Towards a single European electricity market

A structured approach to regulatory mode decision-making

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 7 mei 2009 om 12:30 uur

door Hanneke Martine DE JONG
bestuurskundig ingenieur
geboren te Bleskensgraaf

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ISBN 978-90-79787-06-7

Printing: Gildeprint Drukkerijen, Enschede

Published and distributed by:
Next Generation Infrastructures Foundation
P.O. Box 5015, 2600 GA Delft, the Netherlands
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I: www.nginfra.nl

This research was funded by the Next Generation Infrastructures Foundation programme.

Keywords: energy, electricity, regulation, European Union, market integration, interconnector investment, congestion management, market transparency, European governance, European modes of regulation, regulatory change

Printed in the Netherlands

In memory of my grandfather

Herman de Jong

ACKNOWLEDGEMENT

First, I would like to thank Professor Margot Weijnen for offering me a Ph.D. position and the opportunity to combine the Ph.D. project with my work for the Dutch Office of Energy Regulation. Furthermore, I thank my committee members for accepting the invitation to participate in my Ph.D. committee. I am especially grateful to my advisor and copromotor Rudi Hakvoort not only for his input and guidance in seeing me through the Ph.D. project but also for all the inspiring conversations about the bigger picture of life.

I am fortunate in having worked with Ruud Vrolijk, Paul Giesbertz, Carel van der Lippe, Paul Meijer, and Machiel Mulder. They all provided valuable input to my work.

The warm and friendly relations between colleagues and the highly multicultural character of our Energy & Industry section made working at the TPM faculty a real pleasure to me. I especially enjoyed the numerous interesting, open, and entertaining discussions during conferences, lunches, and coffee breaks. With respect to my Ph.D. project, I specifically like to mention my energy colleagues Laurens de Vries, Hamilcar Knops, Ype Wijnia, Jeroen de Joode, and Catherine Chiong Meza. Thank you all for being such good sparring-partners! Furthermore, I am very grateful to Angelique Nauta for helping me overcome the various procedural hurdles to my doctoral degree and for being such a nice roommate.

I also want to thank all my close friends for being there. Daan, I have really appreciated our long, nightly conversations on my Ph.D. project as well as on life in general. 'The pie', your friendship and support is invaluable to me. William, I am very grateful for all the IT-support you have given me. Catherine and Amara, thank you for willing to be my two 'paranimfjes'.

Finally, I deeply thank my family for all their love and support, and last, but not least, Bob for his love, support, and patience.

Hanneke de Jong

25-02-2009

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CHAPTER 1

INTRODUCTION

1.1 REASON FOR THIS STUDY

Europe's single market policy

To secure economic prosperity and foster closer relations in post-war Europe, the 1957 Treaty of Rome envisaged the creation of a single European market free of restrictions on the movement of persons, services, goods, and capital within a period of twelve years. However, after attention had been successfully concentrated on the establishment of a common customs tariff (1968), the single market momentum was lost because of an economic recession and a lack of confidence and vision. It was not until 1982 that this momentum was regained. In that year, the Heads of State and Governments once again declared the completion of the single European market as a high priority. Following this declaration, the Single European Act (SEA) of 1987 set the new deadline of 31 December 1992 for the single market's completion.

Towards a single European market for energy

Despite the (new) single market deadline of 31 December 1992, it was only with the publication of the 1995 Green Paper on energy policy that the creation of a single energy market gained momentum. Following this Green Paper, European Directives prescribing the liberalization of energy markets entered into force in the late 1990s. Over the years, several other pieces of energy market legislation have been adopted and political attention has gradually shifted from energy market liberalization towards energy market integration.

The slow electricity market integration process

The opening of the European electricity markets to all customers was completed in 2007. Presently, Europe finds itself in the middle of the process of integrating the liberalized national markets into a single European market for electricity. So far, this market integration process has only developed slowly. Explanations for this slow development commonly focus on technical and economic issues. However, the past decade reveals another factor impeding the electricity market integration process. This factor concerns the processes through which the rules and regulations that govern European electricity markets (and inherently, their integration process) are made. The current unstructured and ad hoc approach of selecting the regulatory mode to apply not only causes delays, it also leads to a situation in which certain key principles of good governance are insufficiently considered and the impression of the EU as a black-box is reinforced.

A structured approach to regulatory mode decision-making

Besides traditional European modes of regulation, such as intergovernmental negotiations (from the late 1940s) and co-decision (from 1993), several new modes of regulation have emerged over the last decades. The different European modes of regulation all have their own features, strengths, and weaknesses. As mentioned above, policy makers largely follow an unstructured and ad hoc approach to select the appropriate mode of regulation to apply, which causes several problems. Therefore, this study focuses on the development of a more structured approach to regulatory mode decision-making (STARMODE). The approach should help policy makers choose between a range of regulatory mode alternatives based on the nature of the issue at hand.

1.2 THE EUROPEAN ELECTRICITY SECTOR AS SUBJECT OF STUDY

Electricity is vital for modern society. Electricity is one of the key drivers of the world economy and runs many activities in our everyday life. Besides its economic and social significance, electricity has several other characteristics distinguishing it from 'ordinary' goods:

- Electricity is (economically) non-storable meaning that production has to equal consumption in all instances of time.
- Electricity is characterized by a relatively inelastic demand.
- Electricity flows take low-resistance paths, making them difficult to predict and control.

In addition, the electricity sector is a network industry like the gas industry, rail transport, and telecommunications. Important features of network industries are (Knops, 2008):

- High capital intensity and thus high investment requirements,
- The network infrastructure plays a key role,
- The goods/services provided by network industries are of vital importance both for other industries and private households and, in general, there are no substitutes, and
- The industry is important with respect to economic growth and national security.

The general approach to network industry liberalization is to introduce competition where possible and to regulate the remaining monopoly activities. With respect to the electricity sector, the initial conception was that electricity could be a 'normal' competitive activity, as long as the network (natural monopoly) was regulated (De Vries, 2004). However, the free market's 'invisible hand' appeared insufficient to establish the envisaged single European market for electricity. Liberalization transformed the electricity sector into a complex technical-economic system facing a variety of regulatory issues.

The multifaceted regulatory challenges attached to the European electricity market liberalization and integration process make this sector particularly interesting with respect to European regulatory mode decision-making. Furthermore, the fact that Europe currently finds itself in the middle of the process of electricity market integration on the one hand implies that experiences to learn from exist. On the other hand, there is still time to apply any lessons learned during the remainder of the integration process.

1.3 SOCIAL AND SCIENTIFIC RELEVANCE

This study fits the 'Next Generation Infrastructures (NGI)' program aimed at improving infrastructures in the way they are developed, operated, and managed. Today's infrastructural issues ask for an interdisciplinary approach. Therefore, scientists of different countries and disciplines have joined forces with parties from the industry to develop and test theories, models, and tools to ensure that our future infrastructures will function at their full potential. This study's social and scientific relevance is discussed by means of the five key NGI research output characteristics, i.e. (i) relevance, (ii) truth, (iii) usefulness, (iv) generality, and (v) innovativeness (Ehrenfeld, 2006).

Relevance: how well does the work fit the needs of the user world?

The rising influence of the European Union manifests itself in both horizontal and vertical sense. Presently, most countries of Europe are part of the European Union. Furthermore, an increasing share of the rules and regulations in force originates, either directly or indirectly, from an EU level. Consequently, gaining insight into the European process of regulation and contributing to its effectiveness and democratic legitimacy is increasingly important. More specifically, this study aims at contributing to a more effective and legitimate electricity market integration process, which is particularly relevant considering the economic and social significance of the electricity sector and the generally agreed objective of creating a single European electricity market.

Truth: how well does the work conform to reality?

This study makes intensive use of empirical material; it uses historical and comparative empirical data, as well as a case study covering three real-life cases. In addition, the study starts from the actually existing European modes of regulation.

Usefulness: do the envisaged users and the academic community learn new practices? Since this thesis particularly aims at being used in practice, it is written in such a way that it is easily accessible for the envisaged problem-owner (the European Commission). The envisaged users may use this study to:

- Gain more insight into the various European modes of regulation and their corresponding features, strengths and weaknesses.
- Make more informed decisions about the 'appropriate' European mode of regulation to apply given a certain (electricity) market integration issue at hand.
- Gain more understanding about:
  - The general process of regulatory change,
  - The assessment of interconnector investment projects and the regulatory issues attached to such projects (results have already been used by the Dutch office of energy regulation while assessing the BritNed interconnector),
  - The effects of introducing a FBMC (flow-based market coupling) congestion management system in the Central-West European region (results have already been used by the Dutch Ministry of Economic Affairs), and
  - The aspects to consider in the process of increasing the level of market transparency (results have already been used within the context of the Central-West European Regional Energy Market).

Scientifically, this study contributes to:

- Theory on European governance. Theory on European governance already includes the recognition that any final evaluation of regulatory modes depends on the weighing of the individual evaluation criteria (the principles of good governance) and that this weighing in turn will be based on the particular policy context as well as on individual and/or cultural preferences. This study goes a step further by analyzing the relation between an issue's specific policy context and the general principles of good governance. Among others, a general inventory is made of characteristics and regulatory needs typical of (electricity) market integration issues and relevant for the process of regulatory mode decision-making (the determination of weight factors).
- Broadening the application area of decision modelling theory. The theory on decision modelling in policy management is normally used with respect to policy related decision-problems (e.g. choosing between various explicit policy alternatives). Alternatively, this study applies the general model of policy decision-making to

regulatory mode decision-making with the general principles of good governance acting as the evaluation criteria.

- The understanding of the complex European electricity system from an international perspective (this knowledge may also be interesting for the envisaged user).
- The understanding of (i) the economic and regulatory aspects of interconnector investment, (ii) the technical and economic aspects of congestion management as well as the various congestion management alternatives, and (iii) the various regulatory aspects related to market transparency (this knowledge may also be interesting for the envisaged user).
- The development of an interdisciplinary approach integrating technical, economic, legal, political, and administrative/institutional issues.

Generality and Innovativeness: how well does the work advance new possibilities and how many will be able to us the work?

The concept of regulatory mode decision-making based on a multi-criteria analysis is in itself not a new concept. However, the structured approach to regulatory mode decision-making (STARMODE) that is established in this study forms a new, explicit tool for the European Commission to apply with respect to regulatory mode decision-making.

The main intention of the STARMODE approach is to create a common, structured, and comprehensive basis for discussing regulatory mode decisions. Furthermore, the approach may help and encourage European policy makers to examine the specific policy context of a certain market integration at hand in a more structured and informed way. By assigning weights in an indirect way, the approach may also stimulate an explicit consideration of all principles of good governance (regulatory mode evaluation criteria), including those related to legitimacy. Finally, the STARMODE approach could contribute to a higher level of European transparency; on the one hand, the European Commission may use the approach to provide a structured and well-founded explanation of why one has decided to apply (or not to apply) a particular regulatory mode. On the other hand, the approach could serve as a frame of reference for the regulated helping and stimulating them to ask the European Commission pointed questions about their regulatory practices.

Given the nature of its basic elements, the STARMODE approach seems generally applicable to (and relevant for) European market integration issues in industries characterized by a natural monopoly and/or an essential service. By adjusting the basic elements of the approach to the changed environment, the general concept of the STARMODE approach could also be applied with respect to national regulatory mode decision-making and multi-state decision-making in other continents.

1.4 READING GUIDE

This thesis is structured as follows.[1] The next chapter first analyses and structures the general process of regulatory change. After this, Chapter 3 formally introduces the research project, defines its research scope and discusses its theoretical framework.

Chapter 4 and 5 analyze the relevant system. Chapter 4 provides a description of the European electricity system and chapter 5 discusses the European electricity market actor network.

Chapter 6-11 concentrate on the regulatory mode decision-making process. Chapter 6 identifies and discusses the various European modes of regulation (*alternatives*) and the general principles of governance (*evaluation criteria*). Subsequently, chapter 7 selects the prominent modes of regulation with respect to the European process of electricity market integration and analyses these prominent modes in terms of the general principles of good governance (*non-weighted scorecard*). By means of a case study (Ch. 8) covering the three cases of interconnector investment (Ch. 9), congestion management (Ch. 10), and market transparency (Ch. 11), chapters 9-11 make an inventory of characteristics and regulatory needs typical of (electricity) market integration issues and relevant for the process of regulatory mode decision-making (*input to the assignment of weight factors).*

Chapter 12 integrates the various building blocks of the regulatory mode decision-making process into the STARMODE approach. In addition, this chapter reviews and tests the approach.

Finally, chapter 13 summarizes the study's main conclusions and reflects upon the STARMODE approach as well as on the European process of electricity market integration.

With respect to the information used and the real-life developments described in this thesis, the date of reference is 1 January 2009.

[1] Based on the overall research framework, section 3.6 provides a more extended overview of this study's structure.

CHAPTER 2

REGULATORY CHANGE

2.1 INTRODUCTION

Industry reform is largely determined by its institutional environment (Glachant and Fignon, 2000). This institutional environment comprises the informal (e.g. values and norms) and formal rules (e.g. laws and regulations) of the game. Since this study particularly focuses on the way in which the institutional environment with respect to European electricity market reform is shaped, this chapter aims at creating awareness of the variety of theoretical explanations with respect to regulatory change. The objective is not to tie this study to a particular theoretical approach. Rather, this chapter attempts to link this study to a wider variety of theories in order:

- To place the subject of study — European regulatory mode decision-making — in the broader context of regulatory change,
- To identify aspects to consider while defining the scope and assumptions underlying this study, and
- To identify aspects to consider while evaluating the process of European regulatory mode decision-making.

Section 2.2 first identifies the various reasons for regulation. After this, section 2.3 gives an overview of the different theories explaining regulation. Special attention is paid to the category of institutional theories. Section 2.4 discusses three key elements of regulatory change i.e. (i) the causes of regulatory change, (ii) the process of regulatory change, and (iii) the outcome of regulatory change. Based on these theoretic insights, a conceptual model of regulatory change is established. The chapter concludes by identifying several aspects to consider with respect to this study's problem definition as well as several aspects to bear in mind while evaluating the process of regulatory mode decision-making.

2.2 REASONS FOR REGULATION

The term regulation has been in defined in a number of ways. The definition of Selznick (1985), i.e. '*sustained and focused control exercised by a public agency over activities that are valued by a community*' has however been referred to as expressing a central meaning

(Baldwin and Cave, 1999). Although, regulation is often considered as restricting undesirable behaviour, the influence of regulation may also be enabling or facilitating.

Various technical justifications, meaning justifications for regulation with a view to the public interest, exist. Baldwin and Cave (1999) identify twelve technical justifications for regulation, which are summarized in Table 1. These twelve justifications for regulation should however be distinguished from *motives* for regulation as these motives could relate to complete different objectives than the pursuit of the public interest (e.g. taking a specific regulatory stance as a means to be re-elected).

Table 1: Technical justifications for regulation

Technical justification for regulation	**Aim of regulation**
Monopolies (natural monopolies)	Counter tendency to raise prices and lower output (Harness the benefits of scale economies)
Windfall profits	Transfer benefits of windfalls from firms to consumers/taxpayers
Externalities	Compel producer or consumer to bear full costs of production rather than pass it on to third parties or society
Information inadequacies	Inform consumers (or other market participants) to allow the market to operate
Continuity and availability of service	Ensure socially desired (or protect minimal) level of essential service
Anti-competitive behaviour	Prevent anti-competitive behaviour
Public goods and moral hazards	Share costs where benefits of activity are shared but free-rider problems exist
Unequal bargaining power	Protect vulnerable interests where the market fails to do so
Scarcity and rationing	Protect public interests with respect to scarce commodities
Distribution justice and social policy	Redistribute wealth or prevent undesirable behaviour
Rationalization and coordination	Secure efficient production in a situation of high transaction costs or standardization
Planning	Protect interests of future generation or coordinate altruistic intentions.

The case of regulation in a sector or industry is often not based on a single but on a combination of rationales. With respect to the European process of electricity market integration, for example, reasons for regulation include:

- *Natural monopolies* (regulation of the electricity transmission service),
- *Information inadequacies* (increasing the level of transparency in electricity wholesale markets),
- *Anti-competitive behaviour* (e.g. vertical unbundling in view of the lack of network investments made by vertically integrated companies),
- *Continuity and availability of service* (e.g. ensuring a minimum level of security of electricity supply), and
- *Rationalization and coordination* (e.g. harmonization of the regulatory framework to facilitate international electricity transactions).

2.3 THEORIES EXPLAINING REGULATION

Most theories explaining regulation are types of interest theory although other views exist as well. Baldwin and Cave (1999) distinguish five categories of theories with respect to regulation, namely (i) Public Interest Theories, (ii) Interest Group Theories, (iii) Private Interest Theories, (iv) Force of Ideas Explanations, and (v) Institutional Theories. Below, these different schools of regulatory theory are shortly discussed.

Public Interest Theories

Public interest theories centre on the idea that those developing regulation do so in pursuit of public interest related objectives (rather than group, sector, or individual self-interests). Regulation would seek the protection and benefit of the public at large (Hantke-Domas, 2003) and the regulatory authorities are considered trustworthy and disinterested. Critics have identified several problems with respect to public interest theories (Baldwin and Cave, 1999), namely:

- It would be difficult to agree on a general conception of public interest.
- The disinterestedness, expertise, competence, and efficiency that the public interests approach attributes to regulators would not hold in practice.
- The influence of economic power, the prevalence of regulatory capture, and the competition for power among groups would be understated.

Interest Group Theories

During the past decades, the interest group theory has grown from an intuitive but loose idea about how the regulatory process works into a serious (competing) explanation of regulatory origin and development (Tollison, 1998). Interest group theorists see regulatory developments as the products of relationships between different groups and between such groups and the state. Contrary to the public theory theorists, they consider regulatory behaviour to be a competition for power (Baldwin and Cave, 1999). The government possesses a number of powerful instruments (e.g. laws, regulations, and taxes) which interest groups seek to control and use in their own interest (Simonis, 2001). Visions that bridge that gab between public interest and group interest theories exist as well. Bernstein (1955), for example, points that although regulatory authorities negotiate with interest groups and other parties, they could still be in pursuit of the public interest. Critics of interest group theories claim that these theories understate the role of private economic power (Baldwin and Cave, 1999).

Private Interest Theories

Private interest theories assume that regulatory developments are driven by the pursuit of private interests. Furthermore, industry (compact, organized interests) tends to be better served by regulation than the more diffused and less organized consumers. Private interest approaches assume that all parties involved in the regulatory process (including politicians and regulators) are well-informed income maximizers (Baldwin and Cave, 1999). The private interest theory is, among others, supported by the work of economists from the Chicago School. They argue that the types of market failure analysed by public interest theory do not necessarily call for government intervention, but can be remedied by the market itself. The cause of market failure would be insufficient freedom for market forces to operate or the absence of a market altogether. The Chicago economists explain the multiplicity of government regulations by pointing out that interest groups ask for rules to protect them from competitors, and that governments are willing to satisfy these requests in return for political support (Simonis, 2001). A problem frequently mentioned with respect to private interest approaches is that parties may lack determinate preferences on political or deregulatory issues and that individuals may behave altruistically in certain respects (Baldwin and Cave, 1999). Furthermore, a lack of information may prevent parties from acting rational. Finally, some critics state that private interest approaches underemphasize the role of groups and institutions (Baldwin and Cave, 1999).

Force of Ideas Explanations

Force of ideas explanations support the notion that ideas (intellectual conceptions that express how and why the government should regulate) possess a force for regulatory development of their own. Examples supporting this category of explanations would be the deregulatory programmes of the Reagan and Thatcher administrations. A problem related to this type of theory is that it may be hard to separate the force of ideas from the role of economic interests. Furthermore, it would be difficult to explain the patchiness of deregulation by means of this approach (Baldwin and Cave, 1999).

Institutional Theories

Institutional theorists centre on the notion that institutional structure and arrangements, as well as social processes, significantly shape regulation. They argue that there is more driving regulatory developments than mere aggregations of individuals' preferences (Baldwin and Cave, 1999, p.27). Institutionalist Douglass North (1990, p.3) defines institutions as '*the rules of the game in a society, or more formally, are the humanly devised constraints that shape human interaction*'. Institutionalists generally believe that institutions are the key elements of any economy. Two schools of institutional theory can be distinguished, that is original and new institutionalism. Below, the main differences between these to schools are discussed in terms of (i) objective, (ii) conceptual perspective, (iii) role of the State, and (iv) the concept of time.

- *Objective*: new institutionalism focuses on getting the formal institutions right or designing the optimal institutional arrangements to coordinate transactions. The performance indicators typically are the firm level of economic performance or, for instance, the level of transaction costs. In contrast, the main objective of original institutionalism is to understand the process of change of and within economic systems. The performance indicators are defined on the level of system performance (Groenewegen en Lemstra, 2007).
- *Conceptual perspective*: new institutionalists assume that individuals are given. Institutions are considered to be humanly devised constraints limiting the behaviour of individuals maximizing utility. New institutionalism generally focuses on the movement from individual to institution (Parada, 2002). Conversely, original institutionalists argue that individual preference functions should not be taken as given and that each individual is born into, and moulded by, a world of pre-existing institutions (Hodgson, 1998). The individual is, among others, shaped by organizational rules, social setting, action, knowledge, principles, norms, and preferences (Baldwin and Cave, 1999). Furthermore, original institutionalists assume a bidirectional relation between individual and institution, where an institution typically is a way of thought or action embedded in the habits of a group or the customs of people (Hamilton, 1932).
- *Role of the State:* new institutionalists like Douglass North propose a specific model of the State (North 1981; Parada, 2002); the State is a discriminating monopoly, which maximizes wealth by trading services (protection and justice) for revenues (taxes).

This behaviour is (only) constrained in view of potential rivals to the ruler. Continuous tensions exist between the ownership structure that maximizes income for the ruler and efficient property rights that reduce transaction costs and promote growth. Original institutionalists do not agree with this view of the State. They claim that it is necessary to examine the role of government in enhancing the life process, whereby the government would not only pay attention to the allocation of resources through market mechanisms, but also to the deployment of resources to achieve collective objectives (Klein, 1994, p.200; Parada, 2002, p.57). In general, it can be concluded that new institutional economists have a more favourable view of markets and a more negative view of the government than original institutional economists (Rutheford 1994, 162).

- *Concept of time*: the way in which one considers the concept of time forms a last important area of difference (Groenewegen en Lemstra, 2007). New institutionalism largely is comparative static searching for optimal end states. Conversely, original institutionalists focus on the dynamic process analysis where history matters. Evolution, path dependency, and revolutions are key concepts within this approach.

2.4 REGULATORY CHANGE

One of the lessons of the last century is that the electricity sector is always in a state of criticality (e.g. induced by topics of security of supply or environmental concerns) and therefore not spared from political interventions on a cyclical basis. Insofar, any theory of a lasting regulatory equilibrium is likely to fail as the regulatory framework is fragile and in a process of constant redefinition (Weinmann, 2007).

Kingston and Caballero (2008) distinguish three key elements of regulatory (institutional) change[2] i.e. (i) the causes of regulatory change, (ii) the process of regulatory change, and (iii) the outcome of regulatory change. This section analyses different views on these key elements of regulatory change in order to construct a conceptual model of regulatory change that places the central focus of this study, i.e. the process of European regulatory mode decision-making, in a broader context.

[2] In this section, the 'institutions-as-rules' approach is applied (cf. Greif, 2006, p.7-8). In contrast, authors associated with the 'equilibrium view' of institutions (cf. Greif, 2006; Aoki, 2001) identify institutions with equilibrium patterns of behaviour rather than with rules (Kingston and Caballero, 2008). Equilibrium view theorists define institutions as '*systems of interrelated rules, beliefs, norms and organizations that together generate regulatory or social behaviour*' (Greif, p.30, p.39).

2.4.1 Causes of regulatory change

Where Libecap (1989) considers that exogenous parameters cause regulatory change, Hood (1994) and Ostrom (2005) recognize both *exogenous* causes, such as technological change, and *endogenous* causes, such as the depletion of resources over time (Ostrom, 2005), bureaucratic failings, or integral deficiencies of strategy (Hood, 1994; Baldwin and Cave, 1999). North (1990) identifies two other categories of regulatory change: *changes in relative prices* and *changes in preferences*. Changes in relative prices include changes in price ratios (e.g. change in the ratio labour to capital, or capital to land), change in the cost of information, and change in technology. Changes in preferences include changes in ideas and ideologies. Changes in relative prices and preferences can be both endogenous (e.g. changes due to the ongoing maximizing efforts of entrepreneurs or due to lessons learned during the play of the game) and exogenous (e.g. changes resulting from scientific contributions, demonstrations, etc).

2.4.2 Process of regulatory change

Processes of regulatory change can be distinguished in two categories (Kingston and Caballero, 2008). Processes in which institutions (rules) are purposefully designed and implemented in a centralized way form the first category. By means of a deliberate change process, actors such as political bodies, intermediary organizations, and economic and political entrepreneurs (North, 1990) are bargaining and making compromises which may directly or indirectly change the institutional environment (*centralized processes*). The second category includes processes in which institutional forms periodically emerge (either at random or through deliberate design) and undergo some kind of decentralized selection process as a consequence of which some (successful) institutions spread through the population, while other (unsuccessful) institutions die out (Kingston and Caballero, 2008). Institutional change occurs 'spontaneously', through the uncoordinated choices of many agents rather than in a centralized and coordinated manner (*evolutionary process*es). Kingston and Caballero (2008) argue that although both the evolutionary and centralized approaches are useful in particular settings, it will often be difficult to cleanly separate the two. For example, deliberate institutional design may reflect gradual underlying changes in parameters, beliefs, or knowledge, which result from the spontaneous evolution of the existing institutions over time (Kingston and Caballero, 2008, p.2).

Path dependency and lock-in effects

Various authors emphasize the role of path dependency in the overall process of regulatory change. They argue that path dependency manifests itself in various ways:

- From a *macro* perspective, the process of regulatory change displays path dependency because it is often easier to achieve consensus on small adjustments than on major changes (Libecap, 1989; North, 1990).
- From a *meso* perspective, existing institutions influence the bargaining strength of different parties and often create groups with a vested interest in preserving the status quo (Libecap, 1989).
- From a *micro* perspective, one may also observe path dependent characteristics. North (1990, p.95-96) draws attention to the fact that if markets are incomplete, the information feedback is poor, and the transaction costs are significant, the subjective models of actors are shaped by imperfect feedback and by ideology. In such situations, the historically derived perceptions of the actors shape the choices they make.
- Changes in relative prices may display path dependent characteristics as well, for example with respect to the path dependent character of technological change (Arthur, 1988).

North (1990) argues that besides path dependency, lock-in effects characterize the process of regulatory change; once a certain institutional environment is established, it is difficult to exit from.

Mental models and bounded rationality

North (1990) notices that whereas increasing returns is an essential ingredient to both technological and institutional change, mental models of actors play a more central role in institutional than in technological change. According to Ostrom (2005, p.105) mental models are affected by at least two basic sources i.e. (i) feedback from the world (information on the system and on actual outcomes), and (ii) the shared culture or belief system in which an individual is embedded. Individuals learn from experience and from (developed through communication) shared mental models (Ostrom, 2005. p.106). The degree to which outcomes are consistent with intentions will reflect the degree to which these models are true models (North, 1990).

Inefficient regulatory outcomes may result from the bounded rationality of actors (Ostrom, 2005); individuals often make choices based on incomplete information and have limited capacity (or capability) to absorb relevant information (Simon, 1961). In this respect North (2005, p.24) argues: "it is not the rationality assumption that is wrong rather it is that it does not provide us with a guide to understanding the choices humans make in a variety of crucial contexts that are fundamental for the process of change." Recognizing their bounded rationality, actors may try to learn about the likely effects of a change for example by experimenting with institutional innovations or by imitating successful institutions observed elsewhere; the overall pattern of institutional change may thus have, although change is deliberate, an evolutionary character.

2.4.3 Outcome of regulatory change

The outcome of the (deliberate) regulatory change process may lead to a change in the institutional environment (the rules of the game).

Formal versus informal rules

North (1990) distinguishes formal rules from informal rules. *Formal rules* are deliberately designed prescriptions concerning what actions (or outcomes) are required, prohibited, or permitted (Ostrom, 2005). Formal rules have a double hierarchical character. First, regarding the level of specification (North, 1990) and secondly regarding the way in which rules are nested in another set of rules that define how the first set of rules can be changed (Ostrom, 2005). *Informal rules* (e.g. codes of conduct, norms of behaviour, and conventions) have arisen to coordinate repeated human interaction and more specifically consists of: (i) extensions, elaborations and modifications of formal rules, (ii) socially sanctioned norms of behaviour, and (iii) internally enforced standards of conduct (North, 1990, p.40).

Interaction formal and informal rules

With respect to the interaction between informal and formal rules, the final scheme (North, 1990; Fiori, 2002) seems to be bidirectional; on the one hand, formal rules derive from a (slow) transformation of informal ones and on the other, informal rules are integrated and extended by formal rules.

Increasing impact of contingencies

For the most part, formal rules change through a political process as a result of deliberate action by organizations and individual entrepreneurs (North, 1990). Although informal rules normally change slowly by means of a non-deliberate process including accidents and learning (gradualistic view, North, 1990), the anti-gradualistic view (Fiori, 2002) on regulatory change argues that informal rules are changing more and more rapidly as a result of the increased social complexity and the acceleration of historical experience (acceleration of information). As informal rules change at a different rate than formal rules, a conflict may be developed between informal and formal rules (North, 1990). Fiori (2002) argues that this conflict could lead to unforeseen results, i.e. different from a linear extension from one kind of rule to another. The more rules conflict and the more traditions and norms are weakened, the more certain events (contingencies) and some new formal constraints determine the direction of change (Fiori, 2002).

2.4.4 Conceptual model of regulatory change

To construct a conceptual model of regulatory change, Williamson's (1998, p.25) four-layer model of institutions (see Annex 1) is taken as a starting point. The four layers of Williamson's model are reduced to two layers. The institutional environment, or in other words, the rules of the game (Williamson's levels 1 & 2), forms the top layer. The institutional environment is the context in which decisions on governance structures and day-to-day business are taken. This context consists of both unwritten rules, such as values and norms, and rules that are explicit, such as laws and regulations (Groenewegen en Lemstra, 2007). Therefore, one may argue that the institutional environment includes both informal and formal rules. The second layer comprises the play of the game (Williamson's levels 3 & 4).

Considering the two layers defined above, the basic process of regulatory change seems to be as follows: the present market situation (play of the game) is experienced and observed by the actors operating or involved in the market. Based on these experiences and observations or other, more exogenous, causes, actors are triggered to change the institutional environment (the rules of the game) in such a way that the new environment either contributes to their individual interests or to a certain collective objective.

Figure 1 provides a conceptual model of regulatory change based on the two layers of institutions defined above (the rules of the game and the play of the game) and the preceding discussion on the three main elements of regulatory change i.e. the causes, the process, and the outcome of regulatory change. In terms of this conceptual model of regulatory change, this study particularly concentrates on the way in which one selects a certain 'deliberate change process (*European mode of regulation*)'.

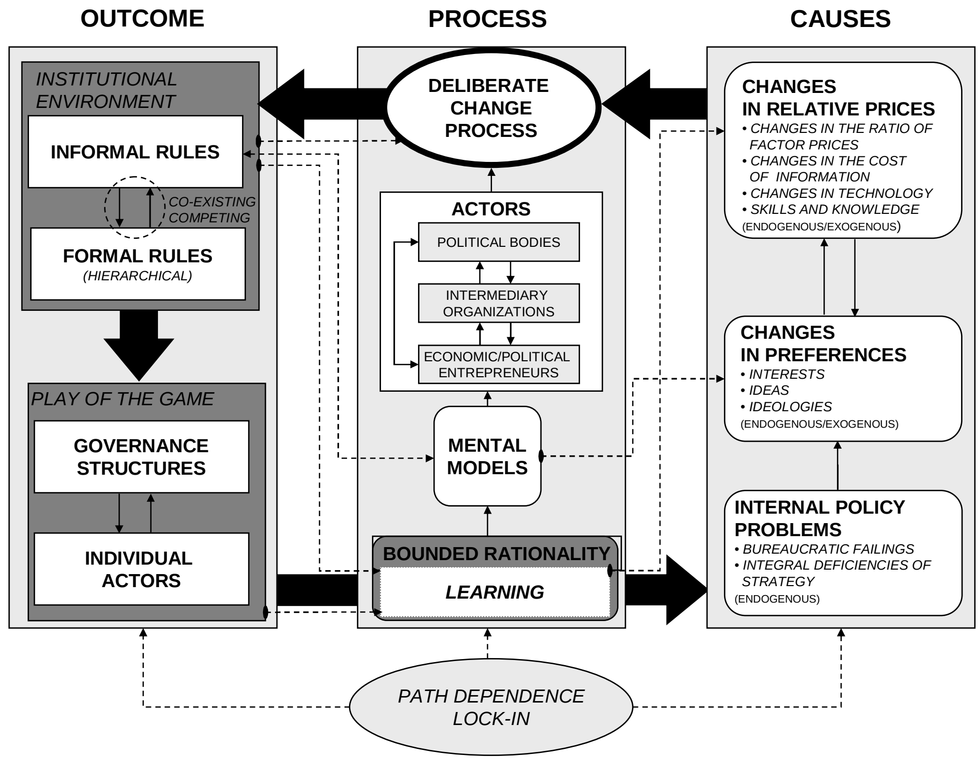

Figure 1: Conceptual model of regulatory change

2.5 CONCLUSIONS

This chapter placed the subject of study — European regulatory mode decision-making — in the broader context of regulatory change. Furthermore, this chapter identified several aspects to consider while defining the scope and assumptions underlying this study, namely:

- What is the assumed role of the state? With respect to this study, both the role of the state on a European level and the role of the state on a national level should be defined.
- What is the assumed framework of interest of the other relevant actors?
- Is, with respect to the process of regulatory change, a centralized or an evolutionary approach applied?
- Does the study focus on the establishment of formal rules, informal rules, or both?

Finally, this chapter provided several aspects to bear in mind while evaluating the process of European regulatory mode decision-making, including the possible existence of bounded rationality, learning effects, path dependency, lock-in effects, and regulatory capture.

CHAPTER 3

RESEARCH FRAMEWORK

3.1 INTRODUCTION

This chapter describes the research framework. The next section defines the problem central to this study and the corresponding research goal. The central problem owner, the scope of research, and the main assumptions are described in section 3.3. The basic theoretical framework underlying this study is presented in section 3.4. This framework is applied to the research goal from which the research questions are derived in section 3.5. The chapter concludes by discussing the research method and overall research structure.

3.2 PROBLEM DEFINITION AND RESEARCH GOAL

The adoption of EU Directive 96/92/EC, which was issued in 1996, initiated the liberalization of the various national electricity markets in the European Union. In the following period from 1996 until today, political attention has gradually shifted from market liberalization towards market integration. Although the liberalization of the national European electricity markets is a necessary condition for the creation of a single European electricity market, it appears far from sufficient.

Presently, Europe finds itself in the middle of the process of integrating the liberalized national electricity markets into a single European market. So far, this market integration process has only developed slowly. Explanations for this slow progress commonly focus on technical or economic issues, such as a lack of transmission network capacity for facilitating international trade and the monopolistic structure of several national electricity markets (European Commission, 2004; DG Competition, 2007). Indeed, these issues impede the integration process. However, an analysis of the past decade reveals another factor slowing down the market integration process.

This factor concerns the processes through which the rules and regulations that govern European electricity markets (and inherently, their integration process) — the so-called European modes of regulation — are established. Currently, although one may observe an implicit process of evolutionary learning, these modes of regulation are not well thought through in advance. Policy makers largely follow a trial-and-error approach to find the appropriate mode of regulation in the sense of being conducive to tackle a certain market integration issue in an effective way. This unstructured, ad hoc approach of regulatory mode selection may lead to several problems.

In the first place, the continuous, unstructured search for the most appropriate regulatory mode to apply may form a rather inconspicuous but important factor slowing down the market integration process. <u>Today's trial-and-error 'strategy'</u> of shifting from one regulatory mode to another <u>is time-consuming</u>. Sometimes the dynamics of the issue at stake may require a shift in regulatory mode. However, as this study will show, changes may also result from the fact that the regulatory mode initially applied simply turns out not be appropriate given the specific characteristics and/or the regulatory needs of the issue at stake.

A second problem that may appear as a result of today's unstructured and ad hoc regulatory mode selecting process is that <u>certain key principles of good governance are insufficiently considered</u>. For example, the pressure to make headway with the market integration process by using new, flexible, and rather discretionary modes of regulation may push elements related to legitimacy, such as public mandate, substantive equality and accountability (too much) into the background (cf. Lavrijssen-Heijmans, 2006).

Finally, the fact that today's regulatory mode selection process is a rather subconscious and unstructured process inevitably leads to the situation in which <u>European regulatory processes are experienced as vague, intransparent, and illegitimate</u> by 'outside' stakeholder as well as by the general public. Given the fact that the European Union (hereafter: EU) already has the image of being a 'black-box' (cf. Baldwin and Cave, 1999), such regulatory mode selection process might add to the EU's image problem. In order to avoid this development, the relevant decision maker should make transparent in what way the various principles of good governance are taken into account (cf. good governance code, Lavrijssen-Heijmans, 2006).

Therefore the main research goal of this study is:

> To develop ***a structured approach to European regulatory mode decision-making*** in order to enable and encourage the European Commission to make more *informed* decisions, on an ex ante basis, about the way in which it creates the rules and regulations that govern the European electricity markets and inherently, their integration process.

In this context '*informed*' means: explicitly (and verifiably) taking into account the various principles of good governance given the specific characteristics and regulatory needs of the market integration issue at stake.

3.3 PROBLEM OWNER AND RESEARCH SCOPE

3.3.1 Central problem owner

By proposing and adopting Directive 96/92/EC, the European Commission and the Council of the European Union formally confirmed their objective to liberalize European electricity markets and to create a (true) single European market for electricity. In its strategy paper of 2004, the European Commission again underlined its desire to integrate the different national electricity markets (European Commission, 2004). Although the choice of regulatory mode is undoubtedly influenced by other stakeholders, this study assumes that the regulatory mode selection process is primarily performed by the body having the powers in proposing European regulation i.e. *the European Commission* (see chapter 5). Any political games with respect to this selection process are ignored. Consequently, *the European Commission* is defined as the central problem owner.

3.3.2 Basic elements of scope

Subject of study

This study focuses on *the process of European regulatory mode decision-making in view of the European policy objective of integrating the various national electricity markets into a single European market for electricity*. Inter alia, based on the lessons that can be learned from this integration process so far, a structured approach to European regulatory mode decision-making is established. Although, the primary aim of this study is that the European Commission is enabled to use this approach during the remainder of the electricity market integration process, *mutatis mutandis,* this approach may also be applied to European (market) integration processes in other fields than electricity.

Geographical dimension

Although this study is based on the European Union's policy objective of market integration (and mostly focuses on the multi-level regulatory organization of the EU), this study considers the whole continent of Europe. With respect to the electricity sector, the EU cannot be isolated from the rest of Europe; strong technical and economic interrelations exist between electricity systems within and outside the European Union (cf. chapter 4 and 5).

Time span of study

The time span of study is approximately the coming two decades. In that period the European electricity market integration process is intended to be completed to a large extent.

Research perspective

This study is primarily performed from an administrative/policy perspective. However, as this study specifically focuses on how a market integration issue's technical or economic characteristics can be taken into account in the process of regulatory mode decision-making, a technical or economic pair of glasses is regularly put on.

Figure 2 summarizes this basic scope of study. The existing legal/regulatory framework constrains the electricity market. While the market develops, it produces new information and brings on certain regulatory needs. The problem owner, given its objective to integrate markets, selects the regulatory process by which the regulatory framework that governs the market can be adapted.

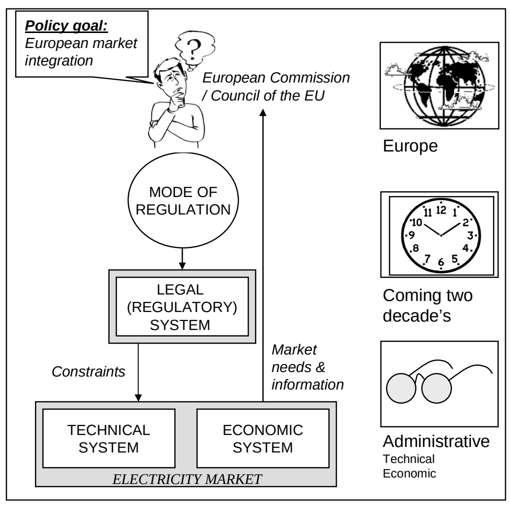

Figure 2: Basic scope of research

3.3.3 Other elements of scope

Institutional level of scope

The European electricity system distinguishes four main institutional levels, namely (i) the supranational level, (ii) the international level, (iii) the national level, and (iv) the local level (intra-national). This study aims at the institutional space between the national level and the supranational level. National modes of regulation and existing national rules and regulations are only taken into account insofar they influence the institutional levels above (see Figure 3, below).

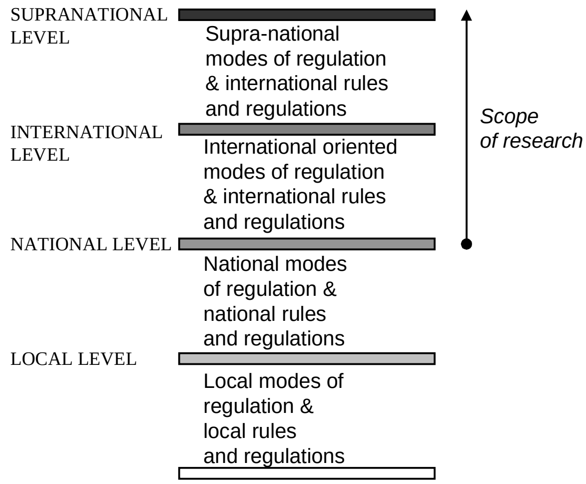

Figure 3: Institutional level of scope

Assumed framework of interest of the central problem owner

One may argue that besides their publicly announced policy goals, European policy makers may have their own agenda, only pay attention to the allocation of resources through market mechanisms, and/or try to maximize their own income (cf. section 2.3, *North's view of the state*). This study assumes that (only) the generally agreed criteria of good governance shape the problem owner's (the European Commission) framework of interest. The problem owner acts in pursuit of the European public interest (cf. section 2.3, *public interest perspective*). Other possible interests of the central problem owner and their influences on the regulatory mode selection process are not considered.

Assumed framework of interest of the other relevant actors

National governments (and national regulatory authorities) are assumed to act in pursuit of the public interest of their country. Market and regulated parties are assumed to act in pursuit of their own private interests (cf. section 2.3, *private interest perspective*).

Process of regulatory change

The process of regulatory change (see section 2.4.2) is considered a centralized deliberate process in which the European Commission (in pursuit of the European public interest) negotiates with interest groups, national governments, and other parties (cf. section 2.3, *interest group perspective*).

Regulatory process versus regulatory contents

This study does not focus on what rules and regulations[3] should be made (regulatory contents, cf. Knops, 2008) but examines the way in which (how) these rules and regulations are developed and established (regulatory process). Furthermore, the scope of this study is limited to the formal rules of the game (cf. section 2.4.3, *formal versus informal rules*).

3.4 THEORETICAL FRAMEWORK: DECISION MODELLING IN POLICYMAKING

3.4.1 Introduction

The last decades have experienced new challenges that call for analysts who are able to bridge the gap between engineering systems and policy decision-making processes, both for the public and private sector. In response to this call, Delft University of Technology introduced the first European faculty of Systems Engineering, Policy analysis and Management (SEPA) in 1993. At this faculty professor Beroggi launched the concept of Decision Modelling in Policy Management. At that time no classical textbook covered or approached this concept of decision modelling in policy management (Beroggi, 1999).

The underlying approach of decision modelling in policy management is based on three premises (Beroggi, 1999):

- *Policy problems*: the increased complexity of technological systems with societal impact calls for analytical support of decision and policy making.
- *Analytic tools*: the large arsenal of analytical tools in decision and policy analysis can be presented from a problem-solving perspective.
- *Information systems*: advanced information systems provide the technological basis for making analytical tools accessible for managers and decision makers.

Beroggi (2001) argues that problem-solving within a policy environment refers to two aspects. The first is the need to understand processes and relations in the system (system analysis). The second refers to problem-solving also referred to as (policy) decision analysis. However, policy management is not merely a scientific-analytic task (Heineman *et al.*, 1997). In general, all stages of policy decision-making are influenced by the decision makers and other stakeholders all having their own mental model and interests. This adds a political, subjective, and sometimes irrational dimension to the problem-solving process. Policy management is therefore a process of learning and understanding,

[3] Nevertheless, the study does consider specific regulatory needs in a broad sense because they influence the regulatory mode decision-making process.

of problem evaluating and problem redefining, and of goal formulation and strategy changing (Beroggi, 1999, p.3).

The complexity of policy problems with societal impacts calls for a subtle interaction between conceptual and analytic modelling concepts. The value of any decision proposed by a policy analysis study is not only determined by its content but also by the process that leads to the decision (Beroggi, 2001. p.349). Consequently, the goal is not so much to find the 'best' solution but to find an acceptable one; that is, a satisfying solution (Simon, 1972). Therefore modelling in policymaking must focus on transparency (and flexibility) rather than on automation and rationality (Beroggi, 2001).

Considering the main research goal underlying this thesis, namely *to develop a structured approach to European regulatory mode decision-making*, one may, in general terms, conclude that such an approach should support policy makers who are confronted with a certain policy related *decision problem*. In other words, the approach should serve as a 'manual' to go through the regulatory mode *decision-making process* in a structured and informed way. In view of the above, *decision modelling in policy management* appears to provide a solid theoretical basis for this study.

3.4.2 Conceptual model of policy decision-making

Figure 4 visualizes the relation between the problem-solving process and its corresponding decision-making process.

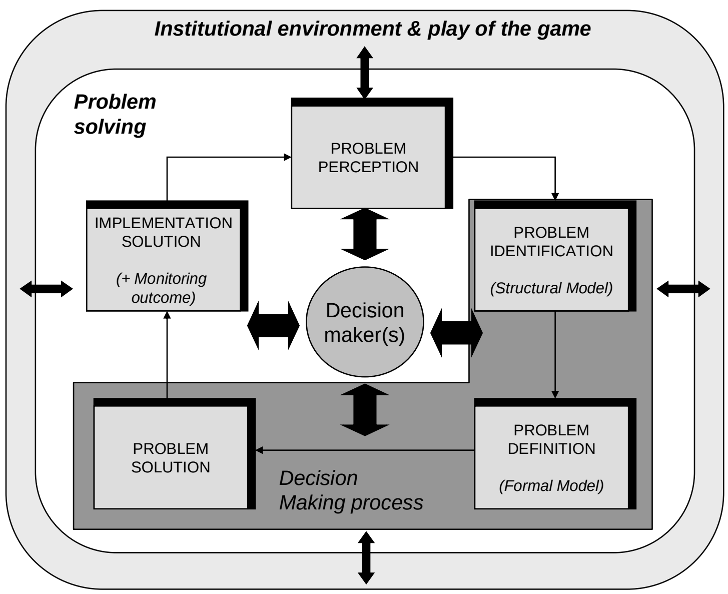

Figure 4: Problem-solving and decision-making process in policy management
(Based on: Beroggi, 1999, p.4)

The underlying approach of decision modelling in policy management divides the (analytic) decision-making process in three main steps (Beroggi, 1999, p.xix).

In the first step, the problem is identified by translating an observer's mental model of a real-world decision problem into a structural model. This model illustrates the main elements of the decision-making process and their relations.

In the second step, the identified problem is defined by deriving a formal model that specifies the elements and relations that were identified in the structural model.

In the third step, the defined problem is solved by specifying a resolution model.

The problem-solving process in policy planning is a cycle with iterations and feedbacks within the five steps (see Figure 4), the environment, and the decision maker(s). Problem identification, problem definition and problem-solving make up the decision process, which is a sub-sequence of the problem-solving process (Beroggi, 1999, p.4).

Problem identification: structural modelling

The decision-making process step of problem identification is the conceptualization phase of the problem-solving process. The purpose of this step is to identify the relevant elements of the decision-making process (and their relations). One starts from a graph that structures these elements and their relations. Figure 5 is a general example of such a structural model. Six main elements of decision modelling can be distinguished, namely (i) alternatives, (ii) criteria, (iii) scenarios, (iv) content goals, (v) structural goals, and (vi) decision makers.

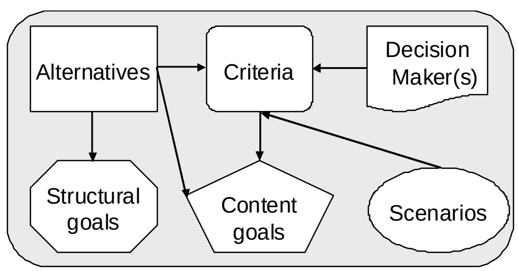

Figure 5: General structural model
(Based on: Beroggi, 1999, p.40)
(An arrow from one element (predecessor) to another (successor) means that the successor element is defined in terms of the predecessor element)

Alternatives

Alternatives are the potential solutions to a certain decision problem. Depending on the type of solution, alternatives are referred to as policies, strategies, actions, etc. Several approaches for identifying alternatives ('solution space') exist including experimentation, status quo analysis, literature review, comparison of real world experiences, brainstorming, development of typologies, etc (Patton and Sawicki, 1993). Alternatives may be explicitly defined but could also be implicitly defined in terms of constraints (cf. constraint-optimization problems). Beroggi (1999, p.14) distinguishes three types of alternatives (decision variables):

- *Binary decision variables* (take or leave the action, e.g. selection of certain project)
- *Integer decision variables* (e.g. the number of people assigned to a project)
- *Real decision variables* (e.g. the time spent on a project)

Criteria

One evaluates decision alternatives with respect to different criteria. In general, one is able to describe alternatives by a set of characteristics (attributes). A criterion may then be defined as '*an important characteristic of an alternative, expressed in terms of some attributes, which implies increasing or decreasing preferences*' (Beroggi, 1999, p.10). One uses evaluation measures to evaluate the alternatives with respect to the criteria defined. An evaluation measure may be defined as '*a value expressed on some scale which reflects preferences for alternatives*'. The two main types of measurement scales are:

- *Linguistic scales*
  - Categorical, e.g. profile of employee in terms of smart, ambitious, aggressive, etc
  - Ordinal (implies a preference order), e.g. medium air pollution is preferred to high air pollution
- *Numerical scales*

Decision maker(s)

Actors who actively participate in the decision-making process by assessing the decision options and having a say in the choice process are the *decision makers*. Actors who are not decision makers, but are affected by the decision, are referred to as *stakeholders*. One refers to group decision-making when multiple decision makers are willing to accept formal processes to reach a consensus and are sharing a common objective. One refers to a conflict situation when each of the decision makers can choose from his/her own set of alternatives and the preference for an alternative depends also on the strategies of other decision makers. This situation is also referred to as a game setting.

Structural goals

Structural goals refer to the structure or form of the decision options (Beroggi, 1999, p.12). They could explicitly refer to decision options (e.g. choose two actions) or to content goals (e.g. consider only one out of 'm' content goals).

Content goals

From the identification of the problem, one may derive the high-level decision objective(s). An example of such a high-level objective could be selecting an appropriate construction site (cf. design goal (Knops, 2008, p.32)). On a lower level, a content goal may be defined as '*an explicit description of preferences for finding a solution, expressed in terms of criteria (e.g. minimize costs), or referring to the alternatives (e.g. choose at least two suitable sites)*'. Content goals serve to rank the alternatives (cf. design objective (Knops, 2008, p.32)). Besides aspirations, which indicate directions of increasing preference (e.g. minimize costs), contents goals could be constraints, which reflect a minimum necessary requirement that a solution must satisfy (e.g. costs should be smaller than 20 million Euro).

Scenario's

One may define a scenario as '*an uncertain condition of the system that cannot be influenced by the decision maker*'. Scenarios are often described in terms of partitions and their states in which every partition encompasses the total space of uncertainty. However, unlike scenarios, every partition encompasses only fragmented information about an uncertain situation (Beroggi, p.149). For example, one partition could be the weather (sun or rain) and another partition could be system safety (safe or unsafe). Partitions may also be interdependent. In decision analysis literature, three levels of problem-solving under uncertainty are distinguished (Beroggi, 1999):

- *Certainty:* one can evaluate the alternatives without consideration of any scenarios.
- *Informed uncertainty (risk):* one must evaluate alternatives with consideration of scenarios; the chance of occurrence of each scenario can be quantified with probability or possibility values.
- *Complete uncertainty:* one must evaluate alternatives with considerations of some scenarios of which the chance of occurrence cannot be quantified.

Problem definition: formal modelling

The decision-making process step of *problem definition* means specifying the elements and the relationships as identified in the structural model. A major part of the formal model is to formalize the evaluation of alternatives. Two important elements of this evaluation are (i) the determination of the relative weights of the criteria, and (ii) specifying the basic approach to ranking the alternatives.

Criteria and weights

The most fundamental way to express the importance of criteria is to determine the weight of each criterion. A weight expresses the relative importance of a criterion over all other criteria. The sum of the weights equals one. There are several ways to determine weights. The most fundamental way is to determine the preference order of the criteria. One way to arrive at this preference order is through interactive paired assessment. Annex 2 discusses how a paired assessment of criteria can be performed.

As a complete paired assessment of all criteria can be quite labour intensive for a large number of criteria[4], more straightforward procedures to assess the weights of criteria are used in practice. For example, one may use a scale from 0 to 100 to assign to each criterion a preference intensity $k_i \in [0,100]$ where a high value corresponds to a high importance for criterion c_i. These preference intensities are then normalized by dividing them by the sum of all preference intensities; this yields the weights. One may also distribute a fix value, for example 100, among all criteria. The downside of such simplified approaches is that the decision maker does not really compare all the criteria to one another.

Alternatives and ranking

<u>Descriptive assessment</u>

When the solution to a decision problem consists of a preference order, one may apply a pair wise approach similar to the assessment of the weights of criteria (see Annex 2). A descriptive preference elicitation approach is based on paired preference comparisons of the alternatives for each criterion. Accordingly, the definition of the binary relations is of major consideration in a descriptive problem-solving method. As apposed to criteria and weights, *paired comparisons for alternatives are done in two regards*: to assess the *dominance* of each alternative over the others, and to assess the *inferiority* of each alternative over the others. Therefore, the descriptive assessment aims not only at a preference ranking but also at a dis-preference ranking. The combination of the two ranks, or their aggregation, leads to the overall preference order of the alternatives (Beroggi, 1999, p.88). Annex 3 illustrates the process of a descriptive assessment by means of an example.

The descriptive approach of decision-making is known as the *European school* of decision-making. This school focuses more on the process of preference elicitation and preference ranking and less on rational behavioural aspects of human decision-making, as opposed to the axiomatic normative preference elicitation theories (Beroggi, 1999, p.88) discussed below. This normative approach is referred to as the *American school* of decision-making.

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[4] Maximum number of assessments to rank m criteria equals $(m^2-m)/2$.

Normative assessment

Normative preference elicitation means to assess a decision maker's subjective preference function (that captures the decision maker's multi-criteria preference profile). With this function, all evaluation values can be transformed into subjective preference values (Beroggi, 1999, p.89). One assumes that the decision maker's subjective preference structure can be captured by an m-dimensional preference function (the m-dimensional value function). One determines a m-dimensional value function v(a) in terms of m component value functions $v_i(e_i)$ (for criterion c_i). However, this can only be done if preferential independence across the components (criteria, attributes) holds (see Beroggi, 1999, p.120). A (component) value function is a subjective formalization of the preference structure for a specific decision maker (e.g. regarding the costs of two alternatives; the value of 60 Euro = 0.2 and the value of 40 Euro = 0.7). Although it is subjective, the decision maker must comply with a set of axioms (see Beroggi, 1999, p.116). If a decision maker complies with these axioms, this decision maker is said to be rational and a value function exists which captures his subjective preference function.

The normative approach of decision-making under certainty is known as *value theory* while under uncertainty it is known as *utility theory* (Beroggi, 1999, p.174). Utility theory is the basis for e.g. game theory. In general, normative approaches are criticized in view to the fact that they are based on the assumption of rational decision makers. Regarding descriptive approaches, a major theoretical problem is the possibility of rank reversals when adding near replicas of alternatives (see '*resolution modelling',* below), and a crucial practical shortcoming is the large number of necessary assessments (Beroggi, 1999, p.90). To minimize the limiting factors of any preference elicitation method, it is important to involve the decision maker, keep the methods transparent, and perform sensitivity analysis (Beroggi, 1999).

Solving the defined decision problem: resolution modelling

A resolution model is a description of how to solve the formalized (defined) problem (Beroggi, 1999, p.53). A resolution model can be specified at different levels of detail. At the most general level, the resolution model provides an approach to the whole problem-solving process (resolution map). Resolution models also refer to specific search strategies. Finding a solution to a certain decision problem involves a search process and an appropriate search strategy. Any search strategy must be tailored to the structure and form of a decision problem. Beroggi (1999, p.31) identifies *five common types of problems* for which special search strategies have been devised:

- *Ranking a finite set of explicit alternatives:* rank all elements (alternatives, criteria, or decision makers) from most to least preferred. For example, rank various construction projects.
- *Constraint-optimization with implicit alternatives:* find only the most preferred alternatives. For example, search for the optimal work-shift schedule.
- *Clustering of alternatives:* find all efficient alternatives. For example, search for non-dominated alternatives that can be presented for further analysis.
- *Optimization of finite set of sequential actions:* find a policy consisting of a chronologically ordered sequence of actions. For example, sequential investment policies.
- *Resolution of conflicts among decision makers:* find a solution that satisfies all decision makers. For example, resolution of conflicts in a conflict situation or the search for a solution in a strictly competitive setting.

Every solution to a decision problem has a certain *stability* (or sensitivity). This stability is determined by how *sensitive* the solution is to changes in the assumptions, parameters, evaluation values, preference elicitations, etc (Beroggi, 1999, p.31). Descriptive assessments, for example, are based on paired comparisons. Consequently, if a new element (alternative, criterion, scenario or decision maker) is added, the original ranking of the alternatives might change. In general, there are three main causes of instability (Beroggi, 1999, p.104-105):

- *Structural instability:* refers to rank reversal in the preference order of alternatives. If an alternative is added or deleted, the preference order of the other alternatives may change (especially if a near replica is added). One alternative A 'takes more away' from alternative B than from C.
- *Functional instability:* refers to rank reversal due to dependencies between criteria and alternatives. The additive model (preference or value aggregation) is based, among others, on the assumption that preferences for criteria are independent of the alternatives.
- *Numerical instability:* refers to rank reversal that occurs as a result of changes in the weights of criteria or the evaluation values of the alternatives.

Structural and numerical instability are not necessarily flaws in the model.

Verification and validation

After the translation of the problem perception (mental model) in a structural, formal, and resolution model, this model must be verified. Verification means to check if the mental model has been correctly translated into the 'analytic model' used within the decision-making process. In other words, one must check whether the structure represents the system, whether the formal definition describes the structure and whether the resolution approach can lead to the envisioned type of solution (Beroggi, 1999, p.37).

In short, validation of the model concerns testing to what extend the (decision) model may be used and to what extent it is useful for its purpose (Knops, 2008). It has a more 'external' character as it assesses how well the (theoretical) method corresponds to the real world phenomena it concerns, and to what extent the method can actually help for the purpose it has been developed for (Knops, 2008). In this respect, one may answer the following three questions (cf. Knops, 2008, p.419):

- Is the method practicable? (Can the method easily be applied in practice?)
- Is the method useful with respect to its goal?
- What is the scope of applicability of the method?

3.4.3 Conceptual model as applied to research goal

As discussed above, the basic process of policy decision-making can be divided in three main steps: (i) problem identification (structural model), (ii) problem definition (formal model), and (iii) problem-solving (resolution model). Below, these three main steps of the policy decision-making process are translated in terms of this study and its corresponding research goal. Based on this concretization, the next section derives the main research questions underlying this study.

Problem identification: structural modelling

The general problem perception (see Figure 4) with respect to this study is that the central problem owner — from a regulatory perspective — must cope with various complex electricity market integration issues. The challenge is to select a mode of regulation through which the specific market integration issue at hand can be tackled in an effective way, while ensuring a sufficient level of legitimacy (cf. Simon, 1972; Beroggi, 2001: a satisfying solution). Below, the six elements of decision modelling (see Figure 5, page 26) are applied to this study's research goal.

Alternatives

As discussed above, alternatives are the potential solutions to a certain decision problem. Concerning this study, the various European modes of regulation form the (binary) alternatives. Since the establishment of a new and official European mode of regulation is difficult and most likely requires an amendment to the EC Treaty, the number of alternatives is assumed to be fixed. Consequently, the alternatives are formed by today's *existing European modes of regulation*.

Criteria

One evaluates the decision alternatives with respect to different criteria. Considering the assumptions made on the decision maker's (problem owner's) framework of interest (see section 3.3.3), the evaluation criteria are formed by the general principles of good governance covering both effectiveness and legitimacy. As discussed above, an evaluation measure may be defined as '*a value expressed on some scale which reflects preferences for alternatives*'. An appropriate type of measurement scale regarding the principles (criteria) of good governance is an *ordinal linguistic scale* (e.g. a *good* score on the criteria of public mandate is preferred to a *medium* score).

Structural goals

Structural goals refer to the structure or form of the decision options. With respect to the regulatory mode decision process under investigation, the structural goal may be defined as '*choosing one alternative (or a combination of alternatives*[5]*)*'.

Content goals

A content goal states how the alternatives should perform with respect to the criteria. For regulatory mode decision processes, the content goal may be defined as '*maximizing (subjective) preference'*. The preference order of the alternatives is determined by a certain preference elicitation approach (see '*formal modelling*', below).

Decision maker(s)

Decision makers are the actors who actively participate in the decision-making process by assessing the decision options and having a say in the choice process. As discussed in section 3.3.1, this study assumes that the regulatory mode selecting process is solely performed by the European Commission. Consequently, this study's central problem owner and the relevant decision maker in the decision-making process under investigation are one and the same.

Scenarios

Although the decision maker may choose to evaluate the regulatory mode alternatives with consideration of some scenarios, for the purpose of this study it is assumed that no scenarios are used during the regulatory mode decision-making process.

Figure 6 summarizes the six main elements of decision modelling (structural model) as applied to this study.

[5] Some modes of regulation naturally go together with another mode of regulation (see chapter 6).

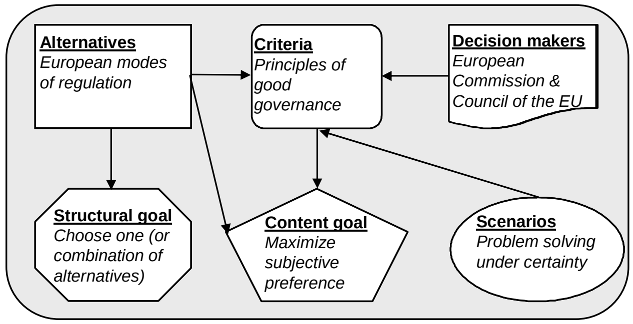


Figure 6: General structural model applied to this study

Problem definition: formal modelling

The decision-making process step of *problem definition* means specifying the elements and relationships as identified in the structural model. Regarding the structural model applied to this study (see Figure 6), the alternatives (the existing European modes of regulation) and the criteria (the general principles of good governance) need to be specified.

As discussed above, a major part of the formal model is to formalize the evaluation of alternatives. Two important elements of this evaluation are (i) determination of the relative weights of the evaluation criteria, and (ii) specification of the basic approach to ranking the alternatives. Considering the context of this study, it seems impossible to capture the decision maker's subjective preference profile by some kind of m-dimensional preference function. Therefore the study starts from the concept of *descriptive preference assessment.*

In such a descriptive assessment, the final preference order of the alternatives (weighted preference matrix) is based on both a dominance and an inferiority analysis (see section 3.4.2 and Annex 3). The weighted dominance and inferiority matrices are derived from (i) the non-weighted scorecard, indicating the non-weighted scores of alternatives in terms of the criteria defined, and (ii) the relative weights of the individual evaluation criteria.

The non-weighted scorecard may be constructed after a thorough evaluation of the various alternatives with respect to the criteria defined. For this study this means that the various modes of regulation must be evaluated in terms of the various principles of good governance. The relative weights of the evaluation criteria form another input to preference determination. Ultimately, the decision maker decides on these weights. In addition to any *scenarios* and the *mental model* (individual or cultural preferences) of the decision maker, an important aspect influencing the choice of weights is the issue-specific *policy context* (cf. Knill and Lenschow, 2003). This study specifically focuses on the complex relation between a market integration issue's policy context and the regulatory mode evaluation criteria (the principles of good governance). The specific features of a certain market integration issue at hand may strongly influence the decision maker's perception on which principle of good governance is most important while evaluating different regulatory mode alternatives. As previously discussed, this study largely ignores the influence of the decision maker's specific mental model and does not take into account any scenarios. Figure 7 summarizes the discussion above in an orderly figure.

