanus, Province of Noord-Brabant, RNV Department
- Mrs. H. ter Schegget, Rivierenland Inter-municipal Organisation, Spatial Planning Department
- R. Leenders, Municipality of Weesp, Department of Spatial Development and Housing

- A. Oudbier, Region Stedendriehoek (City Triangle) Department of Spatial Planning and Economic Affairs
- A.J. van den Broeken, Municipality of Gouda, Department of Urban Renewal, Housing and Monument Care
- Mrs. J.A. van Douwen, Association of Netherlands Municipalities, RVM Department
- T. van Blokland, Inspectorate for Utrecht Housing
- Mrs. Y. van de End, Ministry of Agriculture, Nature and Fisheries, South-West Directorate
- F. van der Wende, Ministry of Economic Affairs, Department of Environment and Spatial Planning
- P.A. Smaal, Novio Consult (consultant Rivierenland Intermunicipal Organisation)
- I.F. Klok, Municipality of Dordrecht, Department of City Development

A draft of Chapter 8 was reviewed by and discussed with:

- C.J. Vriesman, director Programmabureau Stad-Land in de Randstad/G4P3 (Programme Bureau Town-Countryside in the Randstad), former director-general of Spatial Planning at the Ministry of Housing, Spatial Planning and the Environment (October 2008).
- Rianne Zandee and Douwe Tiemersma, Stichting Natuur en Milieu (The Netherlands Society for Nature and Environment) (October 2008).
- Prof. dr. A.K.F. Faludi, Professor of Spatial Policy Systems, OTB Research Institute for Housing, Urban and Mobility Studies, Delft University of Technology (September 2008).

Appendix IV Greening governance in practice

A serious game for sustainable urban renewal[119]

I Introduction

Greening governance, processes of policy making and decision making, in support of a sustainable built environment can benefit from an evolutionary approach to policy learning, as this book points out. This sounds promising, but how can it be achieved? How can policy makers use the lessons learned on variety, selection and retention to make more sustainable decisions? This appendix provides a practical example of how the lessons can be applied in everyday policy and decision making.

Sustainability goals are often difficult to achieve in projects dealing with the renewal, redevelopment or regeneration of urban areas. Such projects have considerable substantive, political and institutional complexity: They involve numerous actors, ownership of land and real estate is split amongst multiple actors, local government has few opportunities to influence such processes and the interests of present and future residents all have to be considered. Under such circumstances, it is not surprising that sustainability ambitions, if they are formulated at all, do not get realised. Because of the contested character of sustainability and the substantive and political complexity of urban renewal projects, sustainability ambitions often erode during the process; they get paid only lip service, and they are not made tangible at all, or only in an early stage of the decision-making process, leading to premature closure and sub-optimised decisions (Bots *et al.*, 2005).

This appendix shows how lessons on variation, selection and retention in policy processes were applied to design a decision making protocol in support of sustainable urban renewal. The decision-making process was a fictitious one, modelled on the complex reality. In a serious role-playing game, participants were given a decision making structure that challenged them to learn about the substance of urban renewal and the process by which they did this: how could they develop a joint understanding of the problems to be addressed and their potential solutions. The game was played numerous times with students and professionals involved in urban renewal. The experience shows how the lessons of this book can be put into practice to improve decision making. This experience also reveals where the lessons themselves have room for improvement.

Outline

Section II relates how the application of a serious game that simulates collaborative decision making in a networked environment in combination with a decision-support systems (DSS) tool, as a form of substantive modelling, offers a promising way of addressing complexity in sustainable decision making.

119 Substantial parts ot this appendix were published in Mayer *et al.*, 2005: 403-423.

Section III presents the DSS tool MEDIA, and Section IV presents the DUBES simulation game. MEDIA stands for 'modelling environment for design-impact assessment'. DUBES is the Dutch acronym for 'sustainable decision making' (*duurzaam beslissen*). The MEDIA-DUBES combination enables participants to explore the substantive complexity of a real or fictitious sustainable urban renewal project while negotiating with other stakeholders. Section V reports on seven DUBES-MEDIA sessions held with both professionals and students. The section compiles the findings and conclusions on sustainable urban development using the collaborative decision making approach, and includes a discussion of possible improvements in the combination of decision-support with collaborative decision making. Section VI discusses how the lessons learned on variation, selection and retention were used to design both game and DSS, and reflects on how much this evolutionary approach adds value to decision making in support of the 'greening' of governance.

II Supporting sustainable decision making in urban renewal projects

This research identified the following conditions for greening governance processes. Policy processes should stimulate learning (1) about the substance of the issue addressed and (2) about the process in which the issue is addressed. Furthermore, (3) actors should be stimulated to learn about learning, which improves their ability to keep up with the dynamics of the policy problem concerned and prevents them from sticking to solutions that are no longer an appropriate response to the problem. In addition, (4) it is important that lessons are shared amongst actors to be able to lead to conceptual changes. Interactive, collaborative, participatory or process-managerial approaches therefore all (5) aim to bring a variety of actors together, so that they can engage in a joint learning process about a problem of their concern.

The complexity of the urban system, particularly the sustainability of technological and design options, can be addressed by the use of substantive modelling combined with DSS (Hendriks, 2001). A range of DSS such as EcoSim (Fatta *et al.,* 2002), UrbanSim (Waddell *et al.,* 2003), and Sprawl Decisions (O'Looney, 2001) are already being used to support urban planning. Other systems, such as EcoQuantum and GreenCalc, based on Life Cycle Analysis (LCA), are being used to support sustainable building (Van den Dobbelsteen, 2004). However, by themselves, these tools and systems do not accommodate the political dimensions of multi-actor decision-making processes.

For urban renewal processes, in which multiple actors have to negotiate and develop a plan, participatory processes are a commonly tried way of bringing stakeholders and experts together to design a plan that can count on everyone's commitment and support. These processes aim for a high lev-

el of integration of multiple disciplinary insights and stakeholders' perspectives, taking into account the various time and space dimensions of the urban development process (Conte and Monno, 2001). Collaborative or participatory approaches to planning and decision making can deal with stakeholders' different, and perhaps competing, perceptions and are therefore often used to ensure that all perceptions are represented in decision making.

If stakeholders are to realise a sustainable renewal project, the trick is to bring together the rationality of the urban design process (i.e. making design choices for the reorganisation of the urban system) with the political rationality (i.e. acquisition of sufficient political and public support and resources). Sustainable urban renewal should thus be seen as a learning process in which various actors must engage. The various stakeholders should explore the opportunities for sustainable urban renewal in a collaborative design or decision-making process. This, of course, is easier said than done.

Participatory planning processes, such as open forum discussions with residents, easily degenerate into relatively one-sided, superficial venting of wishes and viewpoints, usually at a time when plans have already reached an advanced stage (Mayer, 1997). Without substantive knowledge, participatory decision making is useless, which is one reason why administrators tend to avoid the hassle of these participatory decision-making processes. It also explains why participation often seems an 'obligatory ritual', and why residents are often disappointed because their ideas and demands do not materialise in the final designs. There is also the risk that innovative solutions will dissipate or be compromised in the participatory process, and that experts will be disappointed by the quality and depth of discussions with policy makers and residents.

The research in this book has shown that merely bringing multiple stakeholders and experts together is not in itself a sufficient condition for learning. Other, important factors must be considered: the arenas where issues are addressed strongly influence the variety that is generated and selected during a process; the rules have an impact on the actors and experts' accessibility to the arena; the extent to which processes are open to divergent perceptions; the actors' rules that dominate decision making; and the extent to which actors are willing to learn. Sustainable urban renewal projects seem to need methodologies and tools that – apart from their evident suitability for addressing urban systems – can support the substantive (i.e. content), as well as the multi-actor (i.e. context) dimensions of decision making.

The required methods and approaches should therefore have a number of characteristics (Geurts and Joldersma, 2001):

(a) Integrative: they should consider different aspects and levels of design and decision making in a holistic and systematic way.
(b) Dynamics: they should be able to show the 'performance' of various alternatives in relation to preferences and 'behaviour' of stakeholders.

(c) Interactive: they should be able to support the negotiation process between stakeholders.
(d) Transparent: they should produce results that are clear and understandable to all stakeholders (i.e. they should not be a 'black box').
(e) Flexible and reusable: they should be usable for, or adaptable to, a range of similar situations.
(f) Fast and easy to use: the time required to apply them should be relatively short, and non-experts, for example, residents and politicians, should be able to use them.
(g) Communicative and educational: they should be able to convey meaning and insight to stakeholders about problem structure, alternatives, and different perspectives.
(h) Authoritative: they should meet analytical standards (e.g. validity) and political standards (e.g. safeguarding core values and timeliness) in order to increase the likelihood that the outcomes get used.

In recent years, considerable advances have been made in the fields of participative integrated assessment, participatory policy analysis, and collaborative decision making and design (Alshuwaikhat and Nkwenti, 2002; Geurts and Joldersma, 2001; Mayer, 1997; Rotmans *et al.,* 2000; Schot, 2001; Van Asselt and Rijkens-Klomp, 2002). Integrated assessment (IA), for instance, was initially concerned with interdisciplinary computer modelling, such as system-dynamics modelling of complex environmental problems – in particular, global climate change. More recently IA has become concerned with the process dimensions of decision making and the use of participatory methods, not only for large-scale environmental problems but also for other socio-technological systems such as cities (Ravetz, 2000; Rotmans *et al.,* 2000). A paradigmatic shift toward interactive, participatory, and collaborative methods is also manifest in policy analysis (Geurts and Joldersma, 2001; Mayer, 1997) and systems engineering (Mayer *et al.,* 2004a). Much in line with the arguments detailed above, these fields share a growing interest in methodologies and tools that are able to integrate the substantive and political dimensions of complex multi-actor decision making by combining advanced modelling techniques and DSS with collaborative procedures and process management; or by bringing substantive analyses into participatory decision making approaches (Mayer and De Jong, 2004; Mayer *et al.,* 2004b).

Two methodological developments seem particularly promising for furthering collaborative decision making in urban renewal projects. The first concerns an interactive or collaborative DSS. There is growing awareness that a DSS tool would better fit the characteristics of multi-actor and complex decision making if it was made, for instance, more interactive and flexible. Over the years, the arrival of smaller and faster computer and information and communication (IC) technology has opened new avenues for the use of a

group or collaborative DSS and other information technology-based systems, for example, geographical information systems (GIS) and three-dimensional simulation tools to support urban planning and design with stakeholders and residents (Alshuwaikhat and Nkwenti, 2002; Ceccato and Snickars, 2000; Cecchini, 1999; Coors *et al.,* 1999; Fatta *et al.,* 2002; Han and Peng, 2003; O'Connell and Keller, 2002; O'Looney, 2001). Future challenges in this field relate to the development and testing of appropriate and innovative computer systems, the training of and communication with potential users, but, foremost, the development of collaborative ways of working with stakeholders in a multi-actor decision-making process (Mayer *et al.,* 2004a).

The second promising methodological development is serious gaming; serious, because the subject of learning serves another purpose than merely having fun, although it must be emphasised that serious gaming can also be a fun and pleasant way of learning. The use of simulation games and related techniques, such as policy exercises (Brewer, 1986; Toth, 1995a, 1995b), for urban planning is not a recent development. Simulation games have been widely used in urban planning since the 1950s (Cecchini, 1999; Cecchini and Rizzi, 2001; Duke, 2000; Mayer *et al.,* 2004a; Mayer and Veeneman, 2002; Taylor, 1971; Torres and Macedo, 2000). As has been argued and demonstrated in other publications, simulation games provide a safe environment, based on reality, which allow participants to experiment with decisions and negotiations (Mayer and Veeneman, 2002; see also Duke 1974, 1980, 1998, 2000; Geurts *et al.,* 1998; Shubik, 1975a, 1975b). These experiences provide a better understanding of how complex social-technological systems work and how to make the decisions related to them (Duke, 1998). In simulation games a relatively large group of people (re)enacts a part of reality in order to understand and manage that part of reality better. This (re)enactment is usually formatted and supported by professional game designers and moderators. Games used to support decisions and policy making are usually open source games, in many cases moderately supported by advanced computer technology (Duke, 1998, 2000; Underwood and Duke, 1987). In open source games and policy exercises the participants are or represent real stakeholders and face actual problems, and the outcome or message of the game is not predefined but, rather, discovered during social interactions.

Games and exercises of this type can have three main functions (Mayer and Veeneman, 2002):

(a) Learning: the games are experiential environments in which participants can learn (about) the system at hand.
(b) Research: the games are experimental environments through which researchers can learn about the system from the interactions among the participants and from the interaction between the participants and computer models.
(c) Intervention: the games provide an environment in which both resear-

chers and participants can draw conceptual and instrumental inferences for real decision making and policymaking.

Collaborative decision-support systems, (C)DSS, and gaming-simulation techniques can be used in a combined and complementary manner (Bots *et al.*, 1989; Mayer and De Jong, 2004). Simulation games can create a dynamic, flexible, and political multi-actor setting for exploring, testing, and training in the use of existing or new (C)DSS. This can lead to better (C)DSS tools and procedures that have been validated for use in complex multi-actor contexts. In turn, (C)DSS can provide a number of tools to enrich substantive analyses within the context of a simulation game.

The Sustainable Decision making project at Delft University of Technology developed the DUBES simulation game and the collaborative DSS tool MEDIA in tandem, based on the lessons described in this book. The project created a decision making environment in which people can experience a collaborative approach to help them to deal with the substantive and the political, multi-actor complexity of decision making for urban renewal projects. The DUBES design was aimed at optimising variation and selection. The collaborative MEDIA tool was focused on integrating knowledge from different sources and making it available to decision makers, the participants in the process. The next sections outline MEDIA, the (C)DSS, and the DUBES simulation game.