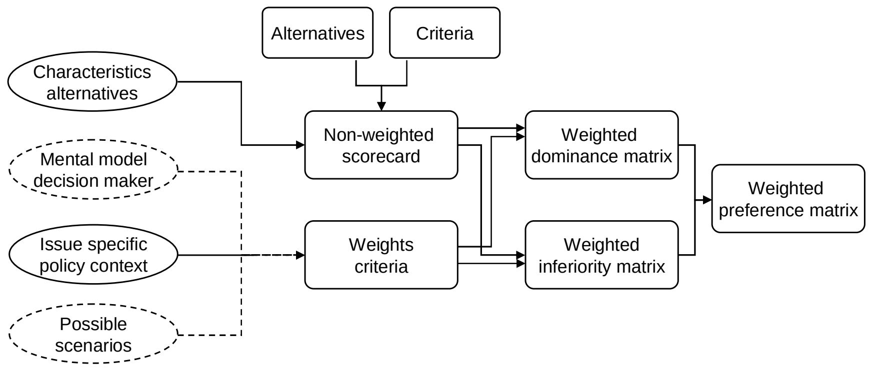


Figure 7: Descriptive preference assessment

Solving the defined decision problem: resolution modelling

A resolution model is a description of how to solve the defined problem. It provides an approach (including an appropriate solution search strategy) to the whole problem-solving process. In this respect, this study's main research goal of 'developing a structured approach to European regulatory mode decision-making', could be rephrased as 'establishing a structured <u>resolution model</u> with respect to the process of European regulatory mode decision-making'.

In terms of Beroggi's general types of problems (see section 3.4.2), this study deals with the problem of 'ranking a finite set of explicit alternatives (European modes of regulation)'.

In order to derive the relevant research questions with a view to this study's main research goal, an overall research framework is constructed below. Section 3.4.1 identified two main aspects of problem-solving within a policy environment, namely (i) the need to understand processes and relations in the system (*system analysis*), and (ii) going through the decision-making process (*decision analysis*). These two aspects form the basis of the overall research framework.

System analysis

Considering this study's research goal and scope, it is useful to analyse the European electricity system and its corresponding relevant actor network before specifically going into the subject of regulatory mode decision-making.

Decision analysis

Figure 7 showed the aspects relevant for a *descriptive preference assessment*. These aspects form the main building blocks for the resolution model (resolution approach). This study aims at filling in as many building blocks as possible to provide the problem owner with the input to make more informed regulatory mode decisions. Figure 8 presents the building blocks (decision elements) to be provided by this study within a bold frame. These elements are:

- *The alternatives* (existing European modes of regulation)
- *The evaluation criteria* (general principles of good governance)
- *A non-weighted scorecard* (an evaluation of the European modes of regulation in terms of the general principles of good governance)
- *Input to the assignment of weight factors (*an analysis of the relation between a market integration issue's specific policy context and the general principles of good governance)

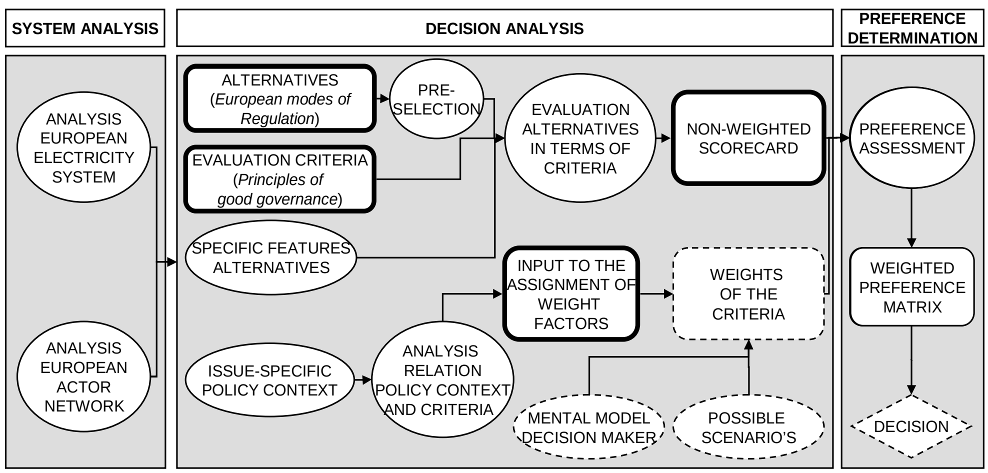


Figure 8: Overall research framework

As discussed above, the decision maker eventually decides on the weights of the evaluation criteria and performs the final preference assessment (see Figure 8, *dotted elements*).[6] However, increased insight into the relation between an issue's specific policy context and the relevant evaluation criteria enables and may encourage the decision

[6] One may argue that the decision maker himself also determines the alternatives, criteria, and the non-weighted scorecard. Although the decision maker is obviously free to consider these elements in the way he wishes, this study already fills in these elements to provide the decision maker with as much input as possible. In this way, the decision maker can concentrate on assigning weights to the evaluation criteria.

maker to make more informed decisions on the relative weights he assigns to the individual evaluation criteria.

The non-weighted scorecard and the relative weights of the evaluation criteria make up the inputs to the final preference determination. As discussed in section 3.4.2 (see also Annex 3), a neat assessment is done in two regards; one not only makes a preference ranking but also a dis-preference ranking. The combination of the two ranks leads to the overall preference order of the alternatives. Based on this final weighted preference overview, the decision maker can make his final decision on which regulatory mode to apply.

3.5 RESEARCH QUESTIONS

Based on the overall research framework discussed above, the following research questions can be derived:

System analysis

Considering the scope of study:

1. How can the European electricity system be described and who are the main actors within this system?

Decision analysis

Considering the scope of study:

2. What are the relevant alternatives (existing European modes of regulation) and evaluation criteria (general principles of good governance) in view of the process of European regulatory mode decision-making?
3. What are the most prominent modes of regulation in view of the European process of electricity market integration and how do these prominent modes of regulation perform on the evaluation criteria (general principles of good governance)?
4. What features typical of market integration issues and relevant for the process of regulatory mode decision making can be identified and how can the relation between these features and the general principles of good governance be described?
5. Can a structured approach to European regulatory mode decision-making (STARMODE) be established, and if yes, is the approach considered useful with respect to its goal?

3.6 RESEARCH METHOD AND STRUCTURE

1. How can the European electricity system be described and who are the main actors within this system?

With respect to the scope of study, the European electricity system is analysed from an international perspective. A distinction is made between the technical and economic international subsystems of the European electricity system. Furthermore, the multi-level legal subsystem is discussed as well as the relevant interdependencies between the technical and economic subsystem (Ch.4). Finally, the key actors in the European process of electricity market integration are identified as well as their main interests (Ch.5).

2. What are the relevant alternatives (the existing European modes of regulation) and evaluation criteria (the general principles of good governance) in view of the process of European regulatory mode decision-making?

Based on scientific and official literature on European governance, the various existing traditional and new European modes of regulation are identified and discussed. Furthermore, an inventory is made of the general principles of good governance (Ch.6).

3. What are the most prominent modes of regulation in view of the European process of electricity market integration and how do these prominent modes of regulation perform on the regulatory mode evaluation criteria?

To establish a non-weighted scorecard of the alternatives (existing European modes of regulation) in terms of the evaluation criteria (general principles of good governance), a preselection of alternatives is conducted; the prominent modes of regulation in view of the European process of electricity market integration are selected by analysing the extent to which the various (traditional and new) European modes of regulation are and/or have been applied in this process. After a general assessment of the main differences between the prominent modes of regulation, the specific features of these modes of regulation are evaluated in more detail, namely in terms of the general principles of good governance. This descriptive evaluation is based on insights gained through both scientific and official literature and leads to the non-weighted scorecard (Ch.7).

4. What features typical of market integration issues and relevant for the process of regulatory mode decision making can be identified and how can the relation between these features and the regulatory mode evaluation criteria be described?

By means of a case study, a general inventory of features typical of (electricity) market integration issues and relevant for the process of regulatory mode decision-making is made. Two categories of relevant features are distinguished: (i) characteristics typical of electricity market integration issues, and (ii) regulatory needs typical of electricity market integration issues. Three different cases are explored covering three important electricity market integration issues, namely (i) *interconnector investment*, (ii) *congestion management*, and (iii) *market transparency.*[7] The objective is to stimulate the decision maker to translate the nature of the market integration issue at stake into such features before assigning a particular weight to a regulatory mode evaluation criterion (Ch.8-11).

After a general inventory is made of characteristics and regulatory needs typical of (electricity) market integration issues and relevant for the process of regulatory mode decision-making, 'profiles' are defined (by the author) explicating the relation between the various characteristics/regulatory needs and the general principles of good governance. Given a certain market integration issue at hand, these profiles enable the decision maker to assign weights to the regulatory mode evaluation criteria in a more structured and informed way (Ch.12).

5. Can a structured approach to European regulatory mode decision-making (STARMODE) be established, and if yes, is the approach considered useful with respect to its goal?

The various building blocks of the regulatory mode decision-making process, i.e. (i) the European modes of regulation (*alternatives*), (ii) the general principles of good governance (*evaluation criteria*), (iii) the evaluation of the European modes of regulation in terms of the general principles of good governance (*the non-weighted scorecard)*, and (iv) the inventory of features typical of (electricity) market integration issues and relevant for the process of regulatory mode decision-making along with the profiles describing the relation between these features and the general principles of good governance (*input to the assignment of weight factors*), together form the structured approach to regulatory mode decision-making (STARMODE).

To facilitate the actual application of the STARMODE approach, a decision support tool is built in Microsoft Excel. In this tool, the general inventory of the characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making is translated into a set of explicit questions. By means of these questions, a decision maker may indicate which features he considers relevant with respect to the market integration issue at hand and how important he judges these relevant features. Based on this input of the decision maker, the STARMODE tool automatically computes the weights of the regulatory mode evaluation criteria and provides the final preference order of the regulatory mode alternatives.

As a final step, the STARMODE approach is tested en reviewed (verification and validation) by putting the approach into practice (Ch.12).

[7] Chapter 8 discusses the chosen research strategy of a case study in more detail.

Figure 9 shows the resulting structure of this study.

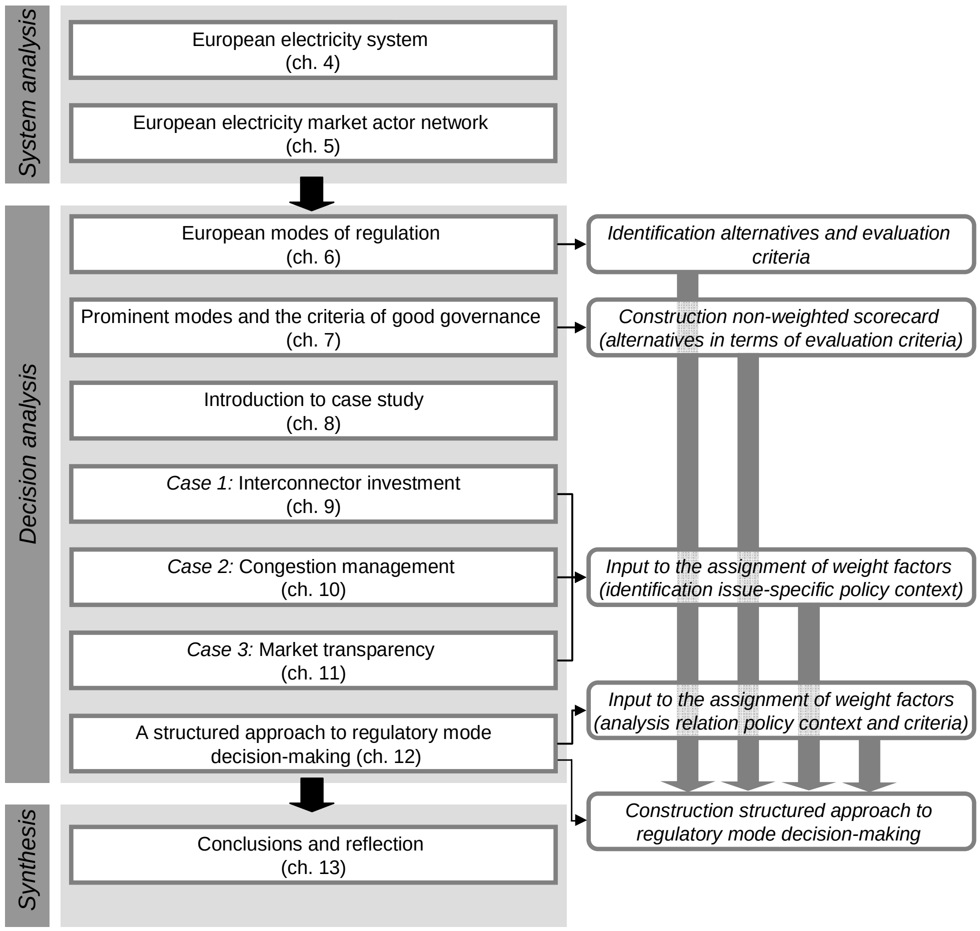
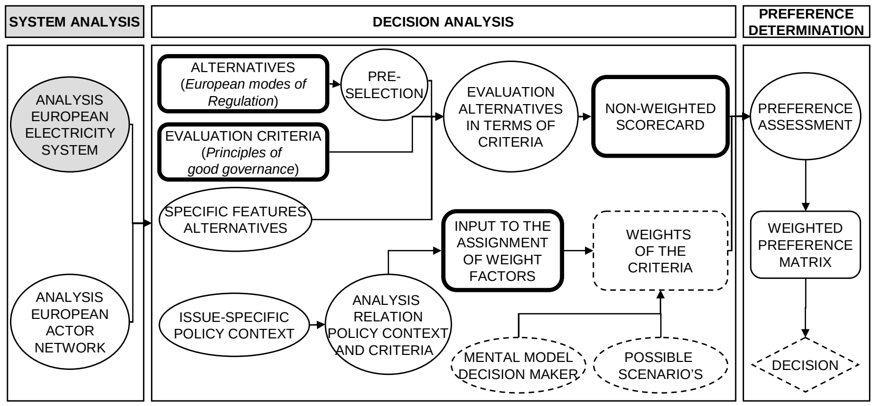


Figure 9: Structure of this study

By means of Figure 8 (page 36), the beginning of each chapter indicates which specific part of the overall research framework is covered in that particular chapter.

CHAPTER 4

THE EUROPEAN ELECTRICITY SYSTEM



4.1 INTRODUCTION

To reach this study's research objective, a good understanding of the European electricity system is a necessity. The term 'electricity system' is used to indicate the entire complex related to electricity supply (Knops, 2008). Various authors already underlined the importance of analysing the technical, economic, and legal (regulatory) subsystem of the electricity system as well as their interrelations (cf. De Vries, 2004; Knops, 2008). However, with respect to this study, not only the rather complex technical, economic, and legal subsystem of the European electricity system play an important role but also its international dimension. Therefore, this chapter analyses the European electricity system from an international perspective (see Figure 10).

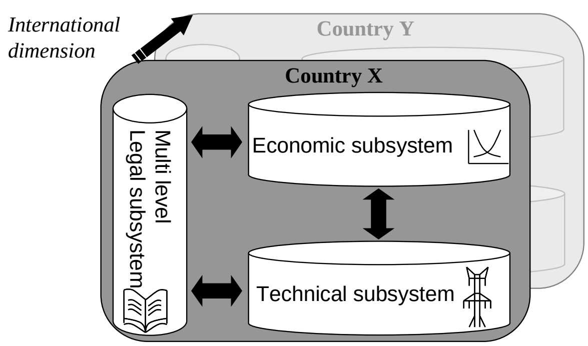


Figure 10: Basic European electricity system from an international perspective

Considering the European electricity system, sections 4.2 and 4.3 discuss the technical and the economic international subsystem, respectively. After this, the interdependencies between these two subsystems are identified. The last section of this chapter (section 4.5) examines the multi-level legal (regulatory) subsystem. An analysis of the relevant actor network also forms an important element of the system analysis. The next chapter, chapter 5, discusses the relevant actor network in view of the scope of study.

4.2 TECHNICAL INTERNATIONAL SUBSYSTEM

The technical international subsystem consists of the physical elements that produce (**generators**), transport (**transmission and distribution networks**), and consume (**loads**) electric energy as well as the technical operation of these elements. Normally, generators supply electricity to the transmission network. The electricity flows from the transmission network into the distribution network. Loads, apparatus that use electric energy, extract the electricity from the distribution grid. However, some generators supply electricity directly to the distribution grid (e.g. solar panels, small wind turbines and small gas turbines) and some (large) loads directly extract electric energy from the transmission network.

Two main operational functions are needed to manage the technical international subsystem, namely **transmission operation** (TO) and **system operation** (SO). TO includes the activities of owning, operating and maintaining the transmission network and connecting distribution networks, consumers, and generators. SO comprises the tasks of maintaining system stability and managing the energy balance in real-time, as the network itself cannot store electricity. Actual demand and supply almost always deviate from the amounts that were contracted by market parties. Therefore the energy balance must continuously be managed. Besides some long(er) term reserve contracts, this energy balance is normally maintained by means of energy bids (e.g. to produce more or to consume less) submitted by market parties in the **balancing market**. In this respect, one may argue that the activity of maintaining system balance could also be interpreted as an element of the economic subsystem. However, since balancing markets have arisen from the technical need to maintain the system balance, they are included in the technical (international) subsystem. In Europe, the activities of TO en SO are normally joined in one agency, the Transmission System Operator (TSO).

From a technical, international perspective, TSOs together bear the responsibility for **maintaining international transmission service reliability**. Neighbouring national transmission networks are connected by *international transmission links*, the so-called **interconnectors**. Neighbouring TSOs together determine (calculate) the amount of international transmission capacity (interconnector capacity) that is safely available for international trading purposes. Besides maintaining transmission service reliability, TSOs are responsible for **maintaining the international power balance**.

Figure 11 shows a model of the technical international subsystem as described above.

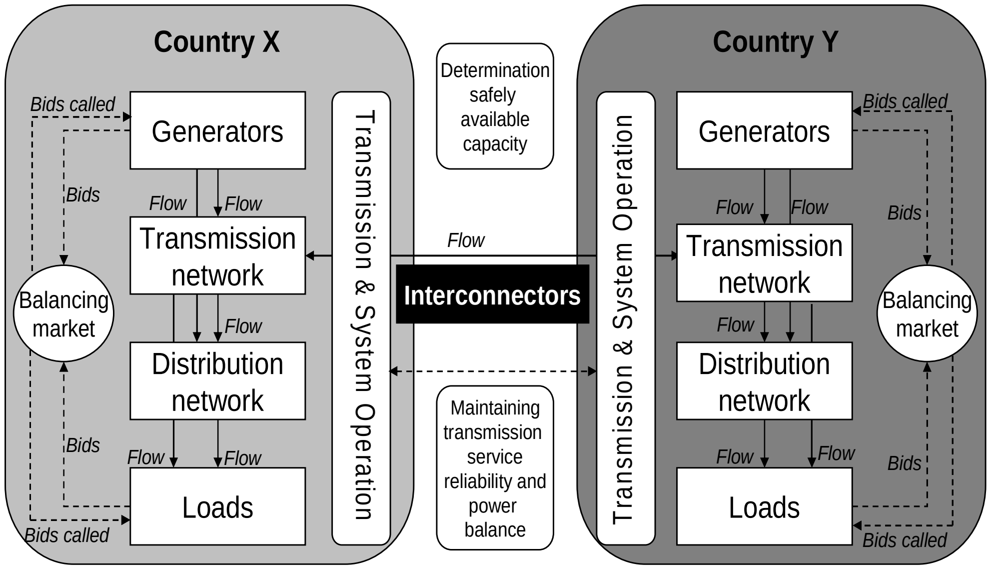


Figure 11: Technical international subsystem

4.3 ECONOMIC INTERNATIONAL SUBSYSTEM

Before electricity market liberalization in the 1990s, utility companies owned the electricity networks as well as the generation facilities. Sometimes they controlled the entire production chain from generation to retail as shown in Figure 12 below.

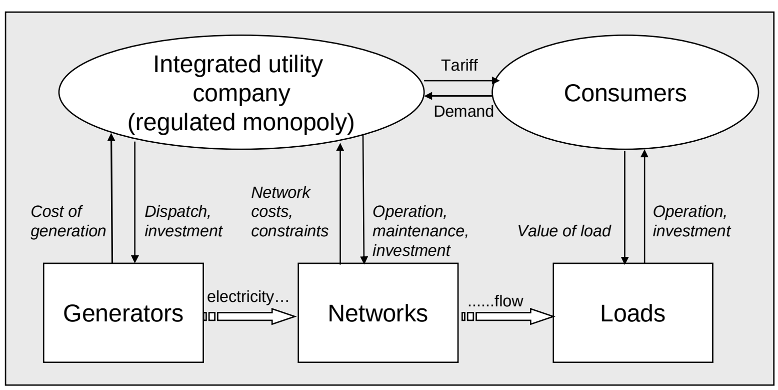


Figure 12: The electricity system before liberalization
(Based on: De Vries, 2004, p.26)

In other cases, different companies provided the various electricity services. Key is, however, that all services were provided by regulated monopolies (De Vries, 2004, p.26). Furthermore, no such thing as an international market for electricity existed. Although interconnectors already existed, the various national electricity systems were only connected for the purpose of mutual assistance and, in some cases, with a view to carry out long term import/export contracts.

Liberalization broke up the economic electricity subsystem and created a new economic layer on top of the technical subsystem. This economic layer covers the trading of goods and services related to electricity including the corresponding (contractual) relations in the electricity system (Knops, 2008). In European countries, the vertically integrated electricity production chain has been unbundled by order of the European Union although to quite different extents.

As shown in Figure 13, four main elements can be distinguished within today's economic electricity subsystem, namely (i) electricity **generation**, (ii) electricity **trade**, (iii) electricity **supply**, and (iv) electricity **consumption**.

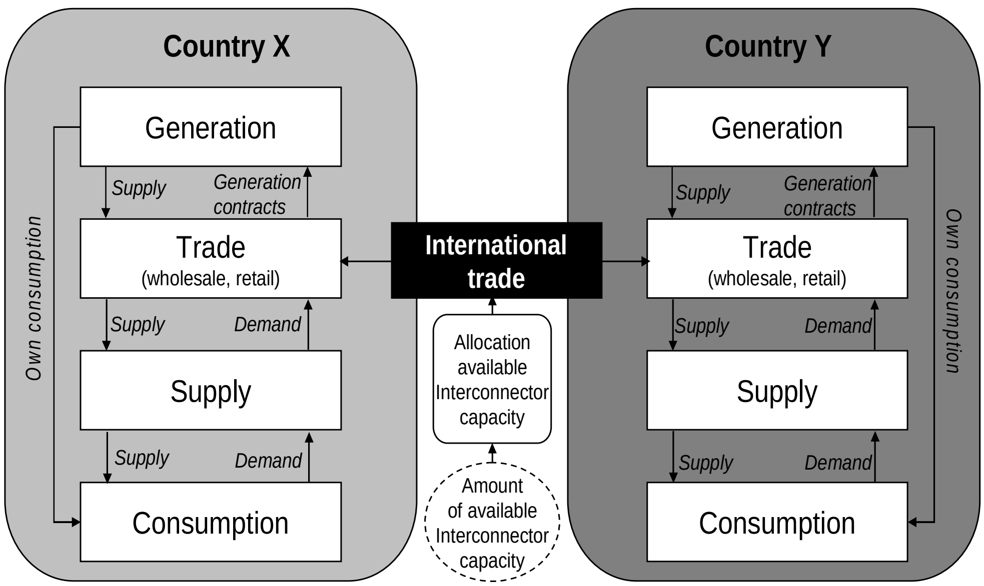


Figure 13: Economic international subsystem

Two fundamentally different types of electricity markets exist: integrated and decentralized markets (Hunt, 2002). In integrated markets generator companies are required to offer all their electricity to a central pool from which consumers (supply companies) obtain their electricity. The pool operator combines the functions of system operator and market operator; he takes care of both the economic matching of supply and demand as well as the physical balancing of the system (De Vries, 2004, p.28-29). In decentralized markets (which are more commonly applied in Europe) contracts between consumers and producers determine the dispatch of generation. Market parties can conclude electricity contracts *bilaterally*, make use of a *broker*, or trade by means of a *power exchange*. The system operator has no involvement with the dispatch of generators except with respect to the balancing market (see section 4.2) or when congestion management appears to be necessary. *Congestion* means a situation in which the electricity network cannot accommodate all physical flows resulting from the scheduled electricity transactions because of a lack of capacity of the transmission network concerned.

In Europe, the pricing system with respect to the service of national transmission differs from the system applied with respect to the service of international transmission. The national transmission pricing system is often based on the so-called postage stamp method.[8] Transmission users pay a regulated tariff based on their electricity consumption (kWh) and/or the capacity of their connection (kW), regardless of where the electricity is coming from or going to. The TSO is responsible for solving any internal congestion and, if necessary, the corrective measures are paid out of the regulated transmission tariffs. In contrast, if electricity is imported from or exported to another country (international transmission), the safely available capacity is determined in advance. An auction normally determines who may use this available capacity as well as the price to pay.

From an international economic perspective, interconnectors have become the heart of the desired single European market for electricity (De Jong, 2004). Without interconnectors, electricity trade between different national electricity markets is not physically possible. However, the perception that the European electricity networks are a 'copper plate' is a myth (De Vries, 2004). Network congestion may occur. In other words, the **amount of safely available interconnector capacity**[9] determines the possibilities for **international trade**. The system operator (TSO) allocates the calculated amount of available interconnector capacity (see previous section) to market participants. In Europe, one mostly uses an auction based **interconnector capacity allocation** system (see also chapter 10, *congestion management*).

[8] However, in the UK, for example, locational signals have been included in the national pricing system.
[9] The maximum capacity that can be used for trading purposes without affecting system security minus the capacity reserved in order to cope with uncertainties concerning future network conditions.

4.4 TECHNICAL AND ECONOMIC SUBSYSTEM: INTERRELATIONS

The restructuring of the European electricity sector aiming at the creation of a single European market has brought a significant shift in perspective. Currently, the economic subsystem takes prevalence over the technical system (Knops, 2008). However, the technical system influences and constrains market activities and, vice versa, the economic subsystem largely determines the technical operation of the system. For example, congestions in the electricity network may influence market outcomes with respect to both electricity prices and trading volumes. On the other hand, market outcomes determine the dispatch of generators and, on a longer term, the need for network investments. Figure 14 visualizes the (short-term) interdependencies between the economic and technical international subsystem. Depending on the exact network tariff structure, generator companies and consumers pay a regulated **network tariff** to the TSO for their use of the (national) electricity network. Furthermore, market participants receive or pay money according to their influence on the system balance (**imbalance settlement**). Information about the scheduled supply and demand in the form of **energy programs** is needed for both transmission (to identify possible congestions) and system operation (to identify a possible imbalance between demand and supply).

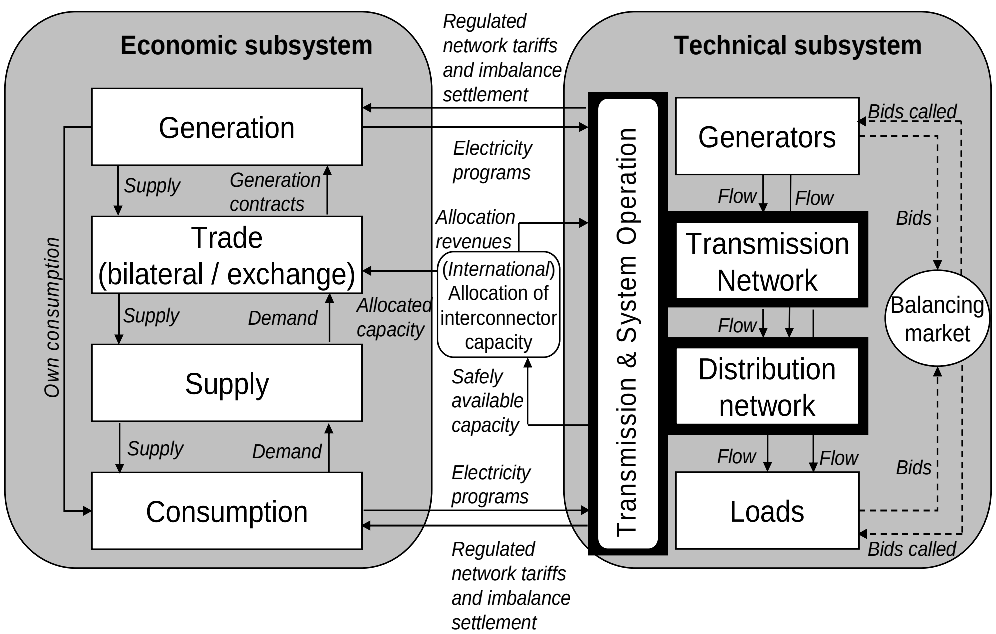


Figure 14: Interdependencies technical and economic international subsystem

From an international perspective, important interrelations between the economic and the technical subsystem exist as well. As discussed above, TSOs calculate the (technical) interconnector **capacity safely available for market transactions**. Subsequently, this **capacity is allocated** to the market based on the willingness to pay for this capacity, which normally is determined by means of an auction mechanism (see section 4.3). The resulting **allocation (auction) revenues** flow back to the TSOs and may be used for lowering the regulated tariffs or for financing network investments.

4.5 THE MULTI-LEVEL LEGAL SUBSYSTEM

4.5.1 Hierarchical composition of the European legal framework

Legal organization is a means to achieve, *inter alia*, the desired performance of an industry by influencing actor behaviour (cf. Knops, 2008). Ostrom (2005) defines rules in the legal sense as "*enforced prescriptions concerning what actions (or outcomes) are required, prohibited, or permitted*". Hart (1994) makes a distinction between two types of such 'regulatory' rules: rules of the *primary type* under which persons are required to do or to abstain from certain actions (operational rules) and rules of the *secondary type* which provide that persons may introduce new rules of the primary type, extinguish or modify old ones, or in various ways determine their incidence or control their operation. Rules of the first type confer duties, rules of the second type confer powers (Knops, 2008, p.68). Ostrom (2005) further divides these *second type* rules into *collective-choice rules*, which are the rules for changing the operational rules, and *constitutional rules,* which are the rules for choosing collective-choice rules.

North (1990) looks at the concept of rules in a different way and distinguishes four levels of rules from general rules to particular specifications; (i) *constitutions,* (ii) *statute and common laws*, (iii) *specific bylaws*, (iv) and *individual contracts*. Figure 15, below, translates this hierarchic perspective on rules into a multi-layer model of the European Union's legal framework.

The European Union is based on the rule of law; everything that the EU does is derived from the **EU treaties**, which are agreed on by all its member states. The EU treaties form the basic constitutional rules of the European Union.

There are three main types of binding EU legislation. **EU Regulations** are directly binding upon member states and do not need any implementation. **EU Directives** are addressed to member states, which, in turn, need to implement the directive in their national legislation. The last type of EU legislation is formed by **EU Decisions.** EU Decisions are not of general application, but only apply to the particular addressee of the decision. In addition to these binding legal instruments, the European Commission may formulate *recommendations* or deliver *opinions*. However, such recommendations and opinions have neither binding force nor direct effect.

On a national level, one may distinguish **national primary legislation** (parliamentary acts) from **national secondary legislation** (for example, a Ministerial order or decisions of a self-governing body).

Besides the establishment of governmental oriented rules, rules are made by the market itself and laid down in **private contracts** (e.g. consumer supply contracts). **Sector self-regulation** (e.g. TSO-TSO regulation) may be considered a special application of such private contracts.

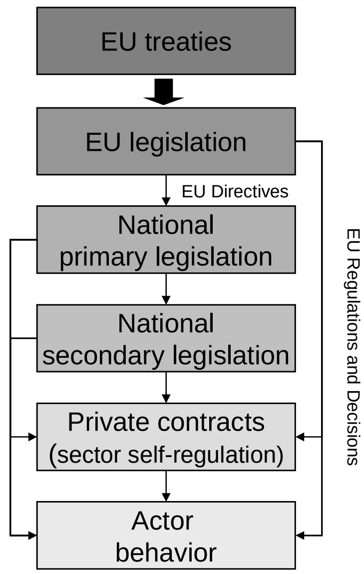


Figure 15: Multi-level legal subsystem

4.5.2 Current structure EU legislation

European legislation concerning electricity markets has evolved gradually in the last 10-15 years. De facto, all currently existing legislation originates from the European Treaty of Rome (1957), which enables the European Council — on proposal of the European Commission — to adopt legal measures in order to create an internal market for electricity.

In 1996, Directive 96/92/EC concerning common rules for the internal market in electricity initiated the liberalization of the European electricity sector. Directive 2003/54/EC repealed the 1996 Directive in 2003. Today, Directive 2003/54/EC is considered the key European legislation to establish the internal electricity market. The Directive contains important provisions on for example market opening, market structure (unbundling), and regulated network access (Directive, 2003).

Besides the 'umbrella' Directive 2003/54/2003, the European legislative structure concerning electricity (wholesale) markets consists of four key areas of interest[10]: (i) *security of supply (and trans-European networks)*, (ii) *cross-border exchange*, (iii) *market transparency,* and (iv) *regulatory procedures and organization*. Figure 16 visualizes this legislative structure as well as the corresponding legal instruments.

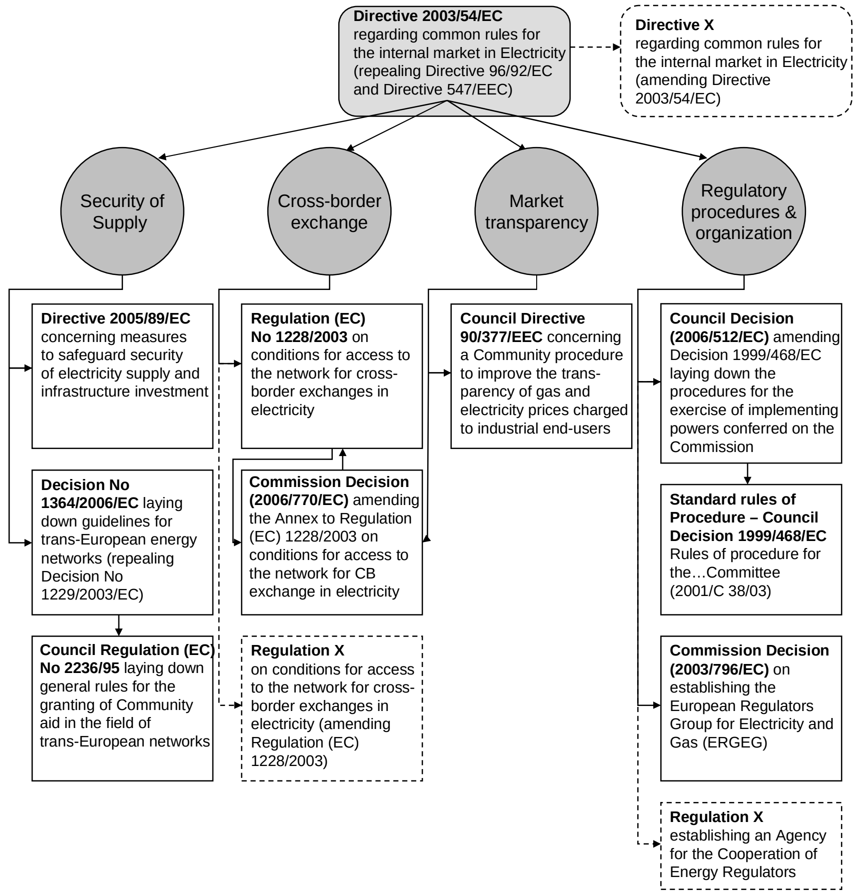


Figure 16: Current structure European legislation

Concerning ***security of supply****,* Directive 2005/89/EC concerning measures to safeguard security of supply and infrastructure investments (Directive, 2005) as well as Decision No 1364/2006/EC laying down the guidelines for trans-European energy networks are most important (Decision, 2006). Council Regulation (EC) 2236/95 is connected to the 2006

[10] Environmental issues and corresponding legislation are left aside.

Decision because it lays down the rules for the granting of Community aid regarding trans-European networks (Council Regulation, 1995).

Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges (Regulation, 2003) forms the key legal instrument in view of ***cross-border exchange***. In 2006, the annex of this Regulation was amended by a Commission decision (Commission Decision, 2006) resulting in several important regulatory changes on the subject of congestion management (see section 7.4.2).

The only binding legal instrument with respect to the issue of ***market transparency*** is the old Council Directive 90/377/EEC concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users (Council Directive, 1990a). The 2006 annex of Regulation (EC) No 1228/2003 (see above), however, also contains some important provisions concerning the issue of market transparency.

With respect to **regulatory procedures and organization**, the main legal instruments are the Council Decisions laying down the procedures for the exercise of implementing powers conferred on the Commission (Council Decision, 1999; Council Decision, 2006) and the corresponding rules of procedure (Official journal of the EC, 2001). These legal instruments focus on the so-called comitology procedure. By means of this procedure, the European Commission may adopt (binding) regulation (see section 6.4.2). Commission Decision (2003/796/EC) establishing the European Regulators Group for Electricity and Gas (Commission Decision, 2003) forms an important Decision for the organizational structure of the European electricity market.

In September 2007, the European Commission published its proposal for a **new legislative energy package**. For electricity, the package contains:

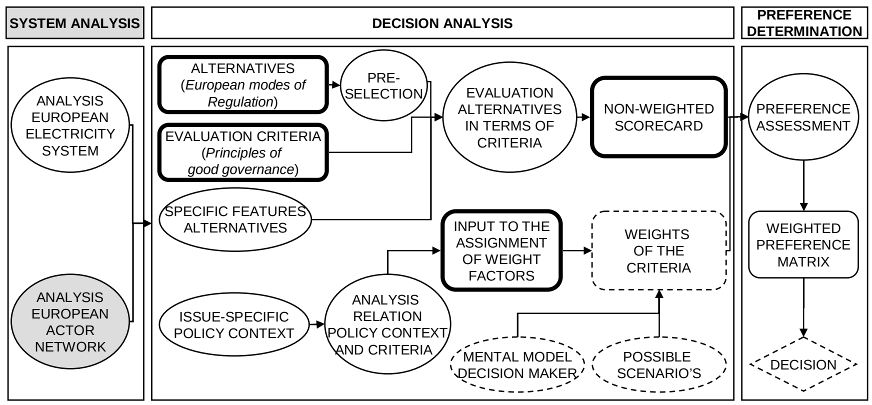
- A proposal for a new directive amending Directive 2003/54/EC regarding common rules for the internal market in electricity,
- A proposal for a new regulation amending Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity, and
- A proposal for a new regulation establishing an Agency for the Cooperation of Energy Regulators (see section 6.4.7).

Figure 16 indicates these proposals by means of the dotted frames.

During the remainder of this study, the various legislative instruments discussed above will regularly be referred to.

CHAPTER 5

THE EUROPEAN ELECTRICITY MARKET ACTOR NETWORK



5.1 INTRODUCTION

This chapter identifies the key actors in the European process of electricity market integration as well as their main interests. The chapter successively discusses (i) *the European Union* (section 5.2), (ii) *the European representative organizations of market parties* (section 5.3), (iii) *the European representative organizations of transmission system operators* (section 5.4), (iv) *the national governments* (section 5.5), and (v) *the national regulatory authorities* (section 5.6). The chapter concludes by presenting an overview of the main actors in the European process of electricity market integration.

5.2 THE EUROPEAN UNION

At present, the EU consists of 27 member states. The high-level, common objectives of the EU include harmonizing the development of economic activities, increasing economic and political stability, accelerating the rise of the standard of living, and fostering closer relations between the EU member states. The ground rules of the EU are based on a series of treaties including the Treaty of Rome, setting up the European Economic Community (EEC) in 1957. The 'Treaty of Maastricht' came into force on 1 November 1993, whereby the EEC was renamed 'the European Community'. By adding areas of intergovernmental cooperation to the existing Community system, this Treaty created the European Union (EU, 2006a). Figure 17 visualizes the division of power and responsibilities in the EU.

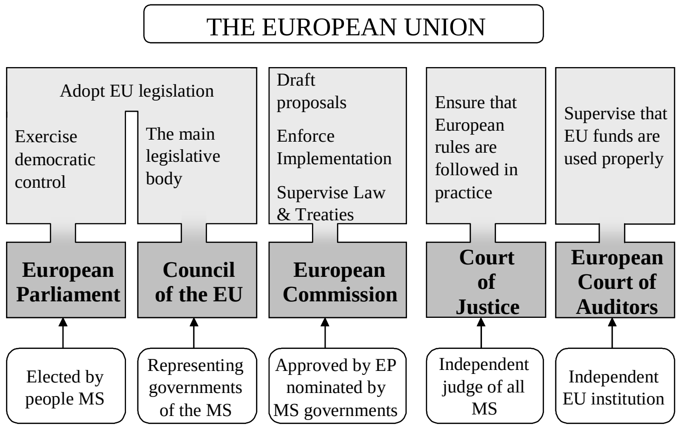


Figure 17: Division of power and responsibilities in the EU

The Treaty of Maastricht also introduced the co-decision procedure (see chapter 6*, Joint Decision*). The Treaty of Amsterdam (1997) and the Treaty of Nice (2001) considerably increased the scope of this procedure. The still-unratified Treaty of Lisbon (2008) even explicitly refers to this procedure as 'the ordinary legislative procedure' (EU, 2007a). Indeed, the co-decision procedure is the main legislative procedure by which law can be adopted in the European Community[11], the first pillar of the European Union comprising, for instance, Single Market and trans-European Networks policy.[12] In the co-decision procedure, the European Commission (hereafter: 'Commission') proposes new regulation. In order for the proposal of the Commission to become law, the proposal must be adopted by both the European Parliament (hereafter: 'Parliament') and the Council of the EU — also known as the Council of Ministers — which share legislative power. The Council of the EU (hereafter: 'Council') and Parliament must approve each other's amendments and agree upon a final text in identical terms. Both Parliament and Council have the power to reject a proposal causing the proposal to fall. In addition, the Commission may withdraw a proposal at any time.

The European Court of Justice (hereafter: 'ECJ') decides on matters of interpretation concerning EU law. For example, the EJC adjudicates on: (i) claims by the Commission that a member state has not implemented a certain European legal requirement, (ii)

[11] Three other legislative procedures of the European Community (first pillar) are (i) the assent procedure, under which the Council must obtain the Parliament's assent (Parliament cannot amend) before decisions can be made, (ii) the consultation procedure, under which the Council officially consults Parliament and other bodies such as the Committee of the regions but the Council is not bound by Parliament's position, and (iii) the cooperation procedure, under which if the Parliament rejects the proposal, unanimity is required for the Council to act on second reading (EU, 2006b).

[12] The second pillar is the Common Foreign (e.g. human rights and foreign aid) and Security (e.g. European Security and Defense policy) Policy (CFSP). The third pillar comprises Police and Judicial Cooperation in Criminal Matters (PJCC). This third pillar deals for example with issues of terrorism, organized crime and drug trafficking.

claims by member states that the Commission exceeded its authority, and (iii) questions received from national courts concerning the interpretation of a particular piece of legislation in a given context. In the latter case the ECJ will give its view, which is binding on the national court to which the case will be returned. Individuals cannot bring cases to the ECJ directly. An individual who is concerned by an act of one of the institutions of the European Union can challenge that act in a lower Court of First Instance. Appeals are then sent to the ECJ. The European Central Bank (hereafter: 'ECB') is in charge of monetary policy for the European Union's official currency, the Euro. The European Council — not to be confused with the Council of the EU — is a meeting of the heads of state or government of the European Union member states and the President of the European Commission several times a year (the European Council is also called European summit).

Based on the division of powers within the European Union and the characteristics of its main of its main bodies, one may conclude that the EU is a somewhat strange mixture of supranational (Commission, EJC and Parliament) and inter-governmental (Council of the European Union) political bodies (Van Buitenen, 2007). The result of this mixture is that there is not such thing as 'the interest of the European Union'. Behind the façade of the European Union, actors may have different or even conflicting interests.

5.3 REPRESENTATIVE ORGANIZATIONS OF MARKET PARTIES

Electricity industry — EURELECTRIC

The Union of the Electricity Industry was formed (EURELECTRIC) in 1999 as a result of a merger of the twin electricity industry associations Unipede — a rather technical association — and the former EURELECTRIC founded in 1989. EURELECTRIC represents the common interests of the European electricity industry (producers, suppliers, traders and distributors) in public affairs, in particular in relation to the EU and other international organizations (EURELECTRIC, 2007).

While EURELECTRIC has the advantage of being very comprehensive, this goes hand and hand with the disadvantage that its membership is very heterogeneous which makes it difficult to formulate strong common positions (Eising, 2001). Therefore, several large companies such as EDF and RWE and some national associations such as the German VDEW and the British Electricity Associations set up their own offices in Brussels (Eising 2001).

Initially, as EURELECTRIC predominantly consisted of the incumbent utilities, it formulated a defensive posture in favour of the status quo and suggested a minimal market opening to satisfy the Commission plans (Weinmann, 2007). However, the British members supported the Commission proposals because the British sector had already been liberalized (Eising, 2001). Gradually, the debate on EU level raised awareness of an uneven distribution of costs and benefits of the regulatory reform. Consequently, genuine economic interests came to the forefront of the internal negotiations also among the continental members (Eising, 2001). The ‘incumbent’ influence of EURELECTRIC is however still noticeable. An example is the discussion on full ownership unbundling with respect to the third legislative energy package. While the Commission considers full ownership unbundling the most effective means to ensure choice for energy users and to encourage investments as the network companies will no longer be influenced by overlapping supply and generation interests (European Commission, 2007a), EURELECTRIC believes that the 2003 Electricity Directive already has found the correct balance on unbundling (EURELECTRIC, 2005).

Large industrial consumers — IFIEC

IFIEC is the International Federation of Industrial Energy Consumers. It represents the interests of industrial energy users in Europe for whom energy is a significant component of the production costs and a key factor for their competitiveness (IFIEC, 2007). Large industrial consumers were among the first and most outspoken supporters of electricity market liberalization for the expected benefits. In particular, they supported direct access to wholesale markets, which would increase their bargaining power (Weinmann, 2007). Today, the local market power of electricity producers is the main concern of the large industrial consumers. Therefore, IFIEC still pushes for further market integration (interconnector capacity and harmonized trading opportunities) combined with a limited market share for the largest electricity producers. They also support fully unbundled networks and an increased level of market transparency (IFIEC, 2005). Considering this local market power fear, one may observe that the large industrial consumers are not only active on a European level but also speak out on a national level. Although industrial consumers in general support competition-enhancing measures, they sometimes prefer solutions diverging from the competition paradigm (but favourable to their business interests). For example, when industrial consumers offer regulated interruptibility contracts for demand-side management which do not reflect real system prices (Weinmann, 2007; Perez-Arriaga, 2005).

Energy traders — EFET

The European Federation of Energy Traders comprises over eighty trading companies. Its main mission is to improve the conditions of energy trading in Europe and to promote the development of a sustainable and liquid European wholesale market (EFET, 2007a). EFET is commonly known as an active organization with a strong representation in various

European discussions. Furthermore, EU traders are often backed by powerful parent companies. Consequently, their opinions are heard and positions integrated in the process of establishing an integrated European market (Weinmann, 2007). EFET considers the lack of harmonization and integration between the practical operations of different national markets as the main barriers to realizing a single European electricity market (EFET, 2005). Therefore, EFET is active in the standardization of business processes, data-exchange and trading contracts. Transmission capacity allocation is also a major issue for EFET. In 2007, EFET published a position paper on the key principles of transmission capacity rights including the firmness of transmission rights, a liquid secondary market and the auctioning of available capacity over appropriate timeframes (EFET, 2007b).

Power exchanges — EuroPEX

The association of European power exchanges represents the interests of the exchange based wholesale markets for electricity with regard to developments of the European regulatory framework. EuroPEX also provides a discussion platform on a European level (EuroPEX, 2007). The shared interest of European power exchanges is to have as much as possible electricity traded through power exchanges as they normally charge a fee for each MWh of traded electricity. However, competition also exists among the various power exchanges. Presently, a power exchange is often not a regulated entity. Therefore, power exchanges compete with respect to the total trade volume processed through their exchanges. Power exchanges also compete in the area of service. For example, they offer auction mechanisms and algorithms (e.g. concerning explicit and implicit transmission capacity auctions) to TSOs or to other power exchanges.

Independent electricity distributors — GEODE

GEODE — Groupment Européen des Entreprises et Organismes de Distribution d'Energie — is the European Group of independent energy distribution and distribution related companies, privately or publicly owned (GEODE, 2007). Predominantly Spanish and French distribution companies founded the organization in 1991. The GEODE members wanted to obtain the right to generate electricity themselves and to purchase it from generators of their own choice (Eising, 1999). Nowadays, its association represents around 100, mostly relatively small, companies throughout Europe. In general, GEODE favours full liberalization. It stands for equal conditions of access to the market for all players and in general strives for the ability of independent distributors and suppliers to act in a competitive market as free and full players in fair competition. A central focus point of GEODE is information exchange to secure the quality of service (GEODE, 2007).

Other organizations — EETF / Energie-Cités

For energy matters, the European Energy and Transport Forum (EETF) serves as a platform to express opinions. The forum is a consultative committee created by the European Commission in 2001 and is composed of the high-level representatives from a large range of sectors and activities in the fields of energy and transport. The Forum is part of the Commission's initiative to improve European governance through increased public participation, transparency, and dialogue between the Commission and interested parties. The Forum regularly assembles representatives of various backgrounds (network operators, consumers, the academic world, environment protection and safety, and trade unions (European Commission, 2007b). The Forum, for example, includes lobbying groups like the European Renewable Energy Council (EREC), the European Wind Energy Association (EWEA), IFIEC (see above), the European Federation of Regional Energy and Environment Agencies (FEDARENE), and the European Alliance of Companies for Energy Efficiency in Buildings (EURO-ACE). The Forum publishes its opinions on a frequent basis or related to special events. Considering the wide composition of this platform, it is still a challenge for small organizations to formulate and defend their own positions, as they have to reach consensus with other stakeholders with whom they may not share a community of interests (Weinmann, 2007).

Energie-Cités is the association of European local authorities for the promotion of local sustainable energy policies. It represents more than 500 towns and cities throughout Europe (Energie-Cités, 2007). Also this organization is of the opinion that although the EU claims that local and regional organizations have a pivotal role to play because they are close to actual situations and local actors, in reality the role left to local and regional authorities within the EU remains marginal despite some recent progress (Weinmann, 2007).

Although with the rise of internet small organizations may take advantage of the non-hierarchical immediacy of the diffusion of information, the rise of informal decision-making bodies (see section 6.4) — to which access is (necessarily) selective and which often are not subject to any classical democratic control (Weinmann, 2007) — makes it more and more difficult to defend their positions.

5.4 REPRESENTATIVE ORGANIZATIONS OF TRANSMISSION SYSTEM OPERATORS

Technical oriented TSO organizations — UCTE & NORDEL

The European technical electricity system comprises several synchronous operating areas. Each synchronous area operates the same system frequency ('system heart beat') related to the nominal balance between electricity production and electricity demand. A technically oriented TSO organization coordinates the internal operation of a synchronous area through a variety of technical rules and recommendations.

The largest technically oriented organization of TSOs is the 'Union for the Coordination of Transmission of Electricity' (UCTE). The UCTE synchronous area covers almost the whole of continental Europe (see Figure 18) which amounts to an annual electricity consumption of approximately 2300 TWh (UCTE, 2007a).

The Czech, Polish, Slovak and Hungarian TSOs established the CENTREL organization in 1992. The technical connection of the CENTREL and the UCTE network was established in 1995. Afterwards, in 2001, the CENTREL countries became full members of the UCTE organization. Furthermore, in May 2003, Bulgaria and Romania were permanently connected to the UCTE network and the permanent synchronous connection with the Western part of the Ukraine was approved in September 2003 (UCTE, 2007b). Presently, the connection of Turkey to the UCTE network is investigated.

Another technical organization of TSOs is Nordel. Nordel is the collaborative organization of the Transmission System Operators (TSOs) of Denmark, Finland, Iceland, Norway and Sweden (Nordel, 2007).

Figure 18 provides an overview of the technical organization of the European electricity network. There are five synchronous zones, which are coordinated separately to maintain system balance. In this technical meshwork, a number of special cases can be identified:

- Germany is connected with nine different countries all of which are UCTE and EU members, except for Switzerland (no EU member).
- Denmark and the Ukraine are part of two different synchronous zones and two different technical associations of TSOs.
- Switzerland lies at the heart of Europe and the UCTE synchronous area but is not a member of the EU.
- Northern Ireland is synchronously connected to Ireland but politically belongs to the UK.
- Albania is neither an EU member nor a UCTE member but nevertheless synchronously connected within the UCTE system.
- Iceland, Malta and Cyprus are isolated electricity systems. Iceland is however a member of the Nordel organization.

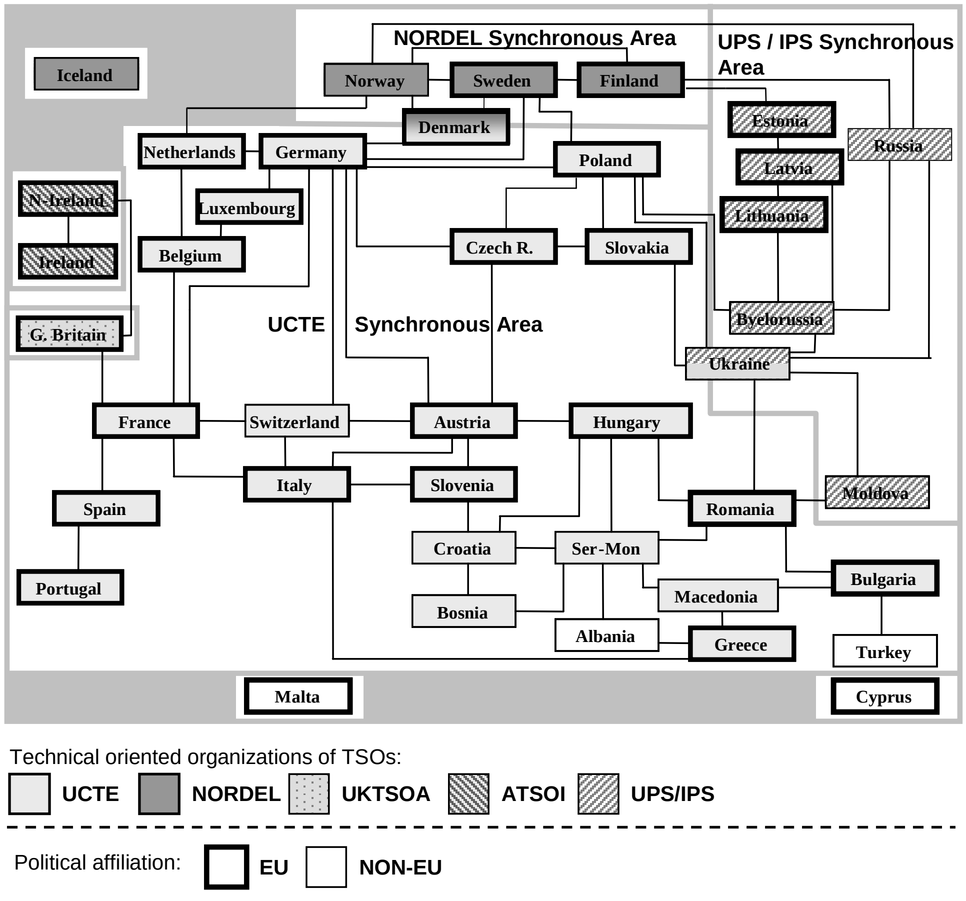


Figure 18: Overview technical oriented TSO Organizations

The main interest of a technical TSO organization is to coordinate the operation and the development of the transmission grid in its area. It defines technical security and reliability standards for all interconnected TSOs in the area. For example, UCTE has defined a set of operational standards (self-regulation), which were recently adapted and restructured in the UCTE Operational Handbook. Similarly, Nordel's technical rules are based on the System Operation Agreement (Nordel, 2007).

Market oriented TSO organization — ETSO

Upon the emergence of electricity sector liberalization in the European Union, the technically oriented TSO organizations recognized the need for an EU-wide harmonization of network access and conditions for usage, especially for cross-border trade (ETSO, 2007a). In 1999, ETSO was created as an association with UCTE, NORDEL, ATSOI and UKTSOA as the founding members. Today ETSO consist of the TSOs of Norway, Switzerland and the EU member states except for Malta (see Figure 19). ETSO defends the interests of TSOs in the European discussions on market integration. Considering TSOs' vital role as market facilitators ETSO also works on market design issues related to market integration.

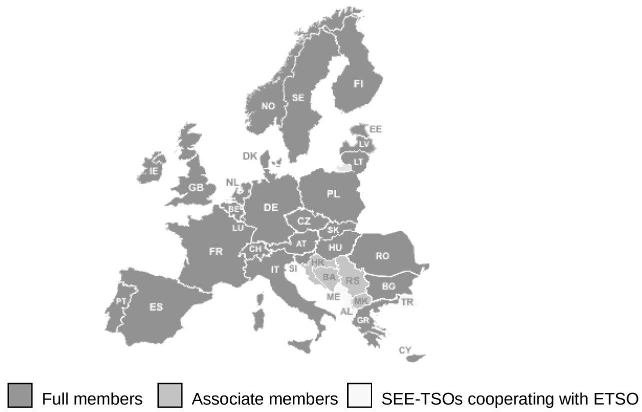


Figure 19: Market oriented TSO organization — ETSO
(Source: ETSO, 2007a)

5.5 NATIONAL GOVERNMENTS

The *European Economic Area* (hereafter: EEA) consists of the 27 EU member states, Norway, Iceland, and Liechtenstein. The EEA agreement was signed in 1992 and entered into force on 1 January 1994. Switzerland, although situated in the heart of Europe, decided not to participate following a referendum. Norway, Iceland, and Liechtenstein wish to participate in the Internal Market while not assuming the full responsibilities of EU membership. The EEA agreement gives them the right to be consulted by the European Commission during the formulation of EU legislation but not the right to vote in the decision-making process. New EU legislation in areas covered by the EEA are integrated into the agreement through an EEA Joint Consultation Committee decision and subsequently becomes part of the national legislation of the EEA member states (EEA, 2007).

- *Relation EU — Norway:* Norway's relations with the EU are mainly governed by the Agreement on the European Economic Area (EEA) which extends the Single Market legislation from the EU member states to Norway, Iceland and Liechtenstein (EU-Norway, 2007). In the EEA Joint Committee meeting of 2 December 2005, the 2003 Directives on common rules for the internal market in electricity and natural gas as well as the Regulation on network access for cross-border exchanges of electricity (Regulation (EC) No 1228/2003) were adopted into the EEA Agreement by Joint

Committee Decision. In addition to this, Norway decided to participate in the European Regulators Group for Electricity and Gas (EU-Norway, 2007).

- *Relation EU — Switzerland*: since the rejection of the EEA Agreement by public referendum in 1992, Switzerland has been aiming to obtain similar access to the Internal Market through the negotiation of bilateral sector agreements (EU, 2007b). In 2006, Switzerland gave green light for the establishment of a bilateral energy treaty with the EU e.g. on regulation for cross-border trade in energy and on security of supply (to prevent a repeat of the 2003 Italian black-out caused by a broken power line in Switzerland). Further issues include renewable energy sources and the recognition of green energy (T&D world, 2006).

National governments particularly focus on politically sensitive (energy) issues such as security of supply, end-consumer prices, and environmental effects. Furthermore, national governments naturally defend national interests in European negotiation processes.

Based on an analysis of the Council negotiations leading to the first liberalization Directive (Directive, 1996), Eising (2001) argues that the EU institutional setting has a big influence on strategic action by member state governments.

First, formal and informal norms applied in the European political arena warrant that essential national concerns are taken into account and that negotiators aim at equitable outcomes (cf. North's informal rules, section 2.4.3). For example, in the Council negotiations on electricity sector liberalization, consensus and distributive fairness (reciprocity) have proven to be important (informal) norms (Eising, 2001).

Secondly, the EU institutional setting changes the coalitions of support and opposition compared to the domestic settings. It brings different actors into the negotiation process and changes the opportunities for the pursuit of interests. In particular, it provides supranational organizations with formal powers in the decision-making process.

Thirdly, EU decision routines make for policy learning; (i) in terms of becoming aware of the preferences of others in the negotiation process, and (ii) in terms of gathering new information and/or knowledge when proposals are new, complex, or multi-dimensional. Due to these learning processes the member states' basic policy preferences may change.

Finally, the vertical differentiation in the Council system (ranging from the Council working groups to the heads of state and government) implies possibilities to broaden the bargaining space and to override issue-specific rigidities (Eising, 2001).

During the years, member states' governments in the Council seem to have increased their knowledge about the elements of the often highly complex regulatory proposals and to have learnt to adopt a more subtle approach as regards the pursuit of their national interests. For example, some governments formally embraced the concept of liberalization while pursuing an agenda to protect the values of the old system and/or the status of their domestic utilities (Eising, 2002; Weinmann, 2007).

5.6 NATIONAL REGULATORY AUTHORITIES

Although most EU member states voluntarily established a sector specific national regulatory authority during the liberalization process of their electricity market, Germany, for instance, chose a more light-handed approach with the industry and the government trying to find a round-table consensus on market rules (e.g. negotiated TPA). However, the European Commission insisted that all that member states should set up a regulatory authority independent from the interests of the electricity market and formalized this view in Directive 2003/54/EC (Article 23).[13] According to the Directive, a regulatory authority is at least responsible for:

- The rules on congestion management,
- Transmission investment and maintenance,
- Transparency regarding the transmission and distribution system,
- The effective unbundling of accounts,
- The methodologies used to calculate or establish the terms and conditions for grid access and transport tariffs (as well as the provision of balancing services),
- Supervision of the tasks imposed on TSOs and DSOs, and
- The level of competition and transparency.

Furthermore, the national regulatory authority should also ensure compliance with national and EU regulation. Despite these common responsibilities, the exact powers of the various European national regulatory authorities vary widely. For example, significant differences appear concerning (ERGEG, 2006):

- The breath and depth (in terms of budget and the possibility to impose a financial penalty) of the tasks and responsibilities,
- The independence from political intervention (Article 23(3) of Directive 2003/54/EC allows for the possibility of political intervention),
- Regulated tariffs; in some countries the regulatory authorities retain power to enforce wholesale and retail price controls, and

[13] Following this legal requirement, Germany created the Bundesnetzagentur in 2005.

- The relation with the National Competition Authority (NCA); some regulatory authorities form a part of the NCA while others do not even cooperate with the NCA.

The existing regulatory framework is primarily designed to create the 'rules of the game' for a liberalized market within national boundaries. However, because EU electricity markets become increasingly integrated, the impact of market decisions will not be constrained to national boundaries. In view of such cross border issues, the difficulty arising from the various national regulatory discrepancies increasingly manifests itself.

In 2000 — within the framework of the Florence Forum (see section 7.2) — the Council of European Energy Regulators (CEER) was founded mainly as a self-initiative of the regulatory authorities to discuss urgent topics more efficiently than in the larger Florence Forum, which included multiple stakeholders (Weinmann, 2007). CEER is an association consisting of the national (energy) regulatory authorities of the European Union (EU). CEER is also open for regulatory authorities of the European Economic Area (EEA).

In 2001 the Energy Regulators Regional Association (ERRA) was legally registered. It is a voluntary organization of independent energy regulatory bodies of the Central and Eastern European region (ERRA, 2007). The US National Association for Regulatory Utility Commissioners (NARUC) and the US Agency for International Development (USAID) support ERRA and have been providing technical forums, meetings and study tours for the ERRA regulators. Today ERRA lists 22 full members (see Figure 20).

Figure 20: Energy Regulators Regional Association — ERRA
(Source: IERN, 2007)

Alongside CEER, a Commission Decision (see section 4.5.2) formally established the European Regulators Group for Electricity and Gas (ERGEG) in November 2003 (Commission Decision, 2003). The purpose of ERGEG is to assist the European Commission in consolidating the internal energy market in particular with respect to the preparation of draft implementing measures. ERGEG's formal members are the heads of the national regulatory authorities of the 27 EU member states. The European Commission also is a high-level representative. The regulatory authorities of the candidate EU countries and the EEA countries may participate as observers (ERGEG, 2007a). With the creation of ERGEG, a direct link has been created between the national regulators and the Commission, circumventing the respective governments (Weinmann, 2007).

In practice, the borders between CEER and ERGEG are vague; more or less the same representatives take part in both CEER and ERGEG. Furthermore, CEER and ERGEG have a joined annual work program and recently merged their websites.

As European regulatory authorities came into existence parallel to the liberalization movement, their principal *raison d'être* is the quest for a liberalized and integrated energy market (Weinmann, 2007). Consequently, the Commission and the national regulators share pro-competitive ideological underpinnings. This certainly has a positive effect on the cooperation between ERGEG and the Commission.

5.7 OVERVIEW MAIN ACTORS EUROPEAN ELECTRICITY MARKET

Based on the analysis above, one may conclude that the multilateral and multilevel character of the European electricity market actor network adds yet another complex dimension to the European electricity system. Figure 21 places the main actors (and their representative organizations) in an orderly figure.

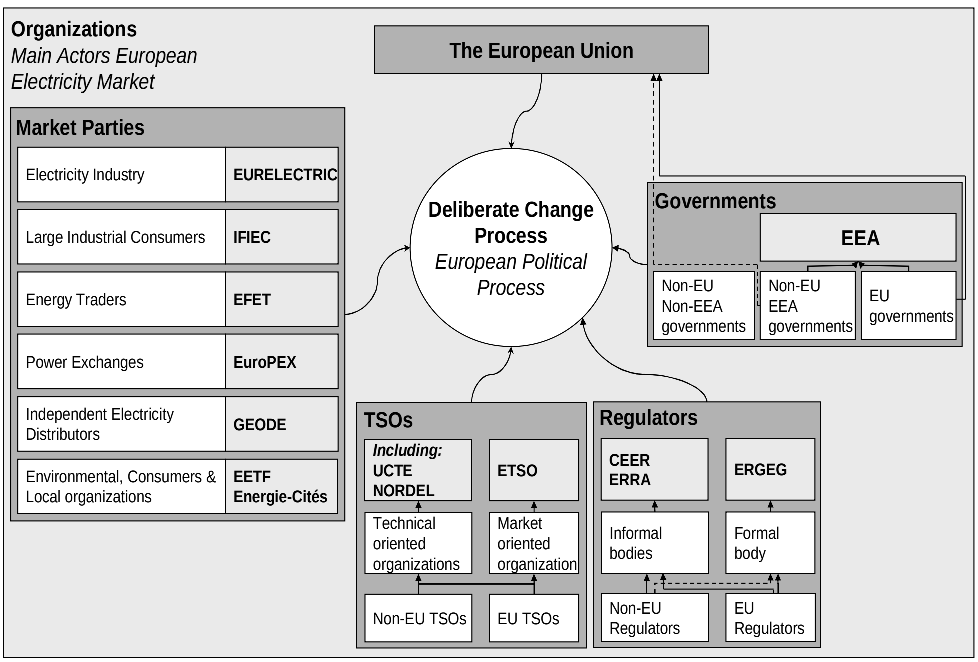
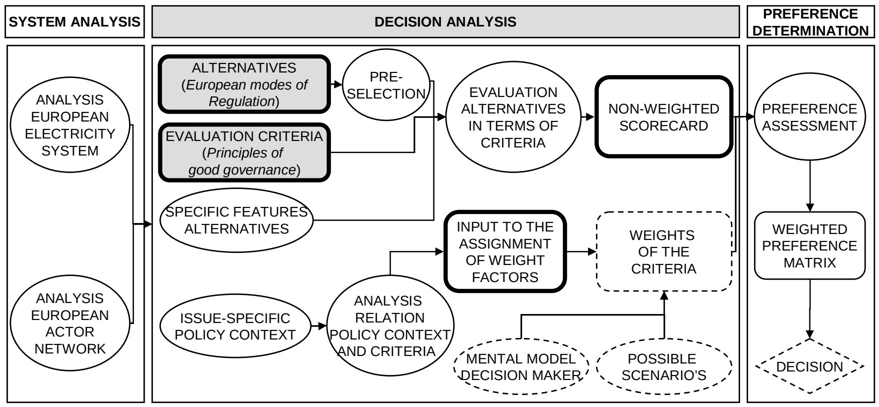


Figure 21: Overview European electricity market actor network

CHAPTER 6

EUROPEAN MODES OF REGULATION



6.1 INTRODUCTION

The multi-level character of the administrative system of the European Union (EU) has resulted in a complex interplay of powers and competencies of public and private actors at various administrative levels (Knill and Lenschow, 2003). Some European citizens consider European governance having serious performance problems both in terms of input (relying on the principles of democratic standards) and output (referring to the effectiveness of regulation) criteria. Furthermore, the EU is often considered to be plagued by a technocratic image and one may observe a fading acceptance of EU policy-making among European citizens in the recent years[14] (Knill and Lenschow, 2003). At the same time, an increase in complexity of the issues on the European political agenda can be witnessed. For example, the EU is increasingly confronted with relatively detailed issues in which the divergent status quo in the (increasing number of) member states often plays a prominent role. Furthermore, the European Union must more and more deal with issues where the legal authority for EU level action is limited or non-existent. Finally, a number of issues are emerging on the European political agenda where the divergent status quo is becoming restrictive for the required future development and evolution. In this setting, new European modes of regulation, characterized by a high level of flexibility, a relatively low

[14] This observation yields from EU-wide public opinion polls.

level of direct obligation, a high level of discretion, experimentalism, and coordination, as well as a decentralized participation of stakeholders, have emerged over the last decades.

This chapter focuses on the different European modes of regulation. After a brief discussion on definitions, sections 6.3 and 6.4 provide an overview of the traditional and new European modes of regulation, respectively. The chapter concludes by discussing the various criteria of good governance.

6.2 EUROPEAN MODES OF REGULATION: A DEFINITION

The ways in which policy (and accompanying legislation) is made in the multi-level European context is often referred to as '*modes of European governance'* (cf. Kohler-Koch, 1999; Scharpf, 2000, Eberlein and Kerwer, 2004; Smismans, 2006). However, literature assigns many different meanings to the term governance. Furthermore, this study particularly focuses on European regulatory processes from a rather normative perspective (Knill and Lenschow, 2003) and less on the 'political strategic games' inevitably attached to European governance as a result of multiple interests interacting in a complex institutional setting. This study therefore uses the more explicit term '*European modes of regulation*' instead of '*modes of European governance'.* For the purpose of this study 'European modes of regulation' are defined as '*the ways in which the European institutional environment — the rules of the game — is constituted.'* This definition is based on North's (1990) definition of institutions (see section 2.3) and various definitions of governance given by academics focusing on European Governance (cf. Treib *et al.*, 2005; Héritier, 2002; Kohler-Koch, 1999).

6.3 TRADITIONAL MODES OF REGULATION

Scharpf (2000, p.11) points out that to the extent that national governments are aware of and respond to their interdependence, one may claim that the governing functions affected are becoming 'Europeanized'. In an integrated European market, consumers will select goods and services without regard to their origin within the Union, capital owners are free to invest, and firms are free to locate their production facilities anywhere within the territory of the Union. Consequently, the impacts of national policies affecting demand, production costs and post-tax profits are no longer limited to the national economy (Scharpf, 2000). Diverging national policies may cause economic externalities, which likely have political repercussions. Considering this interdependence between EU member states, Scharpf distinguishes four traditional modes of regulation (Scharpf, 2000): (A) Mutual Adjustment (also known as the "default mode"), (B) Intergovernmental Negotiations, (C) Hierarchical Direction, and (D) Joint Decision.

6.3.1 (A) Default mode: Mutual Adjustment

The default mode of European policy responses to increasing economic interdependence is *Mutual Adjustment*. Each country is considered on its own but is affected by policies adopted in other countries (Scharpf, 2001). As a result, national governments adopt their national policies in response to, or anticipating on, the policy choices of other governments. However, national bodies have been trying to move away from this approach as competitive (economic) pressures constrained national bodies in e.g. the regulation of employment relations, social policy, environmental policy, and in other 'market-correcting' policy choices. In response to these constraints, one has moved towards coordination and centralization of governing functions at European level. Scharpf (2001) is of the opinion that this default mode of European regulation (governance) has the lowest capacity to adopt effective policy choices.

6.3.2 (B) Intergovernmental Negotiations

At the lowest level of Europeanization, governance is realized by *Intergovernmental Negotiations*. National policies are coordinated or standardized by agreements on a European level, but national governments remain in full control of the decision process. Since all participating governments have a veto, the legitimacy of policies adopted can be indirectly derived from the legitimacy of democratically accountable national governments (Lord, 1998). However, the problem-solving capacity of negotiated policy is strictly limited to solutions that are preferable from the perspective of all participating governments (Scharpf, 2000). If such solutions are not available, side payments and package deals may still facilitate agreement under favourable circumstances (Scharpf, 1997). The intergovernmental mode is used in negotiations over amendments to the European Treaties. Given the weak problem-solving potential of intergovernmental negotiations underlined above, it is relevant to remark that the main function of treaties is not the formulation of substantive European policy, but the establishment of European organs and procedures through which 'secondary' EU policies are to be adopted (Scharpf, 2001; cf. Ostrom's constitutional rules, section 2.4.3). Scharpf (2001) argues that since the decisions adopted are very hard to change in response to new circumstances, treaties should only determine relatively simple, presumably stable, and politically salient primary policy choices. Besides treaties, Intergovernmental Negotiations also apply to policies in the second and the third pillar (Scharpf, 2001) in which sovereignty issues are prominent. Given the strong role of the European Commission, the Council of the EU, and the European Parliament in the Joint Decision mode (see section 6.3.4, below), member state governments have been shifting important policy initiatives that do not require treaty amendments to the intergovernmental mode. Even within the first pillar, the strictly intergovernmental European Council has increased the significance of policy initiatives promoted by the rotating Presidency (of the Council and European Council) rather than by the Commission in recent years (Scharpf, 2001). Here EU's two-sided supranational and intergovernmental character, discussed in chapter 5, finds expression.

6.3.3 (C) Hierarchical Direction

Hierarchical Direction or Supranational mode refers to a situation in which competencies are completely centralized at the European level and exercised by supranational actors without the participation of member state governments. Consequently, competencies are executed without any involvement of politically accountable actors e.g. in the Council or European Parliament (Scharpf, 2006). This includes functions exercised by the European Central Bank, the European Court of Justice, or the European Commission when it is acting as a guardian of the Treaty in infringement procedures against national governments (Scharpf, 2000), when it unilaterally adopts Decisions or Directives, or when it issues regulations specifying the content of Council Directives (Scharpf, 2001). In the absence of veto positions, it is possible to adopt policy choices that violate the interests and preferences of national governments even on politically salient issues. Scharpf (2000) judges the record of hierarchical policy choices adopted by the Commission and the Court as quite impressive (high effectiveness in achieving self-chosen goals). Scharpf (2000), however, underlines his concern about the way the ideal of perfectly competitive markets is pursued by the Commission and the Court.

6.3.4 (D) Joint Decision

The Joint Decision (also known as Community Method) refers to the European mode of regulation in which the 'rules of the game' (institutions) are established by means of the co-decision procedure. In this procedure, the European Commission proposes new regulation that must be adopted by both the European Parliament and the Council, which share legislative power (see section 5.2). The co-decision procedure provides for up to three readings, the first reading (no time limit), the second reading (max. four months for the Parliament and another max. four months for the Council) and a third and last reading with conciliation (max. twenty-four weeks). The procedure can be concluded, however, at any of these stages if the Council and European Parliament reach an overall agreement (European Parliament, 2007). Annex 4 includes a detailed schematic overview of the co-decision procedure.[15] The Joint Decision method applies to most policy areas of the first pillar (see section 5.2) containing the market-making and market-correcting competencies of the European Community (Scharpf, 2000). This also includes energy markets. While the European Commission has the exclusive right of legislative initiative, its initiatives normally respond to a wide variety of inputs from e.g. the Council, individual member state governments, the European Parliament, European and national associations, large firms, and expert groups called together by the Commission (Scharpf, 2001; Kohler-Koch, 1999; Benz, 2000). However, the Commission is able to follow its own preferences in selectively translating inputs into legislative proposals. Although, formally, the Council acts by a qualified majority[16] in the co-decision procedure, the decision-making practices are still characterized by a search for consensus to find solutions that are acceptable for all member states (Eising, 2001). Furthermore, Scharpf (2001) points out the symptom of EU heads of governments to strengthen the (European Council) Presidency at the expense of the Commission in the preparation of policy initiatives and in the negotiation of policy compromises to be reached during summit meetings rather than in regular procedures involving, the Commission, the Parliament and the Council (Scharpf, 2001).

6.3.5 Overview of traditional European modes of regulation

Table 2 provides an overview of the traditional European regulatory modes as discussed above.

[15] From May 1999 to December 2006, 564 files were concluded successfully. 38,5% of these files was concluded at first reading (average time in co-decision: 13,7 months), 44,1% at second reading (average time in co-decision 26,5 months) and 17,4% at conciliation (average time in co-decision: 33,7 months) (EU, 2007c).

[16] Qualified Majority Voting: currently a proposal must be backed by a majority of member states (50%) or two thirds (67%) if the Council is not acting on a proposal of the Commission. Furthermore, the proposal must be supported by about 74% of the votes (each member state has a certain amount of votes). A member state may request the verification of the population condition (62%). A proposal is only blocked if the conditions to pass are not achieved. From 2014 (Treaty of Lisbon) one needs a majority of countries (55%) or 72% if the Council is not acting on a proposal of the Commission to pass a proposal. Furthermore, the proposal must be backed by 65% of the population. A proposal may be blocked if the conditions to pass are not achieved *and* at least 4 countries are against the proposal.

Table 2: Traditional modes of regulation

Traditional modes of regulation	**Main purpose of application**
A) Mutual Adjustment	Regulatory mode of international mutual adaptation in policy areas where there is no European coordination at all
B) Intergovernmental Negotiations	Regulatory mode of inter member state negotiations • Treaty (primary EU law) negotiations • Second and third pillar issues • Council negotiations
C) Hierarchical Direction	Regulatory mode of centralizing competencies completely on an EU level • ECB (European Central Bank) issues • ECJ (European Court of Justice) cases • Commission: - Infringement procedures - Commission directives/decisions
D) Joint Decision	Formal regulatory mode for the establishment of secondary EC law concerning most policy areas of the first pillar including market-making as well as market-correcting competencies

6.4 NEW MODES OF REGULATION

6.4.1 The need for new modes of regulation

Over the last decades, the so-called new modes of regulation, which depart from the traditional modes of regulation, have gained in salience. Many observers still consider European governance having serious performance problems with respect to both the effectiveness of decision-making and, even more often, democratic legitimacy (Eberlein and Kerwer, 2004; Lord, 2006). The EU is often considered as plagued by a technocratic image and one may observe a fading acceptance of EU policy-making among European citizens (Knill and Lenschow, 2003). In addition, the ongoing EU enlargement also creates new challenges concerning European governance.

Scott and Trubek (2001) identify six developments which supposedly cause the shift towards new modes of regulation: i) increasing complexity and uncertainty of the issues on the agenda, ii) diversity of the status quo in the various member states, iii) increasing recognition of the limits of traditional top-down regulatory approaches and repeated calls for things like power sharing, participation, and experimentation, iv) increasing amount of issues on the agenda where the legal authority for EU level action is limited or nonexistent, v) legitimacy, and vi) subsidiarity, the general pressure on the EU to ensure that decisions remain at a national level when the can. In addition, new modes of governance are used in areas where political support from member states is very difficult to gain (Héritier, 2002).

New modes of regulation are generally characterized by a high level of flexibility, a low level of obligation, a high level of discretion, experimentalism, and coordination, as well as a decentralized participation of stakeholders. Roughly, two types of new modes of regulation can be distinguished (Scott and Trubek, 2001). Firstly, the 'new-old' modes of regulation that still represent important elements of continuity with the traditional modes of regulation but equally depart from them in one or more aspects, e.g. *Comitology* or *New Instruments* (discussed below). The second category is new regulation in the strict sense as it provides fully pledged alternatives to the traditional modes of regulation (Smismans, 2006), e.g. *the Open Method of Coordination* (discussed below).

Six regulatory approaches, defined in the literature[17] as new European modes of regulation, are discussed below.

6.4.2 (E) Comitology

Description

Comitology is not an entirely new mode of regulation and a full alternative to the traditional modes of regulation (Scott and Trubek, 2001). Nevertheless, it has common features with new governance; for example, the method is in principle suitable for regular adjustment (Smismans, 2006).

EU regulation is not always enacted in the form of legislation through the Joint Decision mode (the co-decision procedure by the Council and European Parliament). Often it is enacted as implementation measures under the executive duties of the European Commission (EurActiv, 2006). Such regulation can be adopted when the Council has conferred executive powers on the European Commission[18] and after an implementation committee, composed of representatives from the member states, has given its opinion on or approved the Commission's proposed measures (EurActiv, 2006). These committee procedures are commonly referred to as 'comitology'.

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[17] To identify these new modes of regulation, both scientific and official literature has been used.

[18] The Commission may only use its competence to implement or apply legislative rules only where it is necessary to ensure some degree of homogeneity and uniformity. The legal basis for the delegation of implementing powers to the Commission is laid down in the EC Treaty (TEPC, 2003). The Council may impose certain requirements in respect of the Commission's executive actions (comitology).

The origins of comitology date back to the beginning of the 1960s. What the early stages of the Common Agricultural Policy (CAP) already required at that time, i.e. extensive and detailed technical regulation, became a necessity as the single internal market continued to develop (TEPC, 2003, p.4). The supranational organs did neither have the knowledge nor sufficient resources to respond to the changing needs of policy management. Moreover, member states did not wish to fully delegate the implementation of Community acts to a supranational agency (TEPC, 2003, p.4). Consequently, committees were introduced to safeguard the interests of member states with respect to the exercise of the powers of the Commission. Hence, the term 'comitology' refers to a system of committees that control and assist the Commission in its implementation duties.

The use of committees was formalized in more or less its current form in 1987, following the Single European Act. The Council Decision of 1999 further standardized committees and prompted the Commission to use formal rules of procedure for all Comitology Committees (Rhinard, 2003).

Types of comitology procedures

Four types of comitology procedures exist. These procedures are: (i) the Management procedure, (ii) the Regulatory procedure, (iii) the Regulatory procedure with scrutiny, and (iv) the Advisory procedure. In these procedures, the committees as well as the Council and Parliament have varying levels of legislative control over the European Commission. The procedures and the criteria that determine the choice of using one of these procedures have been laid down in Article 2 of Council Decision 1999/468/EC (Council Decision, 1999):

- *Management procedure:* this procedure is to be concerning management measures e.g. relating to the application of the common agricultural and common fisheries policies or to the implementation of Community programs with substantial budgetary implications. In these sectors, the issues at stakes are politically less important and, above all, there is an obligation for the Commission to act (TEPC, 2003).
- *Regulatory procedure:* this procedure is to be used concerning measures of general scope designed to apply essential provisions of basic instruments, including measures concerning the protection of the health or safety of humans, animals, or plants and where a basic instrument stipulates that certain non-essential provisions of the instrument may be adapted or updated by way of implementing procedures.
- *Regulatory procedure with scrutiny:* this procedure is to be used where a basic instrument, adopted in accordance with the procedure referred to in Article 251 of the EC Treaty (co-decision procedure), provides for the adoption of measures of general

scope designed to amend non-essential elements of that instrument, e.g. by deleting some of those elements or by supplementing the instrument by the addition of new non-essential elements.

- *Advisory procedure:* without prejudice to the other procedures, the advisory procedure is obligatory in any case in which it is considered most appropriate. The advisory Committee may issue opinions to the European Commission that must take "utmost account of them" in its implementing measures. This procedure is generally used when the measures under consideration are not very politically sensitive (EurActiv, 2006).

Annex 5 discusses the procedural aspects of the four procedures.

6.4.3 (F) New Instruments

Knill and Lenschow (2003) define New Instruments as a new mode of regulation. New Instruments represent a mixed bag of regulatory tools characterized by a more indirect approach towards achieving behavioural change. They consist of broad, but legally binding requirements. The addressees of these policy instruments have broad leeway to comply with relatively open regulatory space (*framework regulations*) or to react to new *procedural or incentive structures* (Knill and Lenschow, 2003).

Framework regulations leave it to decentralized levels of governance to add regulatory substance fitting local conditions into the European framework by defining obligatory general guidelines and goals. Framework regulations are flexible as far as they do not assume uniform national responses (Baldwin and Cave, 1999, p.161). *Procedural or incentive structures*, e.g. economic incentives and information requirements, seek to change incentive structures of the actors involved in order to modify the national policy context in favour of effective compliance (Knill and Lenschow, 2003).

6.4.4 (G) Self-regulation

The self-regulatory mode of regulation is based on nongovernmental actors devising concrete regulatory standards (Knill and Lenschow, 2003). In the EU, three categories of self-regulation are observed.

First, *voluntary self-regulation* (Héritier, 2002) refers to a situation in which nongovernmental bodies establish and manage their own rules without outside interference.

Secondly, *delegated self-regulation* (or co-regulation) is a self-regulatory arrangement imposed on nongovernmental bodies. Normally, a public authority (Héritier, 2002) defines the rules under which such an arrangement functions. In its 2002 action plan on simplifying and improving the regulatory environment, the Commission proposes to use co-regulation more frequently in accordance to the following criteria (European Commission, 2002a):

- Co-regulation must be used on the basis of a legislative act and in the interests of the general public,
- Within the legislative act, the legislator establishes the essential aspects of the legislation (objectives, deadlines, implementation mechanisms, methods of monitoring, sanctions necessary to guarantee the legal certainty of the legislation, and the extent to which defining and implementing the measures can be left to the parties concerned),
- The Commission reserves the right to make a traditional legislative proposal,
- The principle of transparency must apply, and
- The parties concerned must be considered to be representative, organized, and responsible by the Commission, Council, and Parliament.

In general, the self-regulatory approach is often accompanied with a fallback regulatory option (Knill and Lenschow, 2003).

A third and last category of self-regulation can be observed in the field of social policy (Knills and Lenschow, 2003; Smismans, 2006), also known as the *social dialogue*. This system, established under the Maastricht Treaty, allows the officially recognized representatives of employers and employees to enter into voluntary agreements. In a second stage, the Council enacts these agreements as Directives. Here, the legislative initiative rests with the social partners, not with the Commission (Scott and Trubek, 2001). Furthermore, the Parliament has no formal role in the final outcome.

6.4.5 (H) Partnership

Scott and Trubek (2001) identify 'partnership' as a new mode of regulation. The concept of partnership emerged out of the Community structural funding (Community expenditure to achieve economic and social cohesion). Article 8(1) of the European regulation laying down the general provisions of the Structural Funds formally defines the concept of Partnership as '*the partnership between the Commission and the member state, together with the competent authorities and bodies (such as regional and local authorities) designated by the member state within the framework of its national rules and current practices'* (Council Regulation, 1999). However, with regard to involving regional and local actors in preparing national positions on EU policies, the national framework is often perceived as not adequate (European Commission, 2001a). In its white paper on European governance, the Commission (2001a) admits that the way the European Union works does not allow for adequate interaction in a multi-level partnership. Here, the Commission defines the concept of Partnership more generally i.e. as '*a partnership in which national governments involve their regions and cities fully in the European policy-making'* (European Commission, 2001a). Regions and cities have indicated to the Commission that their role as an elected and representative channel interacting with the public is not exploited and that European legislation is either too detailed, or insufficiently adapted to local conditions and experience. Based on these views, the Commission has concluded that — regarding EU policies with a territorial dimension — action is needed on EU level to build better partnership across the various levels of public actors. The Commission identifies three specific areas of action (European Commission, 2001a):

- *Involvement in policy shaping*: ensuring a systematic dialogue between the Commission and European and national organizations of regional and local government
- *Greater flexibility*: creating more flexibility in the means provided for implementing legislation and programs with strong territorial impact
- *Overall policy coherence*: addressing the territorial impact of EU policies in areas such as transport, energy or environment

6.4.6 (I) Open Method of Coordination

The Open Method of Coordination (hereafter: 'OMC') was first applied in EU employment policy, as defined in the Amsterdam Treaty of 1997, although it was not called by this name at the time. It was officially named, defined, and endorsed by the European Council of Lisbon in March 2000. In order to help member states progress jointly in the reforms they need to undertake in order to reach the Lisbon goals, the Lisbon Council coined the term and extended the application of OMC to several other policy areas. Since then, it has been applied in the European employment strategy, social inclusion, pensions, immigration, education, culture, and asylum and its use has been suggested for health as well as environmental affairs.

OMC resembles the traditional mode of Mutual Adjustment (see section 6.3.1) insofar as governing competencies remain entirely at the national level and continue to be exercised by national governments that remain fully accountable for their policy choices to their national electorates (Scharpf, 2000, p.24). The OMC is a radically innovative approach in the EU as it is based on soft law and mutual learning. Its use is mainly foreseen in areas that remain a primary responsibility of national governments but are of concern to the EU as a whole. OMC could also be used whenever central legislative policies are not feasible because the solutions to policy problems are uncertain and politically sensitive, or when harmonization is unworkable but coordination is needed or to move on after a regulatory deadlock (Héritier, 2002). In contrast to the Joint Decision approach, it aims at coordination rather than harmonization of national policies (EPHA, 2004). In the OMC there is no formal role for the Parliament and the ECJ.

Generally, the OMC works in stages as described below, however, it has to be noted that OMC processes vary considerably across policy areas. First, the Council of Ministers agrees on (often very broad) policy goals based on a proposal of the Commission. Indicators of achievement (benchmarking) are formulated and defined by the responsible actors, i.e. by member states based on a Commission proposal (Héritier, 2002). Member states then translate these guidelines into national and regional policies and submit annual reports on actions taken to implement the guidelines. The reports are evaluated by a permanent high-level committee of national civil servants and by the Commission (Scharpf, 2000, p.24-25) and the outcomes are published and ranked (scoreboards). Based on these outcomes, the monitoring committee and the Commission may propose specific recommendations to the Council of the EU. By publishing and exchanging information about different practices, it is hoped that processes of mutual learning will be set in motion (Héritier, 2002, p.6).

6.4.7 (J) Regulatory Agency

There are two broad types of European agencies. The *Executive Agency* has a clear place in the European institutional framework as they are set up under a Council regulation adopted in 2002. They are under full responsibility of the Commission and their tasks relate to the management of Community programs. Executive agencies are always located close to Commission headquarters (European Commission, 2008a).

The other type of European agencies is the *Regulatory Agency*. From Article 177 of the EC Treaty and the 1958 'Meroni Case' handled by the Court of Justice[19] can be deduced that the European Council may create agencies with certain decision-making powers (Coleman, 2004). Such regulatory agencies are set up on a case-by-case basis often through co-decision. The first independent agencies were set up in the mid 1970s (Baldwin and Cave, 1999). However, during the 1990s, the deepening of the internal market led to a series of new agencies with roles more focused on tasks of a technical and/or scientific nature (European Commission, 2008, p.4). Currently, there are 29 regulatory agencies, and

[19] Case 9/56, Meroni & Co, Industrie Metallurgische S.P.A. v High Authority of the European Coal and Steel Community [1957 and 1958] ECR 133.

proposals for two other exist of which one in the field of energy (European Commission, 2008a). There are no general rules governing the creation and operation of regulatory agencies. Furthermore, regulatory agencies are sometimes called decentralized agencies as they are spread around Europe.

The system of comitology (see section 6.4.2) has been confronted with the problem of its administration in technically specialized areas as the internal market matures. More and more it becomes clear that the European Commission is not composed in a way that gives it the necessary technical expertise to deal effectively with many of the issues likely to arise (Coleman, 2004). Furthermore, the Commission has increasing difficulties in finding the resources to provide the necessary technical expertise. In areas of high technical specialization, the use of regulatory agencies may therefore be appropriate (European Commission, 2002b).

Since regulatory agencies are not explicitly mentioned in the EC Treaty and do not hold any powers explicitly under its provisions, they may only exercise the powers that have been validly conferred upon them by the Council or, under co-decision, by Council and Parliament in accordance with the specific tasks ascribed to each agency (Coleman, 2004). Besides being granted an advisory role, such as providing technical or scientific input for the preparation of regulatory and legislative measures, regulatory agencies can be granted certain decision-making power in areas where a single public interest predominates and the tasks to be carried out require particular technical expertise (European Commission, 2001a).

However, here it is important to distinguish rule making powers — *making rules with general applications* — from adjudicatory powers — *taking decisions in specific cases* — (Coleman, 2004). The principles governing the current Community legal order (European Commission, 2002b) and the Maroni case impose constraints on the scope of the specific tasks ascribed to a regulatory agency.[20] Although the agencies may be empowered to adopt individual decisions in a clearly specified area of Community legislation, they may not establish legislative measures of general application (European Commission, 2002b), although their decision-making practices might result in codifying certain standards (European Commission, 2001a). Other restrictions include that agencies may not be given responsibilities for which the EC Treaty has conferred a direct power of decision on the Commission (e.g. competition policy) and may not be granted decision-making power in areas in which they would have to arbitrate between conflicting public interests, exercise

[20] However, presently, the exact implication of the Meroni Case with a view to this scope is under discussion. Some argue that the restrictive interpretation of the Meroni doctrine seems to be based as much on political as on legal considerations (cf. Geradin, 2005).

political discretion or carry out complex economic assessments (European Commission, 2001a). Furthermore, agencies must be subject to an effective system of supervision and control. Indeed, the agencies created so far have had diverse functions but none has been given real regulatory authority as regards rule making (Coleman, 2004).

6.4.8 Overview new European modes of regulation

Table 3, below, summarizes the new European regulatory modes discussed above in terms of the main purpose of application.

Table 3: New modes of regulation

New modes of regulation	**Main purpose of application**
A) Comitology	Formal regulatory mode for the implementation of measures that fall under the executive duties of the Commission
B) New Instruments	Regulatory mode by which behavioural change is stimulated through a more indirect approach of regulation or by leaving room for dissimilar implementation
C) Self-regulation	Regulatory mode by which nongovernmental bodies are allowed to establish and manage their own rules
D) Partnership	Regulatory mode focussed on the involvement of regional and local actors during the establishment of EU policies with a territorial (local) dimension
E) OMC	Regulatory mode focussed on international mutual learning, policy coordination, and cooperation in areas that remain primarily the responsibility of national governments but are of concern to the EU as a whole
F) Regulatory Agency	Formal regulatory mode to secure technical or scientific input to the preparation of EU law and to adopt individual decisions in areas where a single public interest predominates and specific technical expertise is required

6.5 CRITERIA OF GOOD GOVERNANCE

Scharpf (2001) argues that from a problem-solving perspective both the capacity for collective action and the capacity to convey legitimacy to that action matter. In line with this view, Eberlein and Kerwer (2004) observe that the EU is increasingly confronted with the double requirement of effectiveness and legitimacy. Knill and Lenschow (2003) also argue that the main conflict regarding good governance deals with the question whether either factors that determine the legitimacy of regulation (input factors) or factors that determine the effectiveness of regulation (output factors) should serve as primary evaluation criteria. In this respect, criteria (principles) of good governance can be defined as '*the evaluation criteria with respect to the effectiveness and legitimacy of a certain mode of regulation'* (cf. Lavrijssen-Heijmans, 2006). Knill and Lenschow (2003) define three input and three output criteria (principles) of good governance, that is:

Criteria concerning legitimacy (input factors)

1) *Public mandate:* the extent to which the regulatory procedures establish public mandate
2) *Due process*: the extent to which wide participatory rights are granted and substantive equality is provided to those affected by regulatory decisions
    a. Participation: the extent to which those affected by the regulations or involved in the implementation participate in the formulation of the regulations
    b. Substantive equality: the extent to which 'the regulated' are equally treated, policies are consistent and distortions of the market, due to different local regulatory patterns, are avoided
3) *Accountability*: the possibility to control (e.g. political and judicial control) the responsible authority

Criteria concerning effectiveness (output factors)

1) *Decision-making capacity*: the capability to take a regulatory decision (or to enact a legislative mandate)
2) *Implementation effectiveness*: the extent to which regulatory decisions are actually implemented and complied with
3) *Problem-solving capacity:* the extent to which regulatory decisions do actually reach the objectives defined
    a. Adjustment flexibility: the extent to which swift redesign of regulation is possible
    b. Danger of capture: the extent to which one designs the rules in view of the interest of the public at large (in stead of in the interests of the regulated group/industry)
    c. Context responsiveness: the extent to which the regulatory design is responsive to different national (or sub national) problem constellations
    d. Predictability of outcomes: the extent to which one can make sound predictions on potential regulatory outcomes

6.6 CONCLUSIONS

National governments of EU member states are aware of and respond to European interdependence among their policy choices. The ways in which the European institutional environment — the rules of the game — is constituted are referred to as European modes of regulation. Based on existing literature, four traditional European modes of regulation (governance) are distinguished i.e. Mutual Adjustment (default mode), Intergovernmental Negotiations, Hierarchical Direction, and Joint Decision.

Over the last decades, so-called new modes of regulation have gained in salience. The main reasons for that are:

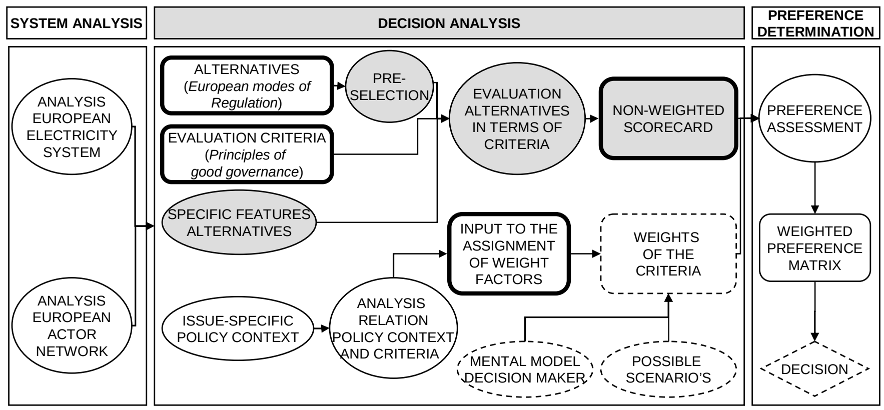
- The type of issues to tackle is changing; the issues on the European political agenda are becoming more specific, complex, and unpredictable. Furthermore, EU-level policy makers are increasingly confronted with issues where the supranational authority for EU level action is limited or nonexistent.
- One may observe a decreasing acceptance of EU decision-making; there is an increasing recognition of the limits of traditional top-down regulatory approaches. Furthermore, concerns exist about the effectiveness and democratic legitimacy of the EU decision-making process.
- The ongoing EU enlargement makes the aforementioned reasons even more prominent.

New modes of regulation are generally characterized by a high level of flexibility, a low level of obligation, a high level of discretion, experimentalism, and coordination, as well as a decentralized participation of stakeholders. This chapter identified Comitology, New Instruments, Self-regulation, Partnership, the Open Method of Coordination, and the Regulatory Agency as the new European modes of regulation.

The (normative) criteria of good governance — *that form the regulatory mode evaluation criteria in this study* — can be divided into two categories. The first category is formed by criteria that determine the legitimacy of regulation (input factors). The second category contains criteria that determine the effectiveness of regulation (output factors).

CHAPTER 7

PROMINENT MODES AND THE CRITERIA OF GOOD GOVERNANCE



7.1 INTRODUCTION

This chapter analyses the role that the various European modes of regulation — as identified in chapter 6 — play(ed) in view of the European electricity market integration process. Section 7.2 provides a general overview of the relevant regulatory developments from the year 1950 onward. Subsequently, section 7.3 compares the main regulatory developments in the EU with those in the US. After this, section 7.4 examines which modes of regulation are prominent in view of the European process of electricity market integration, whereas section 7.5 discusses the main differences between these prominent modes of regulation. The chapter concludes by evaluating the prominent modes of regulation in terms of the criteria of good governance as identified in chapter 6.

7.2 REGULATORY DEVELOPMENTS IN THE MARKET INTEGRATION PROCESS

This section discusses the regulatory developments in view of the European electricity market (liberalization and) integration process from the year 1950 onward.

Phase 1 (1950-1987): Towards liberalization policy

The Coal and Steel Community

In 1951, the Treaty of Paris founded the European Coal and Steel Community (ECSC). This Treaty served as the foundation for the later development of the European Economic Community (EEC) and the European Union (EU). The ECSC members were France, West Germany, Italy, Belgium, Luxembourg, and the Netherlands. The ECSC introduced a common free steel and coal market without import and export duties or subsidies. The underlying reason was the desire to unite the countries by controlling steel and coal, which played a fundamental role in the war. In that time energy policy mostly was coal policy (De Jong *et al.*, 2005).

Euratom

In the mid 1950s, nuclear power emerged. In order to arrange a joint acquisition of uranium and central supervision on the peaceful use of nuclear power, the six countries established — besides the European Economic Community (EEC) — the European Atomic Energy Community (Euratom) in 1957. In 1967, the three organizations ECSC, EEC and Euratom, were merged into the European Community (EC). The ECSC expired in 2002. The EC now forms the first of the three pillars of the European Union (see section 5.2).

International Energy Agency

The International Energy Agency (IEA) was founded during the oil crisis in 1973 and 1974 within the global Organization for Economic Cooperation and Development (OECD) under the Agreement on an International Energy Programme (IEP). The IEP agreement binds participating countries to take specific measures to meet an oil supply emergency.

Energy Policy in Brussels

Until the late 1980s, the IEA continued to be the most important platform for the establishment of energy policy for most European countries. Only after the emergence of the concepts of 'market' and 'environment', the focus shifted and Brussels got more involved (De Jong *et al.*, 2005). In that time, most public services, including electric power supply, fell in the public domain. However, more and more cases showing that public management of infrastructures failed to serve the community adequately were brought forward by advocates of public service liberalization (Chamoux, 2006). The criticism included the following (Chamoux, 2006):

- Monopolies commonly failed to adopt recent or new technologies or did it too late and partially.
- Public services were either heavily subsidized and/or under priced.

- Public service unions took over most of the productivity gains with good wages, guaranteed employment, and social benefits leaving consumer welfare behind.
- The public nature of public services excluded any competitive entry (from national or international entities).

The legal basis to create a single and liberalized European market for electricity supply had already been established in the Treaty of Rome of 1957 (hereafter: 'Treaty'), which was intended to eliminate barriers to trade between member states in order to increase economic prosperity and contribute to a closer union among the people in Europe. Due to a lack of process regarding these goals, the 1987 'Single European Act' incorporated the concept of 'the internal market' in the Treaty. With the internal market, it was intended to create an economic area without internal frontiers in which free movement of goods, persons, services, and capital is ensured (European Parliament, 2006).

Phase 2 (1988-1996): Adoption first liberalization Directive

Commission proposal

During an inventory of obstacles to an Internal Energy Market (hereafter: 'IEM') in 1988, the Commission identified most of them in the fields of electricity and gas. Therefore, the Commission envisaged the application of Community law to these sectors and set free trade between member states as a goal (Eising, 2001). First, Directives on the cross-border transit of electricity (and gas) between the vertically integrated utilities (Council Directive, 1990b), on transparency in prices charged to industrial end-users (Council Directive, 1990a, see section 4.5.2), and on the notification of investment were proposed. The member states only objected to the latter, their reason being the interference with private investment decisions (Eising, 2001). After this, the Commission put forward an ambitious proposal for the liberalization of the EU electricity (and gas) markets including third-party access and the unbundling of vertically integrated utilities.

National opposition to the liberalization proposal

Public service providers were generally opposed to liberalization. Their strong lobbies were generally sufficient to defend the status quo against reform efforts in most member states (Scharpf, 2001). Furthermore, some member states' governments also opposed liberalization, as they feared negative effects on security of supply and could not gain a comprehensive view of the ultimate consequences of a liberalized electricity market (Schmidt, 1998). Secondly, several national governments had a strong political commitment to their existing public service monopolies (Scharpf, 2001), which was often the result of the interleaved decision-making and management structures of the electricity sector and national politics.

Intense intergovernmental negotiations

A highly controversial discussion in the Council followed. France and Germany were the main opponents. Although France had earlier supported plans for limited market opening in order to turn their excess generation capacity into revenues, they now considered the ambitious liberalization proposals of the Commission as a threat to the fundamental principles of their sectoral regime (Eising, 2001). Germany raised concerns about the economic consequences in the context of the heterogeneous national regimes and feared an inflow of French electricity considering the high French excess capacity and the price advantages of the French monopoly EDF. However, as a result of the EU negotiations, the German attitude towards liberalization changed. Based on the long, intensive and detailed debates on different sectoral models, Germany abandoned its conception that competition could not work in the electricity sector due to its economic and technical features (Eising, 2001).

The ultimate compromise

In view of the Commission's proposal, France suggested an alternative and less far-reaching liberalization model (single buyer model). This proposal triggered intense discussions leading to several changes in the Commission's proposal and progressively enhanced the willingness of the member states to agree to a settlement (Eising, 2001). At the end of 1995, most member states were willing to compromise but still German-French disagreements existed over the compromise. This German-French conflict was only solved after bilateral consultations between the French and German heads of government in mid 1996 (Eising, 2001).

Commission's unilateral actions

Another important parallel event in the 1996 Directive adoption phase came from the European Court of Justice, which, in response to a complaint from the European Parliament, had declared the Council's inaction in the transport field to be in violation with the Treaty (Schmidt, 1998). Based on this declaration, the Commission unilaterally issued (cf. section 6.3.3, *Hierarchical Direction*) Directives to liberalize the market for terminal equipment in telecommunications (supported by Article 86 III of the Treaty). This rather 'bold' action was upheld by the Court. Although the Commission still preferred to promote liberalization through 'co-decision', this event defined a new fallback option increasing the bargaining power of the Commission (Scharpf, 2001).

Despite the precedent created by the telecommunications sector, the Commission (DG Competition) was not able to repeat this strategy in the European electricity sector for several reasons. Firstly, member states — even the strong advocate of liberalization: the

United Kingdom — strongly opposed unilateral action by the Commission (Eising, 2001). Secondly, both the Council of the EU and the European Parliament emphasized the need to proceed consensually, to involve all of the relevant EU bodies in the negotiations, and to consult actors intensively (Eising, 2001). Thirdly, due to the heterogeneity of the various national electricity systems, the Commission experienced difficulties preparing proposals that would not trigger resistance immediately (Schmidt, 1998). Finally, as opposed to the telecommunication sector, it appeared to be difficult to liberalize the electricity sector in parts (Schmidt, 1998).

In all, despite the existing precedent of the telecommunication sector, the Commission had insufficient public and private support to establish in one single step a Commission Directive for liberalization of the European power industry. However, the Commission (DG Competition) prepared infringement procedures (1991) against the existing import and export monopolies of nine member states (Schmidt, 1998). Partly due to this legal pressure to be taken to Court, the Commission forced individual member states to open their electricity markets and take a more constructive stance in the Council.[21]

Résumé

In short, despite the initial strong opposition, various factors led to the adoption of Directive 96/92/EC concerning common rules for the internal market in electricity (Directive, 1996). First, the intense debates within the EU negotiations led to learning processes causing member states to alter their initial preferences (e.g. Germany). Furthermore, the deep discussions led to an adapted proposal (compromise) acceptable for all member states. Thirdly, although the Commission's attempt for a unilateral binding decision gained insufficient support, its preparation of a legal case against several member states put pressure on these member states to adopt a more constructive position in the negotiation process.

Phase 3 (1997-2003): Florence Forum and second legislative package

In 1997, member states started the implementation of the 1996 Directive in national legislation. Since the 1996 Directive mainly focused on legal and organizational issues, a clear idea on what a common internal electricity market should look like and the major economic principles governing such an internal market was still absent (Boisseleau and Hakvoort, 2003). For example, although the issue of unbundling was addressed, major issues with respect to the industry structure and network unbundling remained.

[21] Ultimately, the ECJ did not rule against any of the import and export monopolies in its 1997 rulings. Although they regarded these monopolies as violations of the EU rules on market integration, the ECJ accepted their maintenance as they were necessary to enable utilities to perform tasks of general economic interest (Schmidt, 1998).

Additionally, issues like adequacy of supply, system reliability, congestion management, network tariffication, and questions related to the ultimate market model remained open.

Florence Forum

In the late 90s, the Commission tried to make progress by starting negotiations in what has later become known as the 'Florence Forum'. The first Florence Forum was held in 1998. In the forum representatives of the then 15 European member states, their regulatory authorities, the electricity industry, and consumer organizations discussed issues left undecided by the 1996 Directive under the presidency of the Commission. The Florence Forum provided a broad discussion platform for all interested parties to generate general conclusions for further thought. Although the forum certainly facilitated policy learning (and still exists today), the Florence process basically failed to achieve further progress because member states could not be forced to implement the agreed conclusions (De Jong and Hakvoort, 2005).

The new legislative package of 2003

In March 2000, the European Council urged to speed up liberalization in among others gas and electricity markets (European Council, 2000). The Energy Council of May 2000 repeated this call (Energy Council, 2000). In reply to this urge to speed up liberalization, the European Commission (European Commission, 2001b) proposed a new Directive concerning common rules for the internal market in electricity repealing the 1996 Directive. Although this second Directive again mainly focused on legal and organizational issues (Directive, 2003), the 2003 Directive also opened the way for more specific instructions as it was accompanied by a 'Regulation' containing more concrete rules and providing the possibility to establish specific legally binding guidelines on several issues (see section 4.5.2) (Regulation, 2003).

Figure 22 depicts the general regulatory process during the period from 1998 until 2004.

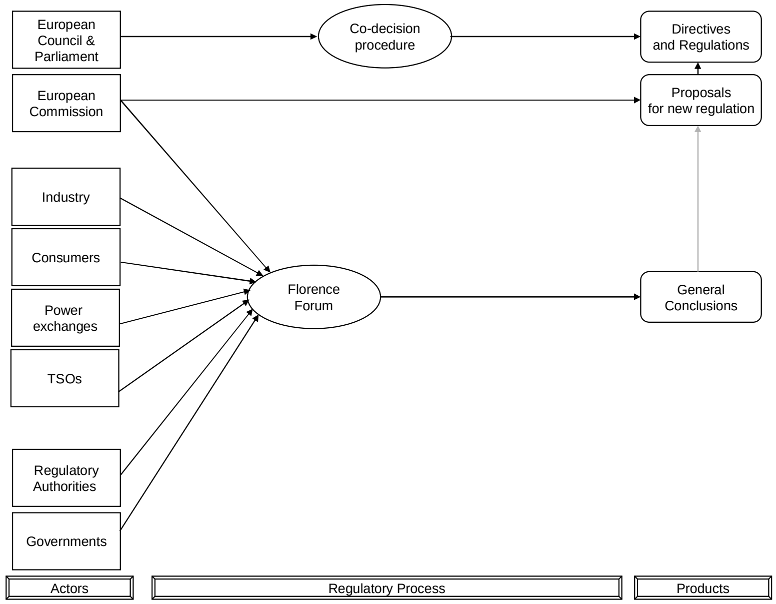


Figure 22: General regulatory process 1996-2003

Phase 4 (2004-2005): Towards a regional approach

The concept of regional markets

On March 1, 2004, the European Directorate-General for Energy and Transport (DG TREN) published a 'strategy paper' containing its medium-term vision for the internal electricity market. This vision came in response to the request of participants in the Florence Forum (European Commission, 2004). In the paper, the Commission recognized that most European electricity networks were not particularly well interconnected and that common harmonized rules were needed (De Jong and Hakvoort, 2004). Therefore, the Commission started focusing on the development of cross-border trade and launched the concept of 'regional markets' (European Commission, 2004). Issues such as the rules for bilateral trading, the rules for standardized day ahead and intra-day markets as well as balancing, cross-border congestion, and ancillary services should be developed first on such a regional basis. Nevertheless, the Commission underlined that there would remain a minimum degree of harmonization, which all member states should comply with. Furthermore, the Commission stressed that markets should not diverge too significantly in their basic design in order to facilitate eventual full integration into a single European electricity market.

Mini fora

In line with the idea of regional markets, the Florence forum of September 2004 reached an agreement on the establishment of a series of regional mini fora. Seven different regions were identified, each consisting of a group of neighbouring countries. The fora were intended to provide an effective platform for the Commission, the relevant regulators, and TSOs to meet regularly in order to make progress in the integration process (Florence Forum, 2004). The first series of mini fora were held in the period of December 2004 to February 2005. Participants in these first series of mini fora were regulatory authorities, TSOs, power exchanges and the European Commission. The series of mini fora resulted in a number of general conclusions on congestion management methods, coordinated congestion management, and legal issues with respect to congestion management and transparency (ERGEG, 2005a). The conclusions were reported to the Florence Forum and taken into account by ERGEG and the European Commission while preparing an new set of binding so-called 'congestion management guidelines' to be adopted through comitology (see section 7.4.2). The adoption process of the new binding congestion management guidelines marked the first application of the comitology procedure (see section 6.4.2) in the liberalized European electricity market.

Figure 23 depicts the general regulatory process during the period from 2004 to 2005.

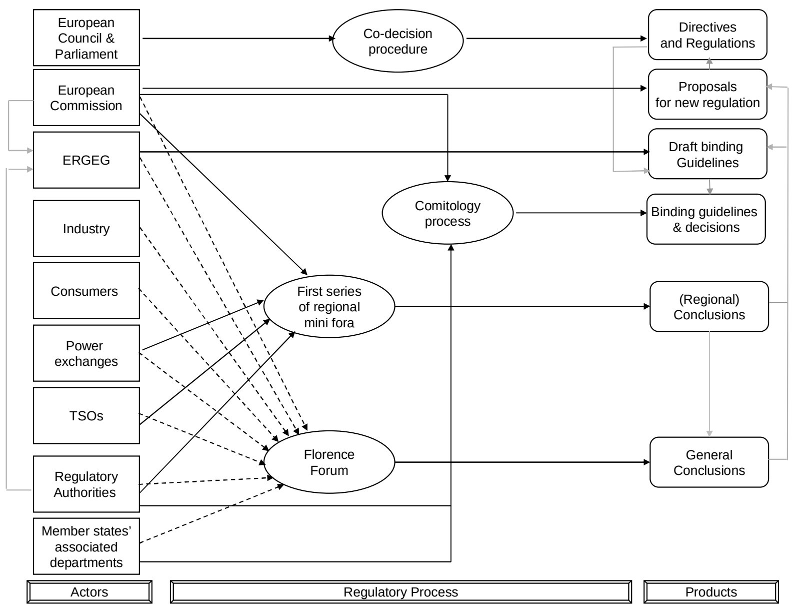


Figure 23: General regulatory process 2004-2005

Phase 5 (2006-2008): ERGEG's Regional Initiatives

The launch of ERGEG's Regional Initiatives

In 2005, ERGEG (see section 5.6) launched a consultation paper on the progress with respect to market integration. This consultation as well as DG Competition's sector enquiry of 2006 (DG Competition, 2007) identified four priority issues, i.e. (i) the availability of transmission capacity, (ii) the availability and control of information, (iii) the cooperation between network operators, and (iv) the compatibility of wholesale market arrangements, which were agreed upon by most respondents. The priority issues underlined the importance of the role and commitment of governments and regulatory authorities (ERGEG, 2005b).

In its conclusions paper, ERGEG confirmed that it would pursue the priority issues for further actions (ERGEG, 2006). The 2005-2006 adoption procedure of new binding congestion management guidelines and the development of guidelines of good practice (GGPs) on information management and balancing markets reflected this confirmation. Besides developing binding and non-binding guidelines within its own organization, ERGEG proposed that relevant regulatory authorities together with the relevant stakeholders (including the European Commission, national governments, TSOs and market participants) would take concrete steps towards market integration on a regional scale. In this light, ERGEG launched the so-called Regional Initiatives for electricity (and gas) in February 2006. Figure 24 visualizes the seven relevant regions for electricity.[22] The Regional Initiatives should identify barriers to further progress towards competitive electricity markets, and develop options for overcoming these barriers.

Priorities

A number of priority issues of interest have been identified in the Regional Initiatives, including: (i) congestion management, (ii) information management and transparency, (iii) cooperation and coordination of the TSOs, (iv) market entry barriers and their removal, (v) ensuring consistent competences of regulatory authorities in the cross-border issues, and (vi) the compatibility of market designs (ERGEG, 2007a).

Box 1: The South Eastern European region — Athens Forum

On 25 October 2005, the Energy Community Treaty was signed in Athens by on the one hand, the EU, and on the other hand, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, the FYR of Macedonia, Albania, and (UNMIK) Kosovo with Turkey, Norway, Moldova and Ukraine as observers. The Treaty builds upon the South East Europe Regional Energy Market (SEEREM), which was launched by the signature of a MoU in November 2002. The South East European Energy Regulation Forum — the Athens Forum — comprises representatives of the Commission, regulatory authorities and TSOs of the SEE region, CEER, ETSO, UCTE and the electric industry (European Commission, 2007c). The MoU envisages the integration of the SEE Region in the EU internal energy market.

[22] The South Eastern European (SEE) Region is not included in ERGEG's Regional Initiatives, however, a Treaty has been signed between that region and the EU (see Box 1).

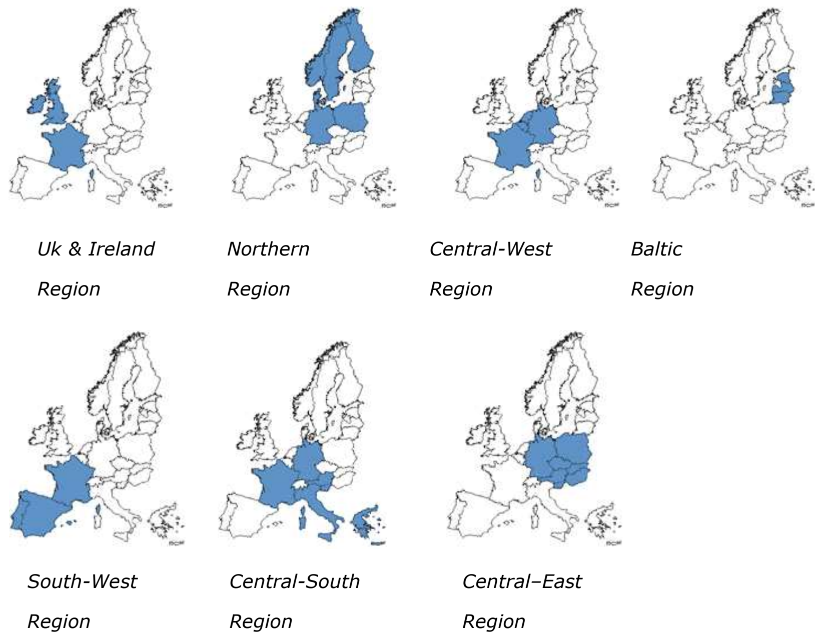


Figure 24: The seven defined regions of the Regional Initiatives
(Source: ERGEG, 2007b)

Figure 25 depicts the general regulatory process during the period from 2006 to 2007.

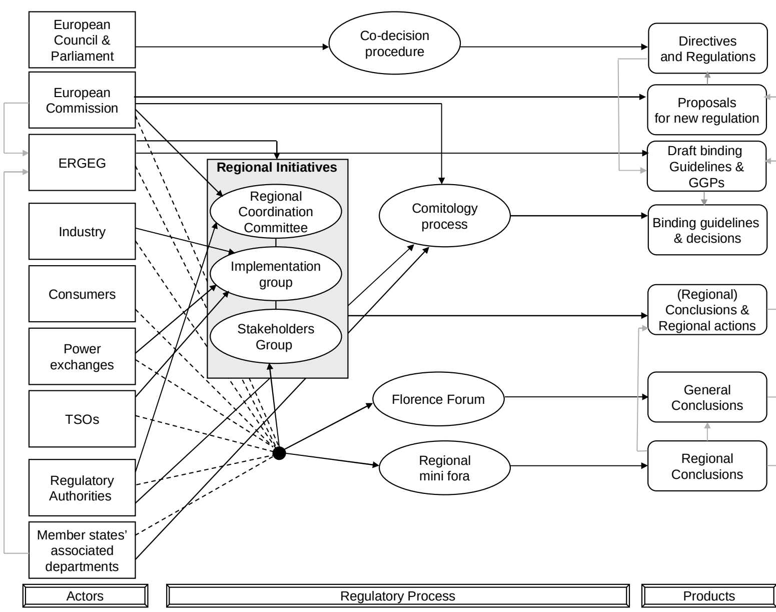


Figure 25: General regulatory process 2006-2008

Organizational structure Regional Initiatives

Each Regional Initiative has a *Regulatory Coordination Committee* **(RCC)** consisting of the regulatory authorities of the region involved. The RCC has the responsibility to coordinate the process, to report on the progress to ERGEG and the Commission, to consult stakeholders, and to set up priorities, milestones, and deliverables. However, regulatory authorities do not always have the powers to take decisions leading to a better functioning regional market. Therefore, the organizational framework anticipates that each RCC will work together with the relevant member state governments (ERGEG, 2006).

The organizational framework of the Regional Initiatives anticipates that the RCC establishes and chairs an *Implementation Group* **(IG)**. Since the IG commits to undertake concrete actions in response to the priorities identified at RCC level, the IG comprises the actors who will have to take concrete action (often TSOs and power exchanges). The IG may propose alternative actions or discuss practical issues.

Finally, in order to allow relevant stakeholders (e.g. governments, consumers, and producers) to express their opinion on the priorities and actions defined, a *Stakeholders Group* **(SG)** is established. Presently, the SG and mini fora meetings comprise the same participants and are in fact the same.

Phase 6 (from 2008 onward): Towards a third legislative package

On 19 September 2007, the European Commission published its proposal for a new legislative package concerning the electricity and gas market. For electricity, the proposed package contains: (i) a proposal for a new Directive amending Directive 2003/54/EC regarding common rules for the internal market in Electricity, (ii) a proposal for a new Regulation amending Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges of electricity, and (iii) a proposal for a new Regulation establishing an Agency for the Cooperation of Energy Regulators. A summary of these new legislative proposals is given below.

Effective separation of supply and production activities from network operations

In the third package proposal, the Commission acknowledges that a vertically integrated company may have incentives to give preferential treatment to its affiliated companies and may have no incentive to develop the network in the overall interests of the market, as this would benefit its competitors (European Commission, 2007d). The Commission argues that it therefore favours *full ownership unbundling* but at the same time proposes a less far-reaching alternative i.e. the *independent system operator* (ISO). The ISO alternative means that the vertically integrated company remains the owner of the network assets but an independent party executes the operational management of the network. In the course of the third package negotiations, yet another unbundling alternative has been introduced, i.e. *the independent transmission operator* (ITO). Also in this alternative, the vertically integrated company remains owner of the network. However, in this case, the company has to comply with a prescribed set of rules to ensure independent operation in practice (Council of the European Union, 2008).

Enhanced powers and independence of national regulatory authorities

The Commission proposes to strengthen national regulatory powers concerning the compliance of TSOs and DSOs with the legal rules imposed on them, the review of investment plans, the monitoring of transparency obligations, the monitoring of the level of market opening and competition, and consumer protection. Furthermore, the Commission argues that the independence of regulatory authorities is a fundamental condition for market confidence. Therefore, it is proposed that the regulatory authority is legally distinct and functionally independent of any other public or private entity. A regulatory authority should have legal personality, budgetary autonomy, appropriate human and financial resources and independent management (European Commission, 2007d).

An Agency for the cooperation of energy regulators

Because the Commission is of the opinion that the establishment of ERGEG has not resulted in the real push towards market integration, it proposes to establish an (Regulatory) Agency for the cooperation of energy regulators (hereafter: 'Agency'). The Agency would complement at European level the regulatory tasks performed at national level by the regulatory authorities by (European Commission, 2007d):

- Providing a framework for national regulators to cooperate,
- Performing regulatory oversight of both the cooperation between transmission system operators (see below) and the actions of individual national authorities,
- Individual decision powers on technical issues where such decisions are provided for in the basic instruments (directives and regulations),
- Deciding on the regulatory regime for infrastructure connecting at least to member states upon a joint request from the competent national regulatory authorities or where the competent national regulatory authorities have not been able to reach an agreement on the appropriate regulatory regime within six months,
- Granting third party access exemptions (only if the relevant national authorities have not been able to reach an agreement in six months or upon their joint request), and
- Having a general advisory role.

Efficient cooperation between TSOs

In parallel to the creation of a regulatory agency, the legislative proposals oblige transmission system operators to establish the European Network of Transmission System Operators for Electricity (hereafter: 'ENTSO'). Several tasks are proposed to be assigned to the TSOs at EU level including a (non-binding) 10-year investment plan every two years and the adoption of technical and market codes. These technical and market codes may cover a broad range of regulatory areas including security and reliability, grid connection and access, congestion management, trading, transparency and balancing rules as well as rules regarding transportation tariff structures (European Commission, 2007e). Under certain circumstances, the Commission may adopt (in its own initiative or upon recommendation of the Agency) binding guidelines on these same areas (European Commission, 2007e; Council of the European Union, 2009).

So far, it remains unclear which part of the technical and market regulation will remain under the responsibility of the main European legislative bodies and/or the various national regulatory authorities, and which part of this regulation will become the primary responsibility of the European network of TSOs.

Figure 26 depicts the general regulatory process as currently proposed in the third legislative energy package.

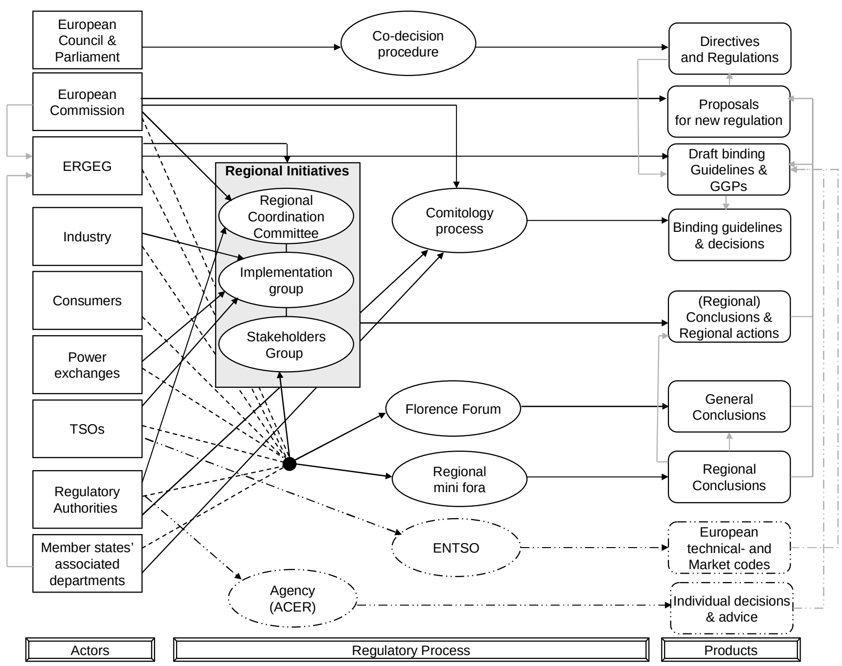


Figure 26: Envisaged general regulatory process

Improving the functioning of the market

The new legislative package also contains more specific proposals aiming at improving the regulatory framework concerning electricity markets (European Commission, 2007f) including:

- A proposal to formulate guidelines to assist applicants and regulators in applying the conditions for an exemption (from third party access rules),
- A proposal to extend the current binding transparency requirements, and
- A proposal to set up a retail forum (Citizens Energy Forum) analogous to the Florence (electricity) and Madrid (gas) forums in order to establish clear rules on competition in retail markets with a view to gradually harmonizing the market rules to allow cross-border retail markets (European Commission, 2007d).

Cooperation to reinforce security of supply

To conclude, the Commission proposes to impose the duty upon the Network of European Transmission System Operators of making system adequacy forecasts (including both generation and network adequacy) for every summer and winter as well as for the long term (European Commission, 2007f).

7.3 REGULATORY DEVELOPMENTS: THE EU VERSUS THE US

Below, the European regulatory developments are placed in a more worldwide perspective by comparing the European regulatory developments with the parallel developments in the United States of America (hereafter: 'US'). Similar to the EU, the US is a multi-state institutional entity that started electricity sector liberalization in the mid 1990s.

Different results so far

The European Union and the US departed with the same agenda for electricity sector liberalization in the mid 1990s. Today, one may observe that the two powers have moved towards different and quite counterintuitive outcomes as regards to market and regulatory design.

Where EU member states (relatively) just recently started growing together under the umbrella of the European Union, the US has existed as a single nation under the umbrella of federal government for roughly two centuries (Weinmann, 2007). In view of this basic institutional analysis, the situation observed today feels at first glance counterintuitive. The EU, lacking a centralized sector authority, achieved more regulatory and market design convergence than the US. EU national electricity systems roughly progress at the same speed in the same direction. In the US, however, both the market and regulatory design diverge greatly. On the one hand, in the North-Eastern part of the US, the most sophisticated competitive wholesale markets are found (e.g. PJM); on the other hand, Texas still has an independent grid, California has a hybrid market with competitive elements but also a legacy of anti-competitive contracts signed after the California crisis (Weinmann, 2007), and in the South-East and North-West of the US still a range of traditional service models are applied.

Based on the extensive EU-US analysis performed by Jens Weinmann (2007), one may conclude that the combination of five factors leads to the divergent regulatory and market designs within the US:

- *The absence of consensus on the ultimate market design model*: not only in the US, but also in general, no consensus exists on the ultimate market design for the electricity sector (Weinmann, 2007).
- *Loss of momentum due to several contingencies:* the repercussions induced by the California crisis (2000-2001), Enron's bankruptcy (2003-2004), the overall meltdown of trading activities, and the 2003 black-out in the North Eastern USA shattered the belief in liberalized markets and motivated many state commissions and politicians to stick to the old models (Weinmann, 2007).
- *Resistance to a firm and inflexible top-down approach*: the US Federal Energy Regulatory Commission (FERC) tried to impose (2002) a detailed so-called Standard Market Design (SMD) on its states. However, this SMD failed political support as states were of the opinion that FERC should honour and recognize the differences in the regional electricity systems.
- *Lack of legal power*: FERC is legally not able to impose a market design model upon its states. Conversely, the EU may use the binding character of a European Directive or Regulation to harmonize the regulatory and market designs within its member states.
- *Background state level regulatory authorities*: where national regulatory authorities in the EU came into existence parallel and by the grace of the liberalization movement, the equivalent institutions in the US (the Public Utilities Commissions) have been serving their local constituencies in some cases over almost a century by rate-of-return tariff setting (Weinmann, 2007). This different background probably accounts for the more pro-liberalization attitude of EU member states regulatory authorities in comparison with their equivalent authorities in the US.