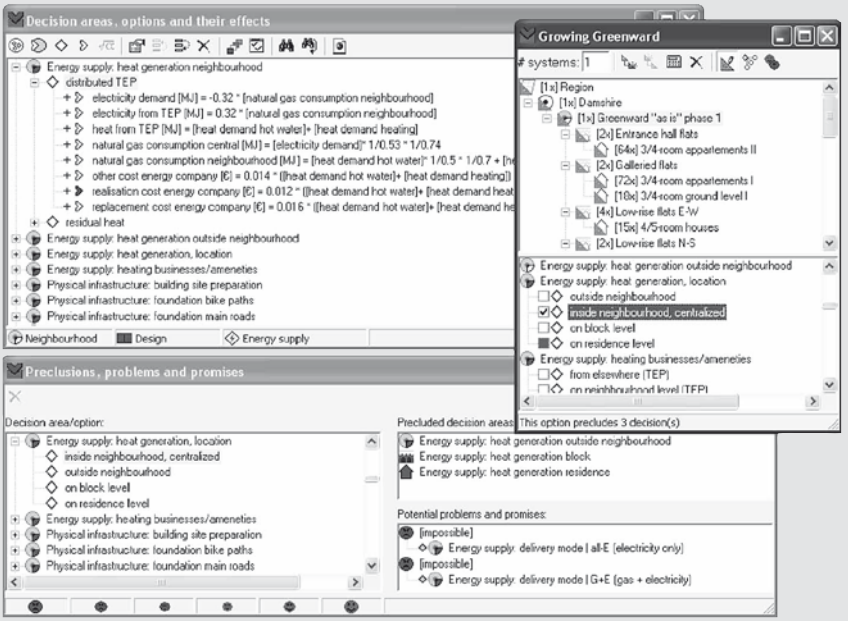
III Modelling environment for design impact assessment (MEDIA)

MEDIA is based on analysis of interconnected decision areas (AIDA), which was developed in the 1970s at the Tavistock Institute of Human Relations (Morgan, 1971). A marked distinction, however, is that MEDIA does not aim to optimise decisions but, rather, to structure and enrich collaboration and interaction. It therefore involves significant adaptations and extensions of AIDA.

As with AIDA, design challenges in MEDIA are described as a set of decision areas, each with two or more alternative decision options. The MEDIA version used in the games reported on in this appendix included some 200 decision areas for urban renewal projects, which were identified and validated through case studies and expert meetings. Debriefings with gaming session participants were used continuously to improve the set of decision areas. With certain limitations, new decision areas and options can be inserted relatively easily while working with MEDIA in collaborative sessions.

Figure A4.1 shows the windows for manipulating the decision areas, options, and effects. Decision areas are grouped according to spatial level: region, city, quarter, block, building, and room. They are also grouped by decision-process stage (e.g. design, construction, maintenance, and demolition) and by theme

Figure A4.1 Main windows of MEDIA



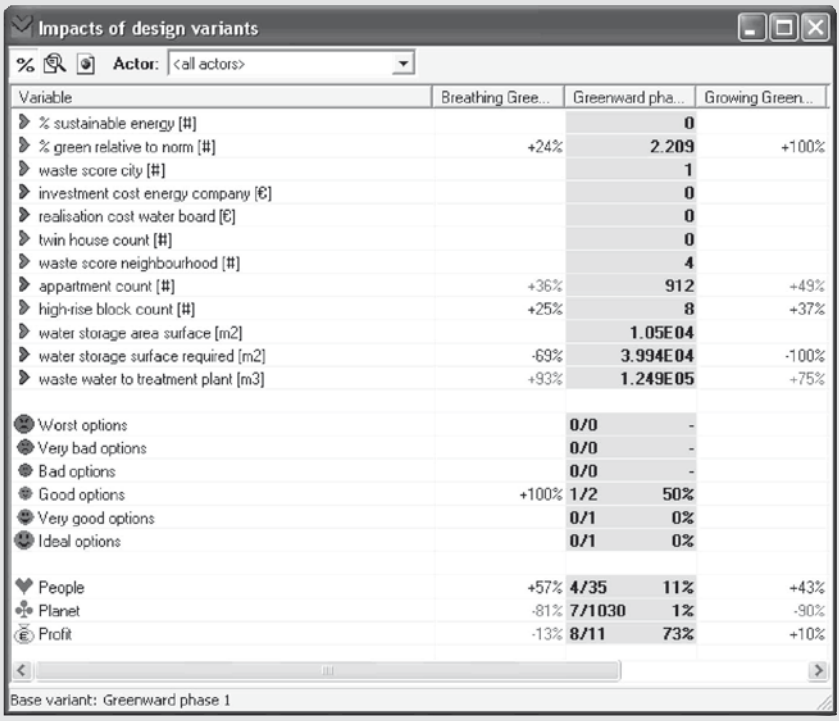
Source: Bots *et al.*, 2005

(e.g. water, energy, mobility and safety). The three ways of grouping decision areas are independent of one another; each may be applied separately or in combination whenever this is opportune in the process. Users can selectively reduce the design complexity by focusing on decisions related to a single spatial level, a single process stage, and/or a single theme; they can also experiment with different options in the focal decision areas and analyse the consequences of partial changes to the design.

Each decision option can have an impact on several variables. These variables typically model primitive attributes of a particular subsystem (e.g. a building) to which the decision pertains. For example, the choice of insulation material will affect the energy required for heating the building, as well as the construction cost. Variables can model system performance at a high level of abstraction by aggregating the values of a range of primitive attributes into a single indicator. For example, the energy efficiency of a block can be computed as the ratio of the total energy consumption to the total usable floor space for that block. The present version of MEDIA embodies a variety of knowledge from different disciplines and can calculate the (cumulative) effect of decision options for some 200 impact variables. If quantitative effects are difficult to assess, MEDIA allows users to define symbolic qualifiers (people, planet, and profit) which can be attributed to certain options by the stakeholders themselves during their discussions.

Decision areas are 'interconnected' when the effects of certain combinations of options interact. Relations between decision areas and options can be defined in the preclusions, problems and promises window (bottom-left in Figure A4.1). Whereas AIDA recognises only one type of interconnection, the exclusion relation used to specify impossible combinations, MEDIA provides a

Figure A4.2 Comparing alternative designs in MEDIA



Source: Bots *et al.*, 2005

wider range. First, decision options can, when chosen, preclude certain decision areas altogether. For example, if one chooses a central heating system for a neighbourhood, decision areas related to the heating of blocks and residences within that neighbourhood become irrelevant. Second, the strict exclusion relation of AIDA is softened to allow specification of both positive and negative relations. Combinations can be labelled (on a seven-point scale) a promise if the interaction effects are beneficial and a problem if they are detrimental. In our example, the central-heating option is problematic if the energy infrastructure for the neighbourhood can transport only electricity and/or natural gas.

In the design window (upper-right window in Figure A4.1), users can specify alternative designs by adding or removing components at different spatial levels and by checking different decision options for each spatial level. MEDIA provides immediate feedback on the compatibility of the chosen options, based on the relations specified by using the preclusions, problems and promises window. MEDIA gives warnings, but does not prevent users from making apparently unrealistic combinations. The idea is that where there's a will, there's a way: design problems may be overcome by creative design and engineering.

Regardless of whether a design is deemed feasible, MEDIA can compute its effect on the values of the defined variables. Because not all of these variables are of interest at all times in the policy process, MEDIA allows users to select

criteria from the list of variables. These criteria are then used to generate customised overviews, similar to that shown in Figure A4.2, which facilitate comparison of alternative designs.

To evaluate a design, the expressions are interpreted in a manner similar to spreadsheets, such as Microsoft Excel. By default, effects on variables are cumulative and aggregated in accordance with the spatial hierarchy. For example, the numeric value of the expression defined for the variable 'energy consumption' at the building level is added to the numeric values of expressions defined for 'energy consumption' for other decision options at the building level. MEDIA uses the resulting sum to compute the energy consumption for the next higher spatial level (block) of which the building is a part. If users have specified that this block consists of ten type A buildings and twenty type B buildings, with different decision options for these two building types, MEDIA calculates the energy consumption for the block by adding 10 times the total value for A plus 20 times the total value for B to the sum of the impacts on energy consumption (if any) of decisions made at the block level.

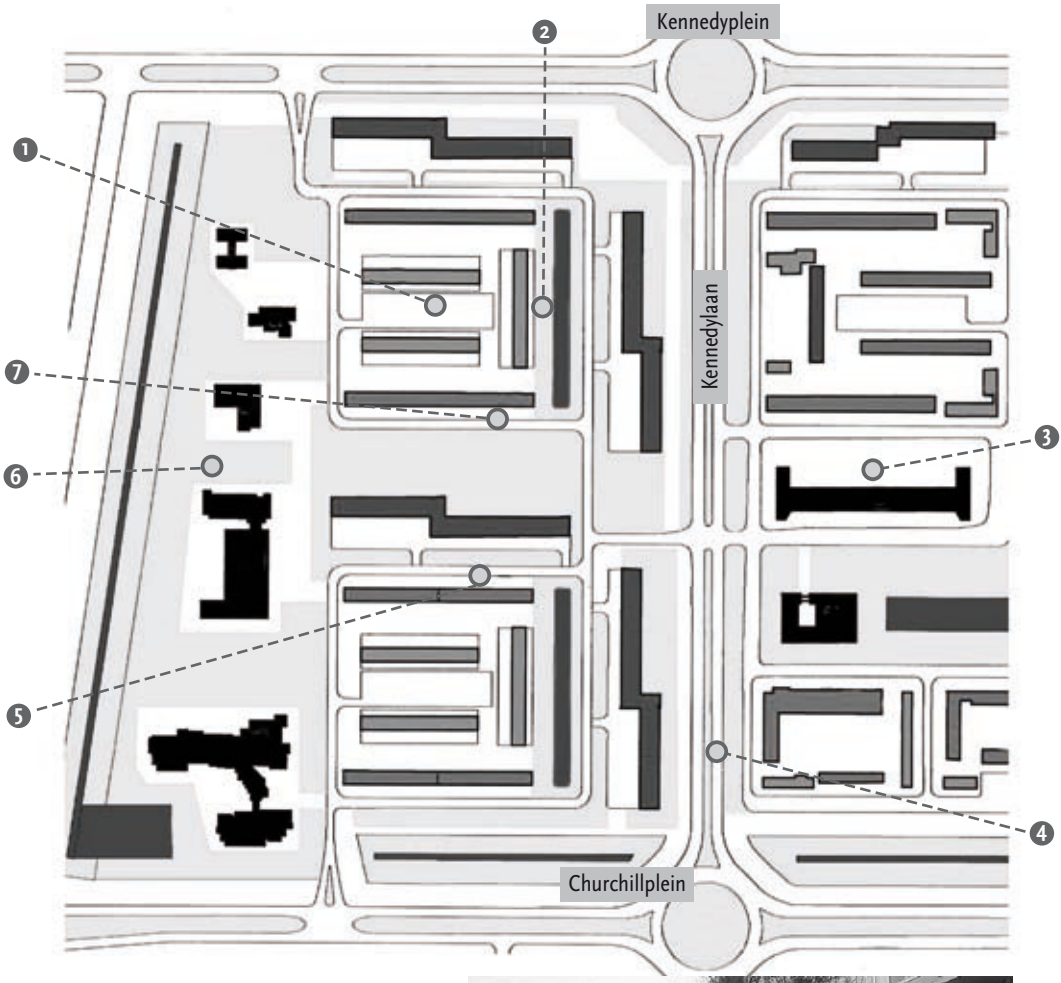
The impact-assessment window in Figure A4.2 also shows the design impacts in terms of the three qualifiers: people (♥), planet (♣), and profit (⍟). MEDIA computes performance scores for each qualifier by aggregating qualifications over different spatial levels and then scaling to the maximum score that could have been obtained for this qualifier if all the appropriate options had been chosen.

IV The DUBES game

While MEDIA was in development, a game was designed which simulated a decision-making process and used MEDIA to support the decision making in the game. The game thus allowed users to become familiar with MEDIA and collaborative DSS supported decision making. Gaming sessions also allowed the DSS designers to validate and develop their system further and explore and test the collaborative procedures. In sum, the game was developed for five reasons:

(1) to communicate the complexity of sustainable urban renewal projects;
(2) to generate and share useful ideas on real sustainable urban renewal projects;
(3) to test prototypes of MEDIA through user interaction and develop new, extended and improved, versions of it;
(4) to develop and test collaborative procedures for working with MEDIA in real-life situations;
(5) to demonstrate to potential clients that MEDIA works and to train them how to work with it.

Figure A4.3 Impression of the map and the problems of the Greenward neighbourhood



7: Apartment blocks

1: Low-rise building

2: High-rise building

3: Shops and apartments

4: Kennedylaan

5: Public space

6: School

Source: Bots *et al.*, 2005

The DUBES role-playing game revolves around the renewal of an existing or fictional post-1945 residential neighbourhood. Stakeholders are requested to draw up a programme of requirements, the main plan, for the sustainable urban renewal of a neighbourhood. Stakeholder negotiations are facilitated by game participants designated as process managers and supported by the MEDIA tool. The DUBES game can create a simulated fictional neighbourhood or reflect a real renewal project. The method and the tool, however, are generic, so in principle the same tool and simulation game can be adapted for other sustainable design projects, such as a new construction project or the development of a sustainable business park. By playing the simulation with a fictional renewal case, participants can experiment on DUBES without involving direct interests. Used in this way, it is primarily an instructive means of exercising and training urban renewal managers in the DUBES method and the concrete results are open-ended. When the simulation game is used for the further development of a real renewal project, the participants gain useful ideas and results relevant to their real programme of requirements. It is important to realise that the DUBES simulation delivers ideas and information for making decisions, but real decisions can never be made in the DUBES game. The following describes the game play for the fictional neighbourhood of Greenward in the municipality of Damshire.