Current process developments

In view of electricity market liberalization and integration, both the EU and the US moved towards more informal, regional strategies. Today, the EU market integration process is one of trial-and-error by incremental learning (Weinmann, 2007) fostered by the Florence process and ERGEG's regional initiatives discussed above. Together all member states gradually evolve towards a desired market design model, which is not yet defined in detail. This European regulatory development is also referred to as 'informal trans-national regulatory networks'. In the US two trajectories exist; one preserving the status quo of the traditional, locally adapted model under a form of anti-federal empowerment, the second leading to an 'oil stain' expansion of the desired market design (which is already largely defined) under the control of a Regional Transmission Organization (RTO[23]). FERC — responsible for inter-state transmission regulation — actively pursues this RTO approach. The latter trajectory is also referred to as 'agglomerative magnet' (Weinmann, 2007). Figure 27 visualizes the EU development of 'trans-national informal regulatory networks' and the US development of the 'agglomerative magnet'.

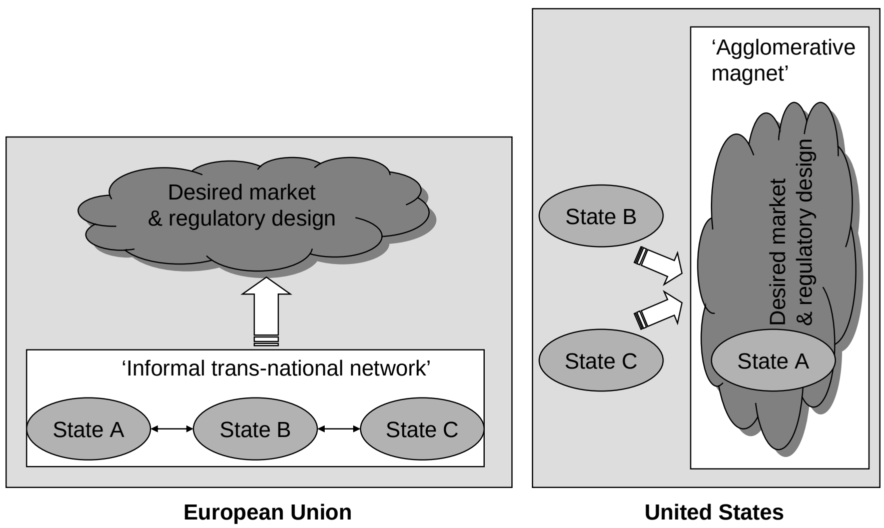


Figure 27: Regulatory process developments — EU versus US

7.4 EUROPEAN MARKET INTEGRATION: PROMINENT MODES OF REGULATION

Chapter 6 discussed several traditional and new European modes of regulation. This section examines which of these modes of regulation are prominent in view of the European process of electricity market integration.

[23] Basically, a RTO is an Independent System Operator (ISO) with a sufficient regional scope.

7.4.1 Traditional modes and the electricity market integration process

Mutual Adjustment

Although member states will always show some '*Mutual Adjustment*'-related behaviour in the sense that their national policies will always be influenced by the policies adopted in other countries to a certain extent, this traditional mode of regulation is no longer a dominating mode of regulation (governance) with regard to many policy areas including the energy sector. In the European Union, one has moved towards centralization and coordination of energy market liberalization and its various accompanying operational issues.

Intergovernmental Negotiations

Table 2 (page 70) showed that Intergovernmental Negotiations are mainly used for (i) treaty negotiations, (ii) second and third pillar issues, and (iii) Council negotiations. The basis for liberalizing the European electricity sector and creating a single European electricity market has been laid down in the EC Treaty of Rome. Furthermore, Single Market and Trans-European Networks policy are first pillar issues for which the regulatory measures needed are mostly adopted by means of co-decision (Joint Decision) and not through Intergovernmental Negotiations. Intergovernmental negotiations, however, still greatly influence today's European electricity market policy[24], e.g. during the European Council meetings and the Council's evaluation of Commission proposals (e.g. within the process of co-decision).

Hierarchical Direction

Although, on occasion, the Commission still takes member states or companies to court claiming that a certain European legal requirement has not been properly implemented or has been violated[25], the mode of Hierarchical Direction — which was initially used by the Commission to force individual member states to take up a more constructive position (see section 7.2) — no longer forms the main strategy for achieving market integration progress. Presently, the Commission establishes progress reports and launches sector inquiries[26] in order to monitor market integration progress and search for still existing or new barriers to competition. Considering the Commission's exclusive right of legislative

[24] Scharpf (2001), for example, concludes that the strictly intergovernmental European Council has increased the significance of policy initiatives promoted by the rotating presidency.

[25] For example, in July 2007, the Commission initiated formal proceedings against Electrabel and EDF for suspected foreclosure of the Belgian and French electricity markets. Another example is formed by the (2008) proposals of E-ON and RWE to sell their electricity transmission system network as a result of legal proceedings initiated by the Commission (DG Competition).

[26] For example, the European Commission launched an extensive inquiry into competition in gas and electricity markets on 13 June 2005 requiring companies, trade associations, and government agencies to supply detailed information, documents and statements.

initiative, this puts pressure on member states to follow the Commission's views to a certain degree.

Joint Decision

As discussed in section 6.3, the mode of Joint Decision applies to most policy areas of the first pillar including market-making and market-correcting competencies of the European Union. Indeed, concerning the European electricity market, the key legislation in place today, i.e. Directive 2003/54/EC and Regulation (EC) No 1228/2003, has been established by means of the co-decision procedure. Furthermore, also the 2005 Directive concerning measures to safeguard security of electricity supply and infrastructure investment (Directive, 2005), and Decision No 1364/2006/EC, laying down guidelines for trans-European energy networks (Decision, 2006) have been established by means of the co-decision procedure.

In order to enhance competition and speed up market integration, the Commission recently proposed a new legislative package containing: (i) a proposal for a new *Directive* amending Directive 2003/54/EC regarding common rules for the internal market in Electricity, (ii) a proposal for a new *Regulation* amending Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges of electricity, and (iii) a proposal for a new *Regulation* establishing an Agency for the Cooperation of Energy Regulators (see section 7.2). This new legislative package will be adopted through co-decision.

Based on the aforementioned, one may conclude that the mode of Joint Decision has been, and still is, an important mode of regulation in view of the European process of electricity market integration.

7.4.2 New modes and the electricity market integration process

Comitology

With the adoption of Regulation (EC) No 1228/2003 laying down conditions for access to the network for cross-border exchanges in electricity, private and public actors in the European power industry became acquainted with Comitology. Article 8 of the Regulation lays down the requirement to adopt and amend binding guidelines in accordance with the regulatory (comitology) procedure on the following cross-border issues (Regulation, 2003):

- Inter TSO Compensations, which is a methodology to financially compensate those transmission system operators that facilitate transit flows more than average

- Harmonization of the underlying principles for the methodology to charge producers and consumers for their network usage, including the provision of locational signals
- Guidelines on the management and allocation of the available transfer capacity of interconnections between national systems
- Common rules on minimum safety and operational standards for the use and operation of the transmission network

Presently, only binding guidelines on the management and allocation of the available transfer capacity of interconnections between national systems (Commission Decision, 2006) have been adopted by means of the *regulatory comitology procedure*. Recently, however, the *regulatory procedure with scrutiny* was adopted (see section 6.4.2). The guidelines on inter-TSO compensation, tarrification of network usage, and safety and operational standards will have to be adopted through this latter procedure since these guidelines are of a general scope and designed to amend non-essential elements of Regulation (EC) No 1228/2003 or to supplement Regulation (EC) No 1228/2003 by the addition of new non-essential elements (European Commission, 2007e).

Another application of comitology is laid down in Article 7 of Regulation (EC) No 1228/2003 concerning new interconnections (see chapter 9). The article reads that within two months after receiving a notification, the European Commission may request that the regulatory authority or the member state concerned amends or withdraws the decision to grant an exemption to the developers of a new private (merchant) interconnection. If the regulatory authority or member state concerned does not comply with the request within a period of four weeks, a final decision shall be taken in accordance with the *advisory comitology procedure* (see section 6.4.2).

The proposed third legislative package significantly extends the scope of areas on which binding guidelines may be adopted through comitology (European Commission, 2007e).

New Instruments

Regarding New Instruments, the EU regulatory framework frequently applies the concept of framework regulations.[27] One of the reasons for the laborious start of electricity sector liberalization was the fact that the Commission experienced difficulties preparing legislative proposals that, due to the heterogeneity of the various national electricity systems, would not trigger resistance immediately (see section 7.2). Indeed, the European electricity

[27] However, also procedural and incentives structures are applied in today's European power markets. For example, economic incentives are given in regard to the network cost of transmission and distribution companies (economic incentives) and national regulatory authorities must publish (based on Article 23 of Directive 2003/54/EC) a yearly report on the functioning of their national power markets (information requirements).

sector is a complex interconnected technical-economic system, in which the various national sub-systems contain their own specific, technical, economic, and regulatory features. This complexity has not decreased over the years, on the contrary, the ongoing liberalization and increasing competition possibly made things even more complex.

Within the European regulatory framework, one may identify various rulings, which can be defined as framework regulations. For example, Article 5 of Directive 2003/54/EC in general reads that member states should ensure that technical safety criteria are defined and that technical rules regarding connection to the system are developed and made public. The specific technical rules may however be determined at each member state's discretion. Another example concerns balancing (ensuring a continuous balance between supply and demand in the real time electricity system operation). Article 7(1) of Directive 2003/54/EC only prescribes high-level criteria for balancing rules i.e. that they shall be objective, transparent and non-discriminatory. A last example concerns congestion management. Article 6 (1) of Regulation (EC) No 1228/2003 rules that network congestion problems shall be addressed with non discriminatory market based solutions which give efficient economic signals to the market participants and transmission system operators involved. It is left to the member states' discretion to implement a (discriminatory market based) congestion management method. However, for interconnectors (see chapter 10), additional and more detailed supranational regulations on congestion management have already been laid down through the regulatory mode of comitology (see above).

Self-regulation

Voluntary and delegated self-regulation are two different categories of self-regulation (see section 6.4.4).

An example of voluntary self-regulation within the European electricity sector is the UCTE (see section 5.4) Operational Handbook. The basic objective of this handbook is to ensure the interoperability among all transmission system operators (TSOs) within the UCTE synchronous area. The UCTE Operational Handbook contains relevant technical standards and recommendations to provide support to the technical operation of the UCTE interconnected grid (UCTE, 2006). The TSOs committed themselves to the Operational Handbook by signing a (private) Multilateral Agreement.

With respect to delegated self-regulation, the situation in the aviation sector provides an interesting comparison. There Eurocontrol[28] formally received various mandates to develop implementing measures on several issues (Eurocontrol, 2006b) according to the specific

[28] Eurocontrol is the European Organization for the Safety of Air Navigation. This organization has the objective to develop a pan-European Air Traffic Management (ATM) system (Eurocontrol, 2006a).

procedural rules prescribed by the Commission.[29] Although, to date, such explicit modes of delegated self-regulation (co-regulation) have not been applied with respect to European electricity markets, one may draw a parallel between the situation of Eurocontrol and the proposals of the third legislative energy package (see section 7.2). In the third legislative package, it is proposed to set up the European Network of Transmission System Operators for Electricity (ENTSO) and, among others, impose on this organization the task to adopt technical and market codes in a large number of areas (delegated self-regulation). The Commission may however adopt binding guidelines on the same areas if considered necessary. In this respect the Commission argues that the voluntary self-regulatory initiatives have shown their limits for example in the form of network incidents and electricity black-outs due to poor coordination of network operation or missing links in the electricity network, and difficulties in proposing or agreeing on common technical standards (European Commission, 2007e). Besides the ENTSO proposal, more implicit forms of delegated self-regulation can be observed. For example, Article 5 of Regulation (EC) No 1228/2003 rules that TSOs must put in place coordination and information exchange mechanisms to ensure the security of the networks.

Partnership

Considering European electricity markets, in particular infrastructural, environmental, and consumer issues may affect regional and local policy. To provide regional and local authorities with a voice with respect to European policy, the Treaty of Maastricht created the Committee of the Regions (1994) composed of more than 300 representatives of regional and local governments. The Commission and Council are obliged to consult the Committee of the Regions (CoR) whenever proposals are made in areas that have repercussions at regional or local level including trans-European infrastructure (energy) networks. In other areas of energy legislation (e.g. on network access and cross-border exchange), a CoR's advice is normally taken into account through optional consulting.

Although European electricity markets are mostly confronted with national and international issues, the concept of partnership can be important with respect to the issue of transmission investment. Transmission investment is, among others, hampered by lengthy license procedures (procedures of 10-15 years are not unusual) involving regional and local government. A more proactive and smartly organized involvement of local and regional authorities in the preparatory phase of new transmission investment project may speed up the preparatory period of transmission investment projects.

[29] In the end, the draft rules should become implementing rules of the European Commission (European Commission, 2005a) e.g. through comitology.

Open Method of Coordination

Although, in practice, the procedure applied differs significantly from the OMC 'standard' procedure described in section 6.4.6, one may qualify (i) the Florence Forum, (ii) ERGEG's regional initiatives, and (iii) current practices concerning network cost regulation as applications of the Open Method of Coordination (OMC) approach. The EU-wide Florence Forum and ERGEG's regional initiatives (see section 7.2) provide platforms in which various stakeholders exchange information about their concerns, problems, best practices throughout Europe and together develop and discuss options to solve existing barriers to competition effectively. The effectiveness of such discussion platforms largely depends on cooperation between the various stakeholders. Furthermore, the targets defined are characterized by a low level of obligation and a high level of discretion. Another area where one uses an OMC related approach is network cost regulation. Member states are given a high level of freedom to design and implement their own network cost regulation scheme (e.g. rate-of-return regulation, price-cap regulation, quality regulation, etc). The different regulatory schemes applied will however affect international competition as market participants are exposed to dissimilar tariffs in different member states. Although no formal coordination and/or mutual learning process exists, member states (regulators) frequently publish and exchange information about current practices.

Regulatory Agency

In September 2007, the European Commission published its proposed third legislative package for the EU electricity and gas markets (see section 7.2). The Commission argues that despite the fact that ERGEG's activities over recent years have made a positive contribution to the completion of the internal market, it has not resulted in the real push towards the development of common standards and approaches, which is necessary to make a European market for electricity a reality (European Commission, 2007d). Therefore, the Commission proposes an independent body that can make proposals to the Commission regarding decisions that involve substantive issues and take individual regulatory decisions that are binding on third parties concerning detailed technical issues. The Agency would complement at European level the regulatory tasks performed at national level by the regulatory authorities (European Commission, 2007d).

7.4.3 Prominent modes in the process of electricity market integration

Table 4 and Table 5 summarize the practical application of the various traditional and new modes of regulation in the European process of electricity market integration. Currently, although all traditional modes of regulation are still applied to some extent, Joint Decision forms the dominant traditional mode of regulation. Nevertheless, the mode of

Intergovernmental Negotiations plays an important role within this mode of Joint Decision. Furthermore, the mode of Hierarchical Direction is still used when the Commission initiates legal proceedings against individual member states or companies.

Table 4: Traditional modes of regulation and the electricity market integration process

Traditional modes of regulation	**General purpose of application**	**Application within the area of European electricity markets**
A) Mutual Adjustment	Regulatory mode of international mutual adaptation in policy areas where there is no European coordination at all	National policies (including energy policy) will always be influenced by the policies adopted in other countries to a certain extent
B) Intergovernmental Negotiations	Regulatory mode of inter member state negotiations - Treaty (primary EU law) negotiations - Second and third pillar issues - Council negotiations	European Council meetings and the Council evaluation of Commission proposals (e.g. the evaluation of the proposed third legislative energy package)
C) Hierarchical Direction	Regulatory mode of centralizing competencies completely on an EU level - ECB (Central Bank) issues - EJC (Court of Justice) cases - European Commission: • Infringement procedures • Commission decisions/directives	Commission taking member states or companies to court claiming that a certain European legal requirement has not been properly implemented or has been violated
D) Joint Decision	Formal regulatory mode for the establishment of secondary EC law	Adoption of European electricity directives and regulations

Presently, the key steps in creating a single European electricity market have largely been taken and one now focuses on refining the established national and international competition. Remaining market integration issues often concern areas where the legal authority for EU level action is limited, non-existent or controversial and/or which are technically complex. Considering the diverging status quo in the various member states, the need for mutual and bottom-up learning, and the need for extensive cooperation of and coordination between the various stakeholders, such issues usually call for a more flexible regulatory approach. Consequently, over the last decades, the so-called new modes of regulation have gained in salience.

Table 5: New modes of regulation and the electricity market integration process

New modes of regulation	General purpose of application	Application within the area of European electricity markets
E) Comitology	Formal regulatory mode for the implementation of measures that fall under the executive duties of the Commission	Binding guidelines developed under Regulation (EC) No 1228/2003 and final decisions on Third Party Access exemptions
F) New Instruments	Regulatory mode by which behavioural change is stimulated through a more indirect approach or by leaving room for dissimilar national implementation	For example: technical safety requirements and the system balancing mechanism
G) Self-regulation	Regulatory mode by which nongovernmental bodies are allowed to establish and manage their own rules	For example: the UCTE Operational Handbook and the technical and market codes to be defined by ENTSO as proposed in the third legislative energy package
H) Partnership	Regulatory mode focussed on the involvement of regional and local actors during the establishment of EU policies with a territorial (local) dimension	Obligation to consult the Committee of the Regions concerning proposals on trans-European infrastructure networks and optional consulting in other areas of energy legislation
I) Open Method of Coordination	Regulatory mode focussed on international mutual learning, policy coordination, and cooperation in areas that remain primarily the responsibility of national governments but are of concern to the EU as a whole	For example: Florence Forum, ERGEG's regional initiatives, and network cost regulation (mutual learning)
J) Regulatory Agency	Formal regulatory mode to secure technical or scientific input to the preparation of EU law and to adopt individual decisions in areas where a single public interest predominates and specific expertise is required	European Agency for the cooperation of national regulatory authorities as proposed in the third legislative energy package

Indeed, Table 5 shows that, presently, all identified new modes of regulation are applied to a certain extent, except for the Regulatory Agency. However, the Commission recently has proposed the introduction of a Regulatory Agency. As Partnership is only relevant for a limited set of market integration issues, Comitology, New Instruments, Self-regulation, the Open Method of Coordination, and the Regulatory Agency are identified as the most prominent new European modes of regulation.

In summary, (i) Joint Decision, (ii) Comitology, (iii) New Instruments, (iv) Self-regulation, and (v) the Open Method of Coordination are the most prominent European modes of regulation applied with respect to today's European electricity market integration process. Furthermore, (vi) the Regulatory Agency seems to form an important mode of regulation for the future.

7.5 PROMINENT MODES OF REGULATION: MAIN DIFFERENCES

This section analyses the main differences between the six prominent modes of regulation as identified in section 7.4 by means of four two-dimensional frames, that is: (i) the level of obligation versus the level of discretion, (ii) the level of focus on process versus the level of focus on contents, (iii) the level of solution flexibility versus the level of democratic legitimacy, and (iv) the institutional level of regulation versus the origin of regulation.

7.5.1 Level of obligation versus level of discretion

Knill and Lenschow (2003) identify the level of obligation and the level of discretion as two important dimensions characterizing European modes of regulation. *Discretion* refers to the leeway of member states/nongovernmental actors in the implementation of EU rules/policies (Treib *et al.*, 2005). *Obligation* refers to the legal bindingness of a regulatory mode's resulting rules or decisions. Figure 28 positions the prominent modes of regulation in the two-dimensional frame of obligation versus discretion.

Obviously, the mode of *Joint Decision* is characterized by a high level of obligation. After all, this mode leads to binding EU regulation although on a reasonably generic level. The mode of *Comitology* also leads to binding EU regulation. However, rules established through comitology are even more detailed leaving less room for lower-level discretion. One the one hand, the mode of *New Instruments* has an obligatory nature; on the other hand, New Instruments (especially framework regulations) leaves room for lower-level specification. Regarding the dimensions obligation and discretion, the mode of *Self-regulation* is split up into delegated and voluntary self-regulation. A high level of discretion and a low level of obligation are typical of the mode of *voluntary self-regulation*. In case of *delegated self-regulation,* the public authority defines the basic framework (implying a lower level of discretion) with the implicit threat of a 'traditional' legislative proposal (implying some level of obligation). The *Open Method of Coordination* is characterized by a rather high level of discretion and low level of obligation. Focus is on mutual learning, coordination, and cooperation. On the one hand, the *Regulatory Agency* may be associated with a low level of discretion in view to its formal advisory role for the preparation of (technical) regulatory measures and its individual decision powers in areas where a single public interest predominates. On the other hand, the Agency is composed of 'people from the field' with the necessary technical expertise. Although, up to now, regulatory agencies do not hold the power to establish legislative measures of general application (though this aspect is currently under discussion, see section 6.4.7), its individual decisions are binding and its regulatory advice is likely to be translated in binding regulation.

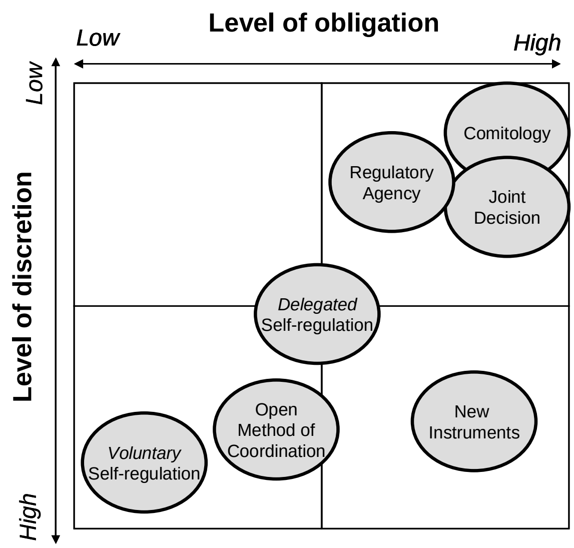


Figure 28: Level of obligation versus level of discretion

7.5.2 Level of focus on process versus level of focus on contents

Figure 29 puts the prominent modes of regulation in the two-dimensional frame of process versus contents. *Process* refers to the way in which (by means of which procedure) rules and regulations are made. *Contents* refers to what rules and regulations are made.

The mode of *Joint Decision* primarily focuses on the rule-making process. The corresponding regulatory procedures have been carefully laid down in various articles of the EC Treaty, in rules of procedure, and in framework agreements. As regards contents, only very high-level principles are defined (in the EC Treaty). Council Decision 1999/468/EC in detail lays down the specific process steps with respect to the different

Comitology procedures. The mode of comitology has primarily been introduced from a process perspective; to safeguard the interests of member states in view of the exercise of the powers of the Commission. Nevertheless, since comitology is used to establish detailed rules on EU level, also the focus on regulatory contents is high. With respect to the dimensions of process and contents, the mode of *New Instruments* is divided framework regulations and incentive structures. *Framework regulations* primarily focus on the regulatory process; consciously leaving it to lower levels of governance to add substance fit to local conditions. In contrast, *incentive structures* concentrate on the way in which certain issues should be regulated (regulatory contents); for example, using economic incentives when efficient supervision and/or clear performance targets are difficult to establish. Framework regulations are often established in conjunction with a more traditional mode of regulation such as Joint Decision.

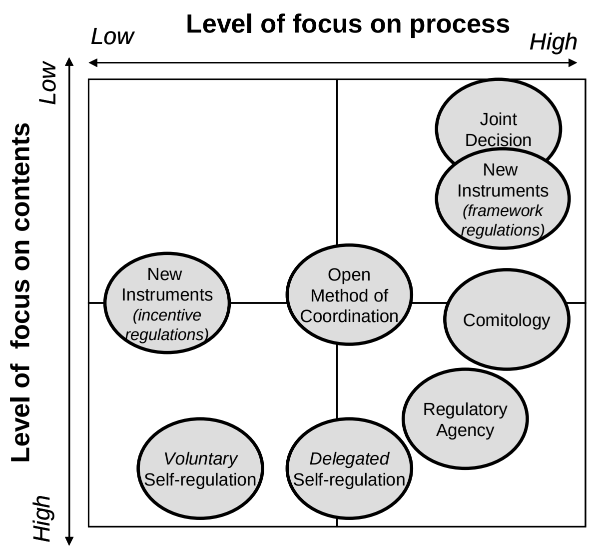


Figure 29: Level of focus on process versus level of focus on contents

Although no standard procedural framework exists for the mode of *Self-regulation*, some procedural aspects may be laid down in a legislative act, e.g. concerning the involvement of third parties or minimum transparency principles (*delegated self-regulation*). In the case of *voluntary self-regulation*, some procedural aspects are often defined as well in order to coordinate the process. The basic idea behind self-regulation relates to contents, namely private organizations — holding the expertise — establishing and managing their own rules. Nevertheless, a legislative body often determines to what extent the definition of measures (as regards to contents) can be left to the parties concerned. Furthermore, the basic objectives and corresponding deadlines are often laid down by the legislative body as well (delegated self-regulation). The *Open Method of Coordination* typically is a process oriented approach although procedures are seldom laid down in detail. International coordination, cooperation, and mutual learning are key principles of this approach, which implies a focus on contents as well. Furthermore, a high-level public organ usually formulates some indicators of achievement (benchmarking). Normally, the way in which the decision-making process of a *Regulation Agency* functions is laid down in formal procedures (cf. the proposal for an Agency for the Cooperation of Energy Regulators (European Commission, 2007d). Furthermore, the concept of a Regulatory Agency has been established to be able to cope with areas of high technical specialization, which can not be dealt with effectively by the Commission (implying a high level of focus on contents).

7.5.3 Level of solution flexibility versus level of democratic legitimacy

Figure 30 places the prominent modes of regulation in the two-dimensional frame of solution flexibility and democratic legitimacy. *Solution flexibility* refers to the extent to which rapid redesign of regulation is possible. *Democratic legitimacy* refers to the extent to which regulatory procedures establish public mandate, provide substantive equality, grant participatory rights, and provide political and/or judicial control.

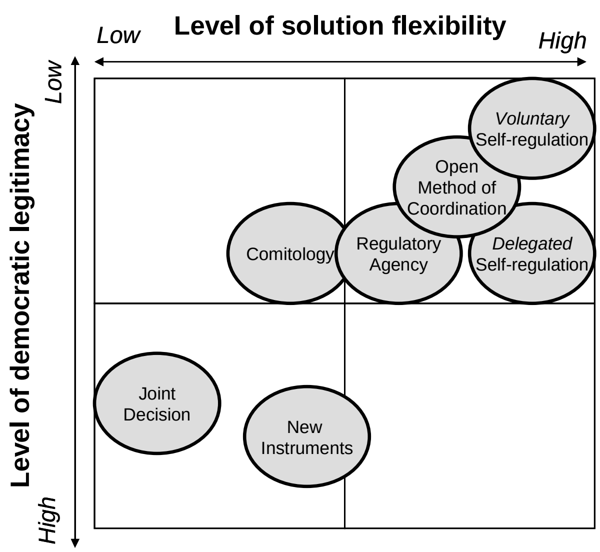


Figure 30: Level of solution flexibility versus level of democratic legitimacy

As the mode of *Joint Decision* can only establish regulation that is supported by a broad consensus of democratically accountable national governments and a directly elected European Parliament, the mode of Joint Decision can be concluded to need a high level of democratic legitimacy (Scharpf, 2000). Evidently, the mode of Joint Decision is not flexible as the decision-making process normally takes a long time (see section 6.3.4). Traditionally, *Comitology* is the subject of criticism as regards democratic legitimacy (TEPC, 2003). The many debates on democratic legitimacy led to the introduction of the comitology procedure with scrutiny extending the role of the Council and Parliament. However, this automatically comes at the expense of the speed of process and thus the possibility for regular adjustments. The high level of discretion linked to the mode of *New Instruments* is likely to have a positive impact on the level of democratic legitimacy. Knill and Lenschow (2003) argue that both the parliamentary and direct public control are enhanced by decentralizing regulatory tasks to national bodies. The opportunities for flexible adjustment of New Instruments are low due its obligatory nature though some room for adjustments remains within the boundaries of the obligatory framework. *Voluntary self-regulation* normally bypasses all representative organs (on both the EU and national level). Legally backed forms of self-regulation (*delegated self-regulation*) may provide a higher level of democratic legitimacy. The solution flexibility is rather high, as *self-regulation* is less bound by formal procedures. Smismans (2006) argues — based on an empirical analysis of current *Open Method of Coordination* practice — that, although there are some signs of involvement, the dominant picture of OMC remains one of a narrow, intransparent, and technocratic process involving a limited group of actors. As implementers enjoy freedom in achieving the objectives defined, the solution flexibility will generally be high. Normally, decisions established through the mode of the *Regulatory Agency* are made by a board of member state representatives (experts). The democratic legitimacy of the Regulatory Agency is highly dependent on the procedural guarantees related to its decision-making process, for example the way in which member states, the Commission, and other stakeholders are involved in the preparatory process. In view of its advisory role, the Regulatory Agency yields little solution flexibility. On the other hand, the fact that the Regulatory Agency allows for individual decisions — instead of standards for general application — brings in some level of solution flexibility.

7.5.4 Institutional level of regulation versus origin of regulation

Figure 31 puts the prominent modes of regulation in the two-dimensional frame of institutional level of regulation and origin of regulation. Three institutional levels can be distinguished, namely the supranational level (EU level), the international level (country-to-country), and the national level. Furthermore, it is useful to separate two categories with respect to the origin of the resulting regulation; governmental and nongovernmental originated regulation.

The mode of *Joint Decision* typically belongs to the institutional level of the EU, where the resulting regulation is of a governmental nature. Although regulatory decisions through *Comitology* are made under the executive duties of the Commission, the opinion of the 'implementation committee' composed of representatives from the member states (national level) plays an important role in the decision-making process. In addition, experts from the industry may be part of the committee. As the mode of *New Instruments* leaves room for implementation fit to the specific circumstances of a particular member state, it may be positioned on the border between the EU and the national level. Furthermore, new instruments (e.g. incentive regulation) leave room for a nongovernmental imposed implementation. *Self-regulation* may occur on all three institutional levels, for example an EU level organization of industry participants establishing standards (e.g. ENTSO, see section 7.4.2), an international organization of industry participants defining their own rules (e.g. UCTE, see section 7.4.2), or industry participant(s) defining their own rules on a national level (e.g. national congestion management rules of TSOs). Evidently, the resulting rules are mainly of a nongovernmental nature.

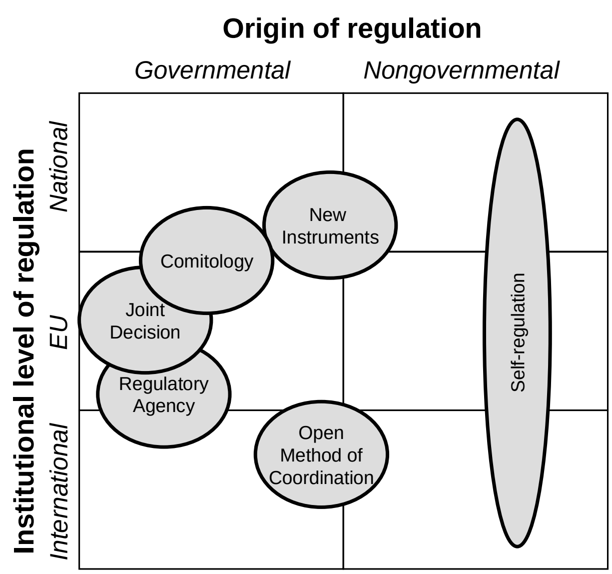


Figure 31: Institutional level of regulation versus origin of regulation

Even though the broad policy goals are defined on an EU level, the *Open Method of Coordinated* largely is an international mode of regulation. As stated above, international cooperation, international coordination, and mutual learning are key features of this mode of regulation. Although the OMC process is often dominated by public actors, the concept normally leaves room for nongovernmental input from the industry. While the *Regulatory*

Agency is a typical EU-level mode of regulation, besides forming an EU level advisory body, it provides a platform to settle cross-border disputes in fields which remain the primary responsibility of national governments but need a certain level of cross-border conformity to ensure the efficient and/or secure functioning of the industry concerned.

7.6 PROMINENT MODES OF REGULATION: NORMATIVE SCORES

Section 7.5 examined the main differences between the six European modes of regulation prominent in view of the European process of electricity market integration. This section analyses the specific features of these modes of regulation in more detail. Chapter 6 identified the general criteria of good governance. Although, in practice, policy decisions are only partially normatively driven, the present existential debates in the EU open windows of opportunity for normative evaluation to influence future policy-making (Knill and Lenschow, 2003, p.9). Therefore, this section analyses the six prominent modes of regulation in terms of the (normative) criteria of good governance. Subsequently, Table 6 summarizes the results in terms of qualitative scores (cf. ordinal linguistic measurement scale, section 3.4.2).

Joint Decision

Input criteria

Since the EU can only deal with problems where European action is supported by a broad consensus of democratically accountable national governments and a directly elected European Parliament, Scharpf (2000) concludes that the public mandate of policies adopted is not seriously in question. However, Knill and Lenschow (2003) identify the gradual shift from the qualified majority (see section 6.3.4) towards simple majority decision-making procedures as problematic from a democratic angle. Scharpf (1999, 2006) shares this view in regard to politically salient decisions. Scharpf (2000) further argues that those affected are able to influence the agenda-setting functions of the Commission to a certain extent. Disregarding local circumstances, the substantive equality of those affected by the policy choices is high (Knill and Lenschow, 2003). Baldwin and Cave (1999) indicate the gap between the power conferred to the EU and the weak control that most national parliaments have over their governments acting in the European arena. Executive bias, secrecy, intransparency, and inequality have become keywords in describing decision-making processes in the Council (Knill and lenschow, 2003, p.18). Moreover, the judicial control is limited. Besides the fact that the resources of the ECJ are limited, the ECJ looks to the legality and not to merits of substance of regulatory rules of action. Initiatives to exercise control are moreover sporadic and depend on there being a party willing to bring on action (Knill and Lenschow, 2003).

Output criteria

Scharpf (2001) underlines that where strongly negative responses can be anticipated or where the policy preferences of national governments or major interest groups strongly diverge, the more likely outcome is either deadlock or a compromise at the lowest common level[30] (low decision-making capacity). Knill and Lenschow (2003) add another reason for this limited decision-making capacity i.e. the situation in which very detailed measures are proposed constraining the options of national government and authorities or private actors for adjusting to EU requirements. Although this view is not uncontested in literature, there seems to be a general agreement that European decision-making is a demanding process, that in many cases requires the use of 'subterfuges' in order to escape from deadlock (Knill and Lenschow, 2003, p.10). The obligatory nature of Joint Decision legislation might positively affect the implementation, but its non-responsiveness towards the domestic context and its non-flexibility creates a source of implementation failures (Knill and Lenschow, 2003). Furthermore, the danger of regulatory capture (the risk that the regulatory outcome primarily serves the industry's interest) is high if detailed regulation is made. The predictability of the regulatory outcomes is however high as clear substantive objectives provide a basis for predicting results (Knill and Lenschow, 2003, p.18).

New Instruments

Input criteria

New Instruments use the generally clear public mandate in the member state for the specification or elaboration of supranational legislation. Especially framework regulations leave real scope for national decision-making. Although discretion is likely to have a positive impact on the level of access and participation of those affected by the decisions (especially implementing actors), it also opens room for unequal treatment of the regulated and distortion of the market due to different local regulatory patterns (Knill and Lenschow, 2003). Knill and Lenschow (2003) argue that both parliamentary and direct public control are enhanced by decentralizing regulatory tasks to national bodies. In practice, this may however come at the expense of some confusion over who bears responsibility.

Output criteria

The decision-making capacity depends on the specific mixture of hierarchical and non-hierarchical elements in the Commission's proposal (Knill and Lenschow, 2003). New Instruments are characterized by 'push factors', the presence of legally binding

[30] This situation is also known as Scharpf's '*Joint-Decision Trap'*.

requirements, as well as 'pull-factors' i.e. factors which positively influence the willingness of implementing bodies and policy addressees to comply with European requirements (Knill and Lenschow, 2003). The opportunities for flexible adjustment are limited due to its obligatory nature though some room for adjustment remains within the boundaries of the obligatory framework. The danger of regulatory capture is limited on EU level as only broad objectives are defined, which do not require detailed technical information from the industry. However, the danger of capture on national level is crucially dependent on the specific domestic arrangements. Therefore, the danger of capture will vary from country to country (Knill and Lenschow, 2003). In the concept of New Instruments, implementers have the freedom to adjust the broad regulatory requirements in light of their specific problem constellations at national (or lower) level. On the one hand, this enhances the chances of effective problem-solving. On the other hand, a high level of discretion implies certain disadvantages with respect to the predictability of regulatory outcomes.

Self-regulation

Input criteria

Voluntary self-regulation bypasses all representative organs on the EU and national level. Indirectly, some level of public mandate could exist if the initiative originates from the European Commission (Knill and Lenschow, 2003). Legally backed forms of self-regulation may provide a higher level of democratic legitimacy. Self-regulation generally involves those directly affected by the regulation. However, the self-regulatory process often constrains the input of other (more indirectly) affected stakeholders. The substantive equality is only safeguarded if the self-regulatory organization covers the entire industry adequately. The accountability strongly depends on the specific organization of the self-regulatory initiative in terms of monitoring, transparency, formalized sanctions, reporting and publication.

Output criteria

The voluntary nature of self-regulation could facilitate the establishment of self-regulatory arrangements. Although detailed supranational preconditions (e.g. procedural) may reduce the industry's preparedness to engage in self-regulation, the threat of hierarchical intervention could reduce this problem (Knill and Lenschow, 2003). Regarding implementation effectiveness, the effectiveness of the 'carrot' largely depends on the 'stick'. Self-regulation is a dynamic mode of regulation being able to evolve according to need. The risk of regulatory capture is high with regard to voluntary self-regulation but is lower if the concept of co-regulation (delegated self-regulation) is applied, as supranational interests are secured by broad objectives. On the one hand, the mode of

Self-regulation is generally characterized by a high level of context responsiveness. On the other hand, the predictability of regulatory outcomes is low. The predictability of regulatory outcomes could be enhanced by defining clear objectives in advance (by the relevant public authority). However, this then may come at the expense of the context responsiveness.

Comitology

Input criteria

Comitology is traditionally a subject of criticism as it hovers on the edge between law-making and implementation (TEPC, 2003, p.9). The main topics of debate have been the involvement of the European Parliament, transparency and accountability. As comitology arose in a period in which the Council played a dominant role at the legislative level[31], the Parliament had no say in comitology as well. With the Council Decision of 1999, the position of the European Parliament was improved although it remained merely informed. Furthermore, Smismans (2006) argues that although, in theory, the Council plays a prominent role in comitology — which would ensure the involvement of national representatives —, in practice, comitology rarely leads to the involvement of the Council since the deliberations between the Commission and national representatives mostly end in an agreement (Smismans, 2006, p.15). The many debates on democratic legitimacy led to Council Decision 2006/512/EC, which, among others, introduced the regulatory procedure with scrutiny (see section 6.4.2). In this procedure, the Commission requires — on top of the approval of the Committee — green light from both the Council and the Parliament before adopting any measure. This procedure must be followed for measures adopted under a legal instrument adopted by means of co-decision (see section 7.4.2). On the one hand, the procedure with scrutiny improves the public mandate of comitology; on the other hand, this may come at the expense of the speed of process. Furthermore, the question remains if both the Council and Parliament possess the knowledge to assess the proposed measures adequately. Although the substantive equality is high, an adequate and timely consultation process (TEPC, 2003) could improve the involvement of national experts and civil servants in the committees. The judicial control — the extent to which individuals can challenge decisions taken through comitology and the procedure followed[32] — is another issue. However, member states are eligible to challenge (the legality of) an act that the Commission has adopted on the basis of the opinion from a comitology committee.

[31] The situation as it was before the introduction of co-decision.

[32] For example, no formal, legally binding criteria for establishing the composition and independence of committees exist.

Output criteria

Comitology committees usually have only a limited amount of members (member states usually delegate 1-3 members), often representatives of national administrative bodies occasionally accompanied by issue-specific experts. Furthermore, the committees are generally durable, institutionalized, and confronted with a continuous flow of decisions (TEPC, 2003). Comitology provides an alternative to lengthy legislative negotiations and allows for faster adjustment to typically technological or scientific developments (Knill and Lenschow, 2003). Considering these characteristics, comitology tends to have a (low-cost) high problem-solving capacity. Since comitology is characterized by a high level of obligation and the implementers (national administrations) are closely involved in the decision-making process, the implementation effectiveness tends to be high as well. Although this obligatory nature comes at the expense of the adjustment flexibility, comitology's flexibility is high compared to the mode of Joint Decision. Because Committees lay down relatively detailed regulation, a danger of regulatory capture exists naturally depending on the character of the rules to be defined. National administrations may contest the applicability (in their member states) of the proposed implementing measures during the decision-making process, however, comitology provides little leeway for implementers once the rules are laid down. Clear and substantive objectives in the basic instrument provides form a sound basis for predicting results, but, even though the Council Decision of 1999 (Council Decision, 1999) enhanced transparency of the committee system to the benefit of the public, the process is still considered to be played 'behind close doors'.

Open Method of Coordination

Input criteria

On EU level, the public mandate of the OMC approach seems limited although national representatives in the Council define the global targets. Furthermore, there is no formal role for the Parliament. The Open Method of Coordination relies on national governments to formulate and decide on all concrete measures to be taken to achieve the benchmarks set on EU level (Knill and Lenschow, 2003). In theory, OMC allows for more decentralized participation of stakeholders. However, this kind of democratic experimentalism raises the question how those who are affected — and therefore should participate in the regulatory process — can be identified (Eberlein and Kerwer, 2004). In line with this view, Smismans (2006) argues[33] that, although there are some signs of involvement, the dominant picture of OMC remains one of a narrow, intransparent, and technocratic process involving

[33] Based on an empirical analysis of current OMC practice.

particularly high civil servants and EU officials in a closed policy network. Consequently, Smismans (2006) reasons that one should be cautious in arguing that new modes of regulation are by definition characterized by a high participatory nature. The high level of discretion could result in the unequal treatment of the regulated as there is an indirect encouragement of local adjustment (Knill and Lenschow, 2003). Furthermore, the Commission's ability and resources to monitor effectively are limited. In this respect, the heavy reliance on data provided by member states themselves forms another problem (Idema and Kelemen, 2006). In contrast to the EJC possibilities with respect to law and treaty violations, the Commission can only shame a member state if it can assure that either a majority or unanimity will support its shaming. The Commission therefore relies on member states in the matter of control and this dependence could discourage the Commission from actual shaming (Idema and Kelemen, 2006). Furthermore, since the Commission can not shield itself behind binding legislation, the Commission has to base its report on presidency conclusions and rather open targets. Consequently, there is always the possibility for a counterclaim from a defensive member state (Idema and Kelemen, 2006).

Output criteria

With respect to the Open Method of Coordination, assessments on both input and output factors vary considerably in the academic literature (cf. Héritier, 2002; Knill and Lenschow, 2003; Eberlein and Kerwer, 2004; Smismans, 2006). In principle, the OMC represents relatively frictionless decision-making (Knill and Lenschow, 2003), however, negotiations on target formulation may be long-winded (Héritier, 2002). The emphasis on mutual learning and coordination might have some positive effects regarding implementation effectiveness (Knill and Lenschow, 2003). For example, there will be great willingness to participate in target definition (Héritier, 2002). However, OMC lacks the threat of sanctions (Treib *et al.*, 2005) so that there is little external push driving and guiding national activities (Knill and Lenschow, 2003). Moreover, member states will prefer and, consequently, will push for target formulation that remains rather vague (Héritier, 2002). OMC is a flexible mode of regulation and therefore better adjustable to rapid technological and economic changes (Héritier, 2002, p.16). The danger of capture is low, however, a low potential for capture at European level does not exclude selective access of certain private interests during the implementation stage (Knill and Lenschow, 2003). As implementers enjoy freedom in achieving the objectives defined, the context responsiveness will generally be high. On the other hand, the predictability of regulatory outcomes is low because it remains uncertain whether the approaches will actually result in the desired behavioural changes and political targets (Knill and Lenschow, 2003).

Regulatory Agency

Input criteria

Since the EC Treaty does not explicitly provide for the formation of regulatory agencies, agencies are instituted on the basis of the classic legislative procedures provided by the EC Treaty (mostly through co-decision). Many raise doubts about the role of the Parliament and the Council beyond this role of agreeing the legal basis for an agency in the first place (Smismans, 2006). Normally, agencies are not subjected to the scrutiny of parliamentary committees. Only a few constituent regulations provide for obligations of regular reporting to the European Parliament (Geradin, 2005). Furthermore, stakeholders, civil society and professional bodies are insufficiently involved in the decision procedures of regulatory agencies (Geradin, 2005, p.54). Procedural guarantees essentially depend on the specific provisions contained in the constituent regulations of the different agencies. Participation solely depends on the agencies' own commitment. Furthermore, the degree of transparency of certain agencies is far from ideal since much of the regulatory work is carried out by opaque committees (Geradin, 2005). The fact that today's agencies may only take individual decisions on a case-by-case basis by definition causes some substantive inequality. Conversely, this individual, case-by-case approach enables agencies to consider specific local or individual circumstances. The situation concerning accountability significantly varies among the existing regulatory agencies. While some constituent regulations explicitly provide that the decisions taken by the agencies are challengeable before the Court of First Instance (ECJ), other regulations entrust the Commission or a specific agency chamber with the review of the legality of agencies' decisions. In addition, in some cases one should first appeal to the specific agency chamber. Only after this initial appeal, one may appeal to the Court of First Instance. Finally, some constituent regulations do not even provide for the possibility of juridical review (Geradin, 2005, p.44). Consequently, besides procedural guarantees, also the level of (judicial) accountability depends on the provisions contained in the constituent regulations. Finally, as agencies are not treaty-framed, the EU legislative institutions could limit the activities of an agency and could even decide to dismantle the agency (Geradin, 2005).

Output criteria

Although the agencies may be empowered to adopt individual decisions in a clearly specified area of Community legislation, thus far, they are not allowed to establish legislative measures of general application. Therefore, on the one hand, the decision-making capacity of a regulatory agency is limited. On the other hand, the expertise embedded in a regulatory agency creates the possibility to decide on complex (technical) case-by-case issues in an efficient and effective way. Furthermore, the obligatory nature of a regulatory agency's decision positively affects the implementation effectiveness. One could argue that the granting of implementation powers to agencies would not amount to a delegation of powers by an EU institution to a regulatory authority but rather to the extraction of powers from the national administrations (Geradin, 2005, p.6). In other words, the level of national discretion is reduced. However, as agencies only take individual decisions on a case-by-case basis, the level of context responsiveness related to agency decisions will most likely be high as well. As one is closely linked with stakeholders, the danger of regulatory capture exists. The impact of certain specialized groups could be high (Coleman, 2004). With a view to its advisory role, a regulatory agency yields little solution flexibility. However, the fact that a regulatory agency allows for individual decisions — instead of binding standards of general application — brings in some level of solution flexibility. The low level of transparency of today's regulatory agencies (Geradin, 2005) negatively influences the predictability of outcomes. Furthermore, the lack of a clear allocation of competences between regulatory agencies and the Commission (Geradin, 2005) may lead to even more uncertainty.

Overview regulatory modes' scores in terms of the criteria of good governance

Table 6 summarizes the analysis above in terms of qualitative scores (non-weighted scorecard; cf. research framework, section 3.4.3). The analysis underwrites the view that the level of obligation and the level of discretion are two important dimensions characterizing European modes of regulation (see section 7.5.1). Often a relation exists between a regulatory mode's level of obligation and discretion and the extent to which it meets the input and output criteria of good governance.[34]

With respect to the non-weighted scorecard of the prominent European modes of regulation in terms of the general criteria of good governance (see Table 6), it is important to stress that any final evaluation of the regulatory modes will depend on the weighing of the individual criteria. In turn, this weighing will be based on (i) the particular policy context, (ii) possible scenarios, and (iii) on individual and/or cultural preferences (cf. Knill and Lenschow, 2003; see section 3.4.3). In addition, the analysis above has shown that some freedom of choice exists with respect to the exact implementation of the various modes of regulation.

[34] For example, a high level of obligation positively influences the implementation effectiveness and a high level of discretion positively influences the context responsiveness.

Table 6: Qualitative scores for the criteria of good governance (scorecard)

Prominent modes of regulation	*Joint Decision*	*New Instruments*	*Self-regulation*	*Comitology*	*OMC*	*Regulatory Agency*
Level of obligation	High	High	Low	High	Low	High
Level of discretion	Low	High	High	Low	High	Low
Input criteria of good governance (legitimacy)						
Public mandate	+	++	––	–	+/–	––
Due process						
-*Participation*	+/–	+	+/–	–	+/–	––
-*Substantive equality*	++	––	–	++	–	+/–
Accountability	–	+/-	––	–	––	–
Output criteria of good governance (effectiveness)						
Decision-making capacity	–	+/–	++	+	+	+/–
Implementation effectiveness	++	+	+/–	++	+/–	++
Problem-solving capacity						
- *Adjustment flexibility*	––	–	++	+/–	++	+
- *Danger of capture*	––	+/–	–	–	+	–
- *Context responsiveness*	––	+	++	–	++	+
- *Predictability of outcomes*	++	–	–	+/–	––	–

Good (score) = ++ Acceptable = + Medium = +/– Insufficient = – Bad = ––

7.7 CONCLUSIONS

Both in the EU and in the US, the initial steps of electricity market liberalization and integration were taken in the mid-1990s. Presently, the European market integration process is basically one of trial-and-error by incremental learning. Together all member states gradually evolve towards a desired market design model, which is not yet defined in detail. Contrary, an 'oil stain' expansion of the desired market design, which is already largely defined, can be observed in the US.

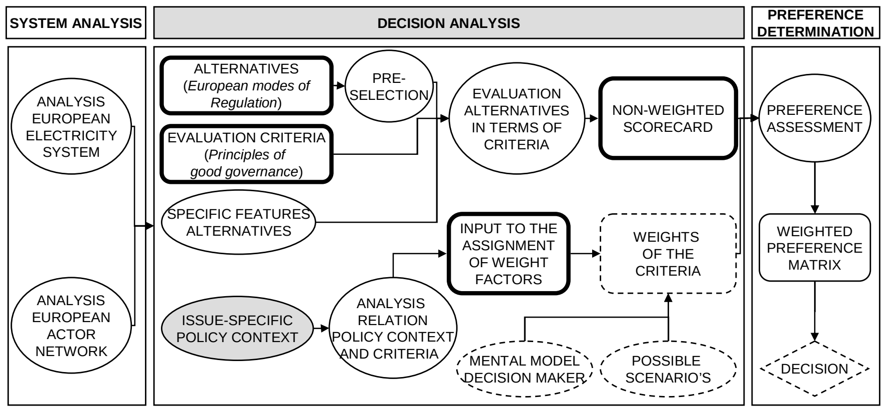
Joint Decision, Comitology, New Instruments, Self-regulation, and the Open Method of Coordination have been identified as the most prominent European modes of regulation with respect to the European process of electricity market integration. Additionally, the Regulatory Agency is expected to be an important mode of regulation in the future.

The various existing European modes of regulation all have their own features. For example, some modes mainly concentrate on the regulatory process whereas others largely focus on regulatory contents. In addition, the regulatory modes differ in terms of the level of obligation, discretion, democratic legitimacy, and flexibility. Finally, the various modes of regulation may be applied at different institutional levels and the origin of the resulting regulation may differ.

A descriptive evaluation of the prominent modes of regulation in terms of the general criteria of good governance reveals that each mode of regulation has its own strengths and weaknesses. Any final evaluation of the regulatory modes depends on the weighing of the individual criteria, which in turn will be based on the particular policy context as well as on individual and/or cultural preferences.

CHAPTER 8

INTRODUCTION TO THE CASE STUDY



8.1 INTRODUCTION

In terms of the overall research framework (cf. Figure 8), the preceding chapters:

- Described the European electricity system, identified the main actors within this system, and analysed the general process of regulatory change (*system analysis*).

Furthermore, the previous chapters:

- Identified and analysed the alternatives (the existing European modes of regulation), identified the evaluation criteria (the general principles of good governance), and established a non-weighted scorecard of these alternatives in terms of the criteria defined (*decision analysis*).

The next chapters focus on the relation between a market integration issue's specific policy context and the regulatory mode evaluation criteria (the general principles of good governance). Insight into this relation forms the last and most complex building block with respect to the structured approach to regulatory mode decision-making (cf. section 3.4.3). In order to learn more about the relation between a market integration issue's specific policy context and the regulatory mode evaluation criteria, the following question should be answered first (see research question 4, section 3.5):

- What features typical of electricity market integration issues and relevant for the process of regulatory mode decision-making can be identified?

At this stage, it is useful to make a distinction between two types of features typical of electricity market integration issues and relevant for the process of regulatory mode decision-making, namely (i) *issue-specific characteristics* and (ii) *issue-specific regulatory needs*. Issue-specific characteristics are mostly static. An example of an issue-specific characteristic is *the number of different actors involved in the issue*. In contrast, issue-specific regulatory needs may be more dynamic. An example of an issue-specific regulatory need is *the need for international harmonization*.

In order to make an — as complete as possible — inventory of characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making, a case study is performed. This chapter introduces this case study. Section 8.2 substantiates why the research method of case study is chosen. After this, section 8.3 specifies what type of case study is used. To conclude, section 8.4 discusses Yin's (2003) general design of a case study, which is applied to this particular case study in section 8.5.

8.2 WHY USING A CASE STUDY?

Why using a case study and not a survey, a history, an archival analysis, or an experiment? In view of selecting an appropriate research strategy, Yin (2003) argues that the main goal is to avoid gross misfits. He presents three conditions distinguishing research strategies, namely:

- The type of research question
- The extent of the researcher's control over actual behavioural events
- The degree of focus on contemporary as opposed to historical events

Case study research has a distinct advantage when a 'how' or 'why' question is being asked. If research questions mainly focus on 'what' questions, two possibilities arise (Yin, 2003, p.5). Some types of 'what' questions are exploratory (e.g. 'what can be learned from a case study of…'). For such an exploratory study any of the five research strategies can be used (Yin, 2003). 'What' questions that can be rephrased as 'how many' or 'how much' questions are likely to favour survey strategies or the analysis of archival records (Yin, 2003). Histories normally deal with the 'dead' past and are the preferred strategy when there is virtually no access to or control over the relevant behaviours. The case study is preferred in examining contemporary events when the relevant behaviours cannot be manipulated. In contrast to the case study, experiments are performed when an investigator can manipulate behaviour directly, precisely, and systematically (Yin, 2003, p.8).

Considering the above, this case study's research question can be characterized as an exploratory 'what' question, namely *what* are the various characteristics and regulatory needs typical of electricity market integration issues and relevant for the process of regulatory mode decision-making? In addition, the focus is on contemporary events over which the researcher has little or no control (i.e. current market integration issues; see section 8.5, below). Therefore, the use of a case study seems a legitimate research strategy.

8.3 TYPE OF CASE STUDY

Yin (2003) distinguishes *exploratory*, *descriptive,* and *explanatory* case studies. *Exploratory* case studies are used to explore any phenomenon in the data that serves as a point of interest to the researcher. *Descriptive* case studies are used to describe the natural phenomena that occur within the data in question. The goal set by the researcher is to describe the data as they occur (Zainal, 2007, p.3). *Explanatory* case studies examine the data both at a surface and deep level in order to explain the phenomena in the data.

Stake (2000) makes another distinction between the different types of case studies. He identifies *intrinsic*, *instrumental,* and *collective* case studies. If the researcher is interested in a particular case without the aim of generalization or theory building, this is classed by Stake (2000) as an *intrinsic* case study (Luck *et al.*, 2006). An *instrumental* case study refers to an interest in a particular case with a view to examination of an issue for insights (Stake, 2000; Luck *et al.*, 2006). The specific case is important because it uncovers knowledge about the phenomena of interest, which may not be the case itself. The third type of case study as identified by Stake (2000), the *collective* case study, involves collecting data from a number of cases to understand a particular phenomenon (Stake, 2000). Besides performing theoretical or literal replication (Yin, 2003), collective case-studies can be undertaken to understand a phenomenon, a population or a general condition (Luck *et al.*, 2006). In this case, collective case studies may be considered an extended instrumental case study (Stake, 2000).

In view of these typologies of case studies, the case study performed in this research may be characterized as *exploratory* and *collective* in the sense of being an extended *instrumental* case study. However, since the individual cases are also interesting in themselves (see section 8.5, below), the case study has *intrinsic* value as well.

8.4 GENERAL CASE STUDY DESIGN

There is no agreed set of methods for case study research. Methods are selected in relation to the nature of the case and the research question (Luck *et al.*, 2006). However, Yin (2003) describes a general framework for case study design consisting of five research design components:

- A study's question(s)
- A study's propositions (if any)
- A study's unit(s) of analysis
- The logic linking the data to the propositions
- The criteria for interpreting the finding

Question

As discussed above, the form of question (in terms of 'who', 'what', 'how', 'where', and 'why') provides an important clue regarding the most relevant research strategy to be used (Yin, 2003, p.22). Therefore the initial task is to clarify precisely the nature of the case study question(s) in this regard.

Propositions

Propositions direct attention to something that should be examined within the scope of study. However Yin (2003) argues that legitimate reasons exist for not having any propositions. This condition exists in research strategies in which a topic is the subject of exploration. Nevertheless, every exploration should still have some purpose. Instead of propositions, the design for an exploratory study should state this purpose as well as the criteria by which an exploration will be judged successful (Yin, 2003).

Unit of analysis

A case describes a real-life situation and has particular boundaries (Luck *et al.*, 2006). Flyvbjerg (2006) discusses different strategies for case selection. He identifies two main categories of case selection strategies: *random* (to avoid systematic biases in the sample) and *information oriented* selection. Within the class of *information oriented* selection he distinguishes four types of case selection strategies, namely a selection based on (i) *extreme* cases, (ii) *maximum variation* cases, (iii) *critical* cases, and (iv) *paradigmatic* cases.

Extreme cases are used to obtain information on unusual cases. Cases are selected based on exceptional and extreme characteristics. To obtain information on the span of outcomes possible, one uses *maximum variation cases*. Such cases are chosen because they are as different as possible from each other on a single (or few) central variables. *Critical cases* have strategic importance in relation to the general problem. Such cases result in a generalization of the sort (Flyvbjerg, 2006, p.230): 'if it is valid for this case, it is valid for all (or many) cases'. Lastly, *paradigmatic cases*, highlight more general characteristics of the domain that the case concerns (has metaphorical and prototypical value).

Logic linking the data to the propositions and criteria for interpreting the findings
These last components of case study design have been the least well developed (Yin, 2003). Linking data to propositions can be done in a number of ways. For example, pattern-matching technique is a way to relate the data to the propositions. Considering this example, criteria should be defined that determine which pattern provides the best match.

8.5 CASE STUDY DESIGN APPLIED TO RESEARCH

Question
As previously discussed, this case study is used to identify the features typical of electricity market integration issues and relevant for the process of regulatory mode decision-making. A distinction is made between two types of features, namely (i) issue-specific characteristics and (ii) issue-specific regulatory needs. Based on the above, the case study's central question is defined as:

'*What are the various characteristics and regulatory needs typical of electricity market integration issues and relevant for the process of regulatory mode decision-making*?'

Propositions
In section 8.3, this case study has been labelled exploratory. In this instance, the case study is not used for testing propositions but aims at producing an — as complete as possible — inventory of characteristics and regulatory needs typical of electricity market integration issues and relevant for the process of regulatory mode decision-making. The final objective is not to be completely comprehensive but to enable and to stimulate the decision maker to translate the nature of a certain market integration issue at hand into these types of features before assigning a particular weight to a regulatory mode evaluation criterion. In other words, the case study's product should contribute to a more informed regulatory mode decision-making process.

Unit of analysis
In view of this case study's central question, a natural unit of analysis is 'electricity market integration issue'. Considering the different strategies for case selection, this case study applies a selection based on *maximum variation cases*; the goal is to identify the span of outcomes possible regarding issue-specific characteristics and regulatory needs typical of electricity market integration issues and relevant for the process of regulatory mode decision-making. The case study explores three different cases, that is, three market

integration issues, namely (i) interconnector investment, (ii) congestion management, and (iii) market transparency.

Apart from issues concerning market structure (e.g. market concentration, vertical foreclosure, and collusion), the European Commission has identified interconnector investment, congestion management, and market transparency as the main issues concerning the European process of electricity market integration (DG Competition, 2006; 2007). Besides being considered today's most important market integration issues by this study's problem owner, the three cases are particularly interesting since the issues on the one hand, all involve some level of international coordination (implying a certain governance challenge), and, on the other hand, all are very different in nature. For example, interconnector investment typically is a border-to-border issue, congestion management mainly is (at least for the time being) a regional issue, and market transparency essentially is a supranational issue. Furthermore, the level of technical and/or economic complexity of the three issues varies. The issue of congestion management is both technically and economically complex, interconnector investment is particularly a rather complicated (socio) economic issue, and market transparency — although inducing some technical and economic oriented questions — mainly is an administrative challenge. Consequently, it is expected that a wide range of relevant issue-specific characteristics and regulatory needs can be derived by exploring these three issues.

Logic linking the data to the propositions and criteria for interpreting the findings

Since this case study does not start from any propositions, this last design component is largely not applicable. However, there must be some logic in linking the data obtained from the cases to the case study's main objective. This case study's primary goal is to produce an — as complete as possible — inventory of characteristics and regulatory needs typical of electricity market integration issues and relevant for the process of regulatory mode decision-making. An important assumption underlying this case study is that the relevant features can only be identified if one dives sufficiently deep into the individual cases. In order to attain such level of depth, an explicit present-day question of importance is examined in detail for each case (see Table 7, below).[35] Furthermore, concerning each case, the past regulatory (mode) developments are analysed. This analysis serves two purposes, namely (i) to examine if any relevant features can be identified from analysing the past, and (ii) to illustrate the continuous search for the appropriate mode of regulation in more concrete terms (see section 3.2).

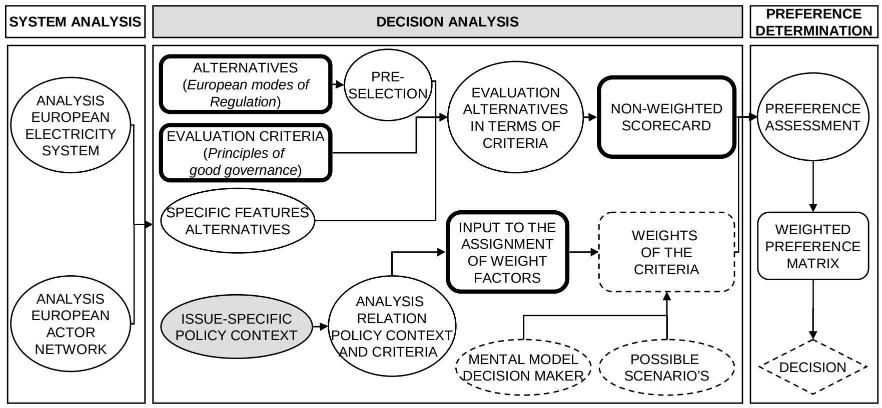
[35] To a large extent, the case study is performed on the basis of tacit knowledge of the author gathered during the period that she worked for the Dutch Office of Energy Regulation.

Table 7: Case study structure

Cases	**Regulatory (mode) developments so far**	**Explicit present-day question of importance**
Case 1: ***Interconnector investment***	Regulatory (mode) developments so far concerning *interconnector investment*	What is the role of the *interconnector* in today's European electricity wholesale markets and can the (perceived) lack of *interconnector investment* be explained based on its economic rationale and/or relevant regulatory framework?
Case 2: ***Congestion management***	Regulatory (mode) developments so far concerning *congestion management*	What is the role of (cross-border) *congestion management* in today's European electricity wholesale markets and what will be the technical and economic effects of introducing flow-based market coupling (FBMC) in the Central-West European region?
Case 3: ***Market Transparency***	Regulatory (mode) developments so far concerning *market transparency*	What is the role of *market transparency* in today's European electricity wholesale markets and what are the aspects to consider in the process of increasing the level of market transparency?

CHAPTER 9

CASE 1: INTERCONNECTOR INVESTMENT



9.1 INTRODUCTION

Chapter 8 discussed the rationale of the case study performed in this study as well as its primary aim, namely to produce an — as complete as possible — inventory of characteristics and regulatory needs typical of electricity market integration issues and relevant for the process of regulatory mode decision-making. Chapter 8 also emphasized the intrinsic value of the three individual cases of interconnector investment, congestion management, and market transparency.

This chapter focuses on the first case of *interconnector investment*. Section 9.2 discusses the role of interconnectors in today's European electricity wholesale markets. Section 9.3 examines the relevant regulatory developments concerning the issue of interconnector investment from 1996 to today. After this, the chapter focuses on the *question* whether the (perceived) lack of interconnector investment can be explained based on its economic rationale and/or relevant regulatory framework (cf. section 8.5).

Section 9.4 discusses the regulatory regime for interconnector investment and section 9.5 analyses interconnector investment economics. After this, section 9.6 concisely describes four recent cases of European interconnector investment, whereas section 9.6.4 identities some key regulatory issues with respect to interconnector investment.

Based on the foregoing analyses, the chapter concludes by answering the question mentioned above (*intrinsic value case*) and by identifying the characteristics and regulatory needs typical of the issue of interconnector investment and relevant for the process of regulatory mode decision-making (*primary aim case study*).

9.2 INTERCONNECTORS

From physical links to international channels of trade

The role of interconnectors within the European electricity system has changed. In the past, most European electricity networks were connected for the purpose of mutual assistance and, in some cases, for carrying out long-term import/exports contracts for electricity (Knops and de Jong, 2005). The process of creating a single European electricity market has transformed interconnectors from physical links between (physical) electricity networks into channels of trade between markets (cf. section 4.3, *economic international subsystem*). By facilitating international trade, interconnectors nowadays form the key to European electricity market integration (see Figure 32).

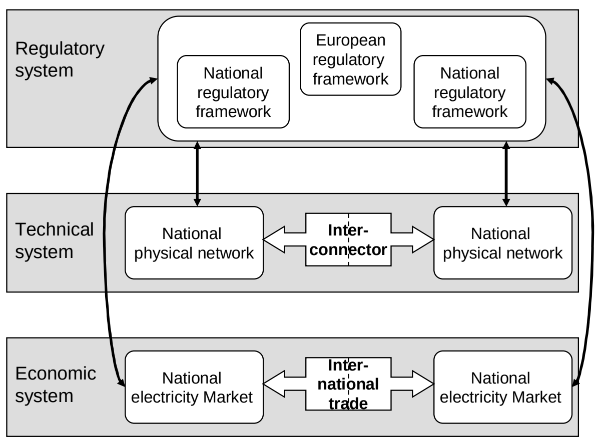


Figure 32: From interconnectors…

From interconnectors to intraconnectors

From a technical, economic as well as a regulatory perspective, interconnectors are treated different from national transmission links. Ideally, within a fully integrated market, interconnectors would relapse into more or less the same role that national transmission links presently fulfil; 'ordinary' transmission lines within an integrated technical and economic system (De Jong and Hakvoort, 2004). The interconnector would form an integral part of the European physical electricity network (technical function) and of the integrated European electricity market (economic function). In other words, *inter*-connectors should transform into *intra*-connectors (see Figure 33).

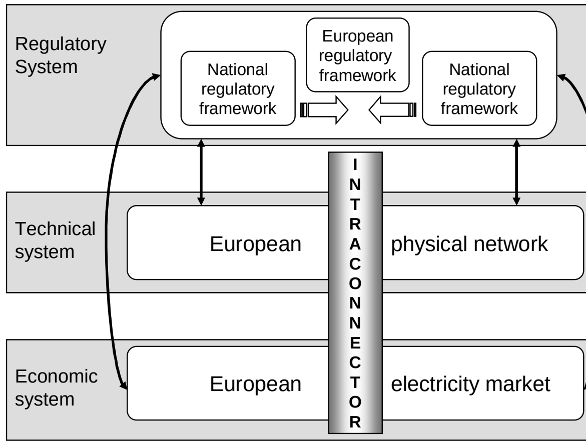


Figure 33: ….. to intraconnectors

9.3 REGULATORY DEVELOPMENTS SO FAR

Issue-specific regulatory developments per regulatory phase

In order to analyse past regulatory developments concerning the (market integration) issue of interconnector investment, this section distinguishes five different regulatory phases from the year 1996 onward:

- 1996: Adoption first European liberalization Directive
- 1997-2000: First phase of the Florence Forum
- 2001-2003: Towards a second European legislative package
- 2004-2006: Adoption of a regional approach to foster market integration
- 2007 onward: Towards a third European legislative package

Section 7.2 already explored the general regulatory dynamics during these phases. Below, the issue-specific regulatory developments concerning the issue of interconnector investment are discussed.

Phase 1 (1996): Adoption first European liberalization Directive

The 1996 liberalization Directive only in general terms ruled that each EU member state should make a regular estimate of (i) the generating and transmission capacity likely to be connected to the system, (ii) the need for interconnectors with other systems, (iii) potential transmission capacity, and (iv) the demand for electricity (Article 6(2)). In addition, Decision No 1254/96/EC (June 1996) introduced some first guidelines concerning the objectives and priorities for trans-European energy networks (Decision, 1996).

Phase 2 (1997-2000): First phase Florence Forum

During the first phase of the Florence Forum, little attention was paid to the issue of transmission (interconnector) availability. However, during the sixth Florence Forum in November 2000, the forum did identify the availability of sufficient transmission infrastructure (and interconnectors in particular) as an important element in avoiding undue problems of abuse of market power and in the creation of a truly integrated market. The intention of the Commission to present an infrastructure plan to highlight the improvements to be made in the network was highly welcomed by the Forum participants.

Phase 3 (2001-2003): Towards a second European legislative package

During the eight Florence Forum meeting in February 2002, the forum participants took note of the Commission's Communication on European Energy Infrastructure (European Commission, 2001c; proposal to amend Decision No 1254/96/EC). The Commission presented the following objectives:

- All member states should achieve an initial level of electricity interconnection of at least 10% of their generation capacity within a reasonable timeframe.
- Key projects should be addressed as priority short-term actions.

The forum stressed the importance of a stable regulatory framework favourable to investments in new infrastructures and proper coordination between public authorities. In March 2002, the European Council agreed on the target value for electricity interconnector capacity equivalent to 10% of installed generation capacity (European Council, 2002). Furthermore, one reached an agreement on priority projects in the framework of the trans-European network. The proposed priority projects, which would have priority for Community aid, were formalized on 26 June 2003 by Decision No 1229/2003/EC. This Decision (Decision, 2003) repealed the 1996 Decision because there was a need to highlight the important projects (priority projects), to update the list of projects, and to adapt the procedure used for identifying projects. In order to further address the perceived problem of underinvestment, the new European Regulation of 2003 opened interconnector investment to profit-motivated (merchant) investors.

Phase 4 (2004-2006): Adoption of a regional approach

Another modification of the trans-European guidelines was adopted in 2006 (Decision, 2006). This 2006 Decision introduced the concept of 'projects of European Interest'. These projects should be assigned the highest priority and would be given special attention regarding Community financing funds. Furthermore, the 2006 Decision rules that the Commission closely monitors the projects of European Interest. When a specific project of European Interest encounters significant delays, the Commission may designate (in agreement with the member states concerned) a European coordinator to speed up implementation.

Phase 5 (2007 onward): Towards a third European legislative package

The proposal of the third legislative energy package amending Regulation (EC) No 1228/2003 introduces international transmission investment plans to be developed by TSOs. ENTSO (see section 7.2) will have to adopt a 10-year investment plan including a generation adequacy outlook every two years. In addition, the TSOs will have to publish regional investment plans every two years. These plans should identify the true bottlenecks and priority projects on a regional scale and should allow regulators/ACER to review investment proposals from a regional perspective. In addition, the proposal amending the 2003 Regulation changes several aspects of the interconnector investment exemption regime (see section 9.4.2). For example, the Regulatory Agency (ACER) may decide on exemption applications if the relevant national regulatory authorities do not reach an agreement within six months. Furthermore, the legislative proposals include the possibility for the Commission to adopt binding guidelines (through comitology) concerning the application of the exemption criteria and on the exemption procedure to be followed.

In November 2008, the European Commission published it Second Strategic Energy Review. In this review, the Commission proposes to replace the existing trans-European energy networks (TEN-E) instrument by a new instrument, the *EU Energy Security and Infrastructure Instrument* (in 2010), that will not only focus on the completion of the Internal Energy Market but also on security of energy supply and the renewable energy objectives. According to the Commission, energy network planning needs to be better coordinated at the political level in which the EU should have an active facilitator role. Furthermore, the Commission argues that more financial resources should be available for key infrastructural projects.

Summary of regulatory developments in terms of European modes of regulation

The regulatory process concerning transmission (interconnector) investment started with some very generic rules on the monitoring of the amount of transmission capacity and some first guidelines on the objectives and priorities concerning trans-European energy networks *(Joint Decision; New Instruments (framework regulations*)).

In the period between 1997 and 2000 little changed although the Commission announced its plan to amend the guidelines for trans-European energy networks (TEN-E) during the Florence Forum discussions *(Open Method of Coordination)*.

During the period between 2001 and 2003, there were some intense discussions on a minimum target for interconnector capacity and the (re)definition of priority investment projects *(Open Method of Coordination)*. By means of Decision No 1229/2003/EC *(Joint Decision)*, these priority projects were formalized. The new Regulation of 2003 opened interconnector investment to merchant investors in order to incentivize private parties to invest in new transmission capacity *(New Instruments (incentive structures)*).

A modification of the TEN-E guidelines was adopted in 2006 in order to introduce the so-called Projects of European Interest *(Joint Decision)*.

The proposals of the third legislative energy package oblige TSOs to establish a (non-binding) 10-year investment plan and regional investment plans every two years *(Delegated Self-regulation)*. The proposed agency for the cooperation of energy regulators will supervise the development of these plans *(Regulatory Agency)*. Furthermore, under certain circumstances, the proposed Regulatory Agency may decide on TPA exemption applications *(Regulatory Agency),* while the Commission will have the possibility to adopt binding guidelines concerning the exemption procedure *(Comitology)*.

Table 8 provides an overview of the regulatory (mode) dynamics concerning the issue of interconnector investment. Chapter 12 will come back to these regulatory dynamics.

Table 8: Overview regulatory dynamics concerning interconnector investment

Phase 1 (1996)	**Phase 2 (1997-2000)**	**Phase 3 (2001-2003)**	**Phase 4 (2004-2006)**	**Phase 5 (2007 onward)**
- Joint Decision / New Instruments *(framework regulations)*	- Open Method of Coordination	- Open Method of Coordination - Joint Decision - New Instruments (*incentive regulations*)	- Joint Decision	- Self-regulation (*delegated*) - Regulatory Agency - (Comitology)

9.4 REGULATORY REGIME

9.4.1 Regulated versus merchant investment

According to European law, an 'interconnector' is defined as '*a transmission line which crosses or spans a border between Member States and which connects the national transmission systems of the Member States*'.[36] Investments in interconnector capacity are part of the more general issue of transmission investment. In Europe, 'transmission' is an

[36] Article 2(1) Regulation (EC) No 1228/2003.

activity under responsibility of transmission system operators (TSOs). Their task includes, in principle, the construction, maintenance, and operation of interconnectors.

European investments in new (high voltage) transmission capacity, including interconnector capacity, are made by TSOs under supervision of their national regulatory authorities. The procedure to get the investment accepted in the rate base for regulated transport tariffs normally includes an assessment of the new capacity to be socially beneficial (Knops and de Jong, 2005). The costs of (regulated) new interconnectors may also be (partially) recovered by the revenues a TSO has collected out of the allocation of interconnector capacity. European legislation prescribes that revenues resulting from the allocation of (scarce) interconnector capacity (congestion rents) must be used for one or more of the following purposes: (i) guaranteeing the actual availability of the allocated capacity, (ii) network investments maintaining or increasing interconnector capacities, or (iii) as an income to be taken into account by the regulatory authorities when approving the methodology for calculating network tariffs, and/or in assessing whether tariffs should be modified.[37]

In addition to regulated TSO investments, Regulation (EC) No 1228/2003 (hereafter: the Regulation) allows for a commercial alternative.[38] The Regulation allows new interconnectors to be exempted from regulated third-party access (TPA) and the prescribed use of the collected congestion rents as discussed above. In particular, where lasting congestion and therefore a prolonged price difference between markets exists, market parties may be interested to invest in new interconnector capacity themselves in order to capture the congestion rents. Such interconnector investments by private parties are commonly referred to as 'merchant interconnectors'.

Within the European context, merchant interconnectors differ on three main points from regulated interconnectors.

First, the most fundamental difference is that the costs of merchant interconnectors are not recovered through regulated (transport) tariffs — that somehow relate to the costs of providing the transmission service — but from revenues from the future use of the interconnector; the revenues that are induced by the electricity price difference between the two ends of the transmission line. Because of such price differences, the use of the interconnector has value for market parties (since it allows transportation of power from a lower priced market to a higher priced market). As the future price differences are uncertain, the investor takes a commercial risk — hence the indication 'merchant'.

[37] Article 6(6) Regulation (EC) No 1228/2003.
[38] Article 7 Regulation (EC) No 1228/2003.

A second difference is that merchant interconnectors are developed by other parties than TSOs. In the European Union, the legal entities that have been designated as TSOs are not allowed to participate in a merchant interconnector.[39]

Third, the regulatory regime for merchant interconnectors may deviate as exemptions from third-party access (TPA) are allowed.

A justified question seems to be why governments should allow merchant investment in the first place. After all, electricity transmission is generally considered to be an essential service subject to economies of scale. Hence, regulation of such a natural monopoly is considered necessary to secure, among others, open access and a certain quality of service. It has been suggested that addressing the perceived problem of under-investment in transmission forms the main reason for opening interconnector investment to profit-motivated investors Indeed, merchant initiatives may be necessary in markets where vertically integrated utilities have poor incentives to invest in new transmission capacity (Brunekreeft, 2003; Brunekreeft and Newbery, 2005). A second reason could be to address a lack of transmission capacity in a situation where a high-price and a low-price market are connected. The authorities at the side of the low-price market might be reluctant to increase the amount of interconnector capacity, since the local market price is likely to increase (cf. De Vries and Hakvoort, 2002). However, as long as merchant investments also need regulatory approval, the force of this argument may be limited. Third, a lack of political willingness to invest in a particular transmission line may provide an additional reason. If other priorities are defined considering the usage of regulated revenues and in case of insufficient political support to raise the regulated tariffs, only by means of merchant initiatives an expansion of the transmission capacity may be achieved.

9.4.2 Merchant investment: current and proposed regulatory regime

Current regime

Article 7 of the Regulation provides for a special regime for merchant interconnectors. New direct current ('DC') interconnectors may, upon request, be exempted from regulated third-party access[40] and from the prescribed use of the collected congestion rents.[41] These exemptions can only be granted by the relevant national authorities[42] on a case-by-case basis. A significant increase in capacity of *existing* DC interconnectors or, in exceptional

[39] Article 7(1)(c) of Regulation (EC) No 1228/2003 rules that a merchant interconnector must be owned by a natural or legal person which is separate *at least in terms of its legal form* from the system operators in whose systems that interconnector will be built.

[40] Articles 20 and 23(2), (3), and (4) of Directive 2003/54/EC.

[41] Article 6(6) of the Regulation.

[42] However, the third legislative energy package contains the proposal that no longer the relevant national authorities but the Regulatory Agency (ACER) will decide on exemption applications.

cases, alternating current ('AC') interconnectors can also be eligible for the exemptions provided for in Article 7 of the Regulation. The exemptions may only be granted under the conditions listed in Article 7(1) of the Regulation:

a) The merchant interconnector should enhance competition in electricity supply
b) The level of the risk is such that the investment would not take place unless the exemption is granted
c) The interconnector must be owned by a person legally separate from the TSOs
d) Charges must be levied on users of the interconnector
e) Since the start of the European electricity liberalization, no part of the capital or operating costs of the interconnector has been recovered from any component of the network tariffs
f) The exemption is not to the detriment of competition or the effective functioning of the internal electricity market or the efficient functioning of the regulated systems to which the interconnector is linked

Exemptions can be granted in several 'modes'. A regulatory authority may grant a full exemption from third-party access or only a partial exemption (for example with the effect that third-party access must be provided, although not on the basis of regulated and published tariffs or by a regulatory prescribed allocation method). It is also possible that only an exemption from Article 6(6), the prescribed use of congestion rents, is granted (Knops and de Jong, 2005).

Any exemption decision may (only) be taken after consultation with the relevant national authorities concerned. In this way, some cross-border coordination on the future regulatory and operational regime for a proposed merchant interconnector is secured. Moreover, the exemption decision(s) must be notified to the European Commission, which may request the national authorities concerned to amend or withdraw the decision to grant the exemption (cf. section 9.6.3, *BritNed and East-West*). If the national authority concerned does not comply with the Commission's request, a final decision is taken in accordance with the 'advisory comitology procedure' (see section 6.4.2). This authority of the European Commission provides an important instrument for European coordination with respect to merchant interconnectors.

Proposed changes

The proposals of the third legislative energy package change the existing exemption regime (Article 7 of the Regulation) on four main aspects (De Jong and Giesbertz, 2008).

First, the regulatory authorities of the member states concerned take decisions on exemption applications.[43] However, if the regulatory authorities concerned are not able to reach an agreement within six months, the exemption decision is taken by the Agency. The Agency may also take the exemption decision upon a joint request from the regulatory authorities concerned (Council of the European Union, 2009). The final verdict on exemption applications still lies with the Commission.

Second, although the exemption procedures largely remain unchanged, an important requirement is added. Before granting an exemption, the regulatory authorities of the member states concerned must decide upon the rules and mechanism for congestion management. This congestion management mechanism must include the obligation to offer unused capacity on the market and must allow users of the interconnector to trade their contracted capacities on the secondary market.

A third amendment of the exemption regime implies that the (final) Commission's approval of an exemption decision will lose its effect after two years from its adoption if construction of the interconnector has not yet started, and after five years if the interconnector has not become operational.

Finally, the legislative proposals include the possibility for the Commission to adopt binding guidelines (through comitology) concerning the application of the exemption criteria and on the exemption procedure to be followed.

In view of the issue of interconnector investment, another relevant proposal of the third package concerns the use of congestion revenues. It is proposed that these revenues should be used either for guaranteeing the availability of allocated interconnector capacity or for maintaining/increasing interconnector capacities. Only if the revenues can not be efficiently used for these two purposes, they may be used for the modification of regulated network tariffs (Council of the European Union, 2009).

9.5 ECONOMIC RATIONALE

Costs of interconnector investment

Several special features characterize interconnector investment. In the first place, interconnector investment is a capital-intensive business. Secondly, interconnector investments are 'sunk' investments; the resale value of the assets is low and transmission capacity cannot economically be relocated. Thirdly, interconnector investments are lumpy in the sense that they can only be installed economically in sufficiently large unit sizes. In

[43] Member states have the possibility to provide that the formal decision on the exemption is taken by another relevant body of the member state based on the opinion of the regulatory authority.

the fourth place, the investment projects are usually designed for an expected lifetime ranging from 20 to 40 years, or even longer (Kirchen and Strbac, 2004). Finally, interconnector investment is characterized by economies of scale; the costs per MW per km typically decline when the line's capacity increases (Newbery *et al.*, 2003a).

Social benefits of interconnector investment

When an interconnector is established between two markets (with a price difference), the benefits from a private perspective and a social perspective will differ. Giesbertz and Mulder (2008) identify three categories of benefits (of a new interconnector) from a social perspective:

- *Benefits from decreased price differences*: price differences between two (national) markets form a source of benefits of an interconnection. A large part of the effects resulting from the coupling of two markets consists of distribution effects (between consumer and producer surplus, see Annex 6); after all, transport of electricity from a lower-price region to a higher-price region raises prices in the former region and reduces them in the latter. The real welfare effect comprises both productive and allocative efficiency. The *productive efficiency effect* follows from the increased efficiency of generation; the interconnector enables a more extensive use of the cheapest method of generation. *The allocative efficiency* effect of the interconnector follows from the fact that the price level will get closer to the level of the (combined) marginal costs of both regions (Giesbertz and Mulder, 2008); without the interconnector, some consumers will not purchase electricity because the price they have to pay exceeds their willingness-to-pay while the latter exceeds the (combined) marginal costs.
- *Benefits from enhanced competition:* in addition to the benefits following from price differences, benefits from enhanced competition may result from the interconnector. For example, the interconnector could reduce the degree of market concentration and the pivotality of one or more players. This may reduce the extent to which the electricity price differs from the underlying production costs. Besides distribution effects, enhanced competition will likely result in some productive efficiency (increased dispatch efficiency) and allocative efficiency (less distorted prices) (Giesbertz and Mulder, 2008).
- *Benefits from increased security of supply*: a last benefit from an interconnector is that the security of supply can be realized against lower costs (Giesbertz and Mulder, 2008); in an isolated market more installed generation capacity is needed than in larger markets (in order to meet peak demand). The interconnector may reduce the

price volatility in both regions, decreasing the profitability of peak plants, which, in the long term, will result in a lower level of installed generation capacity.

Private benefits interconnector investment

For a merchant investor, the benefits of interconnector investment consist of the gains resulting from the price differences between the two connected markets. A merchant investor may either directly profit from this price difference by purchasing electricity at the cheap side and selling it into the expensive market (using the interconnector himself for trading purposes), or indirectly by selling the interconnector capacity to market parties.

Social versus private benefits

Figure 34 visualizes the difference between the social and private benefits of an interconnector. Consider a two-node network (assuming perfect competition in both nodes) with relatively inexpensive generation in node A and relatively expensive generation in node B. Based on the aggregated supply and demand curves for each node, the import and export price dependency curves (PDC) can be constructed. These price dependency curves depict how the price in each node is affected when power is transported between nodes A and B (De Jong *et al.*, 2007a).

In Figure 34, the curve Ex_PDC_A represents the price dependency curve of exporting node A. This curve shows how the price in the node A would increase as a function of exported capacity. Curve Im_PDC_B represents the price dependency curve of importing node B showing a price decrease in node B when importing a given capacity.

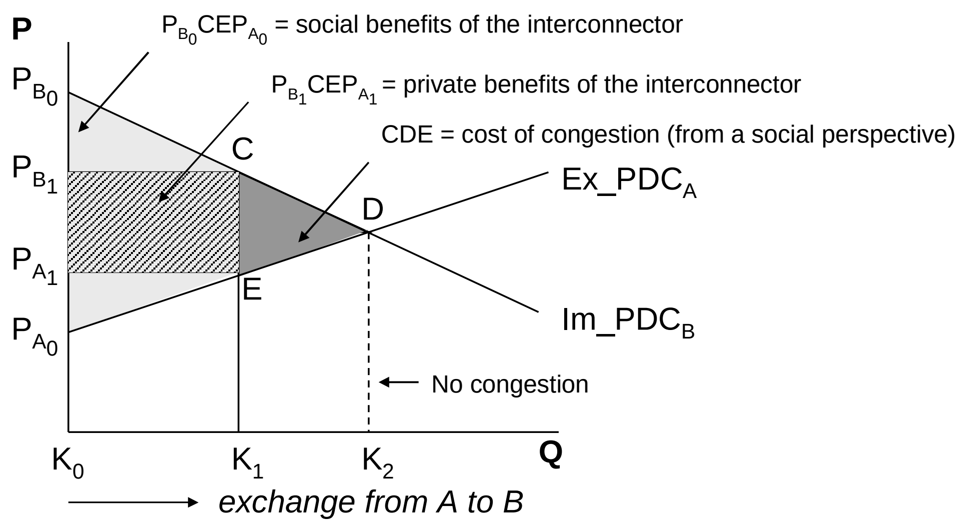


Figure 34: Social versus private benefits of interconnector investment
(The horizontal axis represents the interconnector capacity between the two nodes A and B, whereas the vertical axis gives the price in each node)

K_0 represents the situation in which no interconnector capacity exists between node A and node B. If the available transmission capacity between node A and B increases to K_1, the price in exporting node A rises to P_{A1} and the price in importing node B falls to P_{B1}. The triangle CDE in Figure 34 then reflects the social cost of the remaining congestion; the deadweight loss caused by a lack of interconnector capacity. From a private perspective, the benefits related to the new interconnector with capacity K_1–K_0 consist of the congestion rents[44] in situation K_1, i.e., the marginal price of congestion P_{B1}–P_{A1} times the capacity of the new interconnector K_1–K_0, i.e., square $P_{B1}CEP_{A1}$. From a social perspective, however, the benefits of the new interconnector are higher. These benefits consist of the reduction of the congestion cost, i.e., the net increase of social welfare which is represented by area $P_{B0}CEP_{A0}$ (increased productive and allocative efficiency). Additionally, from a social perspective, the interconnector may also contribute to a higher level of security of supply[45] (see above).

As the upfront interconnector investment costs are significant and the benefits uncertain (both from a social and private perspective), investments in new interconnector capacity do not automatically generate positive welfare effects or a positive (private) business case. Hence, any investment decision should, *inter alia*, be founded on a thorough cost-benefit analysis.

9.6 FOUR RECENT CASES

By now, Europe has gained some experience in cross-border investment under the regulatory regime established in 2003. Below, the cases of NorNed (regulated project), Estlink (temporary merchant project, TSO related), BritNed (merchant project, TSO related), and East-West (merchant project) will concisely be described.

9.6.1 NorNed

In 2004, TenneT and Statnett (Dutch and Norwegian TSO) submitted an application for a 580 km[46], 600 MW DC submarine cable (the 'NorNed cable') between the Netherlands and Norway. They requested regulatory approval from the respective authorities to recover the investment cost (about 550 million Euros) from their regulated income.

The diverging generation characteristics of the Dutch (mainly gas and coal fired plants) and Norwegian (main hydro plants) electricity generation facilities constitute a significant

[44] The exact private benefits will however depend on how the private investor uses its interconnector capacity.

[45] Since perfect competition is assumed, the potential benefits of enhanced competition are not relevant for this example.

[46] Presently, NorNed is the longest high-voltage submarine cable in the world.

source of price differences. By linking the two markets, limitations of the one system may partially be accommodated by the other and vice versa. For example, the Dutch system may use (relatively cheap) Norwegian electricity in times of peak demand while the Norwegian system may use Dutch electricity at night or in times of extreme drought (Van der Lippe and Meijer, 2005).

The Dutch regulatory authority performed a socio-economic cost-benefit analysis and concluded that the overall welfare effect of the NorNed project will be slightly positive. Possible benefits from enhanced competition and security of supply were not monetarized (DTe, 2004).

On December 23, 2004, the Dutch Office of Energy Regulation approved (after the Norwegian authorities had already granted permission) the construction of the 700 MW[47] DC regulated interconnector between the Netherlands and Norway (DTe, 2004). The NorNed cable came into operation on 5 May 2008.

9.6.2 Estlink

The first merchant (electricity) interconnector project for which an exemption pursuant to Article 7 of the Regulation has been granted is the Estlink interconnector between Estonia and Finland. The Estlink project concerns a 105 km, 350 MW DC submarine cable from Estonia to Finland. The investment costs are about 110 million Euro. The Estlink cable would lead to enhanced security of supply and competition in both countries (EMEAC, 2005).

The Estlink interconnector will be a merchant interconnector until it will be transferred to the Finnish and Estonian TSOs somewhere between 2011 and 2013, when it becomes a regulated transmission link. The transmission capacity of the link will then be opened to third parties without any preference clause. In the period between the start of Estlink (Estlink was taken into service on 4 December 2006) and its transfer to the TSOs (somewhere between 2011 and 2013) the interconnector's capacity is distributed by contractual arrangements among the project parties. These arrangements need regulatory approval. The project parties (see Table 9, below) are the owners of the company Nordic Energy Link, which in turn is the owner (and operator) of Estlink. Any unused capacity must be offered to other market participants by means of an auction (EMEAC, 2005).

[47] During the regulatory assessment, TenneT and Statnett guaranteed that the cable would have a nominal capacity of 700 MW instead of the original 600 MW without any additional cost.

Table 9: Ownership structure Estlink

Merchant Project 2006-2011/2013	**Regulated Project 2011/2013 onward**
Powest Oy 10,1% (Finland): joint venture of Pohjolan Voima (60%) and Helsingin Energeia (40%) **Eesti Energeia 39,9% (Estonia):** vertically integrated state-owned utility **Latvenergo 25% (Latvia):** vertically integrated state-owned utility **Lietuvos Energija 25% (Lithuania):** TSO	**Fingrid 50% (Finland):** TSO **Eesti Energia 25 % (Estonia):** vertically integrated state-owned utility **Latvenergo 12,5% (Latvia):** vertically integrated state-owned utility **Lietuvos Energija 12,5% (Lithuania):** TSO (owner of transmission grid and system operator), market operator and trade organizer

(source: Paegle, 2005; European Commission, 2005b)

The final decision of the Finnish authority approving of Estlink was taken on 2 February 2005 (FEMA, 2005), while the Estonian decision dates from 9 February 2005 (EMEAC, 2005). On 23 February 2005, the Commission was notified of the decision by the Estonian Ministry of Economic Affairs and Communications and by the Finnish Energy Market Authority to exempt the above-mentioned project from certain provisions of the Regulation and of Directive 2003/54/EC. The Commission assessed the notification within three months, resulting in an approval of both (national) decisions on April 27, 2005 (European Commission, 2005b).

The business rational for the Estlink investors is to exploit the currently existing price differential between Finland and the Baltic States by importing cheap electricity from the Baltic States, which have substantial ovecapacity. This price differential is expected to disappear somewhere between 2009 and 2013. Once this happens, the Estlink cable will be sold to the TSOs and the exemption of third party access will expire (European Commission, 2005b).

9.6.3 BritNed

BritNed is the proposed 260 km, 1000 MW (peak capacity 1320 MW) DC merchant submarine interconnector connecting the United Kingdom and the Netherlands. The investment costs are about 600 million Euros. BritNed Development Ltd is a joint venture between National Grid International Ltd, a fully owned subsidiary of the British National Grid plc, and NLink International B.V., a fully owned subsidiary of TenneT Holding B.V. BritNed is planned to become operational by 2010. Since the subsidiaries are legally separated from the Dutch and British TSO, BritNed's TSO related ownership construction is, in principle, allowed (see section 9.4.2, *exemption criterion (c)*).

Although BritNed plans to grant third party access to its cable, it has requested (besides an exemption from the prescribed use of congestion revenues) an exemption from regulated third party access (rTPA) to limit the risk that returns to the investors will be capped (European Commission 2007g).

BritNed's (private) revenues will be determined by sales of interconnector capacity. Since no capacity will be sold under long-term contracts, financial risks of the investment relate predominantly to differences in electricity prices between the UK and the Netherlands. The uncertainty related to the development of these future price differences implies a high project risk. In this respect, the relevant national authorities assured that they have taken adequate measures to prevent the risk that the British or Dutch TSO (and thus the network users) will end up paying for bankruptcy or financial problems of BritNed (European Commission, 2007g).

On 18 July 2007, the relevant Dutch and British national authorities notified the Commission of their decision to grant BritNed an exemption from rTPA and the prescribed use of congestion revenues for the duration of 25 years (European Commission, 2007g). Although the Commission acknowledged that exemption duration of 25 years is in principle justified to amortize the investment (due to the high project risk), it also considered that the project could lead to higher profits then expected. In view of the inherent incentive of merchant investors to build a, from social perspective, suboptimal amount of interconnector capacity (see section 9.7.2, *lock-in effects*), the European Commission therefore requested the Dutch and British authorities to establish an additional regulatory safeguard ten years after the start of operations (European Commission, 2007g).

Following the Commission's request, the Dutch and British authorities published their amended decisions on 15 November 2007 (MinEZ, 2007; Ofgem, 2007). The amended decisions include the provision that if after 10 years the estimated internal rate of return for the entire project is more than one percentage point above the internal rate of return estimated when filing the exemption request, BritNed should:

- Increase the interconnector capacity to such an extent that the initially estimated rate of return is met, or
- Accept that the profits (exceeding the initially estimated rate of return by more than one percentage point) are capped and used, at equal parts, to finance the regulated asset base in the UK and in the Netherlands.

9.6.4 East-West

In February 2007, Imera Hydragrid Limited (a private energy infrastructure company) made an application to the national regulatory authorities of Ireland and the United Kingdom for two 135 km, 350 MW DC merchant submarine interconnectors connecting Ireland and the United Kingdom (CER, 2008). The construction costs are estimated at 340 million Euros (Imera, 2008). Imera applied for an (full) exemption from the requirements to offer regulated third party access and the restriction on the use of congestion revenues for the duration of 25 (East-West 1) and 20 years (East-West 2), respectively. According to Imera, interconnection with the UK would enable Irish suppliers to access the UK wholesale market to competitively procure power and increase competition in the Irish market and UK suppliers to supply customers in Ireland without the need for them to commit to large capital investment in Ireland itself (Imera, 2009).

In its application, Imera proposes that all capacity on both interconnectors will be offered through an open season process on a pay-as-bid basis. This capacity is offered for a minimum term of ten years and a maximum term consistent with the period of the exemption (CER, 2008). Imera further indicates that (i) the use-it-or-lose-it principle will apply to the capacity, (ii) the creation of a secondary market will be facilitated, and (iii) there will be a cap of 70% on any single player in the market as well as a 40% cap on ESB (the semi-state electricity company in the Republic of Ireland).

On 30 September 2008, the European Commission was notified by the decisions of the Irish regulatory authority (CER) and the British regulatory authority (OFGEM) to exempt the East-West interconnectors from (regulated) third party access and the prescribed use of congestion revenues (European Commission, 2008c).

In December 2008, the European Commission requested CER and OFGEM to include the following aspects in their exemption decisions (Ofgem, 2009):

- A capacity cap of 40% to any dominant party in either market to which the interconnectors are connected, and
- The provision that an effective congestion management system in accordance to the congestion management guidelines of Regulation (EC) No 1228/2003 has to be implemented before commercial operation is started.

Ofgem and CER published their amended decisions on 11 February 2009 and 17 February 2009, respectively (Ofgem, 2009; CER, 2009). The first East-West interconnector is expected to be operational in 2010, the second interconnector in 2011 (Imera, 2009).

9.7 REGULATORY ISSUES

Based on the foregoing, this section identifies and discusses some key regulatory issues with respect to prior to commencing commercial operation and merchant interconnectors.

9.7.1 Issues concerning regulated interconnectors

Social cost-benefit analysis: consumer or producer surplus?

As discussed in section 9.5, a cost-benefit analysis concerning a new regulated interconnector should include all social benefits associated with the investment. A large part of the social benefits is gained through an increase in welfare (enhanced productive and allocative efficiency). A public authority deciding on a regulated investment project should clearly define its position on how to assess this effect on social welfare. A regulator may opt for limiting the assessment to the net effect on consumer and producer surplus (remaining indifferent to the question who will actually benefit most), or it may assess the combined net effect of the consumer and producer surplus under additional constraints. For example, the Dutch Office of Energy Regulation applied the criterion that consumers may not become worse off (DTe, 2004). Although this choice may have a political component, it should nevertheless be transparent in advance.

Weighted Average Cost of Capital (WACC)

The financing cost (as reflected by the interest rate) for a merchant project relying on variations in (spot) market prices as a major source for the revenues are significantly higher than for a regulated project for which the costs are recovered through regulated tariffs. Because of this fact, some have argued that in the cost-benefit analysis related to a regulated investment project (initiated from economic prospects) a significantly lower discount rate should be used than for a merchant investment project. The argument is that the regulatory regime in place assures full cost recovery, thereby reducing the project risk for the financial investor, thus warranting a low interest and therefore discount rate. However, a guaranteed cost-recovery regime does not make the risk disappear (which mainly depends on the future market development); it just shifts risks from the regulated investor to the network users, who will pay for the investment, regardless whether the benefits will be realized. Unless a transmission investment is considered required from the perspective of an essential service (in which case it must be paid for anyway), it seems fair to perform the social cost-benefit analysis from the perspective of the party who bears the risk, i.e., the network user (DTe, 2004). For assessing the WACC, a regulated transmission investment for improving the internal market should therefore be treated as a private investment without cost-recovery guarantees (Hakvoort and de Jong, 2007).

A separate issue is whether the business case should be based on the value of the WACC before or after taxes (De Nooij, 2007). As long as the TSOs investing in the interconnector are state-owned, a case can be made for using the lower WACC value since taxes paid in effect constitute an income to society, which group generally coincides with the network users who actually run the investment risk.

Reducing public risk: incentives for TSOs

Since for regulated interconnector investments cost-recovery is guaranteed, the TSOs run a limited risk regarding cost overruns, project delays, or revenue setbacks. Consequently, they experience little pressure to minimize costs and maximize revenues (by maximizing the available transmission capacity and the availability of the interconnector). To decrease end-users' risk of being exposed to higher regulated tariffs than necessary, it may be considered to impose conditions on the approval of a regulated investment project which provide incentives to the TSOs. For example, with respect to the NorNed interconnector, the Dutch Office of Energy Regulation imposed a bonus-malus incentive scheme on its TSO to reduce the risk of cost overruns, project delays, and the availability of the interconnector in terms of both capacity and time (De Jong *et al.*, 2007a; DTe, 2004).

Authorization procedures[48]

The European organization of Transmission System Operators (ETSO) has indicated that, even without major obstacles, the period between the first planning of a new high voltage transmission line and its entry into operation is about 10 years (ETSO, 2006a). In the presence of obstacles or opposition, the process may easily be extended to 20 years. During the last years, some countries simplified authorization and licensing procedures with respect to new high voltage lines (Hakvoort and de Jong, 2007). Although the Commission has urged member states to complete their (national) authorization procedures within a maximum period, sometimes the procedures prescribed by EU law are limiting progress. For instance, the requirements regarding Environmental Impact Assessments (for individual projects) and Strategic Environmental Assessments (for plans, programs, and policies) are becoming more and more strict in terms of prescribed public consultation procedures, assessment requirements and the like (EU, 2007d).

9.7.2 Issues concerning merchant interconnectors

The opportunities for merchant investment in practice

Joskow's expectation of only "a very small contribution of merchant interconnectors in the overall portfolio of transmission investment projects" seems to be applicable for Europe

[48] This issue also applies to merchant investment.

(Joskow, 2005). Until today, only one entirely merchant project has come into existence (East-West interconnectors). In the other two merchant cases previously described, either a TSO (in the case of BritNed) or a vertically integrated company (Estlink), although legally separated, is involved.

Since private revenues result from locational price differences, which are highly uncertain especially on a longer term, the perceived risk for merchant investment by private parties is high. This risk could be alleviated by issuing long-term capacity contracts providing private investors with more certainty about future revenues (cf. the long-term capacity contracts in the case of the East-West interconnectors). However, such contracts shift (some of) the risk to the capacity buyers, who in turn may be reluctant to enter into such agreements. Several threats for long-term capacity contracts exist: due to new investment in generation, locational price differences may develop over time, which directly affect the attractiveness of signing long-term transmission capacity agreements.[49] Additionally, public authorities do generally not welcome long-term (physical) capacity contracts as they are considered to pose a hurdle to new entrants and decrease the capacity market's liquidity.

Conflict of interest in a TSO holding company

The (direct or indirect) involvement of a TSO in a merchant interconnector (cf. Estlink and BritNed, section 9.6.2 and 9.6.3) may result in a potential conflict of interest for the holding company between the commercial activities of one subsidiary company and the (regulated) 'public' activities of the TSO. This conflict of interest could be to the detriment of the effective functioning of the internal electricity market (cf. criteria (f), section 9.4.2). In the case of Estlink, it seems that the authorities have paid little attention to this issue, whereas with respect to BritNed, Ofgem and the Dutch Ministry of Economic Affairs did consider this issue and concluded that BritNed has provided adequate proof that BritNed will be operated fully independently from the system operator.

Four areas where a potential conflict of interest could occur between commercial activities and regulated activities performed under the umbrella of the same holding company are:

- One would like to avoid the risk that any potential financial loss of the merchant interconnector investments could have an impact on the regulated activities of the TSO. Therefore, all merchant interconnector activities should be financed completely independently from the TSO.

[49] This problem is less apparent in the gas sector. Gas production is associated with the presence of gas wells which are limited geographically to a few regions within the reach of Europe. This increases the likelihood that transport capacity will actually be used.

- It should be safeguarded that the cross-border capacity available to the market on the existing (regulated) interconnectors is determined in an objective and independent way. Since the available capacity influences market prices, it affects the price margin over the merchant interconnector and hence its revenues.
- The transmission investment plans of the TSO might be influenced by the merchant activities within the holding company. Building new regulated interconnectors (or internal transmission lines) may affect the revenues of the merchant interconnector since market prices will be influenced by the amount of import and export capacity. It should be safeguarded that any line that should be built from a social perspective will actually be built. Additionally, regulatory authorities would like to prevent a situation where the lucrative investments are carried out as a merchant activity and the more risky or less rewarding projects are shifted to the TSO.
- A merchant interconnector needs to be connected to the transmission grid and agreements might be needed on the conditions for connection and possibly the delivery of ancillary services by the merchant interconnector to the TSO. Such agreements between a merchant interconnector company and the TSO should be non-discriminatory with respect to who applies for them, a sister company (within the same holding) or an external market party.

Since most of these potential conflicts of interest relate to complex issues requiring specific knowledge, effective supervision by regulatory authorities may not be easy to perform. For example, how could one effectively ensure an objective determination of the cross-border capacity available to the market?

Lock-in effects

Merchant interconnectors could enhance market integration by creating additional cross-border transmission capacity. However, although a merchant interconnector increases the (physical) coupling of different electricity markets in the short term, it should be safeguarded that the existence of this interconnector does not block market integration in the longer term. As the investment must be recouped from exploitation of the trade potential across the link, the parties involved have a considerable interest to keep those markets at least partly separated (cf. the Commission's remarks related to the BritNed exemption, section 9.6.3). Annex 6 illustrates the difference between the interconnector capacity maximizing private benefit and the capacity maximizing social benefit by means of a quantitative analysis.

Obviously, any additional interconnector capacity in parallel to the merchant interconnection would decrease the value of the merchant interconnection, so investors in merchant interconnections would try to prevent the construction of any additional, competing capacity. Kuijlaars and Zwart (2003) have pointed out that merchant investment may lead to severe underinvestment relative to the welfare optimum, as the economies of scale involved in such projects may lead to foreclosure of the market by the first mover (by constructing capacity up to the no-entry point).

A merchant interconnector could thus have the character of a '*Trojan horse'* (Knops and de Jong, 2005), yielding more interconnector capacity in the short term, but proving an obstacle to full market integration in the long run.

Strategic bidding behaviour

Merchant interconnectors open the way to strategic bidding behaviour. For example, this may occur when the interconnector capacity is allocated by means of an open and non-discriminatory capacity auction. Since the investor in the merchant interconnector will receive (part of) the auction revenues (which actually serve to recover the investment cost), it will be indifferent to the clearing price for its own bids for capacity on the link. Especially if this company also exploits generation or supply activities, it may increase its revenues by driving up the price of the available capacity through aggressive bidding. Consequently, although the company earns lower profits from its competitive activities (since it applies a bidding function that is not optimal from a competitive viewpoint) this bidding strategy may maximize the compound profit, i.e., the profit including its share of the auction revenues. Conversely, independent competing market participants will earn less because they are less likely to gain transmission rights and, in any case, pay a higher price for it (Van Koten, 2006).

9.8 CONCLUSIONS

Can the (perceived) lack of interconnector investment be explained based on its economic rationale and/or relevant regulatory framework?

Need for additional interconnector capacity

Despite the strong focus on building new interconnectors and the overall ambition to increase interconnection to 10% of domestic generation, it is still open for debate how much interconnector capacity Europe really needs. Even with the definition of (super) priority links (see section 9.3), it is still not clear which specific links really should receive priority from a social perspective. A thorough socio-economic cost-benefit analysis is a necessity to answer this question adequately. However, given the complex nature of such an analysis and the time lag between the moment of making the investment decision and the actual commissioning of the line, this criterion is difficult to fulfil in practice.

Regulated interconnector investment

Two categories of interconnector investment projects may be distinguished (ETSO, 2006b): (i) investments for reasons of security of supply or network reliability, and (ii) investments for reasons of economic welfare. Concerning regulated interconnector investment, a relevant question is whether the relevant TSOs (and national authorities) have the right incentives to invest. With respect to the first category of interconnector investment projects, one may assume that TSOs (and national authorities) have sufficient incentives to invest as they are under political pressure to maintain a high level of security of supply and network reliability. Regarding the second category, however, one may wonder if the current regulatory framework provides the proper incentives to invest:

- Some national markets (still) contain vertically integrated companies. Such companies may have no incentive to develop the network in the overall interests of the market, as this would benefit the competitors of their affiliated (commercial) companies.
- The authorities at a 'low price' market might be reluctant to connect their market with a 'higher price' market since the local market price is likely to increase (political consequences).
- A lack of political willingness to invest in interconnector capacity may also exist when other priorities are defined concerning the usage of regulated revenues, when there is insufficient political support to raise the regulated tariffs, or when one desires to stimulate national generation investment.
- Although the 2003 Regulation prescribes ring-fencing of congestion revenues, there still may be an incentive to keep at least some congestion in existence; since the ring-fenced money is available at limited cost, the existence of congestion revenues may (in theory) alleviate the process to gain regulatory approval for selected investments.
- The difficulty to get administrative approval from municipalities and environmental agencies may form a disincentive to invest (this also applies to merchant investment).

Merchant interconnector investment

So far, the solution to stimulate the construction of more interconnectors by opening investment to private parties has not proven successful. Since private revenues result from locational price differences, which are uncertain especially on a longer term, private parties' perceived risk related to merchant investment projects is high. Regulatory decisions to cap private profits made on merchant interconnectors (cf. the Commission's decision concerning BritNed) add to this risk. Additionally, also from a social perspective, merchant investment may yield some risks:

- The incentives for private parties to invest in an interconnection may clearly deviate from common public interests, which may lead to lock-in effects and long-term inefficiencies.
- The involvement of a TSO holding company in a merchant interconnector may result in a potential conflict of interest between the commercial activities of one (commercial) subsidiary company and the (regulated) 'public' activities of the TSO.
- Merchant interconnectors may lead to strategic bidding behaviour, especially if the company that invests in a private interconnector also exploits generation or supply activities.

Résumé

One may conclude that the (perceived) lack of interconnector investment can indeed be explained based on its economic rationale and/or relevant regulatory framework. A clear and generalized framework for assessing investment projects is missing and investment disincentives may exist. Most likely, due to the high (private) project risks involved, the solution of merchant interconnector investment has not proven successful. Moreover, also from a social perspective, merchant investment yields some risks.

What are the characteristics and regulatory needs typical of the issue of interconnector investment and relevant for the process of regulatory mode decision-making?

Based on the preceding sections, the following *characteristics* typical of the issue of interconnector investment can be identified:

- Strong public interests: interconnector investment projects are high-risk projects. The investment costs — normally paid by national network users — are high. However, also the public benefits (from decreased price differences, enhanced competition and/or increased security of supply) can be significant.
- Strong private interests: a new interconnector may provide new business opportunities and may have a significant impact on existing market circumstances.
- Strong political interests on an EU (national) level: Generally, interconnectors are considered an important element in the creation of a truly integrated market and avoiding undue problems of market power abuse (DG Competition, 2007).
- Strong political interests on a national level: interconnector investment projects are largely paid out of national resources (although possibilities for EU funding exist).
- Economically complex: the socio-economic aspects related to interconnector investment are quite complex and characterized by a high level of uncertainty.

- Governmental interdependence (border-to-border): to establish a new interconnector, the relevant authorities on both sides of the interconnector should work in close cooperation with each other and coordinate their views and decisions.
- Nongovernmental interdependence (border-to-border): to establish a new interconnector, the TSOs on both sides of the interconnector should work together and coordinate between themselves. In the case of merchant investment, also the private investors — who often reside in different countries — must cooperate closely.
- Public dependency on cooperation of nongovernmental bodies: to achieve interconnector adequacy[50], one is strongly dependent on the cooperation of TSOs.
- EU dependency on country-specific knowledge: in order to adequately assess an interconnector proposal, specific knowledge about the national markets involved (e.g. generation characteristics, price developments, market shares, and the regulatory regime) is essential.
- Lock-in effects: in view of private interconnector investment, lock-in effects play an important role (see section 9.7.2). Furthermore, the fact that interconnector investments are capital intensive, sunk, and lumpy creates lock-in effects as well.

One may identify the following *regulatory needs* typical of the issue of interconnector investment:

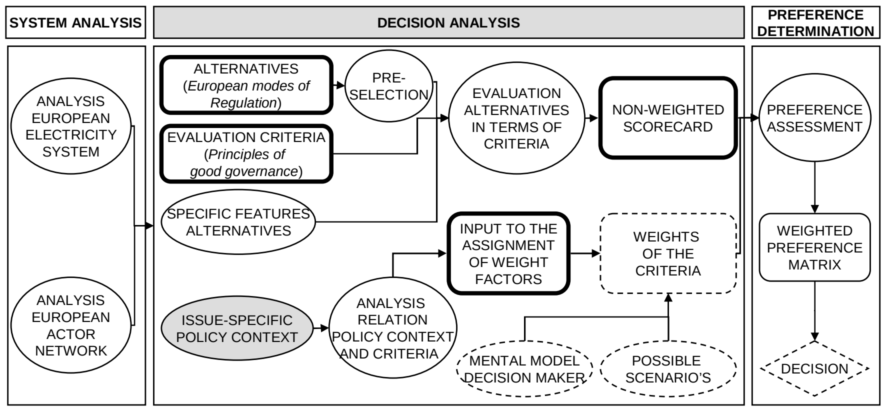
- Need for international cooperation and coordination (border-to-border): in essence, interconnector investment is a border-to-border issue. To secure efficient use of the interconnector, the relevant authorities on both sides of the interconnector must agree on several aspects, such as the distribution of costs and congestion income (regulated interconnectors), the allocation procedure to be applied (regulated merchant interconnectors), or the extent of a TPA exemption (merchant interconnectors).
- Need for a supranational intervention option: from a European welfare perspective, supranational intervention is needed when the construction of a new interconnector — although beneficial for the society as a whole — is not approved by the relevant national authorities at one side of the interconnector. Furthermore, as long as TSOs have insufficient incentives to invest in interconnector capacity, supranational public intervention may appear necessary to achieve further market integration.

[50] ETSO (2006b, p.4) defines adequate interconnector capacity as *'that which enables operational security standards to be met in the reasonably foreseeable circumstances and meet 'economically' the requirements of the market. The latter is achieved when you do not expect any additional net socio-economic benefits from additional investments in transmission capacity'.*

- Need for national regulatory discretion: considering interconnector investment, at least some level of national discretion seems desirable. For example, given the specific characteristics of the two markets to be connected, the approval of a new interconnector may need to be supplemented with dissimilar conditions. Furthermore, the operational procedures concerning the new interconnector (e.g. capacity allocation procedures and information provision) should be in sufficient harmony with the procedures already applied to the existing interconnectors.
- Need for regulatory certainty: given the financial risks related to interconnector investment, regulatory certainty forms a key aspect. TSOs will ask for the assurance that (all) investment costs may be recouped from regulated tariffs or collected congestion income. Private investors will wish for an exemption which duration is long enough to amortize the investment and which conditions are not significantly changed during that period. Furthermore, private investors might seek some assurance with respect to the construction of parallel interconnectors. Any additional interconnector capacity in parallel to the merchant interconnector would decrease the scarcity of the capacity of the merchant interconnector (and thus decrease congestion rents).

CHAPTER 10

CASE 2: CONGESTION MANAGEMENT



10.1 INTRODUCTION

This chapter focuses on the second case of (cross-border) congestion management. Section 10.2 discusses the role of congestion management in today's European electricity wholesale markets as well as the different congestion management practices. Similar to the case of interconnector investment, section 10.3 examines the relevant regulatory developments concerning the issue of congestion management from 1996 to today. After this, the chapter focuses on the *question* of what will be the technical and economic effects of introducing a flow-based market coupling (FBMC) in the Central-West European region (cf. section 8.5).

Section 10.4 provides an overview of the current congestion management practices in the Central-West region. The technical-economic model used for examining the effects of introducing a FBMC system in the Central-West region is described in section 10.5. Subsequently, section 10.6 presents the model results.

Based on the foregoing analyses, the chapter concludes by answering the question mentioned above (*intrinsic value case*) and by identifying the characteristics and regulatory needs typical of the issue of congestion management and relevant for the process of regulatory mode decision-making (*primary aim case study*).

10.2 CROSS-BORDER CONGESTION MANAGEMENT

10.2.1 Basic definitions

Congestion refers to the situation in which the market outcome of scheduled (commercial) transactions cannot be accommodated by the network. In general, two types of congestion exist (Knops, 2008, p.331). *Physical congestion* is the situation in which the available generation and transport resources are insufficient to meet demand in a certain area. Operational measures cannot solve this problem. Such situation will lead to service interruptions if demand is not reduced sufficiently. *Economic congestion* is the situation in which it is technically possible to meet electricity demand, but the commercial transactions scheduled lead to such loading of the network that, at least at one point, the (safely) available capacity is exceeded. *Congestion management* refers to the way in which such economic congestion is alleviated.

Although congestion may just as well occur within a national electricity system, this chapter limits its focus to congestion on (cross-border) interconnectors.[51] Congestion on national borders is considered a serious impediment to European market integration. Because interconnectors were generally not constructed to facilitate extensive cross-border trade in electricity, their capacity is in many cases inadequate with respect to the demand for international trade that developed after liberalization (Knops *et al.*, 2001).

Chapter 9 showed that the establishment of new interconnector capacity needs the appropriate incentives to invest, a positive socio-economic (or private) business-case, and political/regulatory approval. The chapter also illustrated that these conditions are not easily met in practice. Consequently, adequate management of the existing interconnector capacity is all the more important.

10.2.2 Congestion management practices

Congestion can be managed in *real-time* by directly changing the dispatch of generation units or *beforehand* by forcing the market to produce a set of transactions that do not cause congestion (Knops, 2008). Although congestion management in real-time is — except for a last resort remedy (corrective methods) — no longer (legally) allowed in view of cross-border congestion, it still represents the main method applied within a national electricity system (or control area).

[51] Article 2(2)(c) of Regulation (EC) No 1228/2003 defines (cross-border) 'congestion' as '*a situation in which an interconnection linking national transmission networks, cannot accommodate all physical flows resulting from international trade requested by market participants, because of a lack of capacity of the interconnectors and/or the national transmission systems concerned*'.

Congestion management in real time (corrective methods)

Congestion management in real time includes the mechanisms of *redispatching* and *counter trading*.

- *Redispatching*: redispatching allows the market to trade without any consideration of network congestion (De Joode, *et al.*). As a result, a single price develops. To avoid physical overloading, the TSO may directly intervene in the generation dispatch by increasing the output of 'better-placed' generators and decreasing the output of 'íll-placed' generators (Krause, 2005) without the requirement of any economic evaluation. The resulting costs are socialized e.g. in the regulated network tariffs.
- *Counter trading*: counter trading functions similar to redispatching. However, counter-trading is more market-oriented (De Vries and Hakvoort, 2002). If the net power flow leads to congestion, the TSO creates a second market. The TSO then requests 'ill-placed' generators to reduce production and 'better-placed' generators to increase production based on bids submitted to the TSO.

Congestion management beforehand

The category of congestion management beforehand can be divided into mechanisms by which the available capacity is assigned based on economic principles (*market based mechanisms*) and mechanisms by which the capacity is assigned based on other criteria (*distributive methods*).

- *Distributive methods:* two common distributive mechanisms are priority access and pro rata assignment.
    - <u>Priority access</u>: parties receive capacity in a priority order until the entire available capacity is allocated. Priority criteria could be: chronological order, past use of capacity, or certain contractual agreements (cf. Estlink, section 9.6.2).
    - <u>Pro rata:</u> requests for capacity are partially accepted in such way that each participant is granted a fixed share of his requested amount of capacity.
- *Market based mechanisms:* market based mechanisms manage congestion through a pricing method. Below, the market based congestion mechanisms are discussed in more detail.

10.2.3 Market based mechanisms

The 2006 congestion management guidelines (see section 7.4.2) prescribe that (cross-border) congestion management mechanisms should be market based, and more precisely, the pricing method applied should be an explicit or an implicit auction. However, besides the choice for a certain market clearing mechanism, market based congestion management comprises other fundamental aspects. In Europe, the different market based congestion management alternatives essentially stem from four basic choices (De Jong and Hakvoort, 2007). These choices concern:

- The way in which the interconnector capacity (safely) available for the market is determined: *individual or coordinated determination*?
- The way in which the interconnector capacity (safely) available for the market is distributed among borders, TSO-TSO interfaces, or individual interconnectors: *fixed distribution code or regional optimization*?
- The way in which the interconnector capacity (safely) available for the market is assigned to market parties or commercial transactions: *contract-based or flow-based assignment*?
- The way in which the market is cleared: *explicit or implicit market clearing*?

Capacity determination

Presently, the amount of interconnector capacity that is safely available for the facilitation of market transactions is determined on an individual basis. A TSO simulates the exchanges between two areas by increasing generation in one area and reducing correspondingly the power injection in the other area (Haubrich, 2001). The available capacity is normally determined per border — without taking into account the interrelations with other borders — while each TSO uses its own assumptions. If the values of the TSOs deviate, the lowest value is taken. An increased level of TSO coordination during the capacity determination phase would most likely lead to more accurate outcomes. Furthermore, a high-level of inter-TSO coordination is an important prerequisite for the introduction of more advanced congestion management methods such as flow-based market coupling (see below).

Capacity distribution

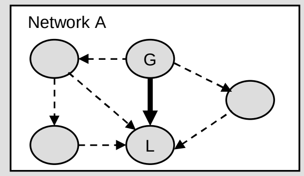
Usually, the amount of capacity available for the market (per border) is distributed over the various interconnections according to a certain fixed distribution code (typically per TSO-TSO interface). A more regional and market based distribution approach would lead to more possibilities for economic optimization. For example, one could determine a single 'capacity value' for the entire Dutch-German border (including both the TenneT-RWE and TenneT-E-ON interface[52]) and assign the capacity to those market parties (or commercial bids) that value capacity from Germany to the Netherlands, or vice versa, most.

[52] Presently, the capacities of the TenneT-RWE and TenneT-E-ON interface are auctioned separately.

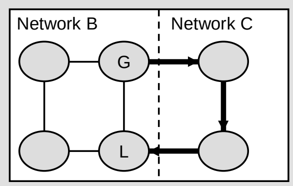
Capacity assignment

Today, the assignment of available interconnector capacity for the market is based on the so-called 'contract path' paradigm; as long as there is capacity available on the contract path of the commercial transaction proposed, the transaction is accepted. The actual physical flows resulting from the commercial transaction are not taken into account.[53] In reality, however each transaction physically spreads over the entire network according to 'Kirchhoffs' laws (see Box 2, below).

Box 2: Contract path, parallel flows, and loop flows



Since electricity between a generator and a load may move though all lines connecting the two (not only along the shortest distance between the two points) the state of the network is difficult to predict. Electricity follows the path of least resistance and the resistance may change in response to any changing condition. The intended route for electricity to follow is commonly referred to as the *contract path*. Flows that deviate from this contract path are referred to as *parallel flows*. The figure above visualizes this phenomenon of parallel flows in a 5-node network. The bold arrow represents the contract path but, as shown, various alternative (parallel) paths (dotted arrows) exist from generation (G) to load (L).



The fact that neighbouring transmission grids are often interconnected complicates network operation even more. In certain situations the electricity might, even when generation (G) and Load (L) are both situated in the same network B, flow out of this network B, into a neighbouring network C, and back again into network B. Flows that flow out of and back into a certain network are commonly referred to as *loop flows* (see bold arrows in the figure alongside). Loop flows may thus be considered as a specific kind of parallel flows. For example, in case of high winds, the abundant wind-generated electricity in the northern part of Germany used to supply load situated in the southern part of Germany regularly causes loop flows through the Netherlands, Belgium, France, and Switzerland (left-handed loop) and Poland, Czech Republic, and Austria (right-handed loop) as the north-south network connection within Germany is weak (high resistance).

A flow-based method combines commercial transactions with physical reality in an iterative process. A so-called PTDF (Power Transfer Distribution Function) matrix expresses

[53] For example, until a few years ago, commercial transactions between Germany and France with a total capacity exceeding the thermal capacity limits on this border were accepted. Since the commercial transactions between Germany and France only induced small physical flows on the DE-FR border (but causing huge parallel flows in other parts of the meshed network), this particular border was not considered to be congested and commercial transactions continued to be accepted.

the relation between a commercial transaction and the resulting physical flows on the (defined) network. The optimal network usage (e.g. with welfare maximization as the objective) — in terms of transactions allowed — may then be calculated while taking into account the (jointly defined) technical constraints.

Market clearing

A last choice with respect to market based congestion management concerns the way is which the market is cleared. An *explicit* market clearing approach separates the energy market from the transmission capacity market. Market parties purchase capacity in advance in order to facilitate their intended electricity transactions. In an *implicit* market clearing system, market parties do not purchase transmission capacity in advance. The available transmission capacity (determined by the TSOs, see above) is automatically used (assigned implicitly) to match the 'best' electricity bids. *Market coupling* and *market splitting* are different implementations of *implicit* market clearing. Although the operational processes differ, the two concepts lead to the same market outcomes.

Market coupling is a mechanism in which market participants submit electricity bids and offers on the organized spot market (power exchange) within their own area. The bids and offers on the organized spot markets are being matched until the available interconnector capacity is fully used or until all bids and offers are matched. Figure 35 visualizes the concept of market coupling.

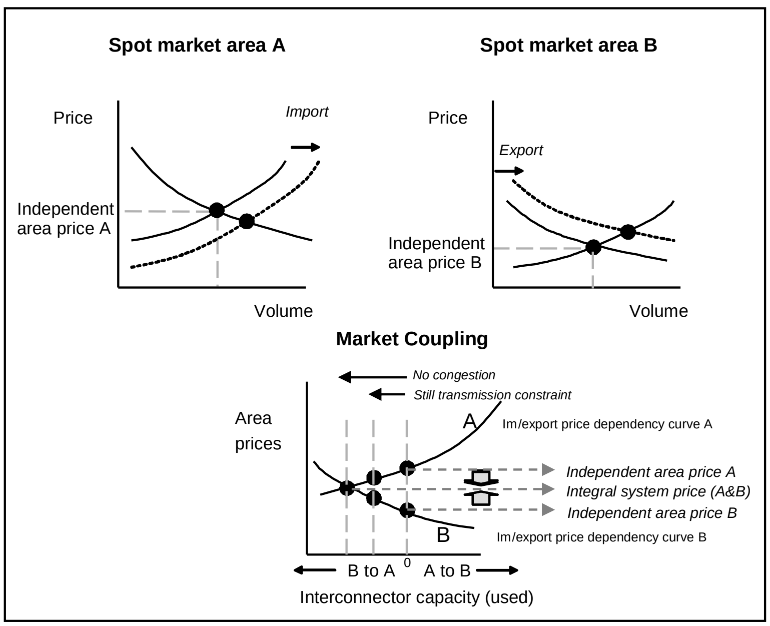


Figure 35: The concept of market coupling

In case of a transmission constraint, a difference in market clearing prices (between the coupled areas) ensures that the excess of accepted bids over offers in the high price area(s) and the excess of accepted offers over bids in the lower price area(s) both equal the available transmission capacity on the congested interconnector(s) (cf. Turvey, 2004).

As apposed to market coupling, *market splitting* uses only one centralized spot market. Without congestion, the centralized spot market clears like a regular power exchange. However, in case of congestion, the operator splits the region into different areas on either side of the congestion and creates separate clearing prices for each area.

Figure 36 provides a systematic overview of the congestion management alternatives discussed above.

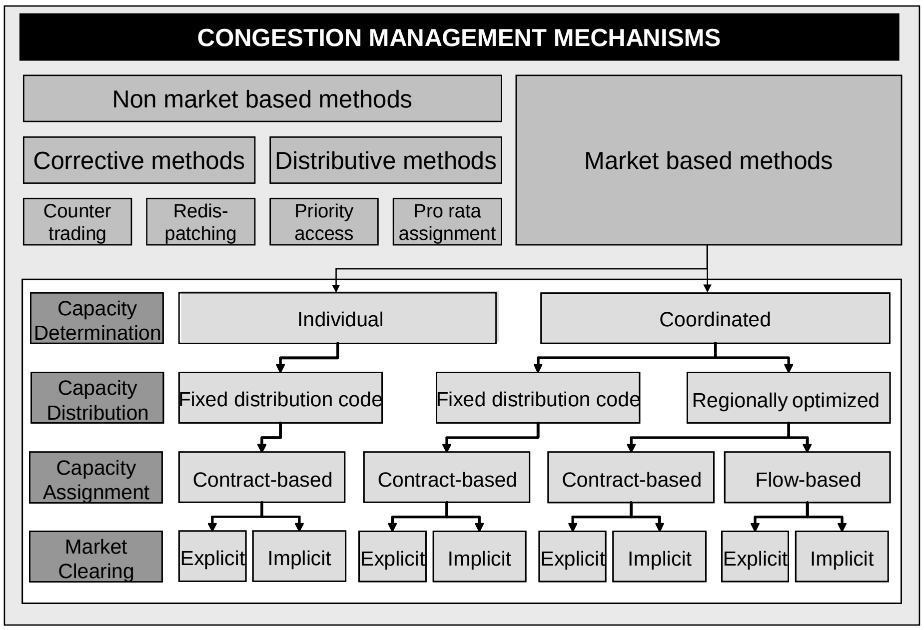


Figure 36: Systematic overview congestion management mechanisms

10.3 REGULATORY DEVELOPMENTS SO FAR

Analogous to chapter 9, this section discusses the issue-specific regulatory developments concerning the issue of congestion management.

Issue-specific regulatory developments per regulatory phase

Phase 1 (1996): Adoption first European liberalization Directive

The 1996 Directive held TSOs explicitly responsible for managing energy flows on the system including the exchanges with other interconnected systems (Article 7(3)).

Furthermore, TSOs were considered in charge of dispatching the generating installations in their area and of determining the use of interconnectors with other systems (Article 8(1)).