Greenward is a residential neighbourhood in a medium-sized Dutch town typical of those constructed in the 1960s and 1970s, when there was a great need for housing. The plan was influenced by the CIAM (*Congrès International d'Architecture Moderne*) principles fashionable in those days. CIAM was a movement in architecture that promoted separation of functions, leading to housing being concentrated in blocks of residential flats surrounded by green spaces for recreation and nature. Figure A4.3 gives an impression of the neighbourhood and its problems. The neighbourhood has lots of multi-storey subsidised housing, interspersed with smaller blocks of terraced houses, concentrated shopping areas, and schools. As with so many neighbourhoods of this kind, Greenward faces such problems as vacant houses, alienation, poor maintenance, loitering teenagers, and vandalism. It is in urgent need of improvement. Because there is a good chance of getting financial support from the national government, the participants are asked to produce, in one day, a programme of requirements for the renewal of Greenward. The municipality of Damshire and the Our House housing association, which owns more than half of the real estate in Greenward, have decided to involve the principally interested parties in drawing up the programme of requirements. There is an important condition attached to eligibility for financing: plans must make a clear contribution to the sustainability of Greenward.

In preparation for the day, the participants receive the DUBES game documentation which includes the Greenward neighbourhood scenario. This describes the urban planning history and characteristics of both Damshire

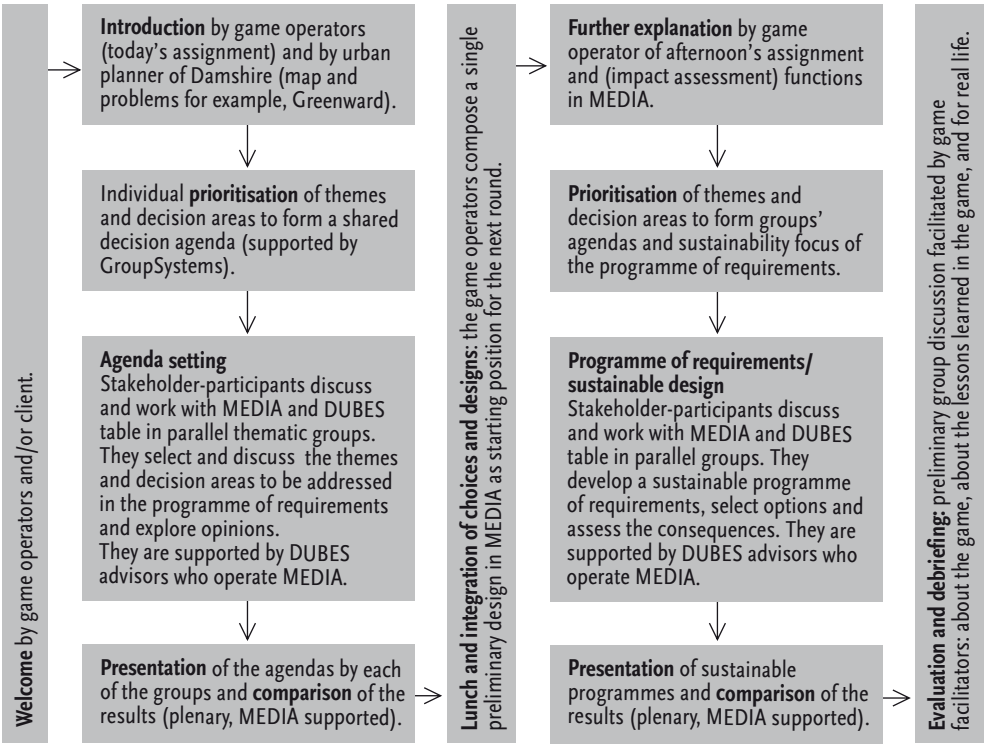
and Greenward, including housing stock and demographics and the neighbourhood's problems with respect to housing, public space, water, energy, safety, and traffic and transport. The scenario also provides details of a previous renewal plan, which was rejected, as well as a scale model of the neighbourhood. The DUBES game documentation contains an overview of the roles, and the tasks and competencies associated with each role. Prior to the game, each participant is given a role, such as councillor; project leader of the municipal building department; resident representative; environmentalist; director of the energy company; director of the housing association; director of the welfare foundation; and project manager of the municipal water, energy, and environment services. In each game the roles defined depend on the case and the participants. Key in the definition of roles is to ensure representation of a diversity of stakeholders and interests, including those involved only in later stages of the lifecycle of the neighbourhood (for example, at the stage of use, management, and maintenance), but whose interests may be affected by decisions made in planning the neighbourhood renewal.

Each simulation game involves between twenty and forty people. Depending on the number of participants, two to three individuals may perform the same role. Differences in role perceptions between players allocated the same role do not present a problem, as such differences are also present in the real world. In addition to their role descriptions, the participants are asked to apply their own knowledge and experience when playing the simulation game. When the game is played with professionals, they can play either their own role or the role of another stakeholder, depending on the specific lessons they want to learn from the game.

As noted above, the game is played out in one day. In the morning session, the players explore the opportunities for sustainable urban renewal in Greenward as well as their own preferences and priorities. By morning's end there is an agenda for decision making, an overview of the themes, and a list of decision areas that should be included, without specifying these topics in decisions at this point. This specification is done in the afternoon session, during which the players define the programme of requirements for the sustainable urban renewal. Figure A4.4 presents an overview of the structure and programme of the game.

At the start of the game, the participants individually and anonymously prioritise all the decision areas in MEDIA, based on how important they personally think a theme or decision area is for the programme of requirements. A mobile version of GroupSystems (an electronic meeting system: see http://www.groupsystems.com) is used for this and makes the results of votes immediately available to participants. On the basis of the prioritised results, the participants split into a number of parallel working groups, arranging and managing this process for themselves. Game operators only facilitate the

Figure A4.4 Structure and programme of the DUBES game



Source: Mayer *et al.* 2005

game: they do not exert any influence over what is to be discussed and with whom. The various groups approach the work from different angles, such as public space, housing, and welfare, to explore the themes and decision areas and decide which must be included in the programme of requirements. As they do this, they can refer to MEDIA and MEDIA advisors for guidance. They can also make use of the DUBES table, a poster that contains a systematic overview of all case-relevant decision fields and options in MEDIA. As an aid to structuring the report of the discussion, each group gets a blank DUBES table, which contains the format but not the content.

Process managers guide the discussions and negotiations in the working groups. Process managers have been instructed by the game leaders prior to the simulation on the best way of chairing and guiding processes in the working groups and planning workshops. The DUBES advisors support the process managers and the working groups. These advisors have usually been trained previously to assist and advise the working groups and know how to record their results in the MEDIA computer programme. Session 1 (morning) ends with each group presenting their agenda for the Greenward renewal programme, including themes and decision areas that need to be addressed in the programme. During the lunch break, the game operates collate the various MEDIA choices into one MEDIA design. Hence, each group starts the sec-

ond session with the same agenda for decision making, although the priorities and decisions may be different for each group.

In session 2 (afternoon), the participants are asked to work out strategies for the programme of requirements in a number of planning workshops oriented toward different aspects of sustainability, such as the environment, quality of life, and feasibility. The participants are asked to reason out their choices by devoting attention to the various effects of options, such as on sustainability, and interrelations with other decisions, such as those relating to other themes and at other scale levels. The chosen options are marked in the table and registered in the MEDIA computer programme, which provides additional information on, for example, the consequences of decisions, effects, and consistency.

At the end of the day, the analysis and comparison of MEDIA results clearly show the points on which the participants agree and those on which they have differences of opinion. On some points, the participants will have to conclude that further research is necessary in order to arrive at the best choice. The MEDIA results, together with the arguments made for the choices during the group discussions and evaluations, form the basis of a sustainable programme of requirements for the neighbourhood.

V Findings and insights

The DUBES game was played by university students and professionals between 2001 and 2006. Data on sessions played between 2001 and 2004 allow for comparative analysis between games and evaluation of the approach. The available data derives from the following:

(a) The game was used for the renewal of Emmerhout-Noord neighbourhood, situated in Emmen in the north-east of the Netherlands, in cooperation with the project bureau 'Emmen Revisited' (a joint venture between the Dutch municipality Emmen and *Stichting Wooncom* housing association).

(b) The simulation was played with the fictional Greenward neighbourhood by employees of the municipality of Alphen aan den Rijn (situated in the mid-west of the Netherlands) and the local *WonenCentraal* housing association. The results were applied in formulating the assignment to the Neighbourhood Development Company, a public-private partnership that was going to be established.

(c) Four game sessions were held with mixed groups of master's degree students from three Delft University of Technology faculties: Civil Engineering; Architecture; and Technology, Policy and Management. The simulation challenged the students to solve problems collectively, enabling them to experience the complexity of interdisciplinary cooperation and familiarising them with collaborative modelling procedures and tools. It also gave

Table A4.1 Overview of the sessions 2001-2003

Game	Emmen	Alphen a/d Rijn	University	Various professional organisations
Number of sessions	1	1	4	1
Number of participants	28	35	140	25
Case	Real: Emmerhout	Fictitious: Greenward	Fictitious: Greenward	Fictitious: Greenward
MEDIA	Prototype 1: group discussion, no impact assessments	Prototype 1: group discussion, no impact assessments	Prototype 2: group discussion, impact assessments	Prototype 2: group discussion, impact assessments
Objective	Testing prototype and real decision support	Teaching and training; improving communication between two organisations; testing prototype	Teaching and training students in inter-disciplinary cooperation and urban renewal; testing prototype	Teaching and training professionals in the use of MEDIA and DUBES; testing prototype; exploring options to use it for real life decision support
Evaluation	Observation; debriefing discussion; evaluation; questionnaire	Observation; debriefing discussion; evaluation; questionnaire	Observation; debriefing discussion; interim measurements	Observation; debriefing discussion; interim measurements
Main findings				
Strengths	Fast, easy, pleasant to use; good overview of issues and decisions; useful ideas for renewal plan; interdisciplinary communication	Pleasant and fast way of working; good overview of issues and decisions	Students had problems with interdisciplinary cooperation and management; MEDIA tool proved fast and easy to use; enhanced quality of discussion; sped up process	Fast and useful collaborative tool and procedure; also useful for related issues such as public management of urban areas
Weaknesses	Impact-assessment functions of MEDIA need to be improved and extended	Impact-assessment functions of MEDIA needed to be improved and extended	Too rigid; reduces creativity and general visions; stakeholder management needs to be improved	Need to address validity questions regarding the impact assessment; interface needs to be improved

Source: Mayer *et al.* 2005: 415

the developers an opportunity to test the MEDIA 2.0 version possessing fully operational impact-assessment functions.

(d) A session was held with some twenty-five professionals from five municipalities and three research institutes involved in sustainable urban renewal, to explore and get acquainted with the potentials of the DUBES-MEDIA approach for sustainable urban renewal.

All seven of the sessions listed above were evaluated through observations, interim group discussions and measurements, debriefings at the end of the game, and evaluation questionnaires. Table A4.1 provides a summary of the analysed sessions. The results and experiences of the participants, based on their verbal and written evaluations, are discussed further below.

In the period 2004-2006 the game was played several times a year with Delft University of Technology university students and once with the polytech-

nic students from *Hogeschool Utrecht*. Professionals played the game another nine times. Some games aimed to contribute to real-life decision-making processes, such as for the development of *De Binckhorst* business park in The Hague and the redevelopment of a quarter in the municipality of Hellevoetsluis. Other sessions, such as the one for the Rotterdam Region, were aimed at training professionals in urban planning and urban renewal, including civil servants from national and local authorities and consultants. About fifteen demonstration sessions were also held in this period, short sessions in which participants could briefly experience what DUBES and MEDIA had to offer.

General findings

The experiences with DUBES show that combining substantive modelling with participatory decision making is a promising approach for dealing with problems characterised by substantive and political complexities. The major findings and insights gained from the seven game sessions show that the DUBES approach:

(1) offers a satisfactory way of working;
(2) creates an overview of interests and opinions;
(3) provides a clearer picture of sustainability;
(4) generates cross-disciplinary discussions;
(5) generates useful outcomes; and
(6) could make better use of the potentials of MEDIA.

These findings are elaborated upon below.

Offers a satisfactory way of working

In all seven sessions the participants were generally satisfied with the way of working in the simulation game. The professionals from the two municipalities of Emmen and Alphen (see Table A4.1) felt that the game was a good and enjoyable way of thinking about the sustainable renewal of their residential neighbourhoods with a large number of parties.

The Emmen session proved that ordinary citizens could participate and contribute just as well as local administrators and disciplinary experts. Participants indicated this in comments on the evaluation questionnaire, and in debriefings from the first two sessions:

> "It is a pleasant way of establishing objectives quickly."
> "This is a good way to form an idea, in a short time, of the problems involved and the matters you want to resolve."