Phase 2 (1997-2000): First phase Florence Forum

During the first Florence Forum meeting of 1998, member states recognized both the importance of accepting diversity and flexibility to reflect the national context as well as the aim of lowering regulatory barriers to international trade. They agreed upon the fact that the 1996 Directive lacked definition on e.g. interconnector capacity, technical standards, and the treatment of parallel flows and transits. Up to that moment, cross border transactions were limited to technical exchanges among TSOs. The establishment of tarification systems and trade facilitating mechanisms were defined as a priority. Such rules and mechanisms should be based on the principles of cost reflectiveness, transparency, and non-discrimination.

During 1999, much attention was paid to the development of an inter-TSO compensation scheme to cover the costs of parallel flows and transits.[54] ETSO developed such a scheme based on measured flows and regularly reported the progress made during the various Florence Forum meetings. At the fifth meeting of the Florence Forum in March 2000, it was agreed to introduce the (ETSO) inter-TSO tariff system.

In the beginning of 1999, the European Commission published its second report on harmonization requirements for the internal market in electricity (European Commission, 1999). In this report, the Commission acknowledged (international) congestion management as a market integration issue. After the Florence Forum meeting of May 1999, it was concluded that the issue of how to allocate scarce capacity should (at that stage) be left to subsidiarity and that the congestion management mechanism to apply should be decided between the TSOs and the regulatory authorities concerned. However, already in March 2000, the Florence Forum concluded that congestion management should at least be based on market solutions that give proper and justified incentives to both market parties and TSOs to act in a rational and economic way. The system of auctioning based allocation was introduced and it was concluded this system should be further analysed by the appropriate authorities. It was agreed that the Commission would develop a document outlining proposals for the most appropriate approaches towards the allocation of interconnection capacity in the EU. Following this agreement, the basic guidelines for congestion management were presented during the November 2000 Florence Forum meeting, including the following principles:

[54] Transit means a physical flow of electricity hosted on a particular transmission system which was neither produced nor is destined for consumption in that transmission system. Loop flows (see Box 2) are part of transit (Boucher and Smeers, 2001).

- Congestion management methods should deal with short-run congestion in an economically efficient manner whilst simultaneously providing incentives for efficient investment.
- Network capacity should be used at the maximum capacity that complies with the safety standards of secure network operation.
- Congestion rents may be used to ensure the firmness (the actual availability) of transmission capacity that is allocated to market capacities. Remaining rents should be spent on network investments, relieving congestion or on reducing network tariffs (cf. section 9.4.1).
- The most feasible methods for congestion management are implicit[55] and explicit auctions.

For the actual implementation of market based congestion management systems, a working group was set up consisting of national regulatory authorities, the European Commission, ETSO, member states' governments and interested market parties.

Phase 3 (2001-2003): Towards a second European legislative package

In May 2001, experiences with innovative mechanisms of allocating interconnector capacities — which had been operated on the basis of the guidelines adopted during the Florence Forum meeting of November 2000 — were presented. The experiences in practice appeared to be positive. They therefore formed the basis for further improvement and an increased level of harmonization. In February 2002, the Florence Forum concluded that with respect to some interconnections, the 2000 guidelines were not (yet) applied. Hence, the forum asked CEER to provide a detailed review of the different congestion management mechanisms operated throughout Europe. Based on the findings of CEER, the ninth Florence Forum (October 2002) requested CEER to consider any necessary revisions of the 2000 guidelines. In July 2003, the Commission presented a discussion paper on congestion management outlining the need to complement and update the rules contained in the existing guidelines, which at that moment already formed an integral part of Regulation (EC) No 1228/2003. At the same time, market participants called for rapid implementation of the market based mechanisms.

Phase 4 (2004-2006): Adoption regional approach

In November 2006, the Commission amended the annex to the 2003 Regulation containing the congestion management guidelines (see section 7.4.2). The new guidelines included several rather detailed requirements. They rule, among others, that member states must

[55] However, at that time, implicit auctions were considered too difficult to implement.

establish mechanisms for the intra-day congestion management of interconnector capacity to enable cross-border intra-day trade across congested borders. Furthermore, the guidelines explicitly prescribe that cross-border capacity shall be only allocated by means of explicit or implicit auctions.[56] In addition, the guidelines hold the obligation of netting transmission nominations in opposite directions and, in response to the limited level of inter-TSO coordination, the new congestion management prescribe several minimum criteria for cross border coordination and harmonization (Commission Decision, 2006).

Phase 5 (from 2007): Towards a third European legislative package

Since 2006, much attention has been paid to the (regional) coordination and harmonization of congestion management methods in order to actually integrate the various national wholesale markets for electricity. Besides the establishment of ERGEG's Regional Initiatives (see section 7.2), the Central-West Region introduced the so-called 'Pentalateral Energy Forum'. In this forum, governments, regulatory authorities, TSOs, and key market actors discuss regional barriers to market integration. Both the Regional Initiatives and the Pentalateral Energy Forum defined the optimization and allocation of available transmission capacity as a main topic.

During the 14th Florence Forum meeting (September 2007), much attention was paid to the issue of parallel flows (see Box 2) reducing the available interconnector capacity for the market. The Commission presented a target model including the use of flow-based allocation methods (see section 10.2.3). Some participants expressed their concerns about the fact that the implementation of a flow-based allocation system could slow down the process of coordination and harmonization as well as the introduction of implicit and intra-day allocation methods. The Forum requested ETSO and EuroPex — who had introduced the basic concept of the target model in 2004 (ETSO-EuroPEX, 2004) — to write a common discussion paper addressing the implementation of regional and interregional capacity allocation methods; in particular the governance of the bodies running the system and the technical, legal, and commercial challenges implied by the target model. Other stakeholders were invited to contribute to the discussion.

The third legislative energy package proposes a new system for cross-border arbitration. An important prerequisite for market integration is that neighbouring member states agree upon a common congestion management method on their shared border(s) or interconnectors(s). Presently, if member states do not agree upon the congestion management method to apply, a deadlock is likely to appear. In other words, a regulatory gap concerning cross-border disagreements would exist. The new legislative proposals

[56] However, for cross-border intraday trade continuous trading may be used.

seem to tackle such a potential regulatory gap by giving the Regulatory Agency an arbitrage function.

Summary regulatory developments in terms of European modes of regulation

Similar to the issue of interconnector investment, the 1996 Directive contained only some generic rules on the issue of congestion management *(Joint Decision; New Instruments (framework regulations*)).

However, from 1997 until today, one has continuously paid attention to the issue of congestion management. In the period between 1999 and 2000, congestion management was a highly discussed issue in the Florence Forum *(Open Method of Coordination)*. At the fifth meeting of the Florence Forum in March 2000, it was agreed to introduce an inter-TSO tariff system *(Self-regulation)*. Furthermore, basic (voluntary) guidelines for congestion management were presented and agreed on during the November 2000 meeting.

In the period between 2001 and 2003, these (voluntary) guidelines were included in the 2003 Regulation *(Joint Decision)*.

Based on further discussions and learning, the Commission concluded the congestion management guidelines needed to be complemented and updated. Therefore, a new set of guidelines was developed in the period between 2004 and 2006 *(Open Method of Coordination)*. In December 2006, these new guidelines were adopted by means of a new annex to Regulation (EC) No 1228/2003 *(Comitology)*.

Since 2006, many discussions on the coordination and harmonization of congestion management mechanisms have taken place (mainly on a regional level). Presently, the introduction of advanced congestion management methods, such as flow-based market coupling (see next section), is a widely discussed topic as well *(Open Method of Coordination)*. Finally, the legislative proposals of the third legislative energy package introduce the concept of cross-border arbitration in order to settle, *inter alia*, cross-border congestion management disputes. In this process, the Agency for the cooperation of energy regulators is expected to be the arbitrator.

Table 10 provides an overview of the regulatory (mode) dynamics concerning the issue of interconnector investment. Chapter 12 will come back to these regulatory dynamics.

Table 10: Overview regulatory dynamics concerning congestion management

Phase 1 **(1996)**	**Phase 2** **(1997-2000)**	**Phase 3** **(2001-2003)**	**Phase 4** **(2004-2006)**	**Phase 5** **(2007 onward)**
- Joint Decision / New Instruments *(framework regulations)*	- Open Method of Coordination - (Self-regulation) (*voluntary*)	- Joint Decision	- Open Method of Coordination - Comitology	- Open Method of Coordination - Regulatory Agency

10.4 FLOW-BASED MARKET COUPLING IN THE CENTRAL-WEST REGION

Background

Within the context of the Pentalateral Energy Forum (see section 10.3), the Ministers responsible for energy, and the high-level representatives of the regulatory authorities, the TSOs, the power exchanges, and the market parties' platform of the Central-West European region (including Germany, the Netherlands, Germany, Luxembourg, and Belgium) signed a Memorandum of Understanding (MoU) in June 2007. In this MoU, the parties agreed to analyse, design, and implement a flow-based market coupling system (see section 10.2.3) between the five countries with January 2009 as a target date.

Although, in general, all parties agree that the introduction of a flow-based market coupling system (hereafter: FBMC) will lead to an increased level of social welfare from a regional perspective, the exact price and welfare effects both on a regional and national level remain unclear.

In order to establish an efficient regional congestion management system, individual countries may have to leave behind national welfare interests in favour of regional welfare optimization. Furthermore, one is dependent on the cooperation of individual parties such as power exchanges and TSOs, all having their own specific interests (De Jong *et al*., 2007b). Considering the current political debates both on EU level in general and in the market integration arena, solving the political issues may prove to be a greater challenge than the technical-economic implementation of the FBMC approach. In order to anticipate such political problems in time, it is necessary to gain more precise insight into the quantitative effects of introducing a FBMC system, both on a regional and national level.

To obtain some idea of the order of magnitude of the various regional and national effects and of the sensitivities of the FBMC system, the next sections examine these effects by using a technical-economic optimization model of the Central-West European electricity market.

From current congestion management practices to FBMC

Figure 37 shows the current congestion management practices in the Central-West region. Today, both explicit and implicit market clearing mechanisms are applied in the Central-West region. On the NL-DE and the FR-DE border, one operates an explicit market clearing mechanism with respect to long (typically a year), medium (typically a month or week) and short-term (typically a day) interconnector capacity assignment. While the long and medium term interconnector capacity on the NL-BE and BE-FR borders is allocated by means of an explicit market clearing mechanism as well, the short term (day-ahead) capacity is being assigned by means of a trilateral (NL-BE-FR) market coupling system since November 2006.

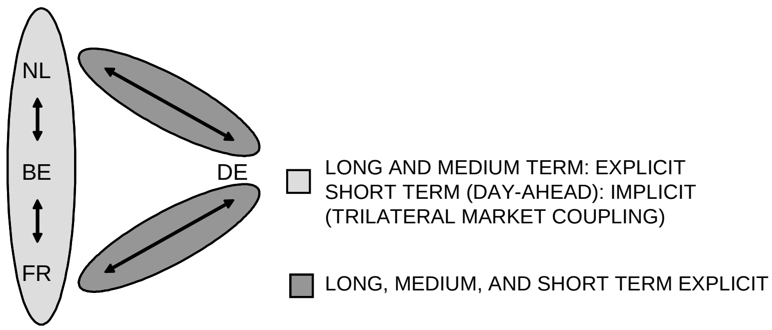


Figure 37: Current congestion management practices in the Central-West region

In this trilateral system, one allocates daily capacities on the FE-BE and BE-NL interconnectors by simultaneous use of the three countries' market order books (of their spot markets); their respective demand and supply curves are handled jointly by matching the highest purchase bids and the lowest sale bids, regardless of where those bids have been submitted, but taking into account the available interconnector capacities on the borders (see section 10.2.3, *market coupling*).

Based on Figure 36, Figure 38 visualizes the change from the current congestion management systems applied in the Central-West region to the system intended to be implemented in 2009.

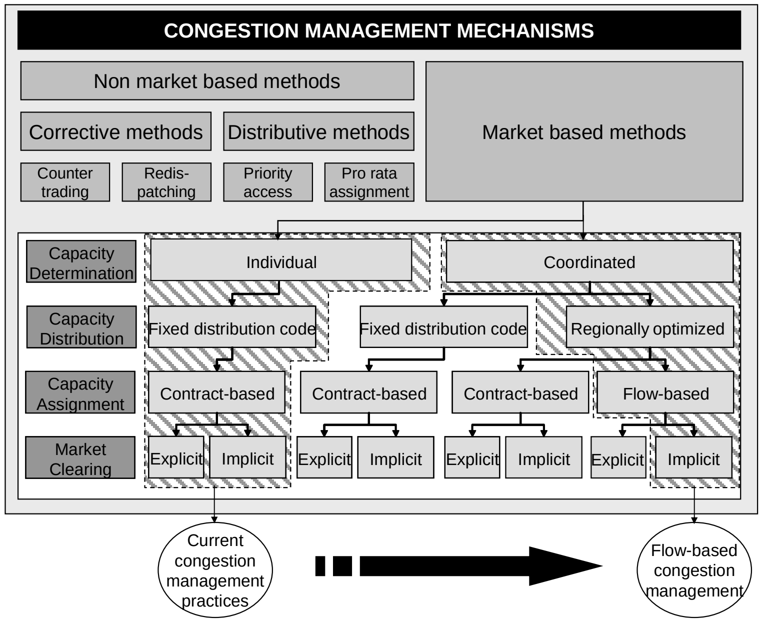


Figure 38: Current and proposed congestion management system

10.5 STRUCTURE OF THE TECHNICAL-ECONOMIC MODEL

The model used to examine the regional and national effects of introducing a FBMC system in the Central-West region, contains three important elements:

- A transmission network module for the four countries (DE, FR, BE and NL)[57]
- An electricity demand and supply module
- A day-ahead Central-West electricity market optimization model

Transmission network module

The model uses the technical representation of the UCTE model made by the University of Edinburgh (Zhou and Bialek, 2005) in *Power World* software. By means of this technical model, the relevant Power Transfer Distribution Function (PTDF) matrix is derived.[58] This matrix expresses the relation between a commercial transaction between two price areas and the resulting physical flows on the flow gates defined (ETSO, 2007b; Frontier Economics *et al.*, 2006). A commercial transaction is modelled by scaling the output of all generators in the source and sink area in proportion to their relative participation factors, i.e. generators in the source area increase their output, while generators in the sink area

[57] Luxembourg is also part of the Central-West region. However, Luxembourg has two electricity transmission networks that are not interconnected but integrated with the networks of the neighbouring countries Germany and Belgium. Therefore, Luxembourg is not considered as an individual price area.
[58] The calculated PTDF values have been validated by means of publications on actual PTDF values obtained from several public sources.

decrease their output. The *Power World* simulator assumes that the buyer accounts for the entire change in system losses. Figure 39 shows the sensitivity and transaction specific PTDF matrices, while taking the Netherlands as the sink node.

Sensitivity Matrix

			NL→NL	BE→NL	FR→NL	DE→NL
BE	→	FR	0	0,196	-0,484	-0,244
BE	→	NL	0	0,804	0,484	0,244
DE	→	FR	0	-0,138	-0,272	0,107
DE	→	NL	0	0,196	0,516	0,756

PTDF Matrix

			Commercial Exchange					
			BE→NL	FR→NL	DE→NL	FR→BE	DE→BE	DE→FR
BE	→	FR	0,196	-0,484	-0,244	0,31	-0,44	0,24
BE	→	NL	0,804	0,484	0,244	0,31	-0,56	-0,24
DE	→	FR	-0,138	-0,272	0,107	-0,69	0,245	0,379
DE	→	NL	0,196	0,516	0,756	0,31	0,56	0,24
Physical Flow								

Figure 39: Sensitivity and transactions specific PTDF matrices

From the sensitivity matrix in Figure 39, one may for example conclude that (only) 80% of a commercial electricity transaction from Belgium to the Netherlands physically flows from Belgium to the Netherlands. About 20% of the transaction value flows via France and Germany. From the sensitivity matrix, the transaction specific PTDF values can be derived by subtracting the relevant values (S_v) provided by the sensitivity matrix (Oren, 2006). For example, the influence of a transaction from Germany (DE) to Belgium (BE) on the DE-NL border is S_v(DE-NL, DE(NL)) minus S_v(DE-NL, BE(NL)). This corresponds with a value of 0.56 (0.756-0.196) given in the transaction specific PTDF matrix (commercial exchange DE-BE for the DE-NL border). From the matrices it may be observed that the sum of the numbers does not always add up to 1. This is because the Central-West region is not completely decoupled from the rest of Europe; some part of the electricity transaction flows through countries (see section 10.2.3, *parallel and loop flows*) outside the region.

Demand and supply module

The supply curves used in the economic model are based on real data for cost of generation and installed generation capacities in each country. Since generation companies do not reveal much data on the cost of generation, data has been collected from various public sources[59] based however on real power plant data. By means of

[59] Sources: (Tarjanne, 2007), (Vattenfall, 2006), (OECD, 2005), (Lise *et al*., 2006), (Hoogwijk *et al*., 2007) and (UCTE, 2007c).

average data on variable generation cost (per technology, the sum of fuel, operation, maintaining, and CO_2 emission costs) and on actual installed capacities per technology (UCTE, 2007c), a supply curve approximation was established by a linear regression fit. The supply curves have been validated by means of data published by DG Competition (DG Competition, 2007; London Economics, 2007).

Since the model focuses on electricity wholesale markets, the demand curves are assumed not to be completely inelastic. An approximation of the demand curves is established based on the average electricity demand per country and the amount of generation capacity actually available (defined as installed generation capacity minus non-useable capacity, maintenance and overhauls, outages and system service reserve) on a certain target date.[60] The intersection of the demand and supply curve gives the equilibrium price and quantity. Assuming that the average demand is the equilibrium demand, this average demand value is substituted into the supply curve. Furthermore, the amount of available generation capacity is assumed equal to demand when the price of electricity is zero. This then gives the second point of the demand curve, assumed to be linear in the model. Because the values on average demand are based on snapshots in time, the values have been validated by using the 'load duration curves[61]' (LDCs) for the years 2003, 2004 and 2005 provided by London Economics (London Economics, 2007) for DG Competition's 2007 sector enquiry report. The average demand values of the model are somewhat higher than what is expected from past load duration curves (see (Sharma, 2007)). However, this could be attributed (i) to the fact that the values in the London Economics study are older (if we consider the annual increase this would lead to more convergence of the values) and (ii) to the snapshot considered by UCTE (3rd Wednesday of January, 2007, at 11:00 a.m.).[62] However, the values are still reflective of the trend and have been achieved at the same instance of time in the past.

Technical-economic optimization model

The optimization model is built in Microsoft Excel. The model simulates (flow-based) market coupling with the data modules discussed above as an input. It provides the optimal dispatch in terms of net imports/exports on a day-ahead basis given the objective function defined (see below).

Model constraints

The basic constraints of the model are:

[60] Target date: 3rd Wednesday of January, 2007, at 11:00 a.m.(Source: (UCTE, 2007c)).
[61] LDCs are graphs that depict the percentage of time that a given load is equalled or exceeded.
[62] More details on the construction of the demand and supply curves can be found in Sharma (2007).

- Net trade is equal to zero
- All electricity produced is also consumed
- The technical limitations of the network

The latter constraints are the capacities available for commercial transactions on the border-to-border interfaces[63] between the countries as determined by the TSOs (see section 10.2.3). Figure 40, below, visualizes these available interconnector capacities. The figures are obtained from the various websites of the relevant TSOs (*2007 values*). In the model it is assumed that all available capacity is allocated on a day-ahead basis.

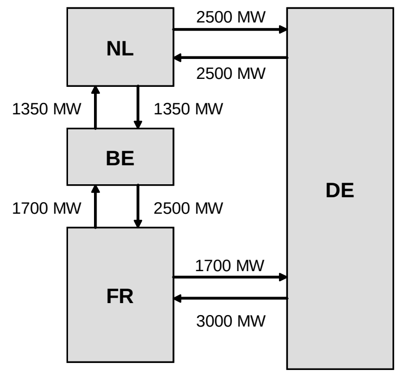


Figure 40: Available interconnector capacities

Objective function

The model applies regional welfare maximization as the objective function; *the sum of the national consumer surpluses, the national producer surpluses and the regional congestion rent*, see section 9.5 and Annex 6). This objective function is generally agreed upon in today's discussions on the introduction of FBMC in the Central-West region. However, this regional optimization function also requires that the individual countries waive their national (welfare) interests. One may imagine that if the individual national consequences of regional optimization become more concrete, this may lead to new political discussions on the objective function (e.g. on additional constraints), on the design of the system (e.g. on the definition of the technical constraints), on the distribution of the congestion rent, and/or on financial compensations.

Model outputs

With reference to the base case of no coupling at all, the model calculates the optimal dispatch (level of import/export per country). Based on this optimal dispatch the model provides (i) the regional consumer surplus, (ii) the regional producer surplus, (iii) the

[63] National limitations are not taken into account.

regional congestion rents, (iv) the total regional welfare, and (v) the utilization of the available interconnector capacity. Furthermore, the model calculates for each individual country (i) the equilibrium price, (ii) the equilibrium level of demand and supply, (iii) import/export levels, and (iv) consumer and producer surpluses.

10.6 APPLICATION OF THE TECHNICAL-ECONOMIC MODEL

By using the model different cases are compared;

- *Base case (No coupling)*: the base case is the (hypothetical) case in which the countries are not coupled at all (*No coupling*). This situation is compared with a representation of the current situation and of flow-based market coupling (FBMC).
- *Current situation (CS)*: an approximation of the current situation (*CS*) of trilateral market coupling between the Netherlands, Belgium and France and explicit auctions between the Netherlands and Germany and between Germany and France (see Figure 37) is modelled as follows: first, the explicit trades are executed (from DE to NL and from FR to DE) assuming that all capacity is being used. After this, a new optimization problem is set for the trilateral market coupling countries NL, BE, and FR.[64]
- *Flow-based market coupling (FBMC)*: in the flow-based market coupling case *(FBMC)*, the whole region applies an implicit market clearing mechanism combined with a flow-based capacity assignment approach (see section 10.2.3). Therefore, the FBMC case uses the PTDF matrices as illustrated in Figure 39.
- *Stretching of the technical constraints*: in order to obtain some idea on the order of magnitude of price convergence and welfare increase that could result from the situation in which more interconnector capacity is available for the market, all technical constraints (see Figure 40, *available interconnector capacities*) have been stretched by 1000 MW *(+ 1000MW)* and 2000 MW *(+ 2000MW)*, respectively, within the FBMC case.[65]

10.6.1 Effects on a national level

Below, the results of the model concerning the cases of No coupling, current situation (*CS*), and flow-based market coupling (*FBMC*) are compared for each individual country (NL, BE, FR, and DE). Successively, the following aspects are shown:

[64] It is assumed that all capacity is allocated through day-ahead market coupling.
[65] First, a sensitivity analysis with regard to the PTDFs has been performed. Installation of new transmission capacity between two countries appeared to have only a small impact on the PTDF values (typically only at the third decimal place) (Sharma, 2007).

- The equilibrium price and the level of import or export
- The equilibrium level of demand and the equilibrium level of supply
- The equilibrium level of consumer and producer surplus
- The sum of (national) consumer and producer surplus, and the change[66] in the sum of (national) consumer and producer surplus

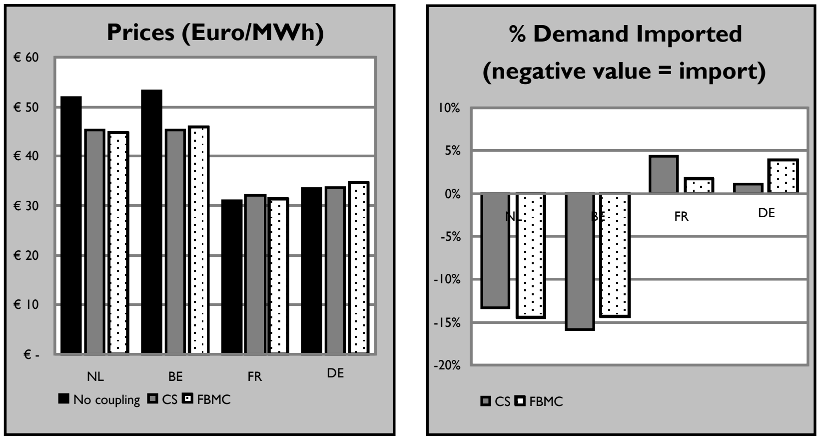


Figure 41: Equilibrium price & import/export level

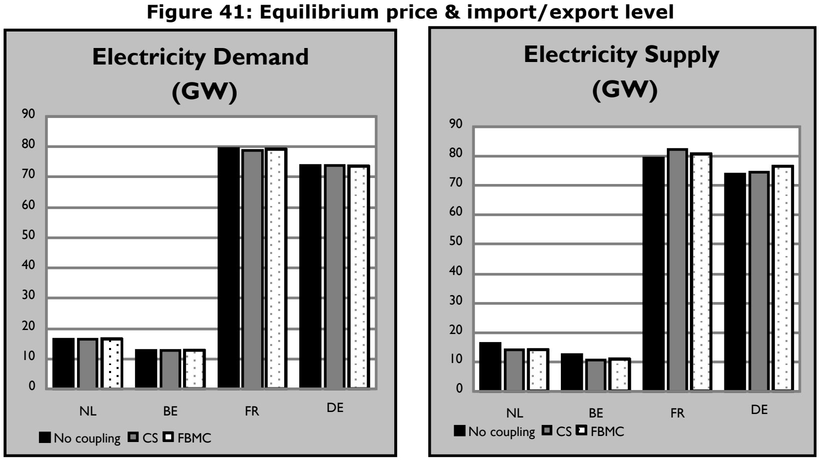


Figure 42: Electricity demand level & electricity supply level

[66] Change compared to the base case of no coupling.

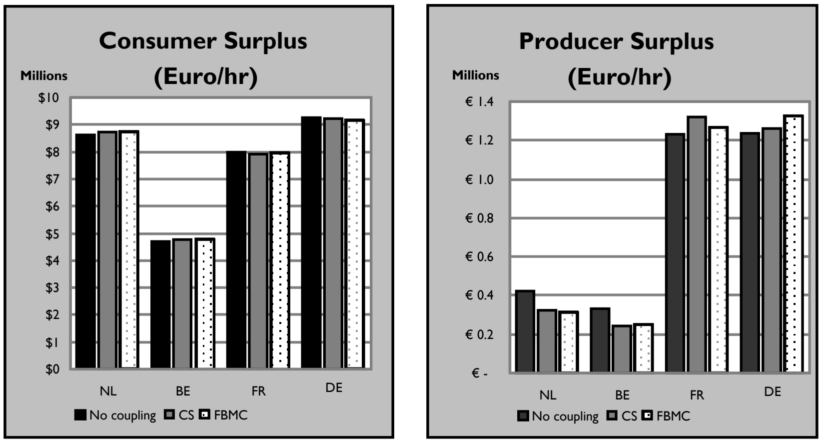


Figure 43: Consumer surplus & producer surplus

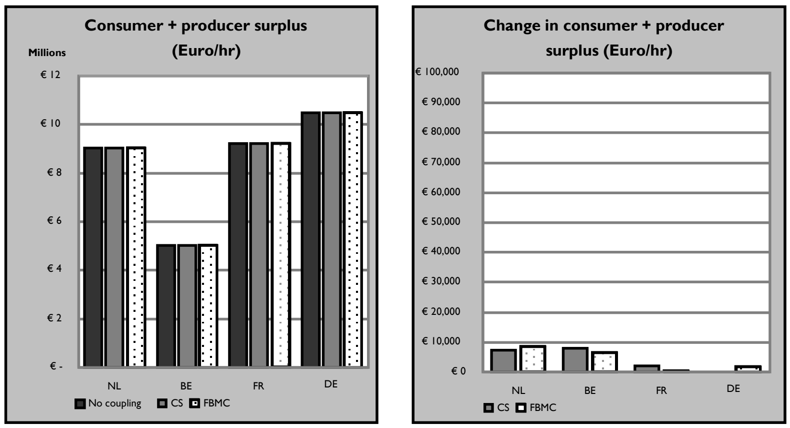


Figure 44: Consumer + producer surplus & change in consumer + producer surplus

10.6.2 Effects on a regional level

Figure 45 to Figure 49 present the model results for the Central-West region as a whole. Successively, the following aspects are shown:

- Regional consumer surplus and producer surplus
- The change[67] in regional consumer and producer surplus
- The change in the sum of regional consumer and producer surplus, and (the change in) regional congestion income
- The total regional welfare and the change in total regional welfare
- The resulting international flows and the degree to which the available interconnector capacity is being used

[67] Change compared to the base case of no coupling.

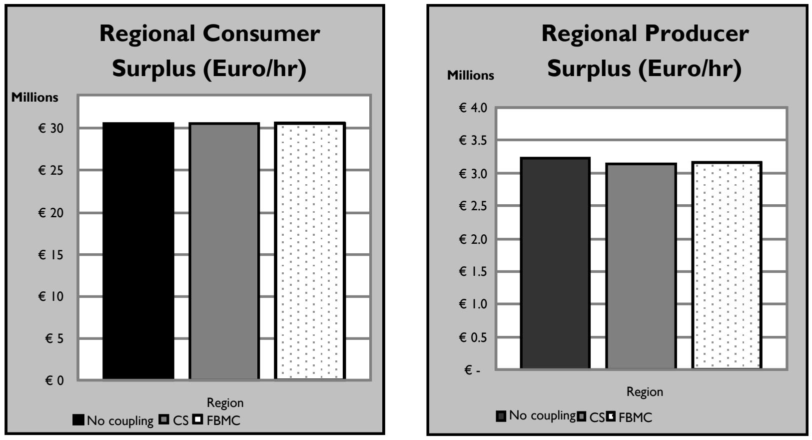


Figure 45: Regional consumer surplus & regional producer surplus

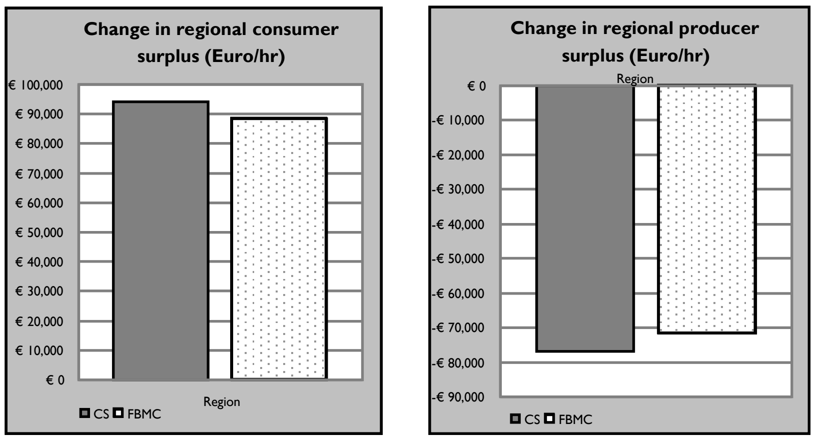


Figure 46: Change in regional consumer surplus & change in regional producer surplus

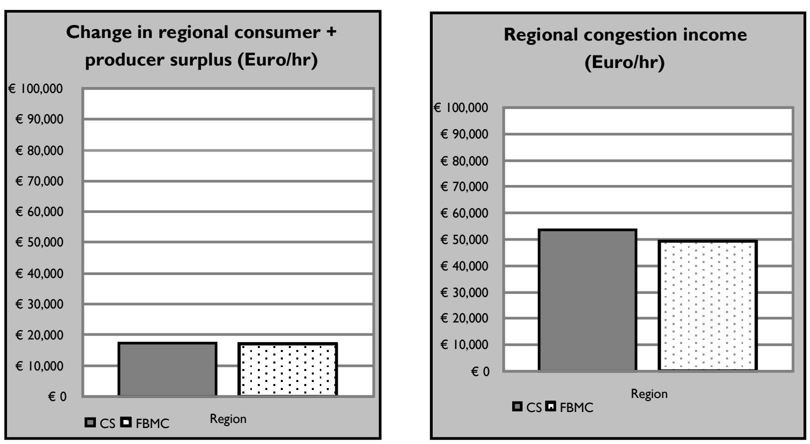


Figure 47: Change in reg. consumer + producer surplus & reg. congestion income

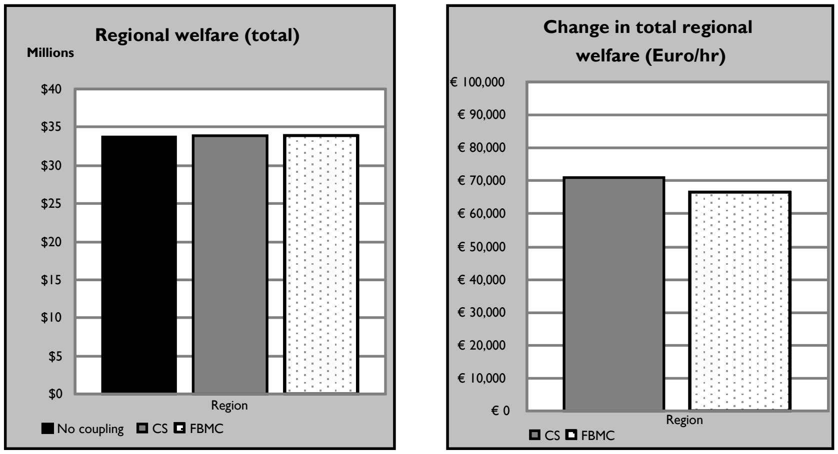


Figure 48: Total regional welfare & change in total regional welfare

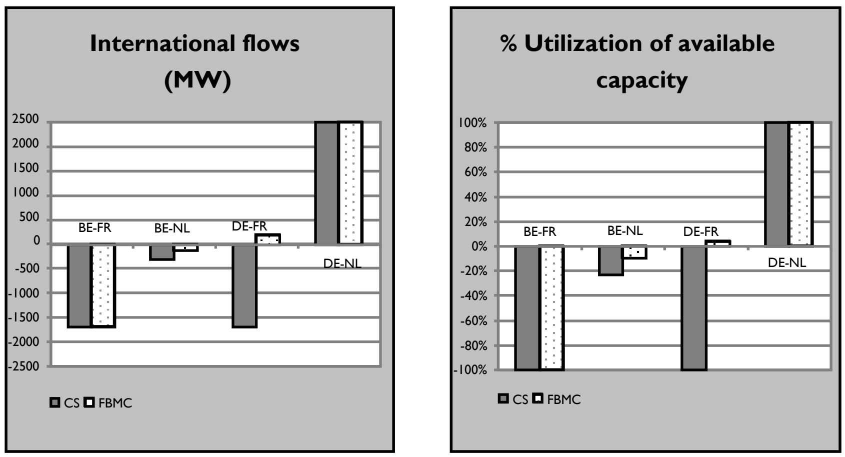


Figure 49: International flows & capacity utilization

10.6.3 Effects of additional interconnector capacity

Figure 50 shows the effects of stretching all technical constraints by 1000 MW and 2000 MW, respectively, on national price levels and regional welfare**.**

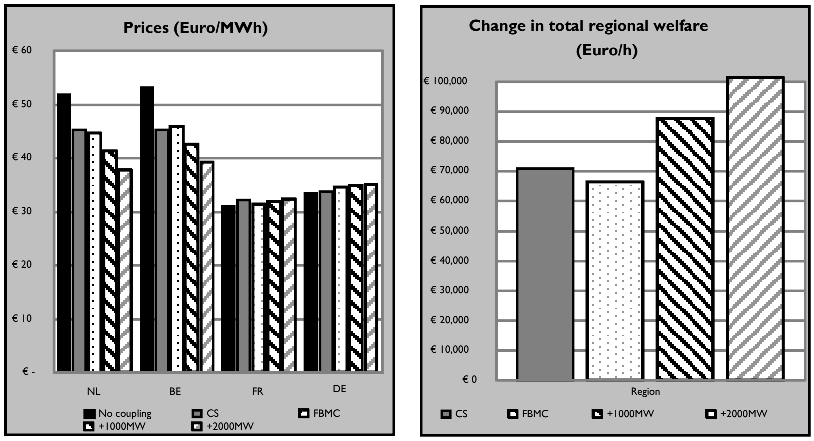


Figure 50: Effects of additional interconnector capacity on: prices & regional welfare

10.6.4 Results and discussion

Results

Based on Figure 41 to Figure 50[68], the following may be concluded:

National effects:

- Both in the CS (current situation) and FBMC case, the Netherlands and Belgium are importing countries. France and Germany are exporting countries.
- Both in the CS and FBMC case, the Dutch and Belgian prices fall significantly (in comparison with the base case of no coupling), while the prices France and Germany prices rise slightly.
- In terms of the total welfare[69], the Netherlands and Belgium benefit most from the coupling of markets. Both the CS and the FBMC case lead to a significant increase of the sum of consumer and producer surplus in these two countries.

Regional effects:

- In comparison with the base case of no coupling, the CS and FBMC case lead to an increase of the sum of regional producer and consumer surplus by approximately 17 thousand Euro/hour.

[68] It must be noted that the figures presented in Figure 41 to Figure 50 most probably represent maximum values and are not representative for a whole year since the demand curves used in the model are based on an hour of high electricity demand (3rd Wednesday of January, 2007, at 11:00 a.m.).

[69] Exclusive of congestion rents.

- Furthermore, the CS and the FBMC case lead to a congestion income of respectively 54 thousand Euro/hour and 49 thousand Euro/hour. Consequently, the CS case increases total regional welfare (the sum of consumer surplus, producer surplus and congestion income) by 71 thousand Euro/hour, while the FBMC case increased total regional welfare by 66 thousand Euro/hour.

Effects of additional interconnector capacity:

- Stretching of the technical constraints (in the FBMC case) by 1000 MW and 2000 MW, respectively, leads to an increased level of price convergence in the region.
- Furthermore, stretching of the technical constraints leads to a higher level of regional welfare. In comparison with the *FBMC* case, the *FBMC +1000 MW* case leads to an increase of total regional welfare of 22 thousand Euro/hour and the *FBMC +2000 MW* case to an increase of 35 thousand Euro/hour.

Discussion

Utilization of interconnector capacity

In the case of contract-based market coupling (e.g. the coupling between NL, BE, and FR in the CS case), the theoretical optimal dispatch is the situation in which either the prices in the connected countries are equal (cf. Figure 41, *the prices of NL and BE in the CS case*) or the interconnector capacity is fully used. Contrary, in a system of FBMC, the optimal dispatch could mean that a price difference between two connected countries continues to exist even when the interconnector capacity is not fully used (cf. Figure 49, *utilization of the BE-NL and DE-FR capacities in FBMC case*).

Based on the discussion in section 10.2.3, this observation can be explained as follows; in the case of a flow-based approach, the transaction of one additional MW from A to B could lead to an indirect flow from A to B through C. Here, the interconnectors between A and C (or C and B) could already be fully used by other (economically more efficient) transactions and therefore restrict further trade between A and B. In the case of contract-based market coupling, parallel flows are not taken into account. Therefore, the interconnector(s) between two countries are either fully used or the prices are equal.

Distribution of congestion rents

The model shows that the collected congestion income can be quite significant. Duthaler and Finger (2008) note that congestion revenue accounts for approximately 1.5% of the average spot market value of electricity consumed in the UCTE. They claim that the total cross-border revenue in the UCTE amounts to approximately 1.5 billion Euros a year. In a flow-based system of congestion management, this congestion revenue will be collected centrally for all participating countries as market participants no longer bid for capacity on individual borders. This raises the (highly political) question of how to re-distribute the region-wide congestion revenue. So far, several distribution keys have been proposed and discussed (Leuthold and Todem, 2007; Duthaler and Finger, 2008). However, all distribution keys have their own pros and cons. They result in substantially different revenue distribution patterns as well as in different incentives given to TSOs (Duthaler and Finger, 2008). Therefore, reaching political agreement on the issue of congestion revenue distribution seems to be one of the main challenges of introducing a flow-based congestion management approach.

Actual benefits of introducing a flow-based market coupling (FBMC) system

Given the fact that — in the model — the FBMC case yields a lower level of regional welfare than the CS case (see Figure 48), why would one still want to introduce a system of flow-based market coupling?

In the first place, an increased level of TSO coordination and the more precise assignment of network flows to market transactions in the FBMC case lead to a better understanding of network behaviour, which contributes to the safe operation of the interconnected network (*technical advantage*).

Secondly, the (regionally coordinated) FBMC approach assures the efficient use of available interconnector capacity with respect to the economic value of commercial transactions (*economic advantage*).

Thirdly, due to the more precise assignment of network flows to market transactions, the presently available capacity values — which by definition must be rather conservative in order to be able to cope with the inaccuracies of unexpected flows related to the (uncoordinated) contract-path paradigm (see section 10.2.3) — may be reassessed. Such a reassessment may lead to lower capacity reserve margins on the technical constraints (borders) and, consequently, a higher amount of interconnector capacity that can be offered to the market. This would then lead to a higher level of regional welfare (cf. Figure 50). In the model, this effect of lower interconnector capacity reserve margins (*economic advantage*) has not been taken into account.

10.7 CONCLUSIONS

What will be the technical and economic effects of introducing flow-based market coupling (FBMC) in the Central-West European region?

Based on the results of the technical-economic model presented in this chapter, it can be concluded that, in the Central-West European region, the Netherlands and Belgium benefit most from the coupling of markets. Both the CS case (current situation) and the FBMC case lead to a significant fall in price and an increase of the sum of consumer and producer surplus in these two countries (compared to the base case of no coupling). Furthermore, the total regional welfare — that is the sum of consumer surplus, producer surplus, and congestion income, increases in both the CS and FBMC case. Finally, stretching of the technical constraints leads to an increase of total regional welfare.

In the case of contract-based market coupling, the theoretical optimal dispatch is the situation in which either the prices in the connected countries are equal or the interconnector capacity is fully used. Contrary, in a system of FBMC, the optimal dispatch could mean that a price difference between two connected countries continues to exist even when the interconnector capacity is not fully used.

In comparison with contract-based market coupling, flow-based market coupling (FBMC) has the following advantages:

- A FBMC approach leads to a better understanding of network behaviour, which contributes to the safe operation of the interconnected network (*technical advantage*).
- A regionally coordinated FBMC approach assures the efficient use of available interconnector capacity with respect to the economic value of commercial transactions (*economic advantage*).
- A FBMC approach may lead to lower capacity reserve margins on the defined technical constraints (borders) and, consequently, a higher amount of interconnector capacity that can be offered to the market. This would then lead to a higher level of regional welfare (*economic advantage*).

Notwithstanding the fact that many complex technical and economic oriented issues should be overcome before a regional FBMC approach can be put into practice, solving the political issues may prove even a greater challenge. Examples of such political issues are the distribution of the centrally collected congestion revenues and the (geographical) definition of the technical constraints.

What are the characteristics and regulatory needs typical of the issue of (cross-border) congestion management and relevant for the process of regulatory mode decision-making?

Based on the preceding sections, the following *characteristics* typical of the issue of (cross-border) congestion management can be identified:

- Strong public interests: the congestion management mechanism applied may influence (national) price levels.
- Strong private interests: the specific design of the congestion management mechanism applied (e.g. the application of implicit and/or explicit auctions, the distribution of the available capacity between day-ahead, month-ahead and/or year-ahead allocation schemes, the timing of allocation procedures, and the firmness of obtained capacity) influences private market operations and strategies.
- Strong political interests on an EU (national) level: considering the lack of interconnector investment, improving access to existing interconnectors by better methods of congestion management is all the more important.
- Strong political interests on a national level: the congestion management mechanism applied may influence national welfare levels significantly.
- Technically and economically complex: Given the role that interconnectors presently fulfil, the issue of (international) congestion management is all about dealing with the complex interdependencies between the technical and economic characteristics of the European electricity market.
- Governmental interdependence (regional): in order to establish or adapt a cross-border congestion management mechanism, at least the public authorities on both sides of the interconnector should reach agreement. However, in order to introduce a regionally coordinated congestion management method, the relevant authorities of all interconnectors within this region should come to terms.
- Nongovernmental interdependence (regional): for the efficient functioning of an explicit congestion management mechanism, cooperation and coordination between TSOs is a basic prerequisite. In the case of implicit methods, cooperation and coordination between TSOs and the relevant spot markets as well as between spot markets themselves (market coupling) form two additional conditions.
- Public dependency on cooperation of nongovernmental bodies: in order to implement a congestion management related policy goal, public authorities are highly dependent on the cooperation of TSOs (e.g. concerning the determination of available capacities

and the organization of capacity allocation processes) and, in the case of implicit methods, on the cooperation of spot markets (e.g. for designing and performing the implicit market algorithm).

- Public dependency on knowledge of nongovernmental bodies: Designing a new congestion management system that is both economic efficient and safe with respect to security of supply is difficult — if not impossible — for public authorities without the specific knowledge of nongovernmental bodies such as TSOs. Furthermore, operational knowledge is also needed to identify the problems to tackle before such a new system can be implemented.
- Many different actors involved in the issue: many different actors are involved in and affected by the issue of congestion management e.g. producers, traders, industrial consumers, TSOs, spot markets, regulatory authorities, and national governments.
- Effects of path dependency: the possibility to introduce more advanced congestion management mechanisms depends, among others, on existing market relations and cooperation structures, the nature of the existing congestion management mechanism(s), the existence of a spot market, the issue-specific expertise acquired throughout the years, and on the existing (national) regulatory framework.

One may identify the following *regulatory needs* typical of the issue of congestion management:

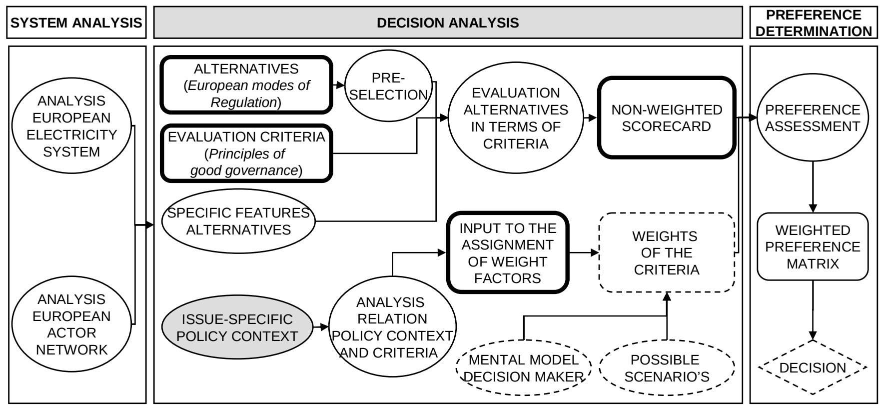
- Need for international cooperation and coordination (regional): at this stage of European market integration, (cross-border) congestion management is changing from a border-to-border to a regional issue. Although the EU defines certain minimum standards, the relevant parties within the region should, among others, agree on the way in which the available capacity is determined, distributed and assigned as well as on the market clearing mechanism, the definition of technical constraints, the distribution of congestion revenues, etcetera.
- Need for regional (short-term)/EU-wide harmonization (long-term): developing harmonized network access and operational rules on a regional, and, ultimately, on an EU level forms an important aspect of European market integration. At this stage of European market integration, the definition of certain 'minimum' conditions on an EU level (e.g. congestion management mechanisms should be market based and coordinated on a regional basis) facilitates the first step towards congestion management convergence.
- Need for a supranational intervention option: in order to introduce more advanced congestion management schemes, individual countries may have to leave behind

national welfare interests in favour of regional (EU-wide) welfare optimization. Furthermore, as discussed above, in order to establish or modify a cross-border congestion management mechanism, at least the public authorities on both sides of the interconnector should reach agreement. If the authorities do not agree upon the congestion management method to apply, a deadlock is likely to appear. Consequently, an arbitrage option through which cross-border (or regional) disputes can be settled seems desirable.

- Need for national/regional regulatory discretion: considering (i) the divergent status quo in the member states and the path dependent character of the issue of congestion management, (ii) the fact that there is still no consensus on the ultimate model for congestion management, and (iii) the fact that both the technical and economic effects of more advanced congestion management methods are (still) largely unknown, at least for the time being, some level of national (or regional) discretion concerning the issue of congestion management seems justified from a social perspective.
- Need for solution flexibility: as discussed above, the issue of congestion management still is a learning process. Therefore, at this stage of market integration, one needs to be able to modify the congestion management mechanism applied on a regular basis. For example, modifications may be necessary to implement new insights, to achieve an increased level of international harmonization, or to experiment with pilot projects.
- Need for regulatory certainty: since the specific design of the congestion management method applied may affect private market operations and decisions, regulatory certainty is an important aspect.

CHAPTER 11

CASE 3: MARKET TRANSPARENCY



11.1 INTRODUCTION

This chapter discusses the third (and last) case of market transparency. Section 11.2 examines the role of transparency in today's European electricity wholesale markets as well as the different transparency relations, based on which the concept of market transparency is defined. Analogous to the cases of interconnector investment and congestion management, section 11.3 describes the relevant regulatory developments concerning the issue of market transparency from 1996 to today. After this, the chapter focuses on the *question* of what aspects to consider in the process of increasing the level of market transparency in electricity wholesale markets (cf. section 8.5).

Section 11.4 discusses the advantages and risks related to a higher level of market transparency, whereas section 11.5 provides an overview of the various transparency variables.

The chapter concludes by answering the question mentioned above (intrinsic value case) and by identifying the characteristics and regulatory needs typical of the issue of market transparency and relevant for the process of regulatory mode decision-making (primary aim case study).

11.2 TRANSPARENCY IN ELECTRICITY WHOLESALE MARKETS

Within the context of this study, transparency refers to '*the extent to and the way in which information related to the functioning of electricity wholesale markets is exchanged or disclosed*'. Figure 51 visualizes the various transparency relations (arrows) within the European electricity wholesale markets. Below, these relations are discussed.

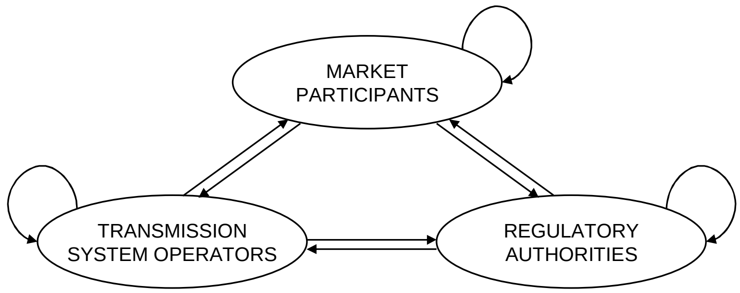


Figure 51: Transparency relations

Information for market participants

…from other market participants

Market participants need information about the development of the market in order to act economically rational (Newbery *et al*., 2003b). Information on, for example, generation, load, and trade activities provides insight into price developments, which allows market participants to make well-considered and optimal business decisions. Lack of such information subjects businesses to increased risk and uncertainty. The consequence may be that businesses are forced to undertake costly actions to protect themselves from increased risk and uncertainty, or make wrong decisions (MSC, 2001). This may ultimately lead to higher costs to society.

…from TSOs

Besides information on the electricity wholesale market, market participants need information about the transmission network, for example, to provide them with proper signals on capacity availability and the value of transmission capacity (see chapter 10). Furthermore, in order to decide whether or not, and if yes, for which price they want to participate in the balancing market, market participants need information about the status of the balancing market.

…from regulatory authorities

For market participants it is important that regulatory authorities clearly communicate. Not only the existing regulation should be clear and unequivocal, but also the various regulatory procedures. Regulatory uncertainty (risk) may cause unrest in the market, put potential new entrants off, and bring on a dismal investment climate.

Information for TSOs

…from market participants

In order to maintain system balance (see section 4.2), TSOs should at any time have a clear view on the level of (reserve) generation capacity available. An insufficient level of transparency on this matter may lead to import/export restrictions or the seclusion of consumers, while there is still capacity left to maintain system balance. In addition, TSOs carry out load flow analyses to predict possible network congestions and to determine the transmission capacity safely available for the market (see chapter 10). These analyses not only require intensive information exchange between market participants and TSOs, but also between TSOs themselves (see below).

…from other TSOs

Liberalized markets use the electricity network more and more intensively and electricity flows are increasingly difficult to predict e.g. due to more short-term trading and the expansion of intermittent production units. An increased level of coordination between TSOs and, consequently, more accurate predictions on the future status of the network will most likely lead to a higher level of system safety and/or economic welfare (cf. section 10.6.4). An important condition for intensive inter-TSO information exchange is strict unbundling from any commercial activities to guarantee discreet treatment of confidential information.

…from regulatory authorities

To operate and manage the transmission network in a proper way as well as to make adequate investment decisions, TSOs need a clear set of network and system regulation.

Information for regulatory authorities

…from market participants

One may distinguish three regulatory activities for which regulatory authorities need information from market participants. The first activity is the establishment of new regulation. Regulatory authorities need information, specific knowledge, and the relevant views from market participants before deciding on any new regulation affecting market functioning. Secondly, regulatory authorities need information from market participants for the supervision and enforcement of the existing rules and regulations. Market participants often are liable to provide information for this specific purpose. A last activity concerns market monitoring. Market monitoring is a forward-looking process (Wolak, 2004) in which market and system performance is measured, for instance, to identify market design flaws or the possible abuse of market power. Analogous to the activity of supervision and enforcement, the provision of information for monitoring purposes usually is a legal obligation.

…from TSOs

In essence, regulatory authorities need information from TSOs for the same three regulatory reasons as they need information from market participants (see above). For instance, in order to specify regulated network tariffs, regulatory authorities need specific data from their TSOs (e.g. on a TSO's cost structure). Furthermore, a field of tension exists between the specific interests of a TSO and the interests of society as a whole. Therefore, regulatory authorities should carefully examine whether or not TSOs adequately fulfil their statutory duties, which usually is an information intensive task. Finally, for monitoring purposes, regulatory authorities need specific information from TSOs as well, for example, concerning network availability, network use, and balancing activities.

…from other regulatory authorities

The market structure of several European electricity markets characterizes these markets as oligopolistic markets (e.g. due to a limited amount of suppliers and/or barriers of entry). Because today's markets are still relatively small and surveyable, an incentive for dominant market players exists to adopt a reserved attitude (the so-called regulatory threat). However, as a result of ongoing market integration, this regulatory threat diminishes since dominant parties feel more freedom within a bigger integrated market. Stoft (2002) argues that when market power is a potential problem, the market needs to be monitored. In an integrated market, this implies that national regulatory and competition authorities should not only have access to (confidential) market information concerning their own country, but also to market information about neighbouring countries.[70] Only then a sufficient threat of regulatory intervention (regulatory threat) continues to exist and regulatory authorities remain able to observe, prove, and deal with any actual abuse of market power in the integrated market. Besides international market monitoring, the exchange of information between regulatory authorities is essential for international benchmarking and learning purposes.

Definition of market transparency

This chapter (only) focuses on transparency for the benefit of market participants, hereafter referred to as '*market transparency'*. This specific part of the overall set of transparency relations is indicated in Figure 52 by means of the bold arrows.

[70] Presently, legal hurdles to exchange confidential information between regulatory authorities still exist.

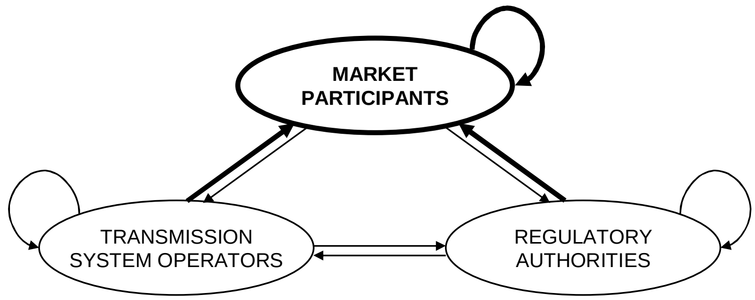


Figure 52: Market transparency

11.3 REGULATORY DEVELOPMENTS SO FAR

Analogous to chapter 9 and 10, this section examines the issue-specific regulatory developments concerning the issue of market transparency.

Issue-specific regulatory developments per regulatory phase

Phase 1 (1996): Adoption first European liberalization Directive

Council Directive 90/377/EEC of 29 June 1990 already provided a procedure to improve the transparency of gas and electricity prices charged to industrial end-users. In addition, the 1996 Directive prescribed the publication of indicative prices for the use of transmission and distribution systems (Article 17) and the creation of appropriate and efficient mechanisms for transparency to avoid any abuse of dominant position and predatory behaviour (Article 22).

Phase 2 (1997-2000): First phase Florence Forum

During the period between 1998 and 2000, market transparency was only mentioned as a side-issue. Furthermore, the attention for market transparency was limited to the subject of transmission network capacity. For example, in 1999, TSOs were asked to make a proposal for making available cross-border capacities transparent to the market at any given time and to provide transparent standards on which congestion management method (see chapter 10) they would apply under specific circumstances. In the Florence Forum meeting of November 2000, more detailed guidelines on the provision of information by TSOs were put forward, including guidelines on inter-TSO transparency, capacity calculation methods, available capacity, and the firmness of network capacity.

Phase 3 (2001-2003): Towards a second European legislative package

In the period between 2001 and 2003, still little attention was paid to the issue of market transparency. Nevertheless, during the ninth Florence Forum meeting in October 2002, ETSO (see section 5.4) brought the issue of market transparency to the notice of the forum participants. Market participants had expressed the need for information not only on grid availability and congestion management mechanisms but also on load, generation, and balancing. The new Directive and Regulation of June 2003 only added little regulation on the subject of market transparency. However, the new Regulation did prescribe that at least information concerning available transmission capacities and the security standards affecting these capacities should be provided to the market (Article 5).

Phase 4 (2004-2006): Adoption regional approach

It was not until 2006 that market transparency became a highly discussed issue. In the beginning of that year, EURELECTRIC (see section 5.3) provided a paper on transparency that was subject of discussion in the second round of the mini fora (see section 7.2) and at the Florence Forum meeting in the summer of 2006. In August 2006, the European Regulators Group for Electricity and Gas (ERGEG) published Guidelines of Good Practice (GGPs) on Information Management and Transparency. These non-binding guidelines were subject to a public consultation and public hearing before their approval and publication by ERGEG. The 13th Florence Forum (November 2006) set up a special Transparency Working Group with the aim of rapid implementation of the — on a voluntary basis — improved transparency measures. Several voluntary initiatives followed. For example, ETSO implemented a common data platform (ETSOVista) and in Germany, Austria, the Netherlands, and France, producers started to publish data on generation.

With respect to the issue of market transparency, the adoption of the new annex to Regulation (EC) No 1228/2003 in November 2006 (Commission Decision, 2006) formed a major milestone. Besides new regulation on congestion management, the annex also includes a set of rather specific guidelines concerning the issue of market transparency. In short, these binding guidelines explicitly oblige TSOs to publish information not only on the transmission network (including interconnectors) but also on the items of generation, load, and balancing (Article 5).

Phase 5 (from 2007): Towards a third European legislative package

In January 2007, a second meeting of the Florence Forum's Transparency Working Group was held. During this meeting, ERGEG not only discussed the need to increase the overall level of market transparency, but also stressed the importance of harmonizing transparency practices to avoid informational asymmetries both between market parties within a specific country and between the market parties of different countries. As a response to this call, the Northern European region engaged in harmonizing the market transparency level based on the new transparency requirements of Regulation (EC) No 1228/2003. Although legally binding, these guidelines needed a higher level of specification on various aspects (see section 11.5, *market transparency variables*) to ensure a harmonized implementation throughout the region. During the 14th Florence Forum meeting (September 2007), the Northern European region presented the final version of its detailed transparency report, which currently forms the basis for implementation of the new binding transparency guidelines (NE REM, 2007). Based on the work already done in the Northern region, the Central-West region established a detailed regional transparency report as well, slightly adapted to its specific market situation (CWE REM, 2007).

The third legislative energy package proposal for a new Regulation amending Regulation (EC) No 1228/2003 explicitly creates the possibility for the Commission to adopt more detailed binding guidelines (through comitology) on the provision of information.

Summary regulatory developments in terms of European modes of regulation

A 1990 Council Directive already provided market transparency rules on prices charged to industrial end-users. Furthermore, the Directive of 1996 contained some rules on the publication of indicative prices for network use (*Joint Decision*).

From 1997 until 2005 only little attention was paid to the issue of market transparency. However, a few discussions on transparency concerning network use took place (*Open Method of Coordination*) and the new legislative package of 2003 did contain some transparency-related aspects (*Joint Decision*).

In 2006, the issue of market transparency became highly discussed both in the various regional discussion platforms and during the Florence Forum meetings (*Open Method of Coordination*). As a result of these discussions, ERGEG published (voluntary) Guidelines of Good Practice (GGPs) on market transparency in August 2006. Several voluntary market initiatives followed (*voluntary Self-regulation*). Furthermore, the adoption of the new annex to Regulation (EC) No 1228/2003 in November 2006 introduced an important set of binding guidelines on the issue of market transparency (*Comitology*).

Despite the fact that the 2006 transparency guidelines are legally binding, they need further specification to ensure a harmonized implementation throughout Europe. Therefore, since 2007, one has worked on the improvement and harmonization of market transparency practices on a regional level (*Open Method of Coordination*). Finally, the third legislative package proposals include the possibility for the Commission to adopt more detailed binding guidelines on market transparency (*Comitology).*

Table 11 provides an overview of the regulatory (mode) dynamics concerning the issue of market transparency. Chapter 12 will come back to these regulatory dynamics.

Table 11: Overview regulatory dynamics concerning market transparency

Phase 1 **(1996)**	**Phase 2** **(1997-2000)**	**Phase 3** **(2001-2003)**	**Phase 4** **(2004-2006)**	**Phase 5** **(2007 onward)**
- Joint Decision	- Open Method of Coordination (limited)	- Open Method of Coordination (limited) - Joint Decision (limited)	- Open Method of Coordination - Self-regulation (*voluntary*) - Comitology	- Open Method of Coordination - Comitology

11.4 MARKET TRANSPARENCY: ADVANTAGES AND RISKS

Advantages

Section 11.2 already indicated that market participants need information about the electricity wholesale market (load, generation, trade activities, etc), the transmission network, the balancing market, and the regulatory framework in order to make informed business decisions. In addition, improved and equal access to relevant market information reduces the historically developed asymmetries (e.g. incumbents often have better information on the marginal costs of generation plants than new entrants do) and improves market liquidity by encouraging more parties to enter the market. Finally, a higher level of market transparency contributes to the efficiency of long-tem investment decisions, such as investments in new generation capacity (De Vries, 2004) or new interconnectors (cf. chapter 9) and increases market confidence (DG Competition, 2007).

Risks

Tacit collusion

Antirust law usually restrains explicit collusion. However, collusion may also be tacit. Tacit collusion refers to the situation in which firms maintain supra-normal profits by tacitly agreeing that any deviation from the collusive path would trigger some retaliation (Ivaldi *et al.,* 2003). Tacit collusion is believed to be more likely when the market is characterized by a limited number of market participants, high entry barriers, a high frequency of interaction, firms with similar cost structures, product homogeneity, multi-market contacts, and a predictable market demand combined with low demand elasticity (Cabral, 2000 and Ivaldi *et al.*, 2003). Considering these characteristics, one may conclude that many electricity markets are sensitive to tacit collusion. In fact, Borenstein *et al.* (2002) explicitly note that most electricity markets provide favourable conditions for firms to collude (Dechenaux, 2005).

The effect of market transparency on the existence of tacit collusion continues to be subject of discussion. Schultz (2001) argues that one should distinguish between transparency on the consumer side and on the producer side. He argues that increased transparency on the consumer side increases the temptation to undercut other firms in such way that collusion is hard to sustain (in other words, the expected value of the profits resulting from deviation plus the present value of the resulting punishment is positive).

On the producer side, transparency would have an opposite effect. The more transparent the market, the more likely defections from collusive play are detected (Schultz, 2001, Ivaldi *et al., 2003*). As a punishment, all firms could revert to the Nash equilibrium or to a situation that gives the deviant its worst possible continuation equilibrium (Vasconcelos, 2001). Furthermore, a higher level of transparency may help to identify possible collusive equilibria and to determine which punishment strategies are available (Peeperkorn, 1996). These aspects facilitate tacit collusion (Schultz, 2001). On the other hand, by stimulating new entry, market transparency could undermine collusive behaviour.

Based on the above, one may conclude that whether or not market transparency facilitates collusion ultimately depends on which of the aforementioned effects dominate.[71]

Transparency costs

The costs (administrative burden) related to a higher level of market transparency may be significant. Gathering and processing data is a time-consuming activity. Furthermore, new transparency standards often require organizational changes and modifications to existing IT systems.

Damage done to commercial position

In the process of defining transparency prerequisites, a balance must be struck between the advantages of a higher level of transparency for the market as a whole and protection of the commercial position of individual market participants.

By disclosing information, damage could be done to a market participant's commercial position. For example, certain information should remain confidential to allow firms to benefit from efforts to improve their competitive position and any in-house innovations that are not protected otherwise (MSC, 2001). Furthermore, the disclosure of operational data could harm a market participant's commercial position as well. For example, an electricity producer who suffers from an unplanned generation outage may be dependent on his competitors to restore its position. If these competitors are informed about the

[71] For example, Schultz (2001) shows that in a simple equilibrium with Nash punishment, the consumer side dominates, meaning that a higher level of transparency on both sides of the market destabilizes collusion.

producer's delicate position, they may exploit this situation (e.g. by asking an unreasonable tariff).

Whereas a higher level of market transparency may contribute to competition, information asymmetries between different countries may reduce this positive effect. International information discrepancies may cause unreasonable damage to certain market participants in relation to others. Therefore pursuing harmonization of the overall market transparency level in Europe is important to profit fully from a higher level of market transparency.

Effective harmonization is not restricted to disclosing the same information items. The challenge is to achieve consistency on all transparency variables. The next section discusses the various market transparency variables and places them in an orderly figure.

11.5 MARKET TRANSPARENCY VARIABLES

Given the advantages and risks discussed above, defining the optimal level of market transparency is a challenging task. The effect of a higher level of market transparency on competition is largely determined by the exact design of the transparency prerequisites as well as the way in which the prerequisites are implemented. Figure 53 provides an overview of the various existing transparency variables.

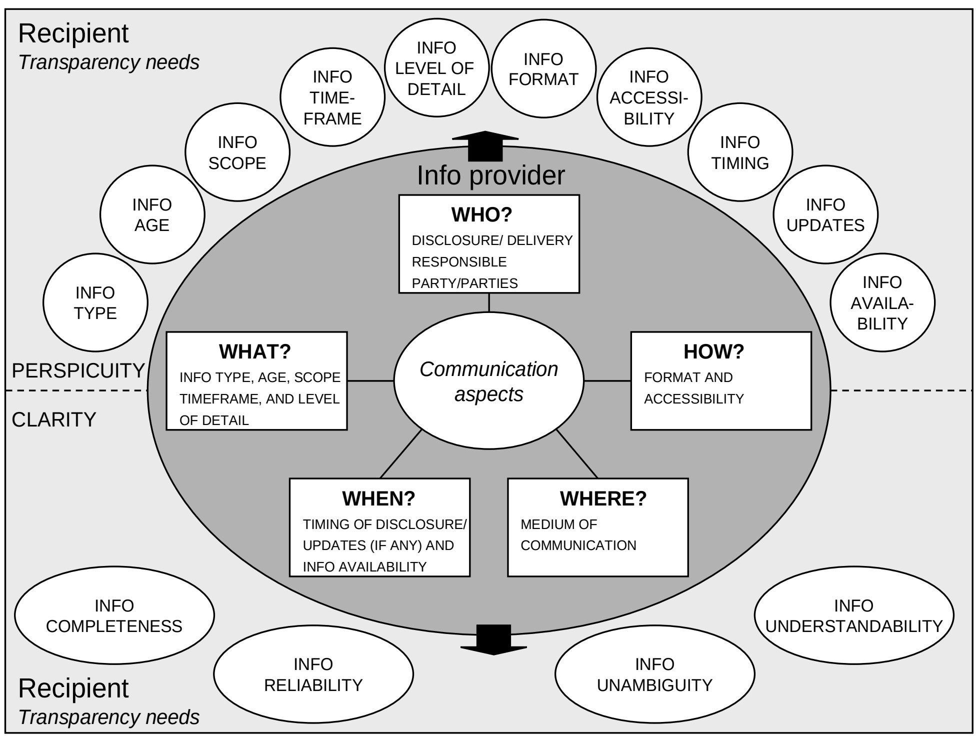


Figure 53: Market transparency variables

Transparency variables can be distinguished into variables related to open and adequate communication (perspicuity) and variables related to the easiness to understand (clarity).[72] Furthermore, a distinction can be made between transparency variables relevant for the information provider (communication aspects) and transparency variables relevant for the information recipient (transparency needs).

Transparency variables of perspicuity

Transparency variables with respect to open and adequate communication include:

- ***Who** delivers and discloses information?*
  - Delivery responsible party: who is responsible for delivering the information
  - Disclosure responsible party: who is responsible for disclosing the information
- ***What** information is disclosed?*
  - Information type: e.g. information on generation, load, balancing, etc
  - Information age: e.g. ex-ante, real-time, or ex-post information
  - Information scope: e.g. information on a national, regional, or European level
  - Timeframe of information: e.g. information per hour, per month, per year, etc
  - Level of detail (aggregation): e.g. information per unit or aggregated per market
- ***When** is the information disclosed?*
  - Timing of information disclosure: e.g. capacity prices and volumes are disclosed *one hour after the relevant capacity auction*
  - Timing of updates (if any): e.g. the update of information on installed generation capacity happens *every three months*
  - Information availability: e.g. hourly figures on actual generation must remain available for *at least two years after the relevant hour*
- ***Where** is the information disclosed?*
  - Medium of communication: e.g. the information is provided by means of a website, report, electronic data interchange, etc.
- ***How** is the information disclosed?*
  - Format: e.g. excel format or plain text, numbers or figures, Dutch or English, etc
  - Accessibility: e.g. with or without a password and/or fee

[72] The distinction between perspicuity and clarity is actually derived from the distinction between 'claritas' and 'perspicuitas' in reformed theology. 'Sola scriptura' — the assertion that the Bible as God's written word is (in itself) self-authenticating and clear to its reader — is based on the principle of the 'claritas' and 'perspicuitas' of God's word.

Transparency variables of clarity

Transparency variables related to the easiness to understand include:

- *The **completeness** of the information disclosed (is the information complete?)*
- *The **reliability** of the information disclosed (is the information correct?)*
- *The **unambiguity** of the information disclosed (are the definitions univocal?)*
- *The **understandability** of the information disclosed (is the information clear?)*

11.6 CONCLUSIONS

What are the aspects to consider in the process of increasing the level of market transparency in electricity wholesale markets?

Advantages

A higher level of market transparency contributes to effective competition. Market participants need information about the electricity wholesale market, the transmission network, the balancing market, and the regulatory framework in order to make well-considered business decisions. Furthermore, improved and equal access to relevant market information reduces the historically developed information asymmetries, encourages market entry, contributes to the efficiency of long-term investment decisions, and increases market confidence.

Risks

The positive effect of a higher level of market transparency on competition may be reduced by several factors. In the first place, in oligopolistic markets (like many electricity wholesale markets), market transparency with respect to specific data may facilitate tacit collusion. Secondly, the costs related to the implementation of a higher level of market transparency can be significant. Finally, by disclosing certain information, harm could be done to a market participant's commercial position. Moreover, discrepancies between the (legally required) transparency levels in different countries may cause unreasonable damage to certain market participants in relation to others.

Transparency variables

One may distinguish two categories of transparency variables: variables that are related to open and adequate communication (perspicuity) and variables related to the easiness to understand (clarity). Given the advantages and risks related to a higher level of market transparency, defining the optimal level of market transparency is a challenging task. Careful consideration of all transparency variables (see Figure 53) is a necessity to approach this optimum as closely as possible.

What are the characteristics and regulatory needs typical of the issue of market transparency and relevant for the process of regulatory mode decision-making?

Based on the preceding sections, the following *characteristics* typical of the issue of market transparency can be identified:

- Strong private interests: from a market participant's perspective, the issue of market transparency is important in two ways. On the one hand, improved and equal access to information facilitates informed business decisions. On the other hand, market transparency may bring additional costs and/or damage to a market participant's commercial position.
- Strong political interests on EU (national) level: public authorities consider a sufficient level of market transparency essential for the development of efficient wholesale markets (DG Competition, 2007). Market transparency would contribute to a level playing field (equal access to information), to efficient market operation (informed business decisions), and market confidence. In view of market integration, the availability of information about the transmission network is considered especially important (DG Competition, 2007).
- Public dependency on cooperation of nongovernmental bodies: in order to implement a higher level of market transparency, one is highly dependent on the cooperation of market participants to deliver the data required. Furthermore, the disclosure of information is often organized and executed by a nongovernmental body.
- Public dependency on knowledge of nongovernmental bodies: in order to figure out which information should be made available in what form, public authorities need input from the market itself. Furthermore, public authorities would want to receive some views on the feasibility of the desired transparency level (e.g. expected cost of implementation, implementation time, most adequate data source(s), etc).
- Many different actors involved in the issue: practically all electricity wholesale market participants (including TSOs) are involved in and affected by the issue of market transparency.
- Many different actors involved in the regulatory implementation phase: since market transparency covers all parts of the market, many different actors are involved in the implementation of new transparency prerequisites.

One may identify the following *regulatory needs* typical of the issue of market transparency:

- Need for regional (short-term)/EU-wide harmonization (long-term): pursuing overall harmonization of the European transparency level is important to fully profit from a higher level of market transparency. Harmonization prevents the situation in which some market participants are able to profit unfairly at the expense of other market participants. Effective harmonization is not restricted to disclosing the same information items. The challenge is to achieve consistency on all transparency variables as presented in section 11.5.

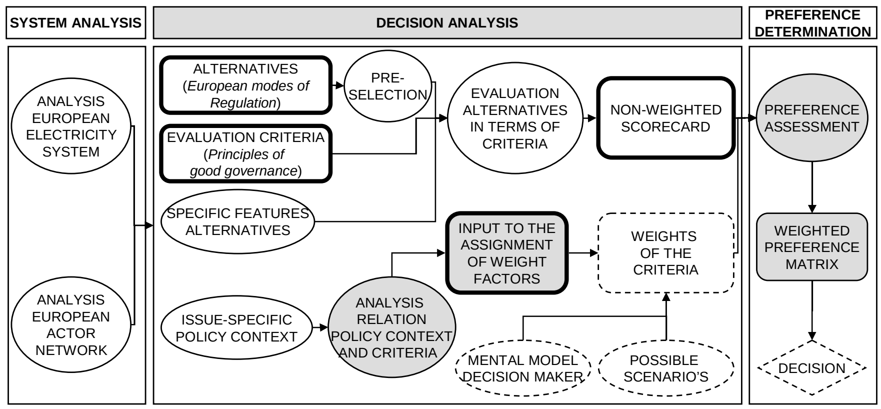
- Need for national/regional regulatory discretion: considering the need for harmonization, the level of discretion should be limited as much as possible. However, as long as the market situation (e.g. market structure) of the different national or regional markets differs, the optimal transparency level may differ as well and ask for some level of discretion. Depending on further market developments, this level of discretion could gradually be reduced.

- Need for legally binding rules: currently, the level of market transparency varies widely between the different national markets in Europe and is generally considered insufficient (DG Competition, 2007; CWE REM, 2007). Although voluntary transparency initiatives may stimulate the cooperation of market participants, such initiatives often lead to incomplete and unreliable information since not all relevant parties participate in the initiative and no (regulatory) pressure to safeguard data quality exists[73]. Therefore, in order to increase and harmonize the level of market transparency, the use of legally binding rules seems inevitable.
- Need for solution flexibility: given the large amount of variables to consider (cf. Figure 53), the process of defining and implementing concrete market transparency prerequisites will most likely turn out to be a lengthy learning process. Therefore, at least during this learning process, it should be possible to change certain transparency variables in the short term. Evidently, such a need for flexibility is at odds with the need for EU-wide harmonization. An important regulatory task, therefore, is to find a proper balance between the two.

[73] For example, in 2007, the APX ceased its voluntary initiative concerning generation data due to the poor quality and incompleteness of the data (APX, 2007).

CHAPTER 12

A STRUCTURED APPROACH TO REGULATORY MODE DECISION-MAKING



12.1 INTRODUCTION

This chapter builds on the case study results. The next section examines whether any trends can be observed concerning the way in which the rules and regulations with respect to the European process of electricity market integration have been established thus far. After this, section 12.3 analyses the relation between the characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making (policy context) — as identified in chapter 9, 10, and 11 — and the regulatory mode evaluation criteria (the principles of good governance). The aim of this analysis is to develop a method by which the weights of these evaluation criteria can be determined in a more structured and informed way. Section 12.4 discusses the final regulatory mode preference assessment. The chapter concludes by performing a verification and validation of the regulatory mode decision-making approach developed in section 12.3 and 12.4.

12.2 REGULATORY TRENDS OF THE LAST DECADE

This section goes back to this study's problem definition and examines whether any trends can be observed concerning the way in which the rules and regulations with respect to European process of electricity market integration have been established thus far.

Issue-specific regulatory dynamics

Table 12 summarizes the issue-specific regulatory developments concerning interconnector investment, congestion management, and market transparency as identified in the sections 9.3, 10.3, and 11.3, respectively.

Table 12: Overview issue-specific regulatory developments

Regulatory phases	Interconnector investment		Congestion management		Market transparency	
Phase 1 (1996) Adoption first European liberalization Directive	-Joint Decision / New instruments *(framework regulations)*	**1**	-Joint Decision / New instruments *(framework regulations)*	**1**	-Joint Decision	**1**
Phase 2 (1997-2000) First phase Florence Forum	-Open Method of Coordination	**2**	-Open Method of Coordination -(Self-regulation) *(voluntary)*	$\mathbf{2_1}$ $\mathbf{2_2}$	-Open Method of Coordination (limited)	**2**
Phase 3 (2001-2003) Towards a second European legislative package	-Open Method of Coordination -Joint Decision -New Instruments *(incentive regulations)*	$\mathbf{3_1}$ $\mathbf{3_2}$ $\mathbf{3_3}$	-Joint Decision	**3**	-Open Method of Coordination (limited) -Joint Decision (limited)	$\mathbf{3_1}$ $\mathbf{3_2}$
Phase 4 (2004-2006) Adoption regional approach	-Joint Decision	**4**	-Open Method of Coordination -Comitology	$\mathbf{4_1}$ $\mathbf{4_2}$	-Open Method of Coordination -Self-regulation *(voluntary)* -Comitology	$\mathbf{4_1}$ $\mathbf{4_2}$ $\mathbf{4_3}$
Phase 5 (from 2007) Towards a third European legislative package	-Self-regulation (delegated) -Regulatory Agency -(Comitology)	$\mathbf{5_1}$ $\mathbf{5_2}$ $\mathbf{5_3}$	-Open Method of Coordination -Regulatory Agency	$\mathbf{5_1}$ $\mathbf{5_2}$	-Open Method of Coordination -Comitology	$\mathbf{5_1}$ $\mathbf{5_2}$

The numbers in Table 12 correspond with the different modes of regulation that have been used with respect to each market integration issue and reflect the chronology of application. Based on Table 12, Figure 54 and Figure 55 visualize the issue-specific regulatory dynamics within the four two-dimensional frames of features distinguishing the different European modes of regulation (see section 7.5).

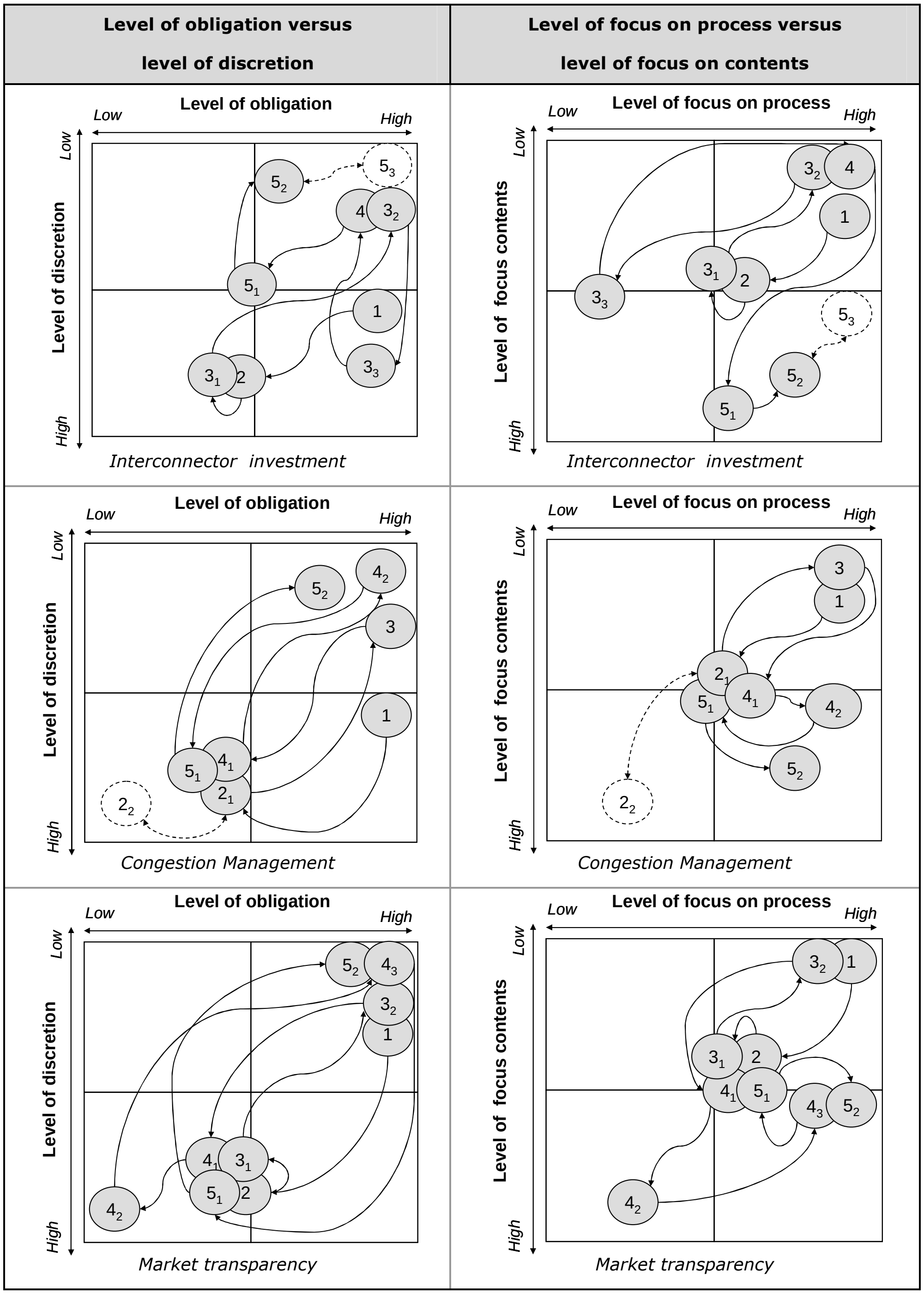


Figure 54: Issue-specific regulatory dynamics (1)

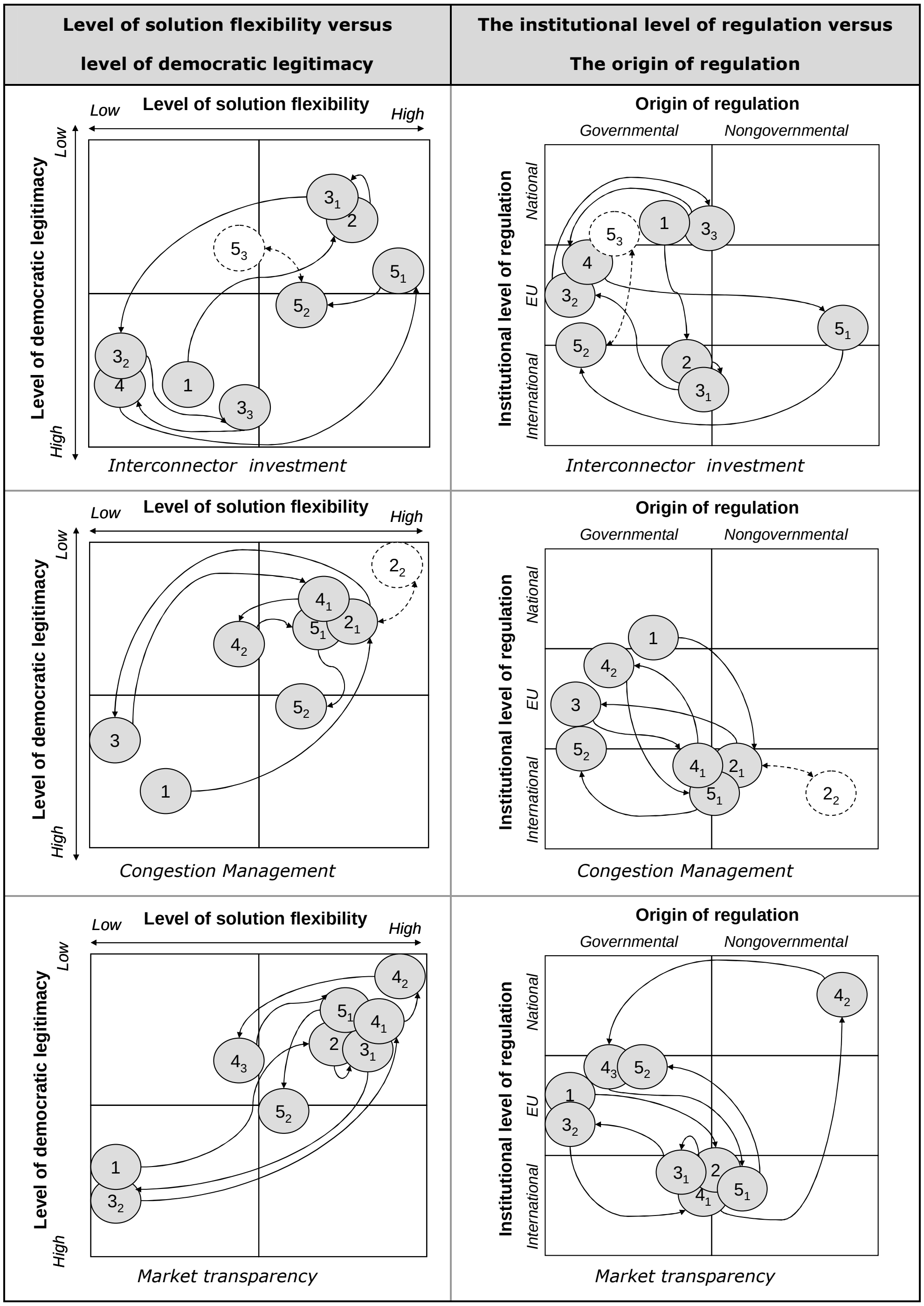


Figure 55: Issue-specific regulatory dynamics (2)

Analysis regulatory trends

Level of obligation versus level of discretion

Figure 54 reveals a circular but steady movement towards a more detailed (low level of discretion) and binding (high level of obligation) regulatory framework on an EU level. During this process, regulatory modes characterized by a high level of obligation and a low level of discretion (such as Joint Decision and Comitology) continuously alternate with regulatory modes characterized by a low level of obligation and a high level of discretion (such as voluntary Self-regulation or OMC).

For the issue of interconnector investment, this general trend is less apparent than for the other two issues. This observation may be explained based on the issues' specific characteristics and regulatory needs. Since the issue of congestion management is characterized by a high level of technical and economic complexity and a diverging status quo in the member states, the EU has not been able to define effective rules without regular periods of bottom-up learning and open discussions. The definition of transparency prerequisites is an iterative learning process as well. With the help of market participants, a proper balance should be struck between market transparency and the protection of commercial interests. The issue of interconnector investment has always been more tangible for EU-level policy makers. Based on expert input, the EU has been able to define regulatory instruments on a rather autonomous basis.

Level of focus on process versus level of focus on contents

Figure 54 shows a gradual shift towards more 'content-oriented' modes of regulation. Since market integration issues on the European political agenda are becoming more specific, complex, and unpredictable — a development, which is made even more prominent due to the ongoing EU enlargement — this trend can be rather easily explained.

Level of solution flexibility versus the level of democratic legitimacy

Based on Figure 55, one may notice that in the course of time less extreme swings occur between regulatory modes with a low level of democratic legitimacy but a high level of solution flexibility and regulatory modes with a high level of democratic legitimacy but a low level of solution flexibility. There seems to be a general tendency towards modes of regulation that provide a reasonable level of solution flexibility while maintaining at least a minimum level of democratic legitimacy.

This general trend is less apparent for the issue of interconnector investment. The reason for this may be that, in contrast to the other two issues, the issue of interconnector investment does not need much solution flexibility and involves only a small number of different actors.

Institutional level of regulation versus origin of regulation

Figure 55 reveals a general trend of governmental oriented modes of regulation applied at an EU level (with some national influences) alternating with more nongovernmental modes of regulation applied on an international level. Given the specific features of the modes of regulation involved (see section 7.5), this observation fits the findings with respect to the level of obligation versus the level of discretion.

A noticeable regulatory development concerns the period of nongovernmental self-regulation on a national level with respect to the issue of market transparency (see Figure 55, number 4_2). Figure 55 shows that this conspicuous mode of regulation is rather quickly pulled back into the general trend of more governmental and international (EU level) oriented modes of regulation. Given the importance of information completeness and a harmonized level of market transparency, this development seems explicable.

Conclusions on regulatory trends

The analysis of the issue-specific regulatory dynamics in the European process of electricity market integration shows that there is a continuous search for the appropriate mode of regulation to apply. Furthermore, although this search is mostly trial-and-error based, the issue-specific characteristics and regulatory needs seem to have influenced — although rather implicitly — the regulatory course as well.

Even though different regulatory strategies have been applied for each individual market integration issue at hand, some general regulatory trends can be observed:

- *Level of obligation vs. level of discretion* — a tendency towards more detailed (low level of discretion) and binding (high level of obligation) regulatory framework on an EU level; during this process, regulatory modes characterized by a high level of obligation and a low level of discretion continuously alternate with regulatory modes characterized by a low level of obligation and a high level of discretion
- *Level of focus on process vs. level of focus on contents* — a gradual shift towards more 'content-oriented' modes of regulation
- *Level of solution flexibility vs. level of democratic legitimacy* — a tendency towards modes of regulation that provide a reasonable level of solution flexibility while maintaining at least a minimum level of democratic legitimacy
- *Institutional level of regulation vs. origin of regulation* — a trend of governmental oriented modes of regulation applied at an EU level (with some national influences) alternating with more nongovernmental modes of regulation applied on an international level

12.3 FROM ISSUE-SPECIFIC POLICY CONTEXT TO WEIGHT FACTORS

By means of a case study, the previous chapters provided an inventory of characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making. This section presents a method for describing a market integration issue at hand into its issue-specific characteristics and regulatory needs and, subsequently, connecting these characteristics and regulatory needs to the various principles of good governance (the regulatory mode evaluation criteria). By making the connection between the relevant issue-specific characteristics/regulatory needs and the regulatory mode evaluation criteria explicit, the decision maker is automatically stimulated to determine the weight factors of the regulatory mode evaluation criteria in a more structured and informed way.

Regulatory mode evaluation criteria

Chapter 6 identified the general principles of good governance, which form the regulatory mode evaluation criteria. Figure 56 provides an overview of these evaluation criteria.

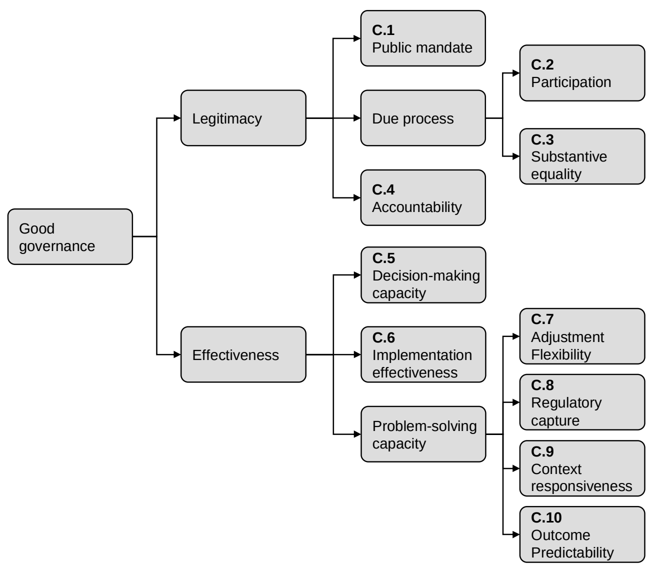


Figure 56: Regulatory mode evaluation criteria

Regulatory mode evaluation criteria

Based on the case study results, Table 13 provides a general inventory of the different characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making.[74]

[74] The inventory might not be completely comprehensive but it does provide a good starting point (basic checklist) for the decision maker to translate the nature of the (market integration) issue at hand into such characteristics and regulatory needs before assigning weights to the regulatory mode evaluation criteria (the principles of good governance).

Table 13: Inventory issue-specific characteristics and regulatory needs

Issue-specific characteristics (ISC) and regulatory needs (ISRN)		
ISC	Extent to which public interests are involved in the issue	*ISC 1*
	Extent to which private interests are involved in the issue	*ISC 2*
	Extent to which EU-level political interests are involved in the issue	*ISC 3*
	Extent to which the issue is technically or economically complex	*ISC4*
	Extent to which the issue is characterized by governmental international interdependence	*ISC 5*
	Extent to which the issue is characterized by nongovernmental international interdependence	*ISC 6*
	Extent to which the European regulatory process depends on the cooperation of many (same and/or different kinds of) nongovernmental bodies	*ISC 7*
	Extent to which the European regulatory process depends on the cooperation of a limited number of (same and/or different kinds of) nongovernmental bodies	*ISC 8*
	Extent to which the European regulatory process depends on the knowledge of multiple (different kinds of) nongovernmental bodies	*ISC 9*
	Extent to which the European regulatory process depends on the knowledge of a limited number of (one or two kinds of) nongovernmental bodies	*ISC 10*
	Extent to which the European regulatory process depends on country-specific knowledge	*ISC 11*
	Extent to which different kinds of nongovernmental bodes are affected by the issue	*ISC 12*
	Extent to which the involved countries have different/diverging starting points with respect to the issue	*ISC 13*
	Extent to which a risk of lock-in effects exist (damaging the public, private and/or political interests)	*ISC 14*
ISRN	Need for international cooperation/coordination	*ISRN 1*
	Need for international harmonization	*ISRN 2*
	Need for a supranational intervention option	*ISRN 3*
	Need for regulatory discretion	*ISRN 4*
	Need for legally binding rules	*ISRN 5*
	Need for solution flexibility	*ISRN 6*
	Need for regulatory certainty	*ISRN 7*
	Need for prompt regulatory action	*ISRN 8*

The last-mentioned regulatory need (ISRN 8), *the need for prompt regulatory action*, is not identified on the basis of the case study but added by the author in view of market integration issues with a more urgent character (e.g. balancing problems, power black-outs, etc).

Relative importance of issue-specific characteristics and regulatory needs

In order to make informed decisions on which regulatory mode to apply, the decision maker should first translate the nature of the (market integration) issue at hand in terms of the issue-specific characteristics and regulatory needs listed in Table 13. In other words, the decision maker should examine which characteristics and regulatory needs apply to the particular issue at hand and determine their relative importance.

In order to express the relative importance of the relevant issue-specific characteristics and regulatory needs into numeric values, the decision maker may use the formula given by Rietveld and Ouwersloot (1992) (see Annex 2).[75] This means that the relative numeric importance (RI_i) of the relevant issue-specific characteristics and regulatory needs can be derived by way of their individual 'importance intensities' (K_i)[76] according to the following formula ('r' represents the rank of importance of each characteristic/regulatory need):

$$\mathrm{RI}_i = \frac{\mathrm{K}_i}{\sum_{j=1}^{m} \mathrm{K}_j}, \textit{where } \mathrm{K}_i = \sum_{r=i}^{m} \frac{1}{r} \text{ and } \sum_{i=1}^{m} \mathrm{RI}_i = 1$$

However, the number of paired assessments needed to determine the preference order of the various issue-specific characteristics and regulatory needs (21 aspects[77]) puts up a significant barrier to use this method. Alternatively, the relative importance figures may be determined by asking the decision maker which of the various characteristics and regulatory needs he considers relevant in view of the issue at stake. Subsequently, the decision maker could indicate how important (e.g. on a scale of 1 to 5) he considers each relevant characteristic/regulatory need. This methods leads to the following formula:

$$\mathrm{RI}_i = \frac{\mathrm{K}_i}{\sum_{j=1}^{m} \mathrm{K}_j}, \textit{where } \mathrm{K}_i = \in \{0,1,2,3,4,5\} \textit{ and } \sum_{i=1}^{m} \mathrm{RI}_i = 1$$

<u>*Example*</u>:

A decision maker identifies 10 relevant issue-specific characteristics/regulatory needs, e.g. ISC 1, 3, 4, 6, 7, 8 and ISRN 1, 3, 4. In addition, the decision maker considers ISC 1, ISC

---

[75] One could also choose to distribute a fix value, for example 100, among all relevant issue-specific characteristics and regulatory needs.

[76] Cf. Rietveld and Ouwersloot's preference intensities.

[77] Maximum number of paired assessments is $(m^2-m)/2$. When m = 21, this then gives a maximum number of 210 assessments).

3, and ISRN 3 of *very high* importance (5 points), ISC 7 of *high* importance (4 points), ISRN 4 of *medium* importance (3 points), ISC 6 and ISRN 1 of *low* importance (2 points), and ISC 4 and ISC 8 of *very low* importance (1 point). This would then lead to the following relative importance figures: $RI_{ISC1} = RI_{ISC3} = RI_{ISRN3} = 5/28$, $RI_{ISC7}=1/7$, $RI_{ISRN4}=3/28$, $RI_{ISC6}=RI_{ISRN1}=1/14$, $RI_{ISC4}=RI_{ISC8}=1/28$.

Relation between the issue-specific characteristics/regulatory needs and the regulatory mode evaluation criteria

After the numeric importance figures of the relevant issue-specific characteristics and regulatory needs have been determined, the relevant issue-specific characteristics and regulatory needs should be translated in terms of the general principles of good governance (the regulatory mode evaluation criteria). In other words, one should define 'profiles' explicating the relation between the relevant issue-specific characteristics/regulatory needs and the general principles of good governance (the regulatory mode evaluation criteria). In this respect, a profile should reflect how important each principle of good governance is for that particular issue-specific characteristic or regulatory need. One way to define such profiles is to distribute a fix value, e.g. 100, among the various principles of good governance (see Figure 56) for each relevant issue-specific characteristic and regulatory need. Table 14, below, provides profiles for all issue-specific characteristics and regulatory needs that have been identified in the case study (see Table 13).[78] Annex 7 comments on the profiles provided by Table 14.

Determination of the evaluation criteria's weights

Based on the relative numeric importance figures of the relevant issue-specific characteristics/regulatory needs and the 'profiles' describing the relation between the relevant issue-specific characteristics/regulatory needs and the general principles of good governance', the weights of the regulatory mode evaluation criteria (the general principles of good governance) can be determined. First, the numeric importance figures of each relevant issue-specific characteristic/regulatory need are distributed among the various evaluation criteria according to the 'profiles' defined. Then, the weight factors of the evaluation criteria (w_i) are computed by adding up the distributed values for each criterion. To illustrate this approach, Annex 8 shows the resulting weights with respect to the example discussed on page 207).

[78] Table 14 reflects the author's view on the relation between the issue-specific characteristics/regulatory needs and the regulatory mode evaluation criteria (principles of good governance). A decision maker may wish — and is free — to change the profiles provided by Table 14.

Table 14: Relation issue-specific features and evaluation criteria

		Regulatory mode evaluation criteria										
		C.1	**C.2**	**C.3**	**C.4**	**C.5**	**C.6**	**C.7**	**C.8**	**C.9**	**C.10**	
Issue-specific Characteristics	**ISC 1**	60			40							*100*
	ISC 2		15	35	35						15	*100*
	ISC 3	20			10	35	35					*100*
	ISC 4		30					25	20	25		*100*
	ISC 5			40		30	30					*100*
	ISC 6		20	30		25	25					*100*
	ISC 7		50				30			20		*100*
	ISC 8		20				30			50		*100*
	ISC 9		60						30	10		*100*
	ISC 10		40						50	10		*100*
	ISC 11		60							40		*100*
	ISC 12	35	35		30							*100*
	ISC 13							40		60		*100*
	ISC 14	15				35	35	15				*100*
Issue-specific Regulatory needs	**ISRN 1**			20		20	20	20		20		*100*
	ISRN 2			70			30					*100*
	ISRN 3				30	40	30					*100*
	ISRN 4									100		*100*
	ISRN 5						100					*100*
	ISRN 6							100				*100*
	ISRN 7						30				70	*100*
	ISRN 8					70	30					*100*

12.4 FINAL PREFERENCE DETERMINATION

For the final preference determination (ranking of the regulatory mode alternatives), the PROMETHEE[79] method can be used (Brans and Vincke, 1985). In this method (see also Annex 3) two m×n[80] matrices are established, namely a weighted N^{+}(m×n) matrix *(dominance matrix)* and a weighted N^{-}(m×n) matrix *(inferiority matrix)*.[81] The overall

[79] PROMETHEE means Preference Ranking Organization Method for Enrichment Evaluations.
[80] '*m*' refers to the amount of evaluation criteria, '*n*' refers to the amount of alternatives.
[81] As discussed in section 3.4.2, a descriptive preference assessment aims not only at preference ranking but also at a dis-preference ranking.

weighted dominance measure n_j^+ of alternative a_j, and its overall weighted inferiority measure n_j^- are defined as follows:

$$n_j^+ = \sum_{i=1}^{m} n_{ij}^+, \text{ where } n_{ij}^+ = \frac{1}{n-1}\sum_{k=1}^{n} w_i k_{jk|i}$$

$$n_j^- = \sum_{i=1}^{m} n_{ij}^-, \text{ where } n_{ij}^- = \frac{1}{n-1}\sum_{k=1}^{n} w_i k_{kj|i}, \textit{ where } n_j = n_j^+ - n_j^-$$

The dominance and inferiority measures are divided by n-1 because each alternative is facing n-1 alternatives. Each alternative has an overall preference measure associated with it (n_j^+, n_j^-), which can be transferred into a one-dimensional preference measure as follows: $n_j = n_j^+ - n_j^-$ (Beroggi, 1999, p.94-95). The higher n_j, the more the alternative is preferred (see numeric example in Annex 3).

In order to establish the two matrices, one needs: (i) a non-weighted scorecard in which the alternatives are evaluated in terms of the evaluation criteria, (ii) the relative weights of the evaluation criteria, and (iii) the non-weighted preference function (see Annex 3).

Section 7.6 provided the non-weighted scorecard of the prominent European modes of regulation (alternatives) in terms of the general principles of good governance (evaluation criteria). Given this (qualitative) scorecard, a paired assessment of the alternatives with respect to all criteria (see Figure 56) according to the following preference function: *Δ (e_{ij} , e_{ik}) is 1 if $e_{ij} \succ e_{ik}$, zero if $e_{ik} \succ e_{ij}$, and zero if $e_{ij} \sim e_{ik}$* (see Annex 3, *preference function type A*), leads to the following dominance (Table 15) and inferiority matrix[82] (Table 16):

Table 15: Dominance matrix European modes of regulation

	JD	**NI**	**S**	**C**	**OMC**	**RA**
C.1	W_{c1}*4/5	W_{c1}*5/5	W_{c1}*0/5	W_{c1}*2/5	W_{c1}*3/5	W_{c1}*0/5
C.2	W_{c2}*2/5	W_{c2}*5/5	W_{c2}*2/5	W_{c2}*1/5	W_{c2}*2/5	W_{c2}*0/5
C.3	W_{c3}*4/5	W_{c3}*0/5	W_{c3}*1/5	W_{c3}*4/5	W_{c3}*1/5	W_{c3}*3/5
C.4	W_{c4}*2/5	W_{c4}*5/5	W_{c4}*0/5	W_{c4}*2/5	W_{c4}*0/5	W_{c4}*2/5
C.5	W_{c5}*0/5	W_{c5}*1/5	W_{c5}*5/5	W_{c5}*3/5	W_{c5}*3/5	W_{c5}*1/5
C.6	W_{c6}*3/5	W_{c5}*2/5	W_{c5}*0/5	W_{c5}*3/5	W_{c5}*0/5	W_{c5}*3/5
C.7	W_{c7}*0/5	W_{c7}*1/5	W_{c7}*4/5	W_{c7}*2/5	W_{c7}*4/5	W_{c7}*3/5
C.8	W_{c8}*0/5	W_{c8}*4/5	W_{c8}*1/5	W_{c8}*1/5	W_{c8}*5/5	W_{c8}*1/5
C.9	W_{c9}*0/5	W_{c9}*2/5	W_{c9}*4/5	W_{c9}*1/5	W_{c9}*4/5	W_{c9}*2/5
C.10	W_{c10}*5/5	W_{c10}*1/5	W_{c10}*1/5	W_{c10}*4/5	W_{c10}*0/5	W_{c10}*1/5
n_j^+	**n^+_{JD}**	**n^+_{NI}**	**n^+_{S}**	**n^+_{C}**	**n^+_{OMC}**	**n^+_{RA}**

[82] The underlying paired assessment is given in Annex 9.

Table 16: Inferiority matrix European modes of regulation

	JD	NI	S	C	OMC	RA
C.1	W_{c1}*1/5	W_{c1}*0/5	W_{c1}*4/5	W_{c1}*3/5	W_{c1}*2/5	W_{c1}*4/5
C.2	W_{c2}*1/5	W_{c2}*0/5	W_{c2}*1/5	W_{c2}*4/5	W_{c2}*1/5	W_{c2}*5/5
C.3	W_{c3}*0/5	W_{c3}*5/5	W_{c3}*3/5	W_{c3}*0/5	W_{c3}*3/5	W_{c3}*2/5
C.4	W_{c4}*1/5	W_{c4}*0/5	W_{c4}*4/5	W_{c4}*1/5	W_{c4}*4/5	W_{c4}*1/5
C.5	W_{c5}*5/5	W_{c5}*3/5	W_{c5}*0/5	W_{c5}*1/5	W_{c5}*1/5	W_{c5}*3/5
C.6	W_{c6}*0/5	W_{c5}*3/5	W_{c5}*4/5	W_{c5}*0/5	W_{c5}*4/5	W_{c5}*0/5
C.7	W_{c7}*5/5	W_{c7}*4/5	W_{c7}*0/5	W_{c7}*3/5	W_{c7}*0/5	W_{c7}*2/5
C.8	W_{c8}*5/5	W_{c8}*1/5	W_{c8}*2/5	W_{c8}*2/5	W_{c8}*0/5	W_{c8}*2/5
C.9	W_{c9}*5/5	W_{c9}*2/5	W_{c9}*0/5	W_{c9}*4/5	W_{c9}*0/5	W_{c9}*2/5
C.10	W_{c10}*0/5	W_{c10}*2/5	W_{c10}*2/5	W_{c10}*1/5	W_{c10}*5/5	W_{c10}*2/5
$\mathbf{n_j^-}$	$\mathbf{n^-_{JD}}$	$\mathbf{n^-_{NI}}$	$\mathbf{n^-_{S}}$	$\mathbf{n^-_{C}}$	$\mathbf{n^-_{OMC}}$	$\mathbf{n^-_{RA}}$
$\mathbf{n_j}$	$\mathbf{n^+_{JD} - n^-_{JD}}$	$\mathbf{n^+_{NI} - n^-_{NI}}$	$\mathbf{n^+_{S} - n^-_{S}}$	$\mathbf{n^+_{C} - n^-_{C}}$	$\mathbf{n^+_{OMC} - n^-_{OMC}}$	$\mathbf{n^+_{RA} - n^-_{RA}}$

By adding the relative weights (w_i) of the evaluation criteria (see section 12.3) in this dominance and inferiority matrix, the final preference order of the alternatives can be derived.

12.5 STARMODE APPROACH: REVIEW AND TESTING

Section 2.4.2 already discussed the need for verification and validation of a decision problem's 'resolution model'. This section therefore performs a verification and validation of the structured resolution approach to regulatory mode decision-making (STARMODE) developed in section 12.3 and 12.4.

12.5.1 Verification

***Does the resolution approach lead to the envisioned type of solution*?**

To facilitate the practical application of the STARMODE approach, a decision support tool has been built in Microsoft Excel. In this tool, the general inventory of the fourteen characteristics and eight regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making (see Table 13) are translated into twenty-two explicit questions. By means of these twenty-two questions, the decision maker is able to indicate which issue-specific characteristics and/or regulatory needs he considers relevant (applicable) with respect to the issue at hand. Furthermore, the decision maker can specify (i) to what extent he considers the relevant issue-specific characteristics applicable to the issue at hand, and (ii) how important he judges the relevant regulatory needs; both on a scale of 1 to 5 (see screenshot questionnaire in Figure 57).

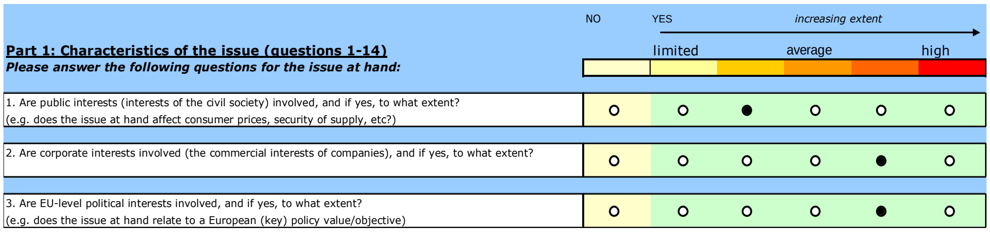


Figure 57: Screenshot questionnaire of STARMODE decision support tool

Based on the input of the decision maker, the STARMODE decision support tool automatically computes the final preference order of the regulatory mode alternatives by performing the different steps described in section 12.3 and 12.4.

To answer the verification question defined above, the author has applied the STARMODE approach to six different market integration issues related to the three cases of the case study. Table 17 presents these six issues.

Table 17: Six electricity market integration issues

Case	Issue
Interconnector investment	1. The stimulation of new interconnector investment
	2. The definition of the regulatory regime applicable to a new interconnector
Congestion management	3. The development of an advanced regional congestion management method
	4. The implementation of an advanced regional method of congestion management
Market transparency	5. The definition (in detail) of a new set of transparency requirements
	6. The broad implementation of a new set of defined transparency requirements

For each issue, the following results are given below:

- The relative importance figures of the relevant issue-specific characteristics and regulatory needs,
- The weights of the evaluation criteria (the general principles of good governance), and
- The final preference order of the regulatory mode alternatives.

In addition, Annex 10 provides for each issue (i) the corresponding questionnaire (input of the decision maker[83]), (ii) the computations underlying the weights of the evaluation criteria, and (iii) the relevant dominance and inferiority matrix.

[83] In this case, the author.

Issue 1: Stimulation interconnector investment

Based on the corresponding questionnaire filled in by the author (see Annex 10), Table 18 presents the resulting relative importance figures and weights.

Table 18: Relative importance figures and weights with respect to issue 1

	Relative Importance figures
RI_ISC1	0,081967213
RI_ISC2	0,081967213
RI_ISC3	0,081967213
RI_ISC4	0,049180328
RI_ISC5	0,081967213
RI_ISC6	0,081967213
RI_ISC7	0
RI_ISC8	0,081967213
RI_ISC9	0
RI_ISC10	0,049180328
RI_ISC11	0,06557377
RI_ISC12	0,049180328
RI_ISC13	0
RI_ISC14	0,081967213
RI_ISRN1	0,06557377
RI_ISRN2	0
RI_ISRN3	0
RI_ISRN4	0
RI_ISRN5	0,049180328
RI_ISRN6	0
RI_ISRN7	0,081967213
RI_ISRN8	0,016393443
Σ	1

Principle of good governance	Weight (w_i)
C1. Public mandate	0,10
C2. Participation	0,14
C3. Substantive equality	0,10
C4. Accountability	0,08
C5. Decision-making capacity	0,13
C6. Implementation effectiveness	0,22
C7. Adjustment flexibility	0,04
C8. Regulatory capture	0,03
C9. Context responsiveness	0,10
C.10 Outcome predictability	0,07
Σ	1,00

Figure 58 visualizes the corresponding regulatory mode preference order.

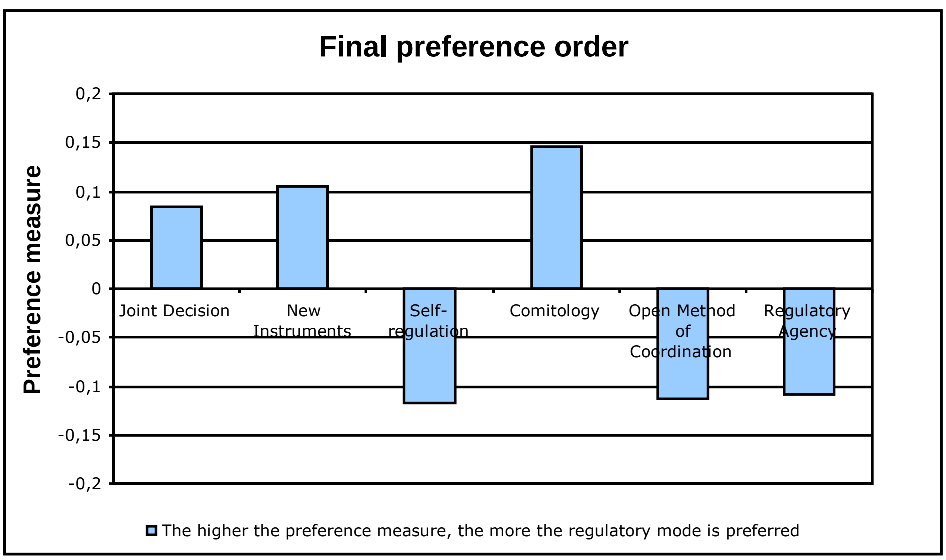


Figure 58: Simulation interconnector investment — final preference order

Issue 2: Definition regulatory regime new interconnector

Based on the corresponding questionnaire filled in by the author (see Annex 10), Table 19 presents the resulting relative importance figures and weights.

Table 19: Relative importance figures and weights with respect to issue 2

	Relative Importance figures
RI_ISC1	0,015625
RI_ISC2	0,078125
RI_ISC3	0,0625
RI_ISC4	0,015625
RI_ISC5	0,078125
RI_ISC6	0,078125
RI_ISC7	0
RI_ISC8	0,0625
RI_ISC9	0
RI_ISC10	0
RI_ISC11	0,03125
RI_ISC12	0,046875
RI_ISC13	0,046875
RI_ISC14	0,015625
RI_ISRN1	0,0625
RI_ISRN2	0,0625
RI_ISRN3	0,078125
RI_ISRN4	0,046875
RI_ISRN5	0,046875
RI_ISRN6	0,0625
RI_ISRN7	0,0625
RI_ISRN8	0,046875
Σ	1

Principle of good governance	Weight (w_i)
C1. Public mandate	0,04
C2. Participation	0,08
C3. Substantive equality	0,14
C4. Accountability	0,08
C5. Decision-making capacity	0,15
C6. Implementation effectiveness	0,22
C7. Adjustment flexibility	0,10
C8. Regulatory capture	0,00
C9. Context responsiveness	0,14
C.10	0,06
Σ	1,00

Figure 59 visualizes the corresponding regulatory mode preference order.

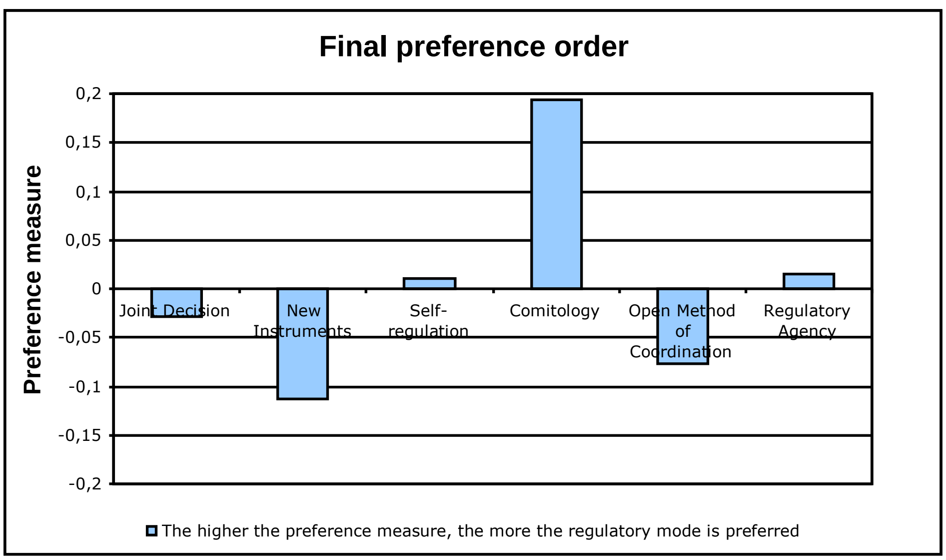


Figure 59: Regulatory regime new interconnector — final preference order

Issue 3: Development of an advanced regional congestion management mechanism

Based on the corresponding questionnaire filled in by the author (see Annex 10), Table 20 presents the resulting relative importance figures and weights.

Table 20: Relative importance figures and weights with respect to issue 3

	Relative Importance figures
RI_ISC1	0,028571429
RI_ISC2	0,057142857
RI_ISC3	0,057142857
RI_ISC4	0,071428571
RI_ISC5	0,071428571
RI_ISC6	0,071428571
RI_ISC7	0,042857143
RI_ISC8	0
RI_ISC9	0
RI_ISC10	0,071428571
RI_ISC11	0,057142857
RI_ISC12	0,071428571
RI_ISC13	0,057142857
RI_ISC14	0,042857143
RI_ISRN1	0,071428571
RI_ISRN2	0,028571429
RI_ISRN3	0
RI_ISRN4	0,057142857
RI_ISRN5	0,028571429
RI_ISRN6	0,071428571
RI_ISRN7	0,028571429
RI_ISRN8	0,014285714
Σ	1

Principle of good governance	Weight (w_i)
C1. Public mandate	0,06
C2. Participation	0,15
C3. Substantive equality	0,10
C4. Accountability	0,06
C5. Decision-making capacity	0,10
C6. Implementation effectiveness	0,15
C7. Adjustment flexibility	0,13
C8. Regulatory capture	0,05
C9. Context responsiveness	0,16
C.10 Outcome predictability	0,03
Σ	1,00

Figure 60 visualizes the corresponding regulatory mode preference order.

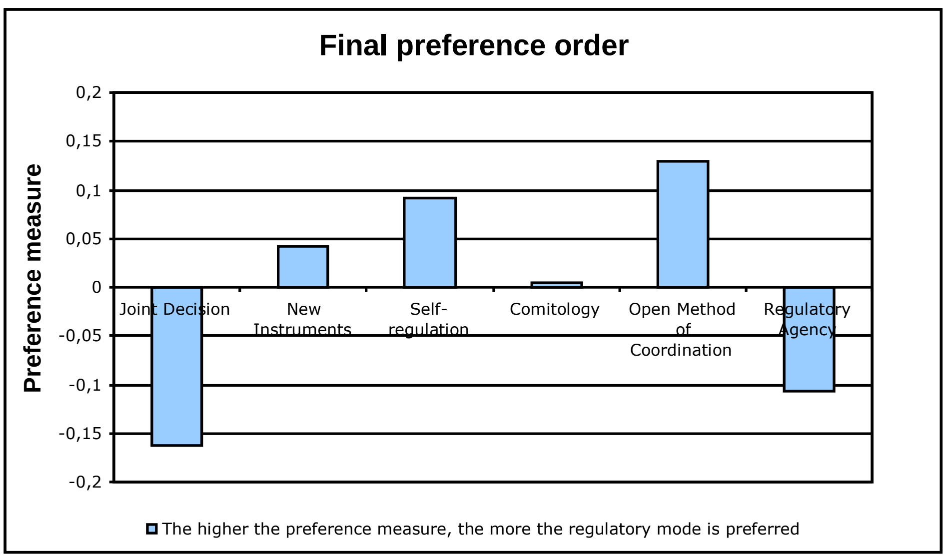


Figure 60: Development new CM mechanism — final preference order

Issue 4: Implementation of an advanced regional congestion management mechanism

Based on the corresponding questionnaire filled in by the author (see Annex 10), Table 21 presents the resulting relative importance figures and weights.

Table 21: Relative importance figures and weights with respect to issue 4

	Relative Importance figures
RI_ISC1	0,028169014
RI_ISC2	0,056338028
RI_ISC3	0,056338028
RI_ISC4	0,070422535
RI_ISC5	0,070422535
RI_ISC6	0,070422535
RI_ISC7	0,056338028
RI_ISC8	0
RI_ISC9	0
RI_ISC10	0,042253521
RI_ISC11	0,028169014
RI_ISC12	0,070422535
RI_ISC13	0,042253521
RI_ISC14	0,042253521
RI_ISRN1	0,042253521
RI_ISRN2	0,070422535
RI_ISRN3	0,042253521
RI_ISRN4	0,014084507
RI_ISRN5	0,056338028
RI_ISRN6	0,056338028
RI_ISRN7	0,042253521
RI_ISRN8	0,042253521
∑	1

Principle of good governance	Weight (w_i)
C1. Public mandate	0,06
C2. Participation	0,13
C3. Substantive equality	0,13
C4. Accountability	0,07
C5. Decision-making capacity	0,13
C6. Implementation effectiveness	0,21
C7. Adjustment flexibility	0,11
C8. Regulatory capture	0,04
C9. Context responsiveness	0,09
C.10 Outcome predictability	0,04
∑	1,00

Figure 61 visualizes the corresponding regulatory mode preference order.

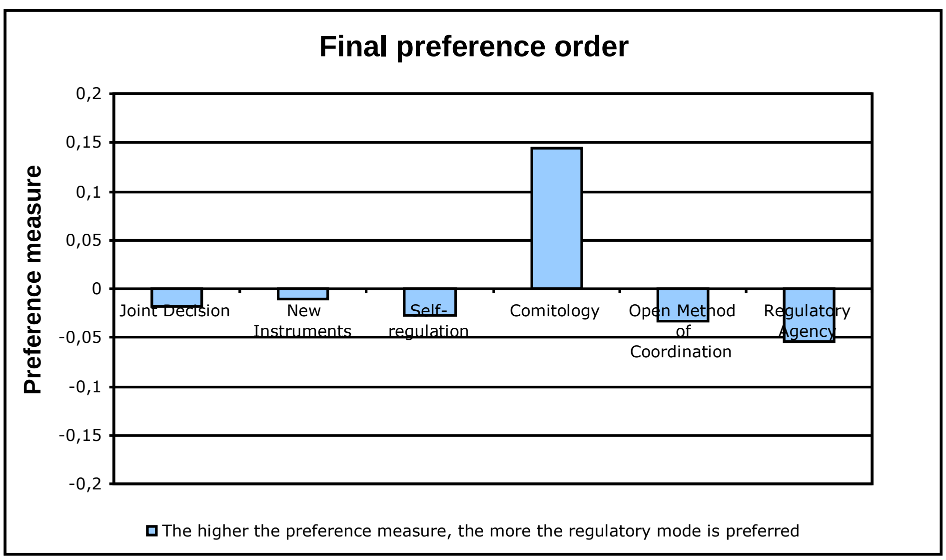


Figure 61: Implementation CM mechanism — final preference order

Issue 5: Definition of new market transparency requirements

Based on the corresponding questionnaire filled in by the author (see Annex 10), Table 22 presents the resulting relative importance figures and weights.

Table 22: Relative importance figures and weights with respect to issue 5

	Relative Importance figures
RI_ISC1	0,046875
RI_ISC2	0,078125
RI_ISC3	0,0625
RI_ISC4	0,015625
RI_ISC5	0,0625
RI_ISC6	0,046875
RI_ISC7	0,078125
RI_ISC8	0
RI_ISC9	0,0625
RI_ISC10	0
RI_ISC11	0,0625
RI_ISC12	0,078125
RI_ISC13	0,0625
RI_ISC14	0,046875
RI_ISRN1	0,078125
RI_ISRN2	0,03125
RI_ISRN3	0
RI_ISRN4	0,046875
RI_ISRN5	0,03125
RI_ISRN6	0,078125
RI_ISRN7	0,03125
RI_ISRN8	0
Σ	1

Principle of good governance	Weight (w_i)
C1. Public mandate	0,08
C2. Participation	0,17
C3. Substantive equality	0,10
C4. Accountability	0,08
C5. Decision-making capacity	0,08
C6. Implementation effectiveness	0,16
C7. Adjustment flexibility	0,13
C8. Regulatory capture	0,02
C9. Context responsiveness	0,15
C.10 Outcome predictability	0,03
Σ	1,00

Figure 62 visualizes the corresponding regulatory mode preference order.

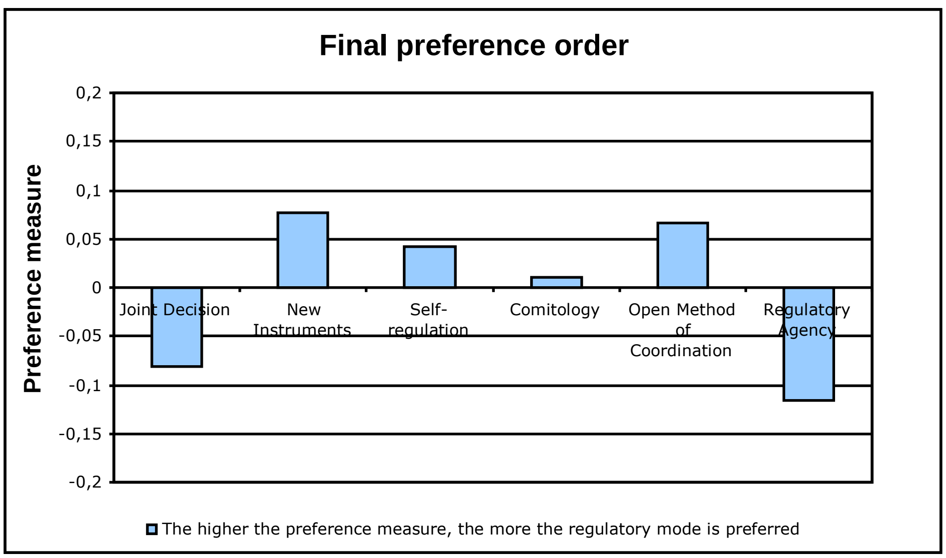


Figure 62: Definition new transparency requirements — final preference order

Issue 6: Implementation of new market transparency requirements

Based on the corresponding questionnaire filled in by the author (see Annex 10), Table 23 presents the resulting relative importance figures and weights.

Table 23: Relative importance figures and weights with respect to issue 6

	Relative Importance figures
RI_ISC1	0,051724138
RI_ISC2	0,086206897
RI_ISC3	0,068965517
RI_ISC4	0,017241379
RI_ISC5	0,034482759
RI_ISC6	0,051724138
RI_ISC7	0,086206897
RI_ISC8	0
RI_ISC9	0,034482759
RI_ISC10	0
RI_ISC11	0,017241379
RI_ISC12	0,086206897
RI_ISC13	0,051724138
RI_ISC14	0,051724138
RI_ISRN1	0,017241379
RI_ISRN2	0,086206897
RI_ISRN3	0
RI_ISRN4	0,017241379
RI_ISRN5	0,086206897
RI_ISRN6	0,051724138
RI_ISRN7	0,068965517
RI_ISRN8	0,034482759
∑	1

Principle of good governance	Weight (w_i)
C1. Public mandate	0,08
C2. Participation	0,13
C3. Substantive equality	0,12
C4. Accountability	0,08
C5. Decision-making capacity	0,09
C6. Implementation effectiveness	0,24
C7. Adjustment flexibility	0,09
C8. Regulatory capture	0,01
C9. Context responsiveness	0,08
C.10 Outcome predictability	0,06
∑	1,00

Figure 63 visualizes the corresponding regulatory mode preference order.

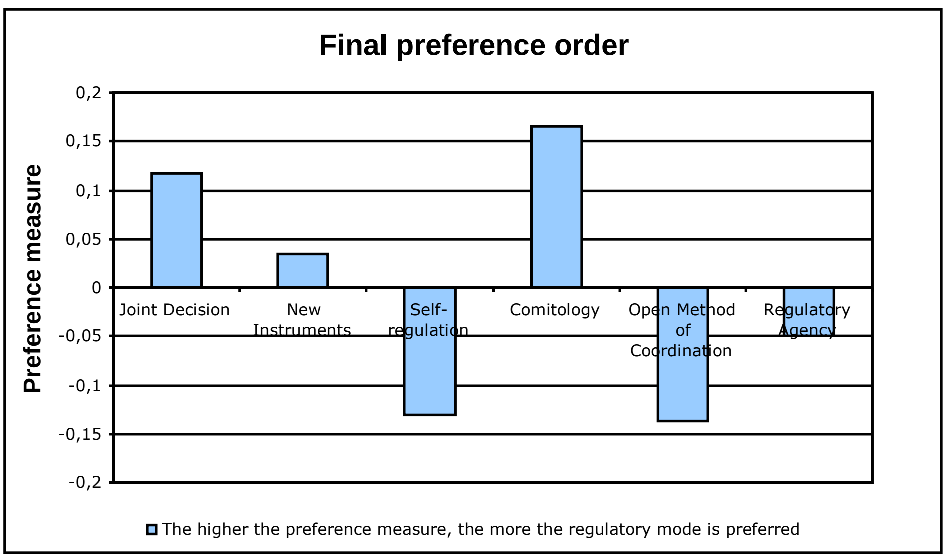
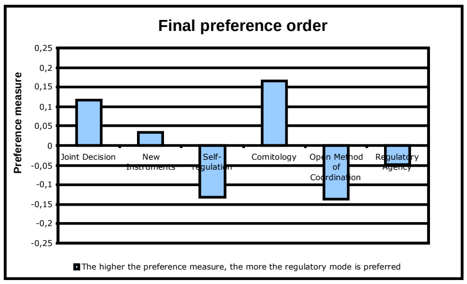


Figure 63: Implementation new transparency requirements — final preference order

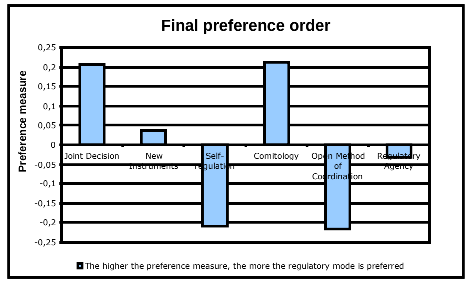
From the analysis above, one may conclude that the STARMODE approach does lead to its envisioned type of solution i.e. providing a preference order of the regulatory mode alternatives with respect to the issue at hand.