Creates an overview of interests and opinions

Various interests and opinions were represented at each of the sessions. In the municipality of Emmen, people played themselves, in their own professional role. In the other sessions, participants were allotted a role within the

Table A4.2 Results of evaluations (n=20) by various professional organisations showing mean score (scaled 1-10) and standard deviation

Evaluation of simulation game by participants	Evaluation (n=20)	SD
The DUBES game is a good way to connect substantive aspects to the decision-making process	7.75	1.18
The function of MEDIA in urban (re)development projects is clear	7.59	1.00
It is easy to express opinions in the planning workshop sessions	7.53	0.72
MEDIA contributes to the quality of the programme of requirements	7.35	1.22
The DUBES game is a good way to implement participation of residents	7.31	1.49
MEDIA played a clear role in discussions	7.12	1.36
The DUBES approach leads to shorter realisation times for projects and greater public support	7.06	1.39
MEDIA makes a positive contribution to the quality of group discussions	7.06	1.25
MEDIA gives good insight into the impacts and performance of decisions	6.82	1.33
Decisions made during the group discussions can easily be inserted in MEDIA	6.18	1.55

game. In both cases, the result was a pluriformity of interests, perspectives, and opinions. In the cases of Emmen and Alphen, for instance, participants were surprised by the many different ways the problems could be viewed:

"As a citizen/resident, you don't realise how many areas decisions have to be made in."
"It was good to hear the opinions of the experts who were present."
"It helps to map out in a structured way the themes and decision areas that the involved parties find important."

Provides a clearer picture of sustainability
In the written evaluations of the sessions held with professionals, about two thirds of the participants indicated that they had gained a clearer picture of what sustainability can mean in practice and the decisions that need to be made in the renewal of a residential neighbourhood such as Greenward, and of the various options for neighbourhood renewal. Table A4.2 is an overview of the professionals' evaluation of the DUBES approach, the game, and MEDIA.

Generates cross-disciplinary discussions
The participants indicated that the method is suitable for developing a good overview of the problems involved in a renewal project and for gaining new insights from different disciplines:

"It may sound like an open door, but sustainability encompasses far more than your own frame of reference."
"This offers you the opportunity to get to know other disciplines in your own field of work."

Even more than the substantive results, the professionals assessed the interactive aspect of the simulation game positively:

"It is good to do this with all the different disciplines. It continues to be instructive."
"We looked at matters that I would not have looked at otherwise, always from different perspectives."

The students were less definite in their opinions about the use of the MEDIA tool and the game. This may be because the game was used to let them experience the complexity of sustainable urban renewal projects. Moreover, it was the first time they had had to cooperate with students from other scientific disciplines. Evaluation findings of the sessions with students showed that they generally found it educational to work together, but that it was sometimes difficult to comprehend each other. Students in Civil Engineering and Architecture had far more knowledge of technical issues, such as the use of grey water or photovoltaic cells, which they could explain to their fellow students from other disciplines, whereas the students from Technology, Policy and Management had a better perspective on the process and political dimensions. At times the two worlds collided, just as in reality. During the final evaluation an extensive debriefing on this phenomenon was needed in order to channel some of the frustration and point out to students that they will have to learn to manage this aspect of the game in their future careers as well.

Generates useful outcomes

Despite the rather advanced stage of their renewal plans, the simulation produced some useful ideas for Emmerhout-Noord. In particular, the municipal's spatial planning and housing service, the Emmen Revisited project bureau, and the *Stichting Wooncom* housing association derived useful ideas on the themes of water and mobility during the simulation. These included some practical and simple ideas, such as placing rain barrels next to houses, and more all-embracing ideas, such as recognition factors in the neighbourhood infrastructure and the choice of slow-moving traffic as the main form of traffic through the neighbourhood. These ideas were later worked out in detail and included in the renewal plans. Participants in the Emmen simulation indicated, moreover, that some ideas derived from the simulation proved useful for other neighbourhoods under restructuring for which decision making was not at such an advanced stage. They felt it was a pity that the method had not been used at an earlier stage for Emmerhout-Noord.

Unlike in Emmen, the sessions with the municipality of Alphen and with the mixed group of professionals were not aimed at generating ideas immediately applicable to an existing renewal project. The learning experiences with respect to sustainability therefore lie at another level of abstraction: the development of various visions of sustainability. Participants in Alphen, for instance, were surprised by the amount of attention the simulation game devoted to social aspects of sustainability and safety, as these had not been major considerations for them before. Moreover, experiences with the game contributed to the municipality's decision to implement an adapted version of MEDIA and the DUBES game in the course of 2004 for participatory neighbourhood management.

In the session with multiple professionals, several project leaders trained

them in the DUBES approach to urban renewal, with the intention that they could communicate the general idea of the approach to their staff (see also Table A4.2).

Could make better use of the potentials of MEDIA
The observations and debriefings of professionals in Emmen and Alphen made it clear that the impact-assessment function of MEDIA 1.0 was crucial and needed further development. The professionals rightly commented that, in particular, the sustainability and economic-impact assessment of options and choices was underdeveloped in the first prototype of MEDIA. They offered many suggestions on how to make the tool more useful for real decision support. These suggestions were used to develop MEDIA 2.0, which was tested with university students and professionals about a year later. These sessions showed that with the support of the DUBES advisors design choices could easily be inserted into MEDIA 2.0 and that impact assessment improved the final quality of the programme of requirements. MEDIA showed no bugs or errors and greatly contributed to the collaborative process. During the evaluation discussion, participants observed that they would not have been able to reach this level of detail and overview without the use of MEDIA and the DUBES working procedure. Students from the Civil Engineering and Architecture faculties, however, were markedly more sceptical about MEDIA 2.0 and pointed out that design tools they were already familiar with offered a greater and more reliable level of detail. These and other observations led to interesting discussions with and among students about the strengths and limitations of different types of support tools and the way they should be embedded in decision making.

Challenges
Promising findings and insights resulted from the seven MEDIA-DUBES sessions, and these were also confirmed in the games played in the period 2004-2006. In particular, participants learned about the political and substantive complexity of decision making on sustainable urban renewal. However, participants also indicated some room for improvement. The weaknesses of the approach are seen in how difficult it is to combine design rationality with political rationality. Table A4.3 shows the requirements for methods and approaches that combine the two rationalities (summarised in section II of this appendix) and describes the potential of DUBES to meet these requirements.

Although the results are promising, the DUBES approach needs further improvement to meet its full potential. There are several weaknesses and challenges that need to be addressed in the future.

A first weakness is the dependence of the participants on the DUBES advisors. These are experts in sustainable building who are familiar with the contents of MEDIA and with the underlying methods and indicators. The role of

Table A4.3 Overview of findings

Requirements of DUBES	Potential of DUBES to meet methodological requirements for combining design and political rationalities
Integrative	MEDIA integrates various design levels, time equals more or less space dimensions, and substantive aspects of decision making in a holistic and systemic way. DUBES communicates the (political) complexity of urban renewal and seeks solutions for it. MEDIA and DUBES complement and reinforce each other.
Dynamic	MEDIA is able to calculate the future performance of alternative decisions (the 'what if ?' question). The simulation game relates these decisions and outcomes to the preferences of stakeholders. Stakeholders can select and negotiate the indicators they consider important.
Interactive	MEDIA is embedded in the DUBES simulation game, which makes it interactive and collaborative. MEDIA is used to structure and enrich stakeholder discussions, but also provides a reality check for these discussions and negotiations.
Transparent	Participants indicate that MEDIA with the support of DUBES advisors is clear and understandable. MEDIA does not limit or take away the right of stakeholders to question the outcomes; but if this is the case, stakeholders should examine why they have doubts and put the issue on a common agenda for further exploration.
Flexible and reusable	Both MEDIA and DUBES are methodological frameworks that can be (re)loaded for different cases. The concepts underlying MEDIA are generic and can be used for a range of applications. The simulation game can be adapted to real or fictitious situations and a variety of objectives. However, the effort required to fill a MEDIA database, or adapt the game, is considerable and therefore worthwhile only if it is subsequently to be used in a series of sessions.
Fast and easy	Experiences show that (non)experts and residents can participate in the game and are able to understand and use MEDIA fully when supported by experienced DUBES advisors. The use of MEDIA in a collaborative setting generates information and ideas for real projects. In about one day, the approach generates a wealth of useful information and analyses. However, the software interface needs to be improved to make it even more accessible to users.
Communicative and educational	In the context of the game, MEDIA clarifies the problem structure and assists stakeholders in finding solutions. The simulation game is designed to enhance communication between participants with different perspectives, levels of knowledge, and forms of expertise. MEDIA structures and enriches the discussions between stakeholders. Participants indicate that the approach is instructive.
Authoritative	MEDIA is based on established and validated methods (e.g. LCA) and models (e.g. EcoQuantum). An introduction to MEDIA, and help of the DUBES advisors during the game, ensure that MEDIA is no `black box' that participants can challenge outcomes and should agree on further exploration of crucial issues by other methods. Within the simulation game, political standards are incorporated in the programme of requirements through the formulation of ambitions, goals and conditions of the stakeholders.

Source: Mayer *et al.*, 2005: 419

these advisors should be reduced for two reasons. First is that the presence of experts makes participants less inclined to express their own opinions; they might feel less responsible for and committed to the decision-making process and to the results of the game. There is also a chance that the DUBES advisors will do the work for the participants, that they, unintentionally will influence the participants' contributions and that the game will therefore evolve into an instruction or training session instead of role play. A second reason to reduce the advisors' role is more practical: it is hard to find skilled DUBES advisors willing to operate MEDIA during the various sessions, and it is costly to have so many experts involved in a game.

A second weakness lies in the role play. When played with professionals the existing role play suffices, but when played with students, the role play needs to be deepened. Students need more guidance in playing their roles as many of them are unfamiliar with the role allotted to them and with the roles played by their fellow students. As a result, students often play the roles as flat characters, with the priorities set and decisions made based on somewhat naive assumptions of actors' preferences and behaviour.

A third weakness is the absence of a geographical interface in MEDIA. A challenge would be to prepare a GIS-based interface to MEDIA, to visualise the physical impact of decisions. Such an interface was not feasible when MEDIA was developed in the early 2000s. Recently, however, there have been considerable developments in visualisation methods and tools, often developed for such games as SimCity (e.g. Mayer *et al.,* 2007), which can be used to support MEDIA. The role of DUBES advisors may become more accepted if they can show participants a physical map or plan that gives an impression of what the renewed urban area will look like, and how this corresponds to constraints for the redesign of the area, such as those resulting from environmental zoning and conditions for water retention capacity. The visualisation may also enhance the communication of the information and knowledge embedded in MEDIA, now presented in screens full of rows, columns, variables, figures and pictograms. Visualisation may reduce the mystification ('black box') factor in MEDIA and thus contribute to the acceptance of the knowledge and information it provides.

VI How the evolutionary approach influenced the game design

This section explains how the lessons learned on greening governance were used in the design of the DUBES game and the DSS MEDIA. First of all, DUBES and MEDIA combined managerial knowledge with substantive knowledge of the urban system by creating a collaborative environment in which stakeholders could jointly explore the opportunities for sustainable urban renewal. In this way, DUBES and MEDIA contributed to a joint learning process about sustainable urban renewal. Secondly, any bias in the variety generated and selected was reduced by specifying a variety of roles in the game, which implied that all interests were represented in the debate, by including in MEDIA multiple entries and all sorts of decisions and their direct and indirect effects, and by uncoupling the generation of variety from selection. The game began with an anonymous priority setting of stressful problems, which improved the chance that participants would give their opinion without being influenced by rules and group processes. Thirdly, although how long this effect lasted has not been measured, game sessions seem to have contributed to a growing awareness of the substantive and multi-actor complexity of

the problem, and an understanding of how such complex problems can be addressed. In this way, the game contributed to the meta-learning skills of participants. Because participants experienced the approach themselves during an intense day of work, this effect is likely to continue longer than when learned in a traditional way.

These follow section elaborates on these points in more detail with a discussion of how the variety and selection applied in DUBES and MEDIA contributed to different forms of learning and to the retention of that learning.

Substantive learning

To improve the learning effect of the MEDIA decision-support system data were structured in various ways, by spatial scale, by stage in the design process, and by theme. All actors could approach the information in MEDIA in a way that suited their interests and knowledge. The evaluations of the games played show that game participants had learned about many dimensions of urban renewal. In the morning session , this was achieved by giving the participants the DUBES table, with all the different topics, themes and scales. Actors discovered the complexity of urban renewal, the connectivity between the design choices and decisions that had to be made, and the many disciplines involved. The DUBES table offered them the opportunity to develop an overview of all the topics, structured in themes and divided in decision areas that they could decide upon. In the games played with professionals and residents, both groups stated that they appreciated the overview, because they were unfamiliar with certain themes or decision areas or they became aware of their own focus on certain themes, which could lead to bias in decisions, of which they otherwise might not have been aware.

In the second, afternoon session of the game, participants learnt in more detail about the various options they could choose from. The set-up in MEDIA, in themes and decision areas with the various decision options identified, stimulated participants to identify problems before establishing a preference for a particular solution. MEDIA also taught participants about the relationships between various options, identifying preclusions and exclusions and the direct and indirect effects of options and combinations of options for the designs. During the development phase of the MEDIA model, its design and content had been improved following in-depth discussions with experts from various disciplinary backgrounds.

Despite the room for potential improvement in MEDIA, also discussed in section V of this appendix, the professional participants of game sessions emphasised the need for models such as MEDIA and acknowledged how decision making for urban renewal could benefit from these models. MEDIA brings together knowledge and insights from multiple disciplines. Because this model does not generate one outcome according to a particular method, but shows the various options and their consequences that actors can choose

from, MEDIA contributed to the participants' understanding that knowledge used for sustainable urban renewal is negotiable. Also, by showing preclusions and exclusions, MEDIA uncovered routes that could optimise the sustainability of the neighbourhood and identified an agenda for innovation to resolve conflicting options.

Social learning

To ensure the participation of a variety of actors, the game identified a number of roles and included several mechanisms that enhanced the ability of actors to express their perceptions.

First, the game was played in small and varied groups. This allowed actors to get to know each other. In the game played with actors from Alphen aan den Rijn, for example, this 'getting to know each other' was an important subgoal of the game. The setting enhanced this by providing ample time for discussion and exchange of viewpoints.

Second, the game was moderated by an external actor, which prevented that risk that the rules and perceptions of one or a few actors would dominate the decision making. The process managers in the game were instructed to be aware of this pitfall and stimulate open discussion amongst all participants in their group. In the Alphen case, the game was played on neutral territory, at Delft University of Technology, to prevent the impression that the game might be an attempt to meet the (hidden) agenda of one of the actors participating. They chose to play with the fictitious neighbourhood to prevent any obstruction to the learning process on sustainable urban renewal by the issues ruling the relationships between participating actors at the time of the game.

Third, the game began with participants individually and anonymously setting their own priorities from a list of themes and decision areas. This was facilitated by GroupSystems software that based on the individual input generated a shared list of priorities to be addressed in the game. In the Emmen case, this technique led to a useful surprise: residents showed a concern for moisture in their homes that other actors had not been aware of. This was especially surprising since the project had started several years earlier and residents were closely involved. They had never mentioned the problem because they assumed it was either not a topic for urban renewal, or that the solution would be too expensive for the housing association.

Fourth, uncoupling variety and selection created room for the generation of a variety of perceptions without focussing overly on the feasibility of the options. Without the pressure to make real decisions, actors engaged in discussions more freely. For example, in the Emmen game this led to the identification of feasible options, such as placing a small windmill in the neighbourhood, that had not been on the agenda before either because the actors had not thought of it, had deemed it unfeasible, did not consider it a priority, or had assumed that the other actors would not be interested.

The intensive interactions and exchange of goals and interests and knowledge throughout the day of game play contributed to an improved understanding of the political and institutional complexity of urban renewal. At the start of the game, participants often had stereotypical images of each other. The game helped them to understand why actors adopt particular points of view or pursue particular strategies. Participants from both professional actors and resident organisations acknowledged the value of this mutual understanding for improving interactions in the future.

The lessons about the social interactions within the context of urban renewal were learned especially by the professionals, real-life actors. For students, the lessons were more general. They learned about the need for multidisciplinary collaboration and the need to explore problems fully before thinking up solutions.

Meta-learning

The extent to which the DUBES game contributed to meta-learning was only asked in the qualitative evaluation at the end of each game. In the debriefing, participants emphasised that they valued the approach, especially the temporary uncoupling of generating variety from selection. This enabled them to freely discuss the problems in the neighbourhood concerned without having to jump to conclusions and pressing for solutions that they preferred. Feedback from MEDIA about the consequences of preferred solutions and the interrelationships between solutions made them think about their usual reflex approaches to urban renewal and penchant for already known solutions. Many participants wanted a copy of the DUBES tables they had filled in to show to their colleagues and perhaps use in their own working environment. The DUBES tables that had been worked on in the game showed the history of the decisions made that day. It contained all the decision-areas and options, including notes taken during the discussions on the various options. Thus the tables provided an overview of decision making, including the debates on the unselected options. For other projects, or for the later stages of a project, it may be worthwhile to look at the issues not considered a priority at an earlier stage of the process or for a project. Actors found it satisfying that options important to them but ultimately not selected had nonetheless been seriously discussed. They considered the tables a silent witness of this.

Retention

The gaming exercise was especially about optimising processes of variety generation and making a selection from that variety to stimulate substantive and social learning. Through the structured and transparent decision-making process, including the substantive assessments by MEDIA, participants also learned about the possibilities of a decision-making process for complex problems such as urban renewal. This meta-learning can also be of use

to continue decision making for the neighbourhood. After all, urban environments are a never-ending story and need continuous adaptation to changing circumstances, problems and challenges as well as to changing understanding of sustainability. Monitoring of meta-learning and measurement of its use to regenerate and continue learning did not take place in the DUBES project. This might be a topic for more longitudinal research.

The extent to which the lessons learned by the participants were retained was also not studied in the DUBES project, which concentrated decision making in one day, parallel to real decision making projects. It would be interesting to see how these game-simulation exercises could be integrated in real decision-making processes. This question is not only relevant to the DUBES game, but to gaming exercises in support of urban decision making in general (cf. Mayer *et al.*, 2007). That this question is asked at all can be considered an indication of the maturing of such policy exercises and the recognised need for decision-support tools that combine substantive knowledge and knowledge of decision-making processes.

VII Summary and conclusion

Table A4.4 summarises how the lessons learned in this book were implemented in the design of both game and DSS and how they contributed to greener, more sustainable decisions. Table A4.2 was used for the evaluation reported in this table.

The central question in this book is how to improve governance in support of a sustainable built environment. Theoretical perspectives show that governance for such contested policy goals as sustainable development can be evaluated from a learning perspective. In this view, governance is supposed to contribute to learning and is successful when actors have learned. When actors involved in policy making and decision making learn about the problem they are trying to resolve and about the social, multi-actor context in which they operate, this helps them to develop better solutions; 'better' because these solutions reflect negotiated knowledge and strategies for decision making and implementation. Depending on the process studied, these solutions can involve policies, plans, programmes, decisions, etc.

But how can policy makers stimulate learning? As with biological processes, policy oriented learning is understood as a process of variety, selection and retention. One claim is that this makes the theory suitable for prescriptions, for developing policy and decision-making processes. The case studies reconstructed in hindsight show how variation and selection contributed to learning and to retention and regeneration of that learning. The conclusions recommended only how variation and selection could stimulate learning and the retention of this learning. This appendix took up the challenge to use these

Table A4.4 Application of evolutionary approach in both DUBES and MEDIA design

Lesson	Implementation in game and DSS design	Evaluation of game and DSS design
Facilitate the presence and expression of diverging perceptions	■ A role play, with a predefined variety of roles ■ DUBES table showed variety of possible decisions ■ Agenda-setting in steps: individually (anonymously), in groups, plenary	■ The game generated an overview of interests and opinions ■ It was easy for participants to express opinions in the gaming exercise ■ The game design connected substantive aspects to decision making ■ The game generated cross-disciplinary discussions ■ Participants had gained a clearer picture of what sustainability could mean in urban renewal
Optimise variety and selection	■ Separation of agenda-setting from decision making ■ Ex ante evaluation of alternative decision options from multiple points of view	■ This way of working generated useful outcomes ■ The DSS gave a good insight in the impacts and performance of decisions
Make decision making transparent	■ DUBES tables showed which decisions were taken and which were not ■ DSS (MEDIA) showed direct and indirect effects of the decisions made from various points of view, using various established and validated selection methods ■ Participants could try out and/or add options	■ The table and the DSS contributed to the quality of the programme of requirements ■ The DSS was too complex and detailed to be transparent for the participants and the MEDIA advisor was essential
Develop shared rules	■ Participants were mixed in groups where they could freely discuss possible decisions without actually having to make them at that point	■ The game offered a pleasant and structured way to map interests ■ The DSS made a positive contribution to the quality of group discussions
Retain variety generated through institutional change	■ The roles defined and sense of urgency created in the game ensured that relevant actors participated	■ The period simulated in the game was too short to evaluate this lesson
Create incentives to revise and reconsider the decisions made	■ Specifying priorities, options, and decisions contributed to transparency and would facilitate monitoring and evaluation	■ The period simulated in the game was too short to evaluate this lesson ■ Participants valued that the DUBES tables made the variety generated (selected and non-selected) visible throughout the process

conclusions in the design of a decision-making process. Since opportunities for real-life policy experiments are limited, the choice was made to design a simulation exercise, based on reality, that could be played by real-life actors to approximate reality as close as possible.

The attempt was worth the effort. It has shown that – despite the room for improvement – the lessons for policy making learned in this book, especially the ones on variation and selection, can be used to improve decision making. The games played show that by smartly structuring the processes of variation and selection, actors can learn how to make more sustainable decisions, decisions that do not necessarily involve much effort or change by any

of the actors involved. They also developed an idea of what it takes if they want to achieve higher ambitions, for example, because of the paths in MEDIA that highlighted matching and conflicting decisions which could perhaps be resolved by technological innovation, institutional change or combinations thereof.

The gaming exercise also showed that stimulating learning retention remains a challenging goal. The games were only very indirectly connected to real-life cases. Retention in the form of actual changes of policy and decision making, whether these be on the instrumental or conceptual level, could not be expected. Nevertheless, in some games, participants stated that because of they had played the game, they would make instrumental changes to the project they were working on. They added that they had learned from the approach and might use it on future projects. This assertion has not been evaluated. Future research should therefore not focus solely on variation and selection, but on how to stimulate the variety selected, including perhaps the non-selected variety generated. Learning is retained not solely through institutional change but through a continual process of technical and conceptual change.

References

Alshuwaikhat, H. and D. Nkwenti (2002), Visualizing decision making: perspectives on collaborative and participative approach to sustainable urban planning and management, *Environment and Planning B: Planning and Design 29*, pp. 513-531.

Bots, P., F. van Schaik and H. Sol (1989), A gaming environment for testing decision support systems, Murray-Smith, D., J. Stephenson and R.N. Zobel (eds.), *Proceedings of the 3rd European Simulation Congress*, The Society for Computer Simulation, San Diego, CA, pp. 673-678.

Bots, P., E. van Bueren, E. ten Heuvelhof and I. Mayer (2005), *Communicative tools in sustainable urban planning and building*, Sustainable Urban Areas Series no. 5, Amsterdam: IOS Press.

Brewer, G. (1986), Methods for synthesis: policy exercises, Clark, W. and R. Munn (eds.), *Sustainable Development of the Biosphere*, Cambridge: Cambridge University Press, pp. 455-475.

Brown, H. Szejnwald and P.J. Vergragt (2008), Bounded socio-technical experiments as agents of systemic change: The case of a zero-energy residential building, *Technological Forecasting and Social Change, 75* (1), pp. 107-130.

Ceccato, V. and F. Snickars (2000), Adapting GIS technology to the needs of local planning, *Environment and Planning B: Planning and Design, 27* (6), pp. 923-937.

Cecchini, A. (1999), New information and communication technologies and the professions of town and regional planners, *Computers, Environment and Urban Systems, 23* (3), pp. 151-172.

Cecchini, A. and P. Rizzi (2001), Is urban gaming simulation useful?, *Simulation and Gaming, 32* (4), pp. 507-521.

Conte, E. and V. Monno (2001), Integrating expert and common knowledge for sustainable housing management, Maiellaro, N. (ed.), *Towards Sustainable Building*, Dordrecht: Kluwer, pp. 11-28.

Coors, V., U. Jasnoch and V. Jung (1999), Using the virtual table as an interaction platform for collaborative urban planning, *Computers and Graphics, 23* (4), pp. 487-496.

Duke, R. (1974), *Gaming the Future's Language*, Beverly Hills, CA: Sage.

Duke, R. (1980), A paradigm for game design, *Simulation and Games, 2* (3), pp. 364-377.

Duke, R. (1998), The gaming discipline as perceived by the policy and organization sciences, Geurts, J., C. Joldersma and E. Roelofs (eds.), *Gaming/Simulation of Policy Development and Organizational Change*, Tilburg: Tilburg University Press, pp. 21-27.

Duke, R. (2000), A personal perspective on the evolution of gaming, *Simulation and Gaming, 31* (1), pp. 79-85.

Fatta, D., D. Naoum and M. Loizidou (2002), Integrated environmental monitoring and simulation system for use as a management decision support tool in urban areas, *Journal of Environmental Management, 64* (4), pp. 333-343.

Geurts, J., C. Joldersma and E. Roelofs (eds) (1998), *Gaming/Simulation for Policy Development and Organizational Change*, Tilburg: Tilburg University Press.

Geurts, J. and C. Joldersma (2001), Methodology for participatory policy analysis, *European Journal of Operational Research, 128* (2), pp. 300-310.

Han, S. and Z. Peng (2003), Public participation GIS (PPGIS) for town council management in Singapore, *Environment and Planning B: Planning and Design, 30*, pp. 89-111.

Hendriks, C. (2001), *Sustainable Construction*, Best: Aeneas.

Mayer, I. (1997), *Debating Technologies: A Methodological Contribution to the Design and Evaluation of Participatory Policy Analysis*, Tilburg: Tilburg University Press.

Mayer, I. and W. Veeneman (eds.) (2002), *Games in a World of Infrastructures: Simulation-games for Research, Learning and Intervention*, Delft: Eburon.

Mayer, I. and M. de Jong (2004), Combining GDSS and gaming for decision support, *Group Decision and Negotiation, 13* (3), pp. 223-241.

Mayer, I., W. Bockstael-Blok and E. Valentin (2004a), A building block approach to simulation tested in the game Containers Adrift, *Simulation and Gaming, 35* (1), pp. 29-52.

Mayer, I., L. Carton, M. de Jong, M. Leijten and E. Dammers (2004b), Gaming the future of an urban network, *Futures, 36* (3), pp. 311-333.

Mayer, I., E. van Bueren, P. Bots, H. van der Voort, R. Seijdel (2005), Collaborative Decision making for Sustainable Urban Renewal Projects: a Simulation-Gaming Approach, *Environment and Planning B: planning and design, 32*, pp. 403-423.

Mayer, I., A. van Bilsen, E. van Bueren and R. Goetgeluk (eds.), (2007), *The Playful City: Serious Games for Sustainable Urban Development, Book of Abstracts*, Workshop November 2007, Delft: Delft University of Technology.

Morgan, J. (1971), *AIDA: A Technique for the Management of Design*, Coventry: Tavistock Institute of Human Relations, Institute of Operational Research.

O'Connell, I. and C. Keller (2002), Design of decision support for stakeholder-driven collaborative land valuation, *Environment and Planning B: Planning and Design, 29*, pp. 606-628.

O'Looney, J. (2001), Sprawl decisions: a simulation and decision support tool for citizens and policy makers, *Government Information Quarterly, 18* (4), pp. 309-327.

Ravetz, J. (2000), Integrated assessment for sustainability appraisal in cities and regions, *Environmental Impact Assessment Review, 20* (1), pp. 31-64.

Rotmans, J., M. van Asselt and P. Vellinga (2000), An integrated planning tool for sustainable cities, *Environmental Impact Assessment Review, 20* (3), pp. 265-276.

Schot, J. (2001), Towards new forms of participatory technology development, *Technology Analysis and Strategic Management, 13* (1), pp. 39-52.

Shubik, M. (1975a), *Games for Society, Business and War: Towards a Theory of Gaming*, New York: Elsevier.

Shubik, M. (1975b), *The Uses and Methods of Gaming*, Amsterdam: Elsevier.

Taylor, J. (1971), *Instructional Planning Systems: A Gaming – Simulation Approach to Urban Problems*, Cambridge: Cambridge University Press.

Torres, M. and J. Macedo (2000), Learning sustainable development with a new simulation-game, *Simulation & Gaming, 31* (1), pp. 119-126.

Toth, F. (1995a), Policy exercises, the first ten years, Crookall, D. and K. Arai (eds.), *Simulation and Gaming Across Disciplines and Cultures*, Beverly Hills, CA: Sage, pp. 257-264.

Toth, F. (1995b), Simulation/gaming for long-term policy problems, Crookall, D. and K. Arai (eds.), *Simulation and Gaming Across Disciplines and Cultures*, Beverly Hills, CA: Sage, pp. 134-142.

Underwood, S. and R. Duke (1987), Decisions at the top: gaming as an aid to formulating policy options, Crookall, D., C. Greenblat, A. Coote, J. Klabbers and D. Watson (eds.), *Simulation and Gaming in the Late 1980s*, Oxford: Pergamon Press, pp. 289-296.

Van Asselt, M. and N. Rijens-Klomp (2002), A look in the mirror: reflection in participation in integrated assessment from a methodological perspective, *Global Environment Change, 12* (3), pp. 167-184.

Dobbelsteen, A.A.J.F. van den (2004), *The sustainable office: An exploration of the potential for factor 20 environmental improvement of office accommodation*, Delft: Delft University of Technology.

Waddell, P., A. Barning, M. Noth, N. Freier, M. Becke and G. Ulfarsson (2003), Microsimulation of urban development and location choices: design and implementation of UrbanSim, *Networks and Spatial Economics, 3* (1), pp. 43-67.

Summary

Greening governance

An evolutionary approach to policy making for a sustainable built environment

Ellen van Bueren

Introduction: a proliferation of policy on sustainable construction
Since the 1990s, sustainable building has been high on the agenda of policy makers. The public sector and the construction sector have been tackling the question of how the built environment can contribute to sustainable development. Our buildings, cities and infrastructure systems place a considerable burden on the environment. The built environment, including its everyday use and management, is a major consumer of raw materials, energy and water, as well as being one of the biggest producers of greenhouse gases and waste. Just as in other European countries and the world as a whole, a range of policy instruments have been developed to promote the sustainable development of the built environment in the Netherlands. Evaluation of these policies has shown that they have led to significant environmental benefits. In the Netherlands, for example, the energy requirements of new residential buildings has halved in thirty years, all waste material from construction and demolition work is now reused, and cities are developing in increasingly compact ways. Nevertheless, experts are still identifying ways in which sustainability could be increased further. They point out that using existing knowledge and technology, we could achieve a greater level of sustainability, and that there continues to be a divide between policy objectives and reality. It appears that there is room for improvement and that policies can be 'greened' further.

Research question and methodology
The central question of this thesis is: *how can policies to promote a sustainable built environment be improved?* This question was answered in a number of steps. First of all, the concept of sustainable development was explored – which characteristics should policy makers be aiming for? The concept turns out to be ambiguous. Realising sustainable development requires multiple actors to collaborate. Then the search was for a policy perspective that can incorporate these characteristics. The policy network approach, combined with a perspective on learning, appears to provide a suitable framework in which to analyse sustainable development. This approach demonstrates why policy processes are slower to bring about change than some actors would like and

shows that the more a policy is geared to take account of its context, which actors are involved and how they interrelate, the greater its chance of success. The approach shows how a range of factors influences the policy process, and that the advice which it produces is therefore not specific in terms of making policy improvements. Earlier research of policy processes that used concepts such as variation and selection achieved more tangible recommendations for policy improvement. It seems that an evolutionary approach could be a step forward in this respect. Additionally, the use of the complete evolutionary process – including variation, selection, retention and regeneration – will also enable us to focus on future changes. Sustainable development is, after all, an ongoing process and policies designed to support it will need to be continually modified to accommodate changing circumstances.

Using these evolutionary concepts, a framework for evaluation was developed which was used to consider to what extent this evolutionary perspective can provide a basis for policy improvements. In empirical, qualitative research based on case studies, three policy processes in the Netherlands – all of which contributed to a sustainable built environment in different ways – were evaluated using this framework. For each of these three processes, it was investigated to what extent evolutionary mechanisms could explain who has learned what, why, and what effect this has had. After all, a better understanding of why actors learn and change, or fail to learn and change, can produce policy recommendations that are more targeted. The conclusion of each case study examines the specific opportunities for improving the policy in question. The general conclusion presents the wider opportunities for improving policies on sustainable development in the built environment. Finally, the added value of the evolutionary approach is considered. Has it led to more specific advice and how can it be sharpened up further in the future?

Sustainable development: an essentially contested concept

Sustainable development aims for a stable and lasting balance between mankind, the environment and economics. According to this definition of sustainability, the previously fundamentally incompatible spheres of the environment and economics are no longer necessarily in opposition to one another. The economy can produce money and technologies from which mankind, nature and the environment can all benefit. A policy for sustainable development aims at collectively creating and exploiting these opportunities and bridging divides which had previously been viewed as unbridgeable. However, when the concept of sustainable development is translated into specific goals, plans and policies, it seems that it is no longer capable of bringing about all the win-win situations that it seemed to promise. Conflicting values lead to difficult choices which the concept of sustainable development is ill-equipped to deal with.

It is said of the concept of sustainable development that it is an 'essentially contested concept', and that it is a *wicked* or 'unstructured' problem. Examples

Table 1 Evolutionary framework of analysis for evaluating policy

Evolutionary process	Explanation	Questions	Operationalisation
Variation	A variety of perceptions stimulates learning; policy should stimulate variety.	Which variety of perceptions has the policy process brought about?	Variety of perceptions, actors, issues, networks, arenas.
Selection	Policy results from a selection from the variety of perceptions generated.	Which variety/lessons were selected and how were selection decisions made?	Influence of the selection environment (networks, arenas and the rules that apply within them for interaction and decision making) on policy process.
Retention	Policy leads to change through institutionalisation of the selected variety	To what extent is the selected variety / are lessons institutionalised?	Change in network structure: relationships, rules, decision making methods
Regeneration	Policy leads to changes in the future through the institutionalisation of incentives for the renewal of variety.	To what extent does the policy contain incentives for change in policy?	Capacity for regeneration of the policy: for example, through monitoring and evaluation, incentives to review policy, expansion of 'learning capacity'.

of other such concepts are 'freedom' and 'democracy'. Such concepts make you feel good, and they are appreciated for this. They can garner significant support and generate minimal opposition. However, when made tangible, these concepts become contested. Problems may arise about the boundary of the concept, for example, are aspects such as local employment opportunities or health part of sustainability? The concepts are also complex – they consist of a tangle of cause-and-effect relationships that cannot be unravelled. Due to the large number of constituent parts, factors and variables that make up this kind of concept, they cannot easily be defined and delimited. Any attempt at definition, delimitation or operationalisation can be challenged on the basis of valid, scientifically sound arguments.

Learning in policy networks

Because of the large number of themes, factors and variables that are involved, many actors are also involved in the concept and the goals that it aims to achieve. Due to the complexity of sustainable development as a concept and the division of power resources (authority, finances, knowledge, etc.) between actors – the construction sector is an extremely fragmented sector – it involves a large number of actors. The diversity of their backgrounds, knowledge, position, objectives and interests means that those involved often have differing perspectives on the goals that need to be achieved. These actors, each having different views, need to jointly define sustainable development. This is how goal-seeking processes emerge.

The policy network approach provides a suitable framework for the analysis of such goal-seeking, multi-actor policy processes. This approach assumes long-term interdependence between actors and demonstrates the necessity of interaction, negotiation and learning in order to arrive at a shared perception of which policy is required. Occasions when actors with differing perceptions confront one another are opportunities for learning. An actor learns if his perception of a policy problem changes. If several actors change their per-

ception and arrive at a shared view of the policy problem, this will lead to a change or repositioning of the policy. There are different types of learning. We can speak of *technical learning* when learning gives rise to a better policy, such as a better justification of the policy or improved implementation. We can talk of *conceptual learning* when the actors conclude that the substance of the policy needs to change; this can lead to more radical policy changes, possibly including changes in the goals of the policy themselves. *Meta-learning* occurs when actors learn about the learning process itself, for example when they learn how to share knowledge.

An evolutionary perspective on policy networks

The policy network approach lacks a specific consideration of how policy can promote learning processes. Various attempts have been made to do this, which have used concepts taken from evolution such as variation and selection. The evolutionary approach taken in this thesis builds on those attempts. It brings together in one framework existing assumptions about how variation, selection, retention and regeneration influence learning and policy changes. By looking at these processes and the interrelationships between them, we can improve our knowledge of how policy leads to change.

Conclusions relating to improving policy on sustainable development

Analysing policy processes using the evolutionary framework has led to the confirmation or refinement of a number of assumptions about how policy processes can lead to learning. The main conclusions of the research are:

Variety is often more limited than assumed: the mobilisation of the like-minded

Under the policy network approach, the variety of those involved is often judged on the basis of the diversity of those involved – whether they have different goals and interests, whether they belong to different networks, and whether the policy process is played out in different arenas. From the case studies researched here, however, it seems that a wide diversity of actors provides no guarantee that the actors will bring differing perceptions into the policy process. Even when actors come from different networks, policy problems usually seem to mobilise the like-minded. This phenomenon also applies to the mobilisation of experts. It is true that they work for different organisations, but they have often followed the same educational path and form part of the same professional community. Experts who have a different perception or who are from another discipline tend to prefer to find an arena in which they know they will be heard and where they have more chance of influencing policy.

Selection methods and rules strongly influence the process and they are difficult to change

The method of selection often has an effect on the variety generated in the process. Actors who believe that their point of view will not be heeded may

sometimes participate in the process but may not always express their point of view. When selection methods are rooted in policy, such as in technical decision methods, e.g. for life cycle analysis and norm setting, this effect is even more pronounced. These methods, which are often specialist in nature, have proven difficult to change; they promote learning about methods but less learning about the problem. If actors question the methods, this tends to lead those overseeing the methods – often a small group of experts – to seek to improve the methods, thereby anchoring them in policy more firmly still. Informal rules also have a strongly selective effect. They represent a significant barrier to participation by actors who are not familiar with these rules. Newcomers to a policy process are thus chiefly preoccupied with learning the rules of the game and have no time for other learning processes. This gives a strategic advantage to those actors who are operating in an arena in which they are already familiar: they are not faced with differing perceptions which invite them to learn about the problem in question.

Policy can become institutionalised on a different level to that intended
In some areas in the case studies, important lessons were learned which were not selected: despite their relevance, these lessons failed to influence the policy process in the arena where they were learned. Policy processes were distributed across various arenas at different administrative levels, meaning that the lessons influenced policy processes in different places. The lessons were utilised in another place often at another administrative level, and translated to the policy practice applicable there. At the more local level of administration, policy makers need more pragmatic guidelines in order to deal with inherently contradictory policy objectives than at the national or international level, where policy makers are often searching for normative, generally applicable policy principles. Conversely, many local processes can sometimes lead to the review of policy at higher administrative levels. 'Multi-level governance' – action by government at several levels simultaneously – thus creates the opportunity for lessons to influence policy practice at various levels.

Limited attention to regeneration
The case studies showed that the focus of policy processes on mechanisms or incentives leading to a review of policy was very limited. If any attention at all is given to this area, it is often only to encourage technical learning. This actually leads to a stronger anchoring of the current policy and makes it more difficult to strike out on a new course.

Recommendations for policy improvement
The evolutionary framework demonstrates that the attention of policy makers, which currently focuses on bringing in a variety of actors, should actually be shifted to the selection environment and the regeneration of the learn-

ing processes. This is because the selection environment has a significant influence on the variety which is produced and strongly influences future policy development. The arena where policy makers put an issue on the agenda and the methods used for selecting from the generated variety influences the development path of a policy. Policy makers should be more aware of this influence. Multi-level governance creates more opportunities, places, where lessons can institutionalise and helps to prevent policy processes from stagnating. Finally, policy regeneration or renewal requires more attention; for example, incentives for regeneration could question the selection environment, such as the selection method.

The added value of the evolutionary approach

The objective of this thesis was to develop an approach which would make it possible to evaluate and improve policies relating to complex, contested goals. The policy network approach is a suitable one, but is still lacking in terms of a clear relationship between policy and learning. An evolutionary approach to policy and decision making makes it clear how policy processes can promote or restrict learning. The approach also shows that policy can produce and sustain learning processes if all four of the processes receive coherent attention. The evolutionary approach is a valuable development of the policy network approach.

This research also shows that the evolutionary approach is still in a rudimentary stage of development, however. The operationalisation of concepts such as the selection environment, institutionalisation and learning capacity merit closer study. This can be done by means of retrospective evaluation studies, such as those in this thesis. A more informative and exciting route would be to carry out an *ex ante* evaluation.

The last ten years have witnessed significant growth in *ex ante* evaluations in the form of simulated and real experiments, both empirical and theoretical. These *ex ante* evaluations offer the opportunity to 'learn by doing'. By putting theories into practice, it is possible to learn how variation, selection, retention and regeneration influence learning and how policy can stimulate these processes. Experiences with a 'serious game' for sustainable urban renewal, in which processes of variation and selection were optimised, confirm this potential. Participants in the game learned to set joint priorities for sustainable development. Such active, learning-by-doing approaches are also in line with current developments whereby the government is being called on to offer greater leadership.

Samenvatting

Het vergroenen van beleid voor een duurzaam gebouwde omgeving

Een evolutionair perspectief

Ellen van Bueren

Inleiding: veel beleid voor duurzaam bouwen
Sinds de jaren negentig staat duurzaam bouwen hoog op de agenda van beleidsmakers. Overheid en bouwsector buigen zich over de vraag hoe de gebouwde omgeving een bijdrage kan leveren aan duurzame ontwikkeling. Onze gebouwen, steden en infrastructuren belasten het milieu aanzienlijk. Inclusief gebruik en beheer is de gebouwde omgeving grootverbruiker van ruwe grondstoffen, energie en water en een van de grootste producenten van afval en broeikasgassen. Net als in andere landen in Europa en in de wereld is een scala aan beleidsprogramma's en instrumenten ontwikkeld om duurzame ontwikkeling in de gebouwde omgeving te bevorderen. Evaluaties tonen aan dat beleid tot grote milieubesparingen heeft geleid. Zo is in Nederland dankzij dit beleid de energiebehoefte van nieuwbouwwoningen in dertig jaar tijd gehalveerd, wordt al het bouw- en sloopafval hergebruikt en hebben steden zich compacter dan voorheen ontwikkeld. Desondanks zien experts mogelijkheden om de duurzaamheidprestatie aanzienlijk te verbeteren. Zij wijzen erop dat met bestaande kennis en technologieën meer milieuwinst kan worden behaald, en dat de kloof tussen beleidsdoelstellingen en werkelijkheid blijft bestaan. Er lijkt dus ruimte voor verbetering, ofwel vergroening, van beleid te zijn.

Onderzoeksvraag en methodologie
De hoofdvraag in dit proefschrift is: *hoe kan beleid voor een duurzaam gebouwde omgeving worden verbeterd?* Deze vraag is in een aantal stappen beantwoord. Allereerst is het begrip duurzame ontwikkeling verkend: welke kenmerken heeft dit beleidsconcept waar beleidsmakers rekening mee moeten houden? Het concept blijkt ambigue. De realisatie van duurzame ontwikkeling vereist samenwerking van vele partijen. Vervolgens is gezocht naar een beleidsperspectief dat met deze kenmerken om kan gaan. De beleidsnetwerkbenadering, in combinatie met een leerperspectief, blijkt een geschikt raamwerk te bieden voor analyse van duurzame ontwikkeling. Het laat zien waarom beleidsprocessen langzamer tot verandering leiden dan sommige actoren zouden willen en wijst erop dat beleid meer kans van slagen heeft naarmate het

beter aansluit bij de context, de actoren, hun onderlinge relaties en de spelregels. Omdat de benadering vooral laat zien hoe een geheel van factoren het beleidsproces heeft beïnvloed, is het daaruit voortvloeiende advies voor beleidsverbetering weinig specifiek. Een evolutionair perspectief lijkt dit te kunnen verbeteren. Eerdere onderzoeken naar variëteit en/of selectie in het beleidsproces, leidden tot toegespitstere aanbevelingen voor de inrichting van dit proces. Bovendien biedt het gebruik van het volledige evolutionaire proces – variatie, selectie, retentie en regeneratie – de mogelijkheid om ook aandacht aan toekomstige veranderingen te besteden. Duurzame ontwikkeling is immers een voortdurend proces en beleid ter ondersteuning daarvan zal zich moeten blijven aanpassen aan veranderende omstandigheden.

Hier is een evaluatiekader opgesteld, waarmee kan worden verkend in hoeverre dit evolutionaire perspectief aanknopingspunten voor beleidsverbetering biedt. In empirisch, kwalitatief casestudieonderzoek zijn drie Nederlandse beleidprocessen met dit kader geëvalueerd, die elk op hun eigen manier bijdragen aan een duurzaam gebouwde omgeving: waterkwaliteitsnormen voor zink en beleid om het gebruik van zink in de bouw te ontmoedigen, pakketten van duurzaambouwenmaatregelen die de bouwsector vrijwillig kan toepassen en contouren rondom stedelijke kernen om open gebieden te vrijwaren van verdere verstedelijking. Voor elk van deze drie processen is onderzocht in hoeverre evolutionaire mechanismen verklaren wie, waarom, wat heeft geleerd en met welk effect. Immers, een beter begrip van waarom actoren leren en veranderen, of dit juist niet doen, leidt tot inzicht hoe beleid dit leren en veranderen kan bevorderen. In elke casus wordt ingegaan op specifieke mogelijkheden voor verbetering van het betreffende beleid. In de conclusies van het boek wordt ingegaan op de algemene mogelijkheden voor verbetering van beleid voor duurzame ontwikkeling in de gebouwde omgeving. Tot slot wordt stilgestaan bij de meerwaarde van het evolutionaire perspectief. Heeft het geleid tot gerichter advies en hoe kan dit in de toekomst nog worden aangescherpt?

Duurzame ontwikkeling: een in essentie betwist concept

Duurzame ontwikkeling streeft naar een stabiel en volhoudbaar evenwicht tussen mens, milieu en economie. Milieu en economie, voorheen gezworen vijanden, zijn in deze definitie van duurzaamheid niet langer per definitie tegengesteld. Zo genereert economische ontwikkeling geld en kennis waar mens, natuur en milieu van kunnen profiteren. Beleid voor duurzame ontwikkeling is gericht op het gezamenlijk creëren en benutten van kansen en overbrugt verschillen die voorheen onoverkomelijk werden geacht; maar als duurzame ontwikkeling wordt uitgewerkt in concrete doelen, plannen en beleid, slaagt het concept er niet langer in alle beloofde win-winsituaties in stand te houden. Conflicterende waarden leiden dan tot moeilijke keuzes waarvoor het concept geen afwegingskader biedt.

Duurzame ontwikkeling wordt wel een 'in essentie betwist concept' genoemd, of een *wicked* of 'ongestructureerd' probleem. Andere voorbeelden van zulke concepten zijn 'vrijheid' en 'democratie'. Deze concepten zijn alle *feel good* concepten. Zij kunnen daardoor rekenen op een positieve waardering en dus op een groot draagvlak. Weerstand is nauwelijks te verwachten. Maar bij nadere uitwerking kan dit omslaan. Er kunnen dan problemen ontstaan over de afbakening van de concepten; maken bijvoorbeeld thema's als lokale werkgelegenheid of gezondheid nu wel of niet onderdeel uit van duurzaamheid? Daarnaast blijken de concepten bij de uitwerking complex: ze bestaan uit onontwarbare kluwen van oorzaak-gevolgrelaties. Door de grote hoeveelheid onderwerpen, factoren en variabelen waaruit dit soort concepten bestaan zijn ze niet eenduidig af te bakenen en te definiëren. Elke afbakening, definitie en operationalisatie kan worden betwist op basis van valide, wetenschappelijk onderbouwde argumenten.

Leren in beleidsnetwerken

Door de grote hoeveelheid onderwerpen, factoren en variabelen, zijn er ook veel actoren, die betrokken zijn bij het concept en de doelen die erbij behoren. Vanwege de complexiteit van duurzame ontwikkeling, en de versnippering van middelen (autoriteit, financiën, kennis, etc.) over actoren – de bouwsector is een zeer gefragmenteerde sector – zijn er veel actoren betrokken bij duurzame ontwikkeling. Als gevolg van een verscheidenheid van achtergrond, kennis, positie, doelen en belangen, hebben betrokkenen vaak verschillende beelden of percepties van het te bereiken doel. Het gevolg is dat een groot aantal, verschillend denkende actoren gezamenlijk een concept als duurzame ontwikkeling uitwerken. Zo ontstaan doelzoekende processen.

De beleidsnetwerkbenadering biedt een geschikt kader voor analyse van dergelijke doelzoekende, multi-actor beleidsprocessen. Deze benadering gaat uit van langdurige, wederzijdse afhankelijkheden tussen actoren en wijst op de noodzaak van interactie, onderhandeling en leren om tot een gedeelde perceptie te komen van het benodigde beleid. Als actoren met verschillende percepties worden geconfronteerd, is dit een aanleiding voor leren. Een actor heeft geleerd als zijn perceptie van het beleidsprobleem is veranderd. Als meerdere actoren van perceptie veranderen, en komen tot een gedeeld beeld van het beleidsprobleem, dan zal dit tot bijstelling of verandering van beleid leiden. Er zijn verschillende vormen van leren. Er is sprake van technisch leren als leren aanleiding geeft tot verbetering van beleid, bijvoorbeeld door een betere verantwoording van het beleid, of door de uitvoering te verbeteren. Er is sprake van conceptueel leren als actoren vinden dat beleid wezenlijk moet veranderen; dit kan leiden tot ingrijpender beleidswijzigingen, waarbij ook de doelen ter discussie staan. Meta-leren vindt plaats als actoren leren over het leerproces zelf, bijvoorbeeld als zij leren hoe zij kennis kunnen delen.

Tabel 1 Evolutionaire benadering voor beleidsevaluatie

Evolutionair proces	Uitleg	Vragen	Operationalisatie
Variatie	Variëteit van percepties stimuleert leren, beleid moet voortbrengen variëteit stimuleren	Welke variëteit aan percepties heeft het beleidsproces voortgebracht?	Variëteit van percepties, actoren, geagendeerde onderwerpen, netwerken, arena's
Selectie	Beleid is resultante van selectie uit voortgebrachte variëteit van percepties	Welke variëteit/lessen zijn geselecteerd en hoe heeft selectie, besluitvorming, plaatsgevonden?	Invloed van selectieomgeving (netwerken, arena's en de daarin geldende regels voor interactie en besluitvorming) op beleidsproces
Retentie	Beleid leidt tot verandering d.m.v. institutionalisering van geselecteerde variëteit	In hoeverre is geselecteerde variëteit/zijn lessen geïnstitutionaliseerd?	Verandering van netwerkstructuur: relaties, regels, besluitvormingsmethoden
Regeneratie	Beleid leidt tot toekomstige verandering d.m.v. institutionalisering van prikkels voor vernieuwing van variëteit	In hoeverre bevat beleid prikkels voor verandering van beleid?	Vermogen tot regeneratie van beleid: bijv. d.m.v. monitoring en evaluatie, prikkels om beleid te herzien, vergroting 'leervermogen'

Een evolutionair perspectief op beleidsnetwerken

De beleidsnetwerkbenadering ontbeert een concreet perspectief op hoe beleid leerprocessen kan bevorderen. Verschillende pogingen om deze relatie te leggen maken gebruik van evolutionaire begrippen als variatie en selectie. Het evolutionaire perspectief in dit proefschrift bouwt hierop voort. Het brengt bestaande assumpties over hoe variatie, selectie, retentie en regeneratie van invloed zijn op leren en verandering van beleid onder in een kader. Door deze processen in samenhang te bekijken kan een beter inzicht ontstaan in hoe beleid tot verandering leidt (zie tabel 1).

Conclusies en aanbevelingen voor verbetering van beleid

Analyse van de beleidsprocessen met het evolutionaire raamwerk heeft een aantal veronderstellingen over hoe beleidsprocessen aanleiding geven tot leren bevestigd, genuanceerd of aangevuld. De hoofdconclusies van het onderzoek luiden als volgt.

Variëteit is vaak geringer dan gedacht: mobilisatie van gelijkgestemden

In de beleidsnetwerkbenadering wordt de variëteit van betrokkenen vaak vastgesteld aan de hand van de verscheidenheid van betrokkenen: hebben zij verschillende doelen en belangen, maken zij onderdeel uit van een variëteit van netwerken, en speelt het beleidsproces zich af in meerdere arena's? Uit de onderzochte cases blijkt dat een grote verscheidenheid van actoren geen garantie biedt op een beleidsproces waarin actoren verschillende percepties inbrengen. Ook al komen actoren uit verschillende netwerken, beleidsproblemen blijken veelal gelijkgestemden te mobiliseren. Dit fenomeen gaat ook op voor de mobilisatie van experts. Deze werken weliswaar voor verschillende organisaties, maar hebben vaak eenzelfde opleiding gevolgd en maken deel uit van dezelfde professionele gemeenschap. Experts met een andere perceptie of vanuit een andere discipline zoeken veeleer een arena op waar zij wel worden gehoord en waar zij meer kans hebben om invloed uit te oefenen op beleid.

Selectiemethoden en regels zijn van grote invloed op het proces en moeilijk veranderbaar

De wijze van selectie werpt vaak al de schaduw vooruit op de variëteit die wordt gegenereerd in een proces. Actoren die denken dat hun perceptie geen gehoor zal vinden, participeren soms wel, maar brengen hun zienswijze niet altijd ter sprake. Bij selectiemethoden die expliciet in beleid zijn verankerd, zoals technische beslismethoden als levenscyclusanalyse of normstelling, is dit effect sterker. Deze, vaak specialistische methoden, blijken moeilijk veranderbaar en zetten vooral aan tot leren over de methode en minder tot leren over het probleem. Als actoren deze methoden ter discussie stellen leidt dit bij de hoeders van de methoden, vaak een kleine groep experts, tot de neiging om de methode te verbeteren en daarmee nog steviger te verankeren in beleid. Ook informele regels hebben een sterk selecterende werking. Zij werpen hoge barrières op voor deelname door actoren die niet bekend zijn met deze regels. Nieuwkomers in een beleidsproces zijn daarom vooral bezig met het leren van de spelregels en hebben geen tijd om te leren over de inhoud van het probleem of over oplossingsstrategieën. Dit biedt de 'thuisspelende' actoren een strategisch voordeel: zij zien zich vooralsnog niet geconfronteerd met afwijkende percepties die uitnodigen tot leren over het betreffende probleem.

Beleid kan op een ander niveau dan beoogd institutionaliseren

In sommige arena's in de cases zijn belangrijke lessen geleerd die niet zijn geselecteerd: ondanks hun relevantie hebben deze lessen het beleidsproces in de arena waar zij zijn geleerd niet beïnvloed. Omdat beleidsprocessen zich verspreidden over verschillende arena's, op verschillende bestuurlijke niveaus, waren er echter meerdere plekken waar deze lessen alsnog van invloed waren op beleidsprocessen. Op een andere plek, vaak op een ander bestuurlijk niveau, werden de lessen benut en vertaald naar de daar heersende beleidspraktijk. Op meer lokale bestuurlijke niveaus hebben beleidsmakers meer behoefte aan pragmatische richtlijnen om met inherente tegenstrijdigheden van beleiddoelstellingen om te gaan dan op nationaal of international niveau, waar beleidsmakers vaak op zoek zijn naar normatieve, algemeen geldende uitgangspunten voor beleid. Op lokaal niveau kunnen beleidsmakers een eigen afweging maken tussen verschillende duurzaamheidswaarden, zonder te verzanden in principiële tegenstellingen die beleidsprocessen op nationaal niveau vertraagden. Deze lokale processen kunnen leerprocessen in andere arena's voeden en zo indirect aanleiding geven voor herziening van beleid op andere bestuurlijke niveaus. 'Multi-level governance', het spelen op meerdere borden tegelijk door overheden, creëert mogelijkheden om lessen op verschillende manieren van invloed te laten zijn op de beleidspraktijk.

Aandacht voor regeneratie is beperkt

In de bestudeerde beleidsprocessen blijkt de aandacht voor mechanismen

of prikkels die tot herziening van beleid zouden kunnen leiden zeer gering. Als er al aandacht aan wordt besteed, dan betreft het vaak een stimulans tot technisch leren. Dit leidt tot een sterkere verankering van de gekozen beleidsrichting en bemoeilijkt het inslaan van nieuwe paden.

Aanbevelingen voor verbetering
De conclusies laten zien dat de aandacht van beleidsmakers, die nu vooral rust op het betrekken van een variëteit aan actoren, meer zou moeten worden gericht op de selectieomgeving en regeneratie van leerprocessen. De selectieomgeving is namelijk van grote invloed op de variëteit die wordt gegenereerd, en bepaalt ook sterk de richting van toekomstige beleidsontwikkeling. Beleidsmakers zouden zich bewuster kunnen zijn van de weg die zij inslaan met de keuze van de arena waar zij het beleid agenderen en met de methoden die zij gebruiken om gegenereerde variëteit mee te beoordelen. Multilevel governance vergroot het aantal plekken waarop lessen kunnen institutionaliseren, en kan impasses in beleid voorkomen of verhelpen. Tot slot verdient regeneratie of vernieuwing van beleid meer aandacht; prikkels voor regeneratie zouden ook de selectieomgeving zelf, zoals de wijze van selectie, ter discussie kunnen stellen.

Meerwaarde van het evolutionaire perspectief
Doel van dit proefschrift was om een benadering te ontwikkelen die het mogelijk maakt om beleid voor complexe, betwiste doelen – zoals duurzame ontwikkeling – te evalueren en verbeteren. De netwerkbenadering van beleid is een geschikte benadering, maar weet nog geen duidelijk verband te leggen tussen beleid en leren. Een evolutionair perspectief op beleids- en besluitvorming maakt inzichtelijk hoe beleidsprocessen leren op korte en lange termijn kunnen stimuleren en beperken. Het evolutionaire perspectief biedt daarmee een waardevolle aanvulling op het beleidsnetwerkperspectief.

Dit onderzoek laat echter ook zien dat het evolutionaire perspectief nog in een rudimentair stadium verkeert. Met name de operationalisatie van begrippen als selectieomgeving, institutionalisering en leervermogen verdient nadere aandacht in toekomstig onderzoek. Dit kan door middel van *ex post* evaluatiestudies, zoals in dit proefschrift. Een informatiever en spannender weg is wellicht die van de 'experimentele' *ex ante* evaluatie. De afgelopen tien jaar heeft *ex ante* evaluatie, in de vorm van gesimuleerde en echte experimenten, zoals demonstratieprojecten en *serious gaming*, een belangrijke groei doorgemaakt, zowel empirisch als theoretisch. Deze *ex ante* evaluaties bieden de mogelijkheid tot *learning-by-doing*. Al doende kan er worden geleerd hoe variatie, selectie, retentie en regeneratie van invloed is op leren en hoe beleid deze processen kan stimuleren. Ervaring met een 'serious game' voor duurzame herstructurering van een wijk laat zien dat deelnemers aan dit spel door een optimalisatie van processen van variatie en selectie kunnen leren over

de inhoud van duurzame ontwikkeling en gezamenlijk prioriteiten leren stellen. Dergelijke actieve learning-by-doing benaderingen passen bij het huidige tijdsbeeld, waarin de overheid wordt opgeroepen tot daadkrachtiger bestuur dat gebaseerd is op bewezen ervaringen.

Curriculum Vitae

Ellen van Bueren (Rotterdam, 1972) is Assistant Professor at the Policy, Organisation, Law and Gaming department of Delft University of Technology. She is interested in the governance of complex decision-making processes. Prior to university, Ellen studied at the Emmauscollege in Rotterdam. She then went on to study Public Administration at Leiden University and the Erasmus University Rotterdam, with one term spent at the Robert Gordon University in Aberdeen. During her studies, she became interested in environmental policy, and organised an environmental research project in South Africa. Well before her graduation in 1996, she had started her career at Zandvoort Ordening & Advies (now part of Royal Haskoning), following an internship in which she was part of the team that evaluated the Dutch Environmental Impact Assessment regulation. It was while working for this urban planning firm that her love for research and for the built environment was born. In 1997, she continued her research and consultancy at Delft University of Technology. At the Interfaculty Research Institute The Ecological City, she worked together with engineers, designers and scientists to explore the opportunities and challenges for a sustainable built environment. In her work at the Faculty of Technology, Policy and Management, her research and teaching stretched to more general governance issues, such as organisation and management, network and process management, regulation and enforcement, and gaming and simulation. Ellen has received several best paper awards and she has been an invited speaker and lecturer at national and international conferences and training programmes.

Sustainable Urban Areas

1. Beerepoot, Milou, **Renewable energy in energy performance regulations. A challenge for European member states in implementing the Energy Performance Building Directive**
2004/202 pages/ISBN 90-407-2534-9

2. Boon, Claudia and Minna Sunikka, **Introduction to sustainable urban renewal. CO_2 reduction and the use of performance agreements: experience from The Netherlands**
2004/153 pages/ISBN 90-407-2535-7

3. De Jonge, Tim, **Cost effectiveness of sustainable housing investments**
2005/196 pages/ISBN 90-407-2578-0

4. Klunder, Gerda, **Sustainable solutions for Dutch housing. Reducing the environmental impact of new and existing houses**
2005/163 pages/ISBN 90-407-2584-5

5. Bots, Pieter, Ellen van Bueren, Ernst ten Heuvelhof and Igor Mayer, **Communicative tools in sustainable urban planning and building**
2005/100 pages/ISBN 90-407-2595-0

6. Kleinhans, R.J., **Sociale implicaties van herstructurering en herhuisvesting**
2005/371 pages/ISBN 90-407-2598-5

7. Kauko, Tom, **Comparing spatial features of urban housing markets. Recent evidence of submarket formation in metropolitan Helsinki and Amsterdam**
2005/163 pages/ISBN 90-407-2618-3

8. Kauko, Tom, **Urban housing pattern in a tide of change. Spatial structure and residential property values in Budapest in a comparative perspective**
2006/142 pages/ISBN 1-58603-679-3

9. Sunikka, Minna Marjaana, **Policies for improving energy efficiency in the European housing stock**
2006/251 pages/ISBN 1-58603-649-1

See next page

10. Hasselaar, Evert, **Health performance of housing. Indicators and tools**
2006/298 pages/ISBN 1-58603-689-0

11. Gruis, Vincent, Henk Visscher and Reinout Kleinhans (eds.), **Sustainable neighbourhood transformation**
2006/158 pages/ISBN 987-1-58603-718-5

12. Trip, Jan Jacob, **What makes a city? Planning for 'quality of place'. The case of high-speed train station area redevelopment**
2007/256 pages/ISBN 978-1-58603-716-1

13. Meijers, Evert, **Synergy in polycentric urban regions. Complementarity, organising capacity and critical mass**
2007/182 pages/ ISBN 978-1-58603-724-6

14. Chen, Yawei, **Shanghai Pudong. Urban development in an era of global-local interaction**
2007/368 pages/ISBN 978-1-58603-747-5

15. Beerepoot, Milou, **Energy policy instruments and technical change in the residential building sector**
2007/238 pages/ISBN 978-1-58603-811-3

16. Guerra Santin, Olivia, **Environmental indicators for building design. Development and application on Mexican dwellings**
2008/124 pages/ISBN 978-1-58603-894-6

17. Van Mossel, Johan Hendrik, **The purchasing of maintenance service delivery in the Dutch social housing sector. Optimising commodity strategies for delivering maintenance services to tenants**
2008/283 pages/ISBN 978-1-58603-877-9

18. Waterhout, Bas, **The institutionalisation of European spatial planning**
2008/226 pages/ISBN 978-1-58603-882-3

19. Koopman, Marnix, Henk-Jan van Mossel and Ad Straub, **Performance measurement in the Dutch social housing sector**
2008/140 pages/ISBN 978-58603-962-2

20. Pal, Anirban, **Planning from the bottom up. Democratic decentralisation in action**
2008/126 pages/ISBN 978-58603-910-3

21. Neuteboom, Peter, **On the rationality of borrowers' behaviour. Comparing risk attitudes of homeowners**
2008/112 pages/ISBN 978-58603-918-9

22. Itard, Laure and Frits Meijer, **Towards a sustainable northern European housing stock. Figures, Facts and future**
2008/226 pages/ISBN 978-58603-977-6

23. Janssen-Jansen, Leonie, Marjolein Spaans and Menno van der Veen, **New instruments in spatial planning. An international perspective on non-financial compensation**
2008/258 pages/ISBN 978-1-58603-978-3

24. Coolen, Henny, **The meaning of dwelling features. Conceptual and methodological issues**
2008/164 pages/ISBN 978-58603-955-4

25. Van Rij, Evelien, **Improving institutions for green landscapes in metropolitan areas**
2008/226 pages/ISBN 978-58603-944-8

26. Van der Veen, Menno, **Contracting for better places. A relational analysis of development agreements in urban development projects**
2009/394 pages/ISBN 978-1-60750-005-6

27. Meesters, Janine, **The meaning of activities in the dwelling and residential environment. A structural approach in people-environment relations**
2009/284 pages/ISBN 978-1-60750-012-4

28. Lux, Martin, **Housing policy and housing finance in the Czech Republic during transition. An example of the schism between the still-living past and the need of reform**
2009/300 pages/ISBN 978-1-60750-058-2

29. Maat, Kees, **Influence of the built environment on car travel. A view on interdependencies: the case of the Netherlands**
2009/174 pages/ISBN 978-1-60750-064-3

30. Van Bueren, Ellen, **Greening governance. An evolutionary approach to policy making for a sustainable built environment**
2009/326 pages/ISBN 978-1-60750-078-0

Copies can be ordered at www.dupress.nl.

Delft Centre for Sustainable Urban Areas carries out research in the field of the built environment and is one of the multidisciplinary research centres at TU Delft. The Delft Research Centres bundle TU Delft's excellent research and provide integrated solutions for today's and tomorrow's problems in society.
OTB Research Institute for Housing, Urban and Mobility Studies and the Faculties of Architecture, Technology, Policy and Management and Civil Engineering and Geosciences participate in this Delft Research Centre.

After twenty years of sustainable building policies, the issue of environmental impact of buildings and urban environments remains. Policy makers still have difficulties addressing the ambiguous, contested and dynamic goals encapsulated in the term 'sustainable development'. How to decide between using zinc or PVC gutters, when knowledge and valuation of environmental risks of both keep changing? How can we accommodate urban growth, now that compact cities turn out to be urban heat islands? 'Greening governance' identifies how policy makers can deal with these contested questions. The book is of interest to policy makers and scientists concerned with both the practical and theoretical issues of sustainable built environments.
'Greening governance' draws on policy network theories that consider stakeholder interaction, negotiation and learning as conditions for policy success. By understanding these conditions from an evolutionary viewpoint it provides a new perspective for governance. The concepts of generative variety, selective retention and regeneration will help policy makers to prioritise and select contested alternatives while also focusing on more long term and ambitious policy goals.

ISBN 978-1-60750-078-0

9 781607 500780

DELFT UNIVERSITY PRESS IS AN IMPRINT OF IOS PRESS