How sensitive is the outcome of the resolution approach to its inputs?

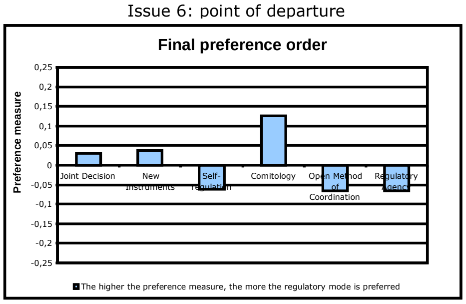
This verification question is answered by means of the outcome (preference order) of issue six: *implementation of new market transparency requirements* (see Figure 63). In Figure 64, the outcome of this issue is compared with five different modifications to the underlying questionnaire.



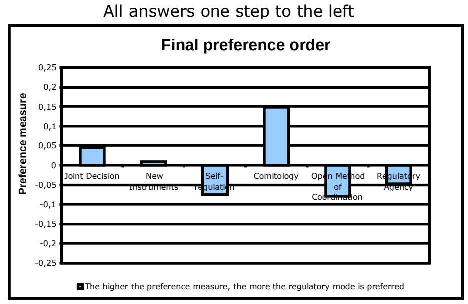
Issue 6: point of departure



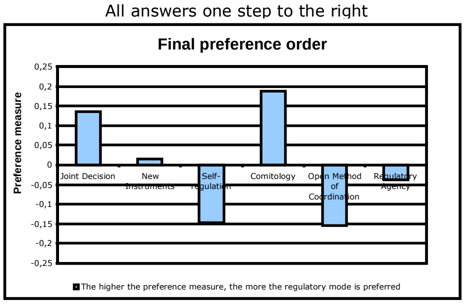
All answers one step to the left



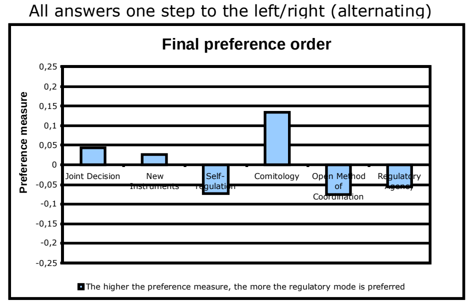
All answers one step to the right



All answers one step to the left/right (alternating)



All answers one step to the left/no change (alternating)



All answers no change/one step to the right (alternating)

Figure 64: Input sensitivity

Although the outcome shows some sensitivity to small input changes, it may be concluded that the outcome (final preference order of the regulatory mode alternatives) does not change significantly.

Can each of the alternatives appear to be the most preferred?

In the non-weighted scorecard, none of the alternatives (modes of regulation) is dominated by another alternative. However, an analysis of extreme questionnaire inputs with respect to the non-weighted scorecard reveals that, in practice, the *Regulatory Agency* is dominated by another alternative in all cases. Two factors seem to cause this result: (i) the fact that the Regulatory Agency scores relatively low in the non-weighted scorecard and (ii) the way in which the questionnaire (input of the resolution approach) is linked to the evaluation criteria. Indeed, currently, the Regulatory Agency does not have many powers and seems — besides its advisory role — only truly effective in the particular case of cross border disputes.[84] If, in the future, the Regulatory Agency is attributed more powers, this may lead to a revised non-weighted scorecard increasing the chance of the Regulatory Agency being most preferred.

12.5.2 Validation

Is the resolution approach practicable?

Clarity of the questions in the questionnaire

To examine whether the questions in the questionnaire are clear and comprehensive, the initial questionnaire (based on Table 13) has been submitted for evaluation to five different scientists[85] familiar with regulatory issues. The outcome of this evaluation was that no relevant questions were missing but many questions needed further clarification. Based on these results, the questions have been rephrased and further exemplified.[86]

Testing the STARMODE approach in practice

The STARMODE approach has been tested in two different settings, namely during the international regulatory training course of the Florence School of Regulation (Florence, 28 October 2008)[87] and during the 8th European doctoral seminar on natural gas (Delft, 24 October 2008).[88] In both instances, a particular case (market integration issue) was presented. Subsequently, the participants were asked to fill in the questionnaire for that particular case and to answer the following evaluation questions;

- How familiar are you with the particular case? (very, fairly, little, or not familiar)
- Do you consider the questions of the questionnaire clear, and if no, why?

[84] Based on the current proposals of the third legislative energy package.
[85] These scientists all work at the TPM faculty of the Delft University of Technology.
[86] The final questionnaire is included in Annex 10.
[87] Most participants in this course were representatives of national regulatory authorities. However, the participants also included some representatives of commercial energy companies, TSOs, CEER, and the European Commission.
[88] Since April 2005 gas market researchers/experts on natural gas market topics have been meeting bi-annually at the European Doctoral Seminar on Natural Gas.

<u>Florence school of regulation</u>

Defined issue

The participants were asked to answer the questionnaire for the particular case that the European Commission has the following policy objective: *making as much progress as possible on the issue of balancing market integration (the creation of a multi-national market for balancing power) in the coming five years*.

Outcome

The questionnaire was answered by 22 (out of 27) participants, of which 1 person indicated to be *very familiar*, 5 persons indicated to be *fairly familiar*, 10 persons indicated to be *little familiar*, and 6 persons indicated to be *not familiar* with the subject of balancing market integration.

For the person who indicated to be *very familiar* with the subject of balancing market integration the Open Method of Coordination appeared most preferred. For the 5 persons who indicated to be *fairly familiar* with the subject of balancing market integration both New Instruments and Comitology appeared most preferred in two cases. In one case, the Open Method of Coordination appeared most preferred. For the 10 persons who indicated to be *little familiar* with the subject of balancing market integration both New Instruments and Self-regulation appeared most preferred in three cases. The modes of Comitology and the Open Method of Coordination were most preferred in two cases. Finally, for all the persons who indicated to be *not familiar* with the subject of balancing market integration, the mode of Comitology appeared most preferred. In general, the questionnaire was considered clear.

<u>Seminar on natural gas</u>

Defined issue

The participants were asked to answer the questionnaire for the particular case that the European Commission has the following policy objective: *implementing a harmonized congestion management method, based on explicit auctions (of pipeline capacity), throughout Europe as soon as possible*.

Outcome

The questionnaire was answered by 13 (out of 17) participants, of which 1 person indicated to be *very familiar*, 6 persons indicated to be *fairly familiar*, 3 persons indicated to be *little familiar*, and 3 persons indicated to be *not familiar* with the issue of congestion management in the gas market.

In 11 of the 13 cases, the mode of Comitology appeared most preferred. In the other 2 cases, the Open Method of Coordination (fairly familiar) and New Instruments (little familiar) turned out most preferred. In general, the questionnaire was considered clear.

Conclusion

The two test sessions showed that the STARMODE approach can be applied in practice. In general, the participants of both test assemblies considered the questionnaire clear. The session in *Florence* led to a very mixed picture of most preferred modes of regulation. Considering the complexity of the issue of balancing market integration and the amount of participants who indicated to be little or not familiar with this issue, this outcome seems not surprising. The session during the *gas seminar* resulted in a more harmonized view of the most preferred modes of regulation. Given the specific expertise of the seminar participants and the rather clearly defined issue of implementing a harmonized congestion management method for gas, this seems a natural outcome as well.

Is the resolution approach useful with respect its goal?

The participants of the two test assemblies were also requested to specify how useful (very useful, useful, little useful, not useful, or no opinion) they consider the STARMODE approach with respect to the following objectives:

a) Creating a common, structured, and comprehensive basis for discussing regulatory mode decisions,

b) Helping European policy makers to examine the specific policy context of a certain market integration issue at hand in a more structured and informed way,

c) Stimulating a careful consideration of all principles of good governance (including legitimacy principles), and

d) Contributing to a higher level of European transparency with respect to regulatory mode decisions.

Florence school of regulation

Outcome

In Florence, 25 (out of 27) participants answered the question concerning the usefulness of the STARMODE approach with the following result:

- With respect to the objective of creating a common, structured, and comprehensive basis for discussing regulatory mode decisions, 32% (8p.) of the participants considered the approach *very useful*, 52% (13p.) considered the approach *useful*, and 4% (1p.) considered the approach *little useful*. Twelve percent (3p.) of the participants indicated to have *no opinion.*

- With respect to the objective of helping European policy makers to examine the specific policy context of a certain market integration issue at hand in a more structured and informed way, 20% (5p.) of the participants considered the approach *very useful*, 52% (13p.) considered the approach *useful*, and 4% (1p.) considered the approach little *useful*. Twenty-four percent (6p.) of the participants indicated to have *no opinion*.
- With respect to the objective of stimulating a careful consideration of all principles of good governance (including legitimacy principles), 20% (5p.) of the participants considered the approach *very useful*, 52% (13p.) considered the approach *useful*, and 12% (3p.) considered the approach *little useful*. Sixteen percent (4p.) of the participants indicated to have *no opinion*.
- With respect to the objective of contributing to a higher level of European transparency with respect to regulatory mode decisions, 24% (6p.) of the participants considered the approach *very useful*, 40% (10p.) considered the approach *useful*, and 8% (2p.) considered the approach *little useful*. Twenty-eight percent (7p.) of the participants indicated to have *no opinion*.

<u>Seminar on natural gas</u>

Outcome

In the gas seminar, 11 (out of 17) participants answered the question concerning the usefulness of the STARMODE approach with the following result:

- With respect to the objective of creating a common, structured, and comprehensive basis for discussing regulatory mode decisions, 27% (3p.) of the participants considered the approach *very useful*, 64% (7p.) considered the approach *useful*, and 9% (1p.) considered the approach *little useful*.
- With respect to the objective of helping European policy makers to examine the specific policy context of a certain market integration issue at hand in a more structured and informed way, 27% (3p.) of the participants considered the approach *very useful*, 36% (4p.) considered the approach *useful*, and 36 % (4p.) considered the approach little *useful*.
- With respect to the objective of stimulating a careful consideration of all principles of good governance (including legitimacy principles), 18% (2p.) of the participants considered the approach *very useful*, 55% (6p.) considered the approach *useful*, and 18% (2p.) considered the approach *little useful*. Nine percent (1p.) of the participants indicated to have *no opinion*.

- With respect to the objective of contributing to a higher level of European transparency with respect to regulatory mode decisions, 45% (5p.) of the participants considered the approach *very useful*, 27% (3p.) considered the approach *useful*, 9% (1p.) considered the approach *little useful,* and 9 % (1p.) considered the approach *not useful*. Nine percent (1p.) of the participants indicated to have *no opinion*.

Interview European Commission

The value of the STARMODE approach has also been discussed with the envisaged user; the European Commission. To this end, the approach was presented to and discussed with a principal administrator of the European Commission's Directorate-General Energy and Transport.[89] Based on this discussion, the principal administrator concluded that the STARMODE approach could be *very useful* for a careful consideration of all principles of good governance (including legitimacy principles) and *useful* for the other three aforementioned objectives provided that the approach is not being misused (e.g. by manipulating the answers to the questionnaire).

More specifically, the principal administrator noted that the STARMODE approach in particular could contribute to the European Commission's *impact assessments* (see Box 3, below) in the following ways:

Firstly, the STARMODE approach could contribute to the first step of the impact assessment (problem definition); the questionnaire may serve as a handle for identifying and describing the issue at stake as concretely as possible.

Secondly, the approach may be of assistance in the second step of the impact assessment (definition of the policy objectives); based on the questionnaire, the general policy goals could be described in terms of issue-specific regulatory needs in a structured way. The resulting high-level description could then serve as a solid basis for the definition of the more content-oriented and operational policy objectives.

Thirdly, the approach may help the Commission choose between the range of regulatory mode alternatives — in the Impact Assessment guidelines referred to as 'basic policy approaches' — in a more structured and informed way. For this purpose, regulatory mode selection should become an explicit part of the third step of the impact assessment (definition of policy options).

Fourthly, the approach may contribute to the establishment of a proper consultation plan. The aim of such a plan is to strike the right balance between the scope and length of the consultation and the efficiency of the regulatory process (European Commission, 2005c).

[89] Interview with Mr. Matti Supponen (Electricity and Gas Unit) on 13 November 2008.

In addition, the STARMDODE approach may help to decide on the collection and usage of expertise.

Finally, by using the STARMODE approach in the various steps of the impact assessment, the overall impact assessment report could be improved leading to a higher level of transparency with respect to the Commission's regulatory mode decisions.

Box 3: Impact Assessment

Impact asessment (IA) is a set of logical steps, which structure the preparation of policy proposals. In such assessment one answers a number of basic analytical questions (European Commission, 2005c):

1. What is the nature of the problem (policy issue at stake)?
2. What should be the objectives pursued by the European Union?
3. What are the main policy options for reaching these objectives
4. What are the likely (economic, social, and environmental) impacts of those options?
5. What are the advantages and disadvantages of the main options?
6. How could the monitoring and evaluation be organised?

The Impact Assessment Guidelines (European Commission, 2005c) require the consultation of interested parties and experts during the impact assessment. Therefore, a consultation plan is made for each impact assessment.

A formal impact assessment is required for items on the Commission's Work Programme. This includes all regulatory proposals, White Papers, expenditure programmes, and negotiating guidelines for international agreements put on the Working Programme. In addition, the Commission may, on a case-by-case basis, decide to carry out an impact assessment of a proposal that does not appear on the Working Programme. The impact assessment should not be confused with the regulatory proposal or with the explanatory memorandum, which precedes the proposal. It gathers and presents evidence that helps in determining possible policy options and their comparative (dis)advantages. Normally, the completed impact assessment report is published along with the (legislative) proposal.

Conclusion

Based on the above, it can be concluded that the STARMODE approach is considered of use with respect to the four objectives of:

- Creating a common, structured, and comprehensive basis for discussing regulatory mode decisions,

- Helping European policy makers to examine the specific policy context of a certain market integration at hand in a more structured and informed way,
- Stimulating a careful consideration of all principles of good governance (including legitimacy principles), and
- Contributing to a higher level of European transparency with respect to regulatory mode decisions.

In particular, the approach could be of use to the European Commission during the preparation of policy (regulatory) proposals by contributing to an improved impact assessment.

What is the scope of applicability of the method?

The last validation aspect of the STARMODE approach involves its scope of applicability. Essentially, the STARMODE approach has been developed for the benefit of the European process of electricity market integration. Therefore, in this study, the approach has been applied to different market integration issues in the field of electricity. Nevertheless, an appealing question with respect to the scope of applicability is whether the STARMODE approach could be applied for market integration issues in other fields than electricity. To answer this question, it must be examined what elements of the STARMODE method are generic and what elements are specific for the electricity industry (*analytic generalisation*, Yin (2003), Knops (2008)). The basic elements of the STARMODE approach are:

- *The alternatives* (existing European modes of regulation)
- *The evaluation criteria* (general principles of good governance)
- *A non-weighted scorecard* (an evaluation of the European modes of regulation in terms of the general principles of good governance)
- *Input to the assignment of weight factors (*an analysis of the relation between a market integration issue‘s specific policy context and the general principles of good governance)

The *alternatives*, *evaluation criteria*, and *non-weighted scorecard* are applicable to all European market integration issues. However, the main aspect of the STARMODE approach is *the input to the assignment of weight factors*. Therefore, the relevant validation question could be rephrased as: *are the characteristics and regulatory needs — that have been identified based on three cases concerning electricity market integration and form the basis of the questionnaire (input of the decision maker) — applicable to all European market integration issues*? Given the nature of the questions in the questionnaire (see Annex 10), it seems reasonable to conclude that the STARMODE approach, could be applied to (and is relevant for) other European market integration issues in industries characterized by a natural monopoly and/or an essential service. For example, this study has already applied the approach to a market integration issue in the field of gas as part of the validation process (see above).

In addition, one could further develop the general concept of the STARMODE approach with respect to national regulatory mode decision-making and multi-state decision-making in other continents. However, this would require a change in the alternatives (e.g. national modes of regulation), the non-weighted scorecard, the questionnaire and possibly also in the evaluation criteria.

Conclusion

Given the nature of its basic elements, the STARMODE approach seems (generally) applicable to (and relevant for) European market integration issues in industries characterized by a natural monopoly and/or an essential service. By adjusting the basic elements of the approach to the changed environment, the general concept of the STARMODE approach could also be applied with respect to national regulatory mode decision-making and multi-state decision-making in other continents.

CHAPTER 13

CONCLUSIONS AND REFLECTION

13.1 INTRODUCTION

This chapter summarizes the conclusions of this study. The first part of this chapter focuses on the main objective of this study: establishing a structured approach to regulatory mode decision-making. The research questions as defined in chapter 3 are discussed in section 13.2.1. After this, section 13.2.2 reflects upon several issues surrounding the STARMODE approach. Specific recommendations to the problem owner of this study, the European Commission, are listed in section 13.2.3. Finally, section 13.2.4 puts forward some suggestions for further research.

The second part of this chapter summarizes the specific results of the case study with respect to the three issues of interconnector investment, congestion management, and market transparency.

To conclude, this chapter raises some reflective questions with respect to the European process of electricity market integration.

13.2 A STRUCTURED APPROACH TO REGULATORY MODE DECISION-MAKING

13.2.1 Answers to the research questions

The main research goal of this study is defined as follows:

"*To develop a structured approach to European regulatory mode decision-making in order to enable and encourage the European Commission to make more informed decisions, on an ex ante basis, about the way in which it creates the rules and regulations that govern the European electricity markets and inherently, their integration process.*"

With respect to this research goal, it is assumed that the generally agreed principles of good governance shape the central problem owner's framework of interest and, consequently, form the regulatory mode evaluation criteria.

In order to achieve the main research goal, an overall research framework has been designed leading to five research questions (see page 36-37). Based on the study's results, these research questions are discussed below.

1. How can the European electricity system be described and who are the main actors within this system?

The European electricity system is not only characterized by rather complex technical and economic subsystems on a national level but also by several technical, economic, and technical-economic interrelations between these national subsystems. With respect to the European integration of electricity markets, these international relations are becoming increasingly important and, as a result, ask for a more supranational approach of regulation. In fact, the multi-level regulatory framework governing the European electricity system includes an increasing share of rules and regulations that originates, either directly or indirectly, from a European level.

The European Union consists of a somewhat strange mixture of supranational (e.g. the European Commission, the European Parliament, and the European Court of Justice) and inter-governmental (Council of the European Union) bodies. Consequently, no such thing as 'the interest of the European Union' exists. Besides the various bodies of the European Union, the European electricity market actor network consists of national governments and the various representative organizations of market parties, transmission system operators, and national regulatory authorities. These different actors all take part in the process of improving the institutional environment of the European electricity system. Consequently, the European electricity market actor network adds yet another complex dimension to the European electricity system.

2. What are the relevant alternatives (existing European modes of regulation) and evaluation criteria (general principles of good governance) in view of the process of regulatory mode decision-making?

Four traditional European modes of regulation can be distinguished: (i) Mutual Adjustment, (ii) Intergovernmental Negotiations, (iii) Hierarchical Direction, and (iv) Joint Decision (see Table 2, page 70). Over the last decades, the type of issues on the European political agenda has changed and EU decision-making has been increasingly criticized. These developments have led to emergence of so-called new modes of regulation. This study identified six new modes of European regulation: (i) Comitology, (ii) New Instruments, (iii) Self-regulation, (iv) Partnership, (v) the Open Method of Coordination, and (vi) the Regulatory Agency (see Table 3, page 78).

The principles of good governance (regulatory mode evaluation criteria) may be divided into two categories. The first category is formed by criteria that determine the legitimacy of regulation (input factors). These criteria include the level of *public mandate*, *participation*, *substantive equality*, and *accountability.* The second category contains criteria that determine the effectiveness of regulation (output factors). These criteria include the level of *decision-making capacity*, *implementation effectiveness*, *adjustment flexibility*, *danger of capture*, *context responsiveness*, and *predictability of outcomes*.

3. What are the most prominent modes of regulation in view of the European process of electricity market integration and how do these prominent modes of regulation perform on the regulatory mode evaluation criteria?

Joint Decision, Comitology, New Instruments, Self-regulation, and the Open Method of Coordination have been identified as the most prominent modes of regulation with respect to the European process of electricity market integration. Additionally, the Regulatory Agency is expected to be an important mode of regulation in the future.

The various European modes of regulation all have their own features. For example, some modes mainly concentrate on the regulatory process whereas others largely focus on regulatory contents. In addition, the regulatory modes differ in terms of the level of obligation, discretion, democratic legitimacy, and flexibility. Finally, the various modes of regulation may be applied at different institutional levels and also the origin of the resulting regulation may differ.

A descriptive evaluation of the prominent modes of regulation in terms of the general criteria of good governance (the regulatory mode evaluation criteria) reveals that each mode of regulation has its own strengths and weaknesses. Any final evaluation of the regulatory modes will depend on the weighing of the individual criteria, which in turn will be based on the particular issue-specific policy context of the market integration issue at hand as well as on individual and/or cultural preferences.

4. What features typical of market integration issues and relevant for the process of regulatory mode decision making can be identified and how can the relation between these features and the regulatory mode evaluation criteria be described?

This research question has been answered by means of a case study exploring three different market integration issues in the field of electricity, namely *interconnector investment*, *congestion management*, and *market transparency*. For each issue, a present-day question has been examined (see section 13.3). Furthermore, concerning each issue, the past regulatory developments have been analyzed. This analysis served two purposes, i.e. (i) to examine if any relevant features can be identified from analyzing the past, and (ii) to illustrate the continuous search for the appropriate mode of regulation in practice.

A distinction can be made between two types of features typical of electricity market integration issues and relevant for the process of regulatory mode decision-making, namely (i) issue-specific characteristics and (ii) issue-specific regulatory needs.

Table 24 presents the general inventory of issue-specific characteristics that has been assembled from the case study.

Table 24: Issue-specific characteristics

	Issue-specific characteristics
1	Extent to which public interests are involved in the issue
2	Extent to which private interests are involved in the issue
3	Extent to which EU-level political interests are involved in the issue
4	Extent to which the issue is technically or economically complex
5	Extent to which the issue is characterized by governmental international interdependence
6	Extent to which the issue is characterized by nongovernmental international interdependence
7	Extent to which the European regulatory process depends on the cooperation of many (same and/or different kinds of) nongovernmental bodies
8	Extent to which the European regulatory process depends on the cooperation of a limited number of (same and/or different kinds of) nongovernmental bodies
9	Extent to which the European regulatory process depends on the knowledge of multiple (different kinds of) nongovernmental bodies
10	Extent to which the European regulatory process depends on the knowledge of a limited number of (one or two kinds of) nongovernmental bodies
11	Extent to which the European regulatory process depends on country-specific knowledge
12	Extent to which different kinds of nongovernmental bodes are affected by the issue
13	Extent to which the involved countries have different/diverging starting points with respect to the issue
14	Extent to which a risk of lock-in effects exist

Table 25 presents the general inventory of issues-specific regulatory needs that has been assembled by means of the case study.

Table 25: Issue-specific regulatory needs

	Issue-specific regulatory needs
1	Need for international cooperation/coordination
2	Need for international harmonization
3	Need for a supranational intervention option
4	Need for regulatory discretion
5	Need for legally binding rules
6	Need for solution flexibility
7	Need for regulatory certainty
8	Need for prompt regulatory action

To translate the relevant issue-specific characteristics and regulatory needs in terms of the general principles of good governance (the regulatory mode evaluation criteria), a set of profiles has been defined. These profiles explicate how important each principle of good governance is for a particular issue-specific characteristic or regulatory need. In this way, the policy context of a certain market integration issue at hand can be systematically translated in terms of the regulatory mode evaluation criteria.

5. Can a structured approach to European regulatory mode decision-making (STARMODE) be established, and if yes, is the approach considered useful with respect to its goal?

The non-weighted scorecard — evaluation of the prominent European modes of regulation in terms of the general principles of good governance — and the relative weights of the evaluation criteria make up the inputs to the final regulatory mode preference assessment (see Figure 8, page 36). The decision maker eventually decides on the weights of the evaluation criteria. However, increased insight into the relation between a market integration issue's specific policy context and the relevant evaluation criteria enables and may encourage the decision maker to make more informed decisions on the relative weights he assigns to the individual evaluation criteria. The decision maker should therefore examine which characteristics and regulatory needs apply to the particular issue at hand and determine their relative importance. Based on these relative importance figures and the 'profiles' describing the relation between the issue-specific characteristics/regulatory needs and the general principles of good governance, the weights of the regulatory mode evaluation criteria can be determined.

For the final preference assessment, the non-weighted scorecard is translated in a dominance and inferiority matrix. By adding the relative weights of the regulatory mode evaluation criteria, the final preference order of the alternatives can be derived.

To facilitate the practical application of the STARMODE approach, a decision support tool has been built in Microsoft Excel. In this tool, the general inventory of the fourteen characteristics and eight regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making is translated into twenty-two explicit questions. By means of these twenty-two questions, the decision maker is able to indicate which characteristics and/or regulatory needs he considers relevant (applicable) with respect to the issue at hand. Furthermore, the decision maker can specify (i) to what extent he considers the relevant issue-specific characteristics applicable to the issue at hand, and (ii) how important he judges the relevant regulatory needs. Based on this input of the decision maker and the other decision elements provided by this study, the decision support tool automatically computes the final preference order of the regulatory mode alternatives.

Two test sessions showed that the STARMODE approach can be applied in practice. Furthermore, based on a questionnaire answered by the participants of the two test sessions[90] and on an interview with a principal administrator of the European Commission's Directorate-General Energy and Transport, it can be concluded that the STARMODE approach is considered of use with respect to the four objectives of:

- Creating a common, structured, and comprehensive basis for discussing regulatory mode decisions,
- Helping European policy makers to examine the specific policy context of a certain market integration at hand in a more structured and informed way,
- Stimulating an explicit consideration of all principles of good governance (including legitimacy principles), and
- Contributing to a higher level of European transparency with respect to regulatory mode decisions.

In particular, the approach could be of use during the preparation of European policy (regulatory) proposals by contributing to an improved impact assessment.

13.2.2 Reflection on the STARMODE approach

Realistic expectations

The main intention of the STARMODE approach is to induce a mind shift concerning the way the process of European regulatory decision-making is performed and to create a common, structured, and comprehensive basis for discussing regulatory mode decisions. The objective of STARMODE's rather arithmetical approach to regulatory mode decision-making is explicitly not that European policy makers indiscriminately apply the regulatory mode that is most preferred according to the final preference assessment. In other words, the aim is not to turn the regulatory mode decision-making process into a blank exercise.

In addition, the approach aims at assisting the decision maker to systematically translate the specific policy context of the market integration issue at hand in terms of the general principles of good governance (the regulatory mode evaluation criteria). Nevertheless, the decision maker himself eventually decides on which regulatory mode to apply. Besides the specific policy context of the issue at hand, this decision will also be influenced by the decision maker's mental model as well as his individual preferences.

[90] These representatives included representatives of national regulatory authorities, commercial energy companies, TSOs, CEER, the European Commission, and research institutes.

The power of combinations

The STARMODE approach evaluates the modes of regulation on an individual basis. However, in practice, the regulatory strategy mostly consists of a combination of regulatory modes. For example, the mode of Self-regulation is often applied within a general framework of high-level rules (New Instruments) and/or in combination with supervisory role of a Regulatory Agency (cf. third legislative energy package). Furthermore, Comitology naturally goes together with the mode of Joint Decision since the basic instrument that provides for the adoption of regulation through Comitology must normally be created by means of the co-decision procedure. This notion once again emphasizes the importance of considering the STARMODE approach not more than a decision support tool.

The importance of sufficient knowledge

Only when the decision maker has substantive knowledge of the market integration issue at hand, the STARMODE approach can bring real benefit. For example, the two validation sessions showed that when a decision maker is not familiar with the issue at hand, this decision maker has a tendency to consider each issue-specific characteristic highly relevant and each regulatory need of high importance. An important condition for using the STARMODE approach is therefore that the decision maker possesses substantive knowledge of the issue at hand to make the necessary distinctions between the different issue-specific characteristics and regulatory needs. Only then, the approach can lead to a meaningful preference order of regulatory mode alternatives.

Definition of the relevant time span and corresponding policy objective

Before answering STARMODE's questionnaire, it should be clearly defined with respect to which time frame the questions are answered. For example, this study showed that during the development phase of a new regional congestion management method one needs a completely different regulatory mode than during the implementation phase of this method. The relevant regulatory period and corresponding (broad) policy objective should therefore be explicitly defined in advance.

Relation issue-specific characteristics/regulatory needs and the evaluation criteria

The profiles explicating the relation between the various issue-specific characteristics/regulatory needs and the general principles of good governance (regulatory mode alternatives) are largely subjective. The profiles used in this study reflect the author's view on this relation. Any decision maker applying the STARMODE approach in practice should always cast a critical glance at these profiles. The decision maker is free to adapt these profiles according to his own view.

The non-weighted scorecard

The non-weighted scorecard of the regulatory mode alternatives in terms of the principles of good governance (regulatory mode evaluation criteria) used in this study is established based on general insights gained through both scientific and official literature. However, the qualitative scores may need to be modified based on the precise design of the regulatory mode alternatives intended to be applied. For example, the risk of regulatory capture is high with regard to voluntary self-regulation but may be much lower if public objectives are secured by means of a set of binding guidelines defining the 'design space' of the self-regulatory bodies (delegated self-regulation).

Option of no regulatory action

It is important to stress that the STARMODE approach starts from the assumption that regulatory intervention is needed to achieve progress on the market integration issue at hand. Nevertheless, in some cases it might be a better idea to postpone regulatory action or to apply softer measures, such as an informational and/or educational campaign.

13.2.3 Recommendations to the European Commission

With respect to the process of electricity market integration, the general regulatory framework has been largely defined. The remaining issues are diverse and need a regulatory approach tailored to their specific characteristics and regulatory needs. Currently, the analytical steps of the impact assessment accompanying a European regulatory proposal are: (i) identifying the problem, (ii) defining the policy objectives, (iii) developing policy options, (iv) analyzing their impacts, (v) comparing the policy options, and (vi) organizing future monitoring and evaluation. With respect to this impact assessment, it is suggested that:

- ***The STARMODE approach is used as a tool to systematically describe the problem at hand in terms of its specific characteristics and regulatory needs****.*
  In this way, the STARMODE approach could contribute to the establishment of a sound basis for performing the remaining steps of the impact assessment. However, before using the STARMODE approach in the analytical step of problem definition (step 1), the general policy objectives (part of step 2) should already have been defined.
- ***The choice of which regulatory mode to apply forms an explicit and separate step of the impact assessment*****.**
  Currently, the choice of regulatory mode seems implicitly included in the policy options step (step 3). However, regulatory mode decision-making (how to establish the rules and regulations) requires a different evaluation approach (e.g. other evaluation criteria) than the identification and evaluation of concrete policy options (what rules

and regulations). Therefore, the European Commission should consider inserting an additional step between the second step (defining the objectives) and the third step (developing policy options) of its impact assessment. In this additional step, the STARMODE approach could be used to make more informed decisions on which regulatory mode to apply.

- ***The STARMODE approach is used to provide a structured and well-founded explanation of why one has decided to apply (or not to apply) a particular regulatory mode*.**

  This would then lead to an increased level of transparency with respect to European regulatory decision-making.

13.2.4 Further research

With respect to the STARMODE approach, further research could be performed on:

- The actual integration of the STARMODE approach in the European Commission's impact assessment,
- The application of the STARMODE concept with respect to national regulatory mode decision-making and multi-state decision-making in other continents,
- The application of the STARMODE concept to other issues than market integration issues in industries characterized by a natural monopoly and/or an essential service,
- The inclusion of regulatory costs (regulatory costs associated with the different regulatory mode alternatives) as an additional regulatory mode evaluation criterion,
- The influence of individual, cultural, and/or national preferences with respect to European regulatory mode decision-making, and
- The integration of regulatory mode decision-making (*STARMODE approach*, this thesis) and regulatory design (e.g. *FULDA-method,* (Knops, 2008)).

13.3 CASE STUDY CONCLUSIONS

The case study performed in this study, among others, answered three present-day questions concerning the market integration issues of *interconnector investment*, *congestion management*, and *market transparency*. The specific conclusions with respect to these questions are summarized below.

13.3.1 Interconnector investment

Can the (perceived) lack of interconnector investment be explained on its economic rationale and/or relevant regulatory framework?

Need for additional interconnector capacity

Despite the strong political focus on building new interconnectors, it is not clear how much additional interconnector capacity Europe really needs and which specific links should receive priority from a social perspective. A thorough socio-economic cost-benefit analysis is a necessity to answer this question adequately. However, a clear and generalized framework for assessing interconnector investment projects is still missing.

Regulated interconnectors

Two categories of regulated interconnector projects may be distinguished: (i) investments for reasons of security of supply or network reliability and (ii) investments for reasons of (socio) economic welfare. With respect to the second category, one may wonder if the current regulatory framework provides the proper incentives to invest:

- TSO holding companies that are still vertically integrated may have no incentive to invest as this could benefit the competitors of their affiliated (commercial) companies.
- Authorities at a 'low price' market might be reluctant to be connected with a 'higher price' market since the local market price is likely to increase (political consequences).
- Authorities may not be willing to invest when they want to stimulate national generation investment or when other priorities are defined concerning the usage of regulated tariffs.
- TSOs may have an incentive to keep at least some congestion in existence, since the existence of congestion revenues may alleviate the process to gain regulatory approval for (other) selected investment projects.
- The difficulty to get administrative approval from municipalities and environmental agencies may form a disincentive to investment.

Since a guaranteed cost-recovery regime does not make the project risk disappear (it just shifts risk from the regulated investor to the network users), the WACC (Weighted Average Cost of Capital) to be applied in the socio-economic assessment of a regulated interconnector project should reflect the project risk as if the project were a private investment project without cost-recovery guarantees.

To limit the project risk for the grid user, the relevant regulatory authority may consider imposing a bonus-malus scheme on its investing TSO, for example with respect to cost overruns, project delays, or interconnector availability.

Merchant interconnectors

Due to the high private project risks attached to merchant interconnector investment, the solution of merchant interconnector investment has so far not proven successful. Also from a social perspective, merchant interconnector investment yields some risks:

- The incentives for private parties to invest in an interconnection may clearly deviate from common public interests, which may lead to lock-in effects and long-term inefficiencies.
- The involvement of a TSO holding company in a merchant interconnector may result in a potential conflict of interest between the commercial activities of one (commercial) subsidiary company and the (regulated) 'public' activities of the TSO.
- Merchant interconnectors may lead to strategic bidding behaviour, especially if the company that invests in a private interconnector also exploits generation or supply activities.

Based on the above, it is concluded that the (perceived) lack of interconnector investment can be explained based on its economic rationale and relevant regulatory framework.

13.3.2 Congestion Management

What will be the technical and economic effects of introducing Flow-based Market Coupling (FBMC) in the Central-West European region?

European methods of congestion management

The congestion management alternatives in Europe stem from four basic choices:

1. How is the interconnector capacity (safely) available for the market *determined*: individual or coordinated (among TSOs)?
2. How is the interconnector capacity available for the market *distributed* among borders, TSO-TSO interfaces, or individual interconnectors: according to a fixed distribution code or based on regional optimization?
3. How is the interconnector capacity available for the market *assigned* to market parties or commercial transactions: contract-based or flow-based?
4. How is the market *cleared*: in an explicit or implicit manner?

Effects of introducing flow-based market coupling in the Central-West European region

By means of the technical-economic model of the Central-West European electricity market that has been built and applied in this study, it can be concluded that:

- The total regional welfare — that is the sum of consumer, producer surplus, and congestion income — increases as a result of the coupling of markets.

- In terms of consumer and producer surplus, the Netherlands and Belgium benefit most of the coupling of markets.
- Stretching of the technical constraints (increasing the amount of transmission capacity available for the market) does lead to an increase of total regional welfare.
- In case of contract-based market coupling, the theoretical optimal dispatch is the situation in which either the prices in the connected markets (countries) are equal or the interconnector is fully used.
- In a system flow-based market coupling, the optimal dispatch could mean that a price difference between to connected markets (countries) continues to exist even when the interconnector capacity is not fully used.

The introduction of a flow-based congestion management system does not automatically mean that the total regional welfare is increased. However, in comparison with contract-based market coupling, flow-based market coupling does have the following advantages:

- A FBMC approach leads to a better understanding of network behaviour, which contributes to the safe operation of the interconnected network.
- A regionally coordinated FBMC approach assures the efficient use of available interconnector capacity with respect to the economic value of commercial transactions.
- A FBMC approach may lead to lower capacity reserve margins on the defined technical constraints (borders) and, consequently, a higher amount of interconnector capacity that can be offered to the market. This would then lead to a higher level of total regional welfare.

Although many complex technical and economic oriented issues should be overcome before a regional flow-based market coupling approach can be put into practice, solving the political issues (the distribution of congestion income, the definition of the technical constraints, etc) may prove even a greater challenge.

13.3.3 Market transparency

What are the aspects to consider in the process of increasing the level of market transparency in electricity wholesale markets?

Advantages of market transparency

A higher level of market transparency contributes to effective competition. Market participants need information about the market to make well-considered business decisions. Furthermore, improved and equal access to relevant market information reduces the historically developed information asymmetries, encourages market entry, contributes to the efficiency of long-term investment decisions, and increases market confidence.

Risks related to market transparency

In oligopolistic markets (like many electricity markets), market transparency with respect to specific data may facilitate tacit collusion. Furthermore, the costs related to the implementation of a higher level of market transparency can be significant. Finally, by disclosing certain information, harm could be done to a market participant's commercial position. Moreover, discrepancies between the transparency level in different markets (countries) may cause unreasonable damage to certain market participants.

Transparency variables

Two categories of transparency variables can be distinguished (see Figure 65, below): (i) variables that are related to open and adequate communication (*perspicuity variables*) and (ii) variables that are related to the easiness to understand (*clarity variables*).

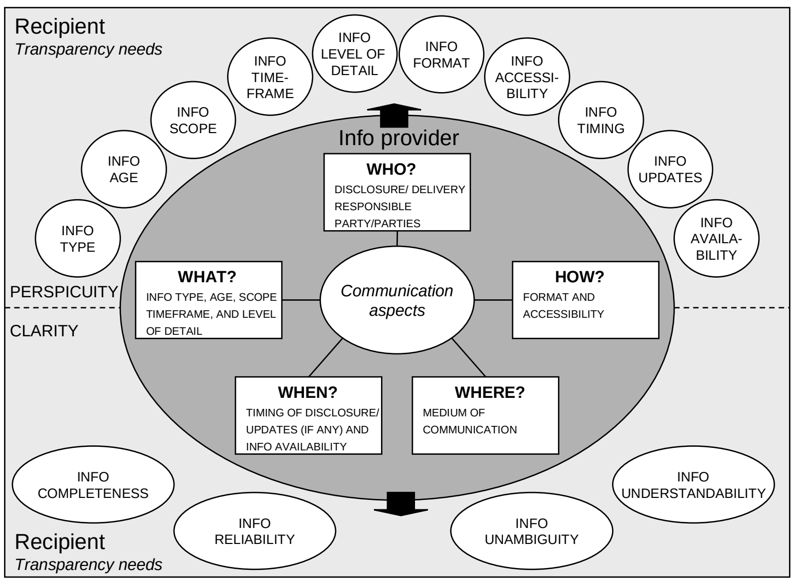


Figure 65: Market transparency variables

Given the advantages and risks related to a higher level of market transparency, defining the optimal level of market transparency is a challenging task. Critical consideration of all transparency variables is a necessity to approach this optimum as closely as possible.

13.4 REFLECTION ON THE EUROPEAN INTEGRATION OF ELECTRICITY MARKETS

To conclude this thesis, this section raises some reflective questions with respect to the European process of electricity market integration.

Will market integration lead to a competitive European electricity market?

To make an integrated and competitive European electricity market a reality, still many issues must be overcome. For example, many consider full ownership unbundling of on the one hand generation, trade, and supply activities and, on the other hand, regulated network activities a precondition for the creation of a competitive European wholesale market. Unbundling removes the potential conflict of interest for the TSO with respect to facilitating competition, which is a core function of TSOs since liberalization. Another important issue concerns the availability of sufficient transmission capacity interconnecting the national electricity systems. Wherever a socio-economic business case exists, investments in the transmission system should be made to facilitate a sufficient level of international trade. Moreover, available transmission capacity should be allocated and used in the most efficient way. Finally, also the existence of incompatible market designs, e.g. with respect to grid access, balancing regimes and transparency requirements, forms a barrier to market integration.

This study showed that since the 1996 liberalization Directive, continuous efforts have been made to remove these obstacles to market integration. However, at the same time, an increasing number of mergers and acquisitions of energy companies has been observed in Europe. Currently, only six different firms own about sixty percent of the EU market in generation capacity while the end of the wave of mergers and acquisitions is not in sight. This raises the following question: if Europe succeeds in establishing an integrated electricity market, will there still be enough market players to compete? After all, an enlargement of the electricity market's geographical scope is only meaningful when this enlargement actually leads to a lower level of market concentration. Therefore, a revision of European competition policy with respect to mergers and acquisitions may turn out to be a necessary condition for an integrated and competitive European market for electricity to become a reality.

From affordability towards acceptability and availability?

The three main policy objectives with respect to the electricity sector can generally be described as the 'triple A' goals, that is *affordability* (low end user prices), *availability* (security of supply), and *acceptability* (social and environmental acceptability). These three goals are often at odds with each other and priorities differ between countries and change over time. From the 1990s until now, Europe has focused particularly on the affordability aspect of the electricity sector. The main policy objective was to create a single European market for electricity whilst ensuring security of supply and respecting environmental protection. Recently, attention is shifting from the affordability aspect towards the aspects of availability (concerns for long-term security of supply) and acceptability (concerns for climate change) as visualized in Figure 66.

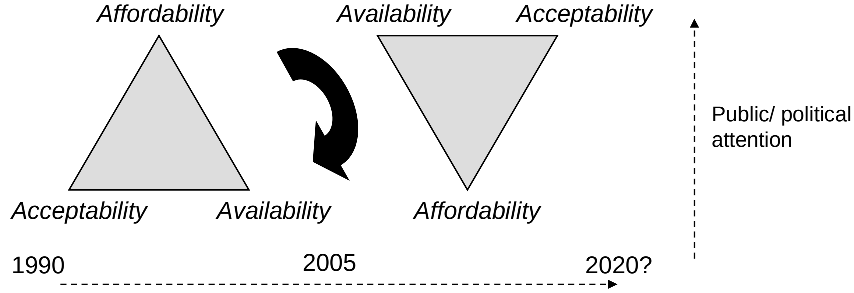


Figure 66: Changing European policy focus

With liberalization, risks were intentionally shifted towards investors, as a means of avoiding overinvestment. The intended energy transition, however, implies significant investments with large positive social externalities while the investment risks are to a large degree determined by government policy. In such an environment, the private sector will not undertake the necessary investments unless the government absorbs a good deal of the risks. A relevant question, therefore, is whether it is possible to integrate the 'new' policy priorities effectively with the longstanding objective of creating an efficient and competitive single European market for electricity. In other words, can the new trade-offs between the 'triple A' goals be arranged in the current market design or does this require a fundamental rethinking of the European market for electricity?

Towards a more rigid European regulatory framework: capacity and innovation issues?

With respect to the electricity sector, this study identified a general movement towards a more detailed and binding regulatory framework on an EU level. Furthermore, an increasing share of regulatory responsibilities is transferred from national authorities and the market itself towards the European Union. There may be good reasons to alter the division of these responsibilities. For example, this study showed that international coordination and harmonization is essential for creating a pan-European level playing field. At the same time, it may be questioned whether the relevant European bodies have sufficient executive capacity and/or budget to perform this increasing amount of regulatory tasks in an appropriate way. Furthermore, a detailed and binding regulatory framework may impose lock-in effects and limit the possibilities for the inclusion of technological innovations and innovative services. Given the shift in policy attention as discussed above, ensuring a sufficient level of flexibility in the European regulatory framework may turn out to be a necessity to achieve the (new) European policy objectives with respect to environmental acceptability and the long-term security of electricity supply.

ANNEXES

Annex 1: Williamson's four-layer model of institutions

Figure 67 shows Williamson's four-layer model of institutions (Williamson, 1998, p.25), the top layer being the most deeply embedded and therefore (according to Williamson) also the most static, and the bottom layer being entirely operational and the most flexible.

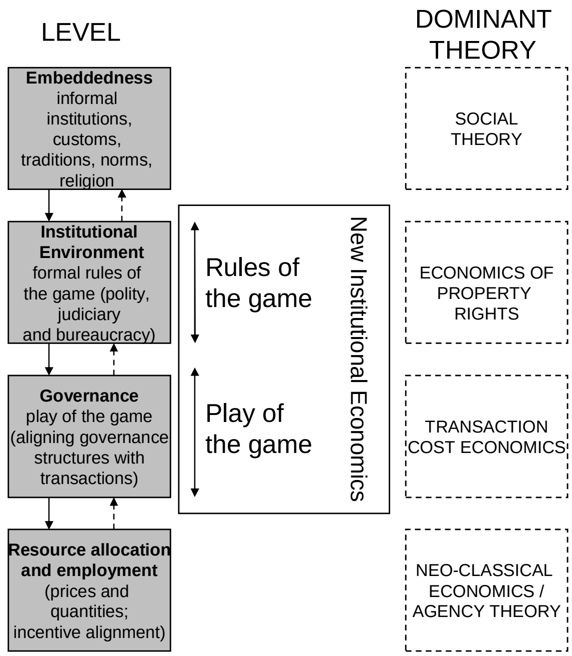


Figure 67: Economics of Institutions
(Based on: Williamson, 1998)

The solid arrows signal that the higher level imposes constraints on the level immediately below. The lower levels signal feedback towards the higher level. In the fullness of time the system is in fact fully interconnected which is, however, largely neglected in this conceptual framework (Williamson, 1998).

The top level of Williamson's model consists of informal institutions (rules), such as customs, tradition, norms and religion but also the original institutionalism's concept of habit is part of this level. In short this level could be indicated as the level of culture (Groenewegen en Lemstra, 2007). Williamson largely takes level 1 as given as institutions on this level typically change very slowly (Williamson, 2000).

The second layer represents the formal rules (e.g. constitutions, laws and property rights) of the game. According to Williamson (1998) choices on this level are vitally important to the economic productivity of an economy. The formal rules of the game are largely legal rules that determine the legal positions of the players and the mechanisms available to coordinate transactions (Koppenjan en Groenewegen, 2005).

Williamson describes the third level as the play of the game or the governance level. Williamson defines governance in this context as '*the means by which order is accomplished in a relation in which potential conflict threatens to undo or upset opportunities to realize mutual gains*'. The third level is therefore about getting the governance structures right e.g. contracts or firms that coordinate economic transactions (Groenewegen en Lemstra, 2007). Governance structures (institutional arrangements) are designed to coordinate specific transactions among multiple actors e.g. concerning labour, capital, intermediate goods and the like. Examples of such institutional arrangements are spot markets, long-term contracts, joint ventures, strategic alliances, cartels and vertically integrated hierarchies (Koppenjan en Groenewegen, 2005). According to Williamson once the rules are developed in level 2, the government can step aside in level 3, except for enforcement (of private contracts) and arbitration.

Level four is the level of individual actors and their interactions. At this level the actual resource allocation takes place considering the constraining levels above. Consequently, at this level neoclassical (Williamson, 1998) and principal-agent theory work (Williamson, 2000).

Annex 2: Paired assessment criteria

Paired assessment criteria

The basic idea of paired assessment is to pick repeatedly two items (criteria), perform paired comparisons, and draw transitive conclusions until the ranking is completed. This means that one compares each alternative with all other alternatives. The decision maker may pick only pairs, which she has not yet assessed (Beroggi, 1999, p.56). To avoid contradictions in such a pair wise analysis — for example, if one assesses the following preference ($\succ$) relation: $c_1 \succ c_2$, $c_2 \succ c_3$, and $c_3 \succ c_1$ — one could use a computerized visual-interactive decision modeling (VIDEMO) system (see Beroggi, 2001).

In general, the maximum number of assessments to rank m elements is $(m^2\text{-}m)/2$. This amount includes both direct and inferred preferences (Beroggi, 1999, p.59). When one needs to assess a high number of elements, it could be more efficient to cluster the criteria into groups and to arrange the groups in a hierarchy. Then the pairs of comparisons are done both within and across the groups. The weight of each criterion then is computed by multiplying its relative weight with the relative weight of the parent element. In such a way, the number of paired assessments could be reduced significantly. However, to apply the paired assessment in such a procedure, an additional axiom should be introduced saying that the preferences of elements are independent of the preference of elements at a lower level (Beroggi, 1999, p.75).

From preference order to numeric preference intensities and weights

After having obtained the preference order of the criteria, one may derive the numeric preference intensities k_i, and weights, w_i, for each criteria c_i. Rietveld and Ouwersloot (1992) (Beroggi, 1999, p.65) propose the following formula for deriving the intensities and weights from the given preference order:

$$\mathrm{w}_{\mathrm{i}} = \frac{k_i}{\sum\limits_{j=1}^{m} k_j}, where\ k_i = \sum_{r=i}^{m} \frac{1}{r}$$

From this formula follows that the preference intensity of the most important criterion (based on the evaluation of three criteria) is $k_1 = 1 + \frac{1}{2} + \frac{1}{3} = \frac{11}{6}$ *(w_1 = 0,61),* the preference intensity of the second most preferred criterion is $k_2 = \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$ *(w_2 = 0,28),* and the preference intensity of the least preferred criterion is $k_3 = \frac{1}{3}$ *(w_2 = 0,11).*

Now suppose that one evaluates four criteria with the preference order: $c_1 \succ c_2 \sim c_3 \succ c_4$ (the second and third criteria are equally preferred). Then one multiplies the preference intensity by the number of tied criteria, which for this example are two. This leads to the following preference intensities: $k_1 = \frac{11}{6}$, $k_2 = k_3 = \frac{5}{6}$, and $k_4 = \frac{2}{6}$. One would compute the following corresponding weights $w_1 = 0.48$, $w_2 = w_3 = 0.22$, and $w_4 = 0.08$.

One could also use a ratio scale (of the weights) to assess the weights of criteria. A ratio approach is based on the assumption that the decision maker can assess how many more times one criterion is preferred to another one (see Beroggi, 1999, p.67). Assessing the relative importance of m criteria pair wise involves assessing the ratios of the unknown weights of the criteria c_i and c_j, where the relative importance k_{ij} is w_i / w_j (e.g. where $k_{ij} = \frac{1}{9}$ reflects extreme inferiority, $k_{ij} = 1$ reflects equal preference, and $k_{ij} = 9$ reflects a very strong dominance). These assessments are then inserted in a quadratic matrix (mxm), where m is the number of criteria. If the relative intensities between the criteria are consistent ($k_{ij} \times k_{jl} = k_{il}$,; intensity transitive matrix), the weight w_i of criterion c_i is the sum of the entries in row i of the matrix, divided by the sum of all entries in the matrix (see Table 26).

Table 26: Example ratio scale based weight assessment

	c_1	c_2	c_3	w_i
c_1	1	3	6	$\frac{2}{3}$
c_2	$\frac{1}{3}$	1	2	$\frac{2}{9}$
c_3	$\frac{1}{6}$	$\frac{1}{2}$	1	$\frac{1}{9}$

Annex 3: Example descriptive alternative assessment

The (non-weighted) preference of alternative a_j over alternative a_k can be expressed by various functions between 0 (no preference outranking) and 1 (pure preference outranking). The larger the difference between the evaluation values of two alternatives, the closer 1 is the preference value. This difference does not have to be numerical, is may also be described qualitatively. The difference between two evaluations e_{ij} and e_{ik} for criterion $c_{i,}$, Δ (e_{ij} , e_{ik}) is positive if $e_{ij} \succ e_{ik}$, negative if $e_{ik} \succ e_{ik}$, and zero if $e_{ij} \sim e_{ik}$. An example of a non-weighted preference function is function type A visualized in Figure 68. This function says that alternative a_j outranks alternative a_k for criterion c_i, if $e_{ij} \succ e_{ik}$. In such case, $k_{jk|i}$ (the non-weighted preference value) of alternative a_j over a_k with respect to criterion c_i is 1.

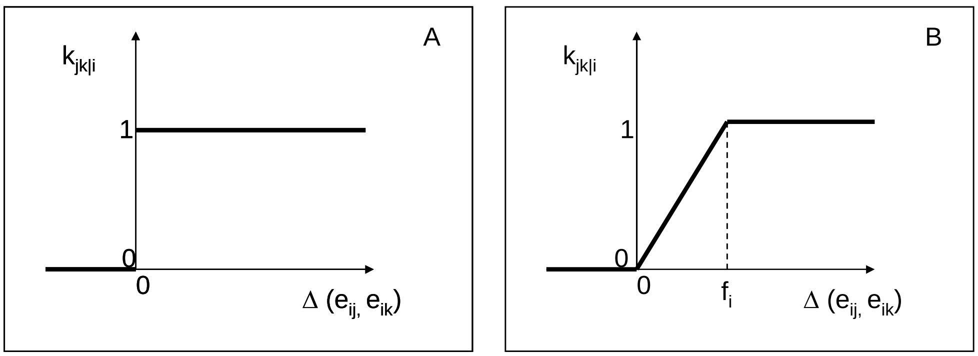


Figure 68: Example non-weighted preference function
(Source: Beroggi, 1999, p. 93)

However, the non-weighted preference function could also show a linear increase of the preference value between the minimum value (0) and the maximum (1) as visualized in Figure 68 (B) (Beroggi, 1999, p.93).

The PROMETHEE method (Brans and Vinck, 1985) computes the overall weighted dominance measure k_j^+ and the inferiority measure k_j^- of alternative a_j as follows:

$$k_j^+ = \frac{1}{n-1}\sum_{k=1}^{n} k_{jk}, \text{ where } k_{jk} = \sum_{i=1}^{m} w_i k_{jk|i}$$

$$k_j^- = \frac{1}{n-1}\sum_{k=1}^{n} k_{kj}, \text{ where } k_{kj} = \sum_{i=1}^{m} w_i k_{kj|i}, \text{ where } n \text{ is the number of alternatives}$$

This two-dimensional preference measure can be transferred into a one-dimensional preference measure as follows (Beroggi, 1999, p.95):

$$k_j = k_j^+ - k_j^-$$

Example (see also Beroggi, 1999, p.95):

Assume a decision maker has to evaluate eight infrastructure projects, $\{a_{1,\dots,}a_8\}$, with four criteria $\{c_{1,\dots,}c_4\}$. Table 27 visualizes the non-weighted scorecard.

Table 27: Non-weighted scorecard

c_i	w_i	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8
Costs	0.4	3.0	2.5	6.5	1.5	4.5	3.5	2.0	5.5
Risks	0.1	4.0	1.0	0.5	3.0	2.0	4.5	5.0	0.8
Value	0.2	high	med.	med.	low	high	low	med.	high
Satisfaction	0.3	low	low	high	med	low	med	high	med

When the weighted preferences ($k_{jk|i}$) of the alternatives are assessed with the preference function of type A (see Figure 68).

Table 28 shows the corresponding weighted (!) preference (nxn) matrix (with entries k_{jk}):

This analysis results in the following rank order from k:

$$a_7 \succ a_4 \succ (a_2 \sim a_8) \succ a_1 \succ a_3 \succ a_5 \succ a_6$$

Table 28: Weighted preference matrix

	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	k_j^+	$k_j = k_j^+ - k_j^-$
a_1	0	0.2	0.6	0.2	0.4	0.7	0.3	0.4	0.400	-0.057
a_2	0.5	0	0.4	0.3	0.5	0.7	0.1	0.4	0.414	-0.029
a_3	0.4	0.4	0	0.6	0.4	0.6	0.1	0.4	0.414	-0.072
a_4	0.8	0,7	0.4	0	0.7	0.5	0.5	0.4	0.414	0.257
a_5	0.1	0.2	0.6	0.3	0	0.3	0.3	0.4	0.314	-0.229
a_6	0.3	0.3	0.4	0	0.7	0	0.1	0.4	0.314	-0.257
a_7	0.7	0.7	0.4	0.5	0.7	0.9	0	0.7	0.657	0.414
a_8	0.4	0.6	0.6	0.3	0.4	0.3	0,3	0	0.414	-0.029
k_j^-	0.457	0.443	0.486	0.314	0.543	0.571	0.243	0.443		

One may also establish two mxn[91] matrices, leading to exactly the same outcome but providing other information. Here, the overall weighted dominance measure n_j^+ of alternative a_j, and its overall weighted inferiority measure n_j^- are defined as:

[91] In these matrices, 'm' represents the number of criteria, 'n' represents the number of alternatives.

$$n_j^+ = \sum_{i=1}^{m} n_{ij}^+ \text{, where } n_{ij}^+ = \frac{1}{n-1}\sum_{k=1}^{n} w_i k_{jk|i}$$

$$n_j^- = \sum_{i=1}^{m} n_{ij}^- \text{, where } n_{ij}^- = \frac{1}{n-1}\sum_{k=1}^{n} w_i k_{kj|i} \text{,}$$

where $n_j = n_j^+ - n_j^-$

These formulas result in the weighted n_j^+ (4x8) matrix (see Table 29, below)…

Table 29: Weighted dominance matrix

c_i	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8
Costs	0.229	0.286	0	0.400	0.114	0.171	0.343	0.057
Risks	0.029	0.071	0.100	0.043	0.057	0.014	0	0.086
Value	0.143	0.057	0.057	0	0.143	0	0.057	0.143
Satisfaction	0	0	0.257	0.129	0	0.129	0.257	0.129
n_j^+	0.400	0.414	0.414	0.571	0.314	0.314	0.657	0.414

…and in the weighted n_j^- (4x8) matrix (see Table 30, below).

Table 30: Weighted inferiority matrix

c_i	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8
Costs	0.171	0.114	0.400	0	0.286	0.229	0.057	0.343
Risks	0.071	0.029	0	0.057	0.043	0.086	0.100	0.014
Value	0	0.086	0.086	0.171	0	0.171	0.086	0
Satisfaction	0.214	0.214	0	0.086	0.214	0.086	0	0.086
n_j^-	0.457	0.443	0.486	0.314	0.543	0.572	0.243	0.443
$n_j = n_j^+ - n_j^-$	-0.057	-0.029	-0.072	0.257	-0.229	-0.257	0.414	-0.029

The tables above show that $n_j = k_j$.

Annex 4: Co-decision procedure

Figure 69 visualizes the procedure of co-decision in the European Union.

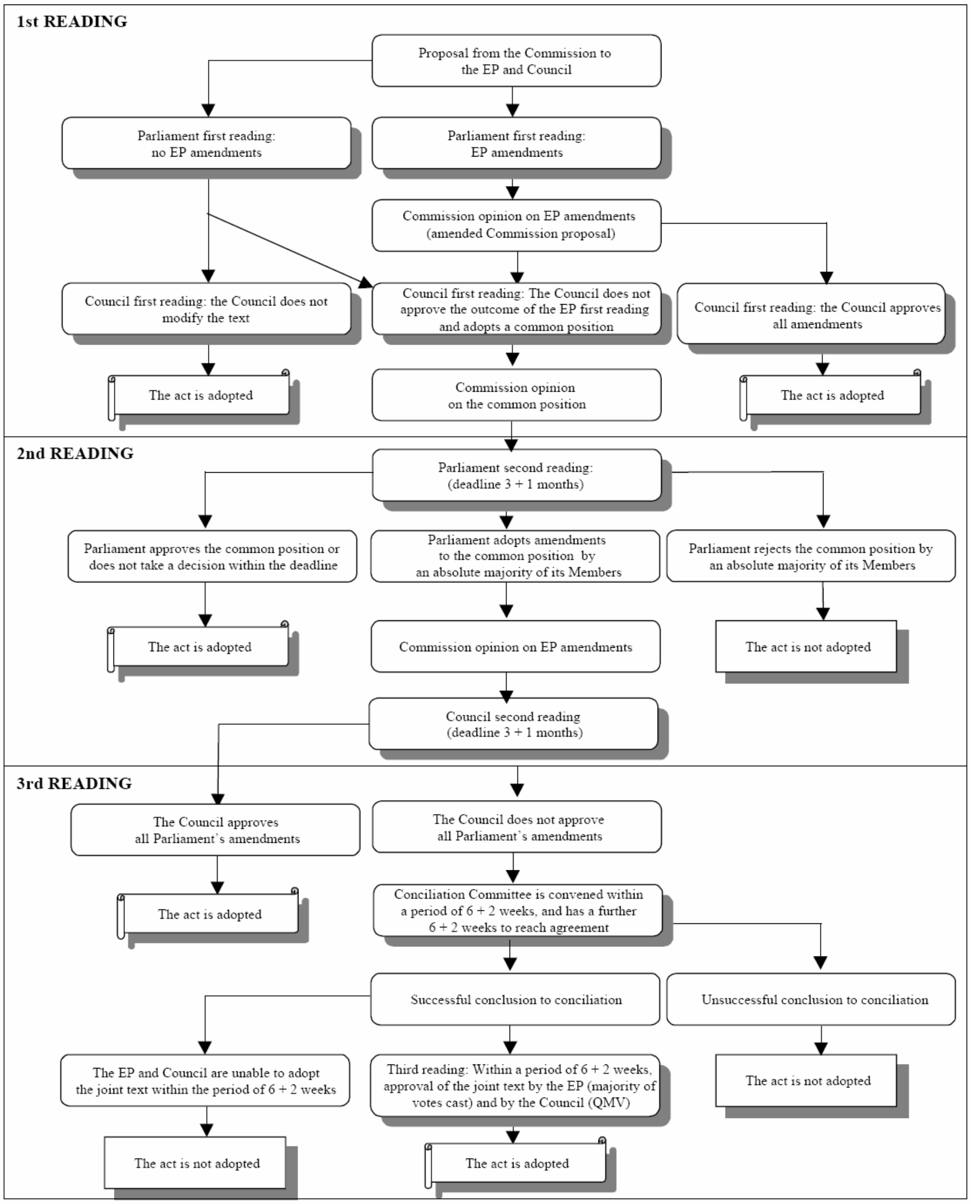


Figure 69: Co-decision procedure
(Source: European Parliament, 2007, Annex 3)

Annex 5: Procedural aspects comitology procedures

Procedural aspects of the 'management procedure'

A committee that works according to the management procedure, delivers its opinion on the Commission's draft measures by a majority decision, as laid down in Article 205 (2) of the EC Treaty (in the same way as when the Council adopts decisions on a proposal from the Commission). After the committee has delivered its opinion, the Commission may adopt measures, which enter into force immediately. The Commission can only be prevented from acting if a qualified majority votes against the proposed measures (Rhinard, 2003). If these measures are not in accordance with the opinion of the committee, the Commission must communicate them to the Council. In that case, the Council, acting by a qualified majority, may take a different decision within a certain time period (determined in the authorizing legislation). Within the same period, the Commission may defer application of the measures (EEA, 2001).

Procedural aspects of the 'regulatory procedure'

A Regulatory Committee must assist the Commission. The Commission can only adopt implementing measures if it obtains the approval of the qualified majority of the Regulatory Committee. If the Committee approves the Commission's proposal by majority the defined measures become binding guidelines (if Article 8 of Decision 1999/468/EC is not applicable). If the Committee disagrees with the proposed draft measures, the Commission is required to submit the proposal to the Council and to inform the European Parliament. If the Parliament considers that the Commission exceeds its implementing powers provided for in the basic instrument, the Parliament is required to inform the Council. The Council may act by qualified majority on the proposal. If the Council opposes the proposal, the Commission is required to re-examine it. The Commission then may submit an amended proposal to the Council or re-submit its proposal. If the Council has not responded after a period of three months, the Commission is allowed to adopt the act.

Procedural aspects of the 'regulatory procedure with scrutiny'

On 17 July 2006, Decision 1999/468/EC laying down the procedures for the exercise of implementing powers conferred on the Commission (comitology procedures) was amended and a new procedure, i.e. the regulatory procedure with scrutiny was introduced (Council Decision, 2006). This new procedure allows the European legislator (the Council and the European Parliament) to oppose draft measures where:

- It indicates that the draft exceeds the implementing powers provided for in the basic instrument,

- It indicates that the draft is incompatible with the aim or the content of that instrument, or where
- It indicates that the draft fails to respect the principles of subsidiarity or proportionality.

As discussed above, the procedure shall be followed for measures designed to delete non-essential elements of an instrument or supplementing the instrument adopted by means of the co-decision. In comparison with the ‘standard’ regulatory procedure, the Commission requires, on top of the approval of the Committee, green light from both the Council and the Parliament. Furthermore, if the Committee disagrees with the proposed draft measures, the Commission may only adopt the measures if both the Council and the Parliament, as apposed to the Committee, approve of the draft measures (see Figure 70, *schematic overview*).

<u>Procedural aspects of the ‘advisory procedure’</u>

The Commission shall submit to the Committee a draft of the measures to be taken. The committee shall deliver its opinion on the draft, within a certain time limit, according to the urgency of the matter, if necessary by taking a vote. The Commission shall take the ‘utmost’ account of the opinion delivered by the committee and shall inform the committee of the manner in which the opinion has been taken into account. The criteria indicating when the advisory procedure should be followed are very broad and open-ended. Basically, the procedure can be used in all those cases in which it is considered to be the most appropriate (EEA, 2001).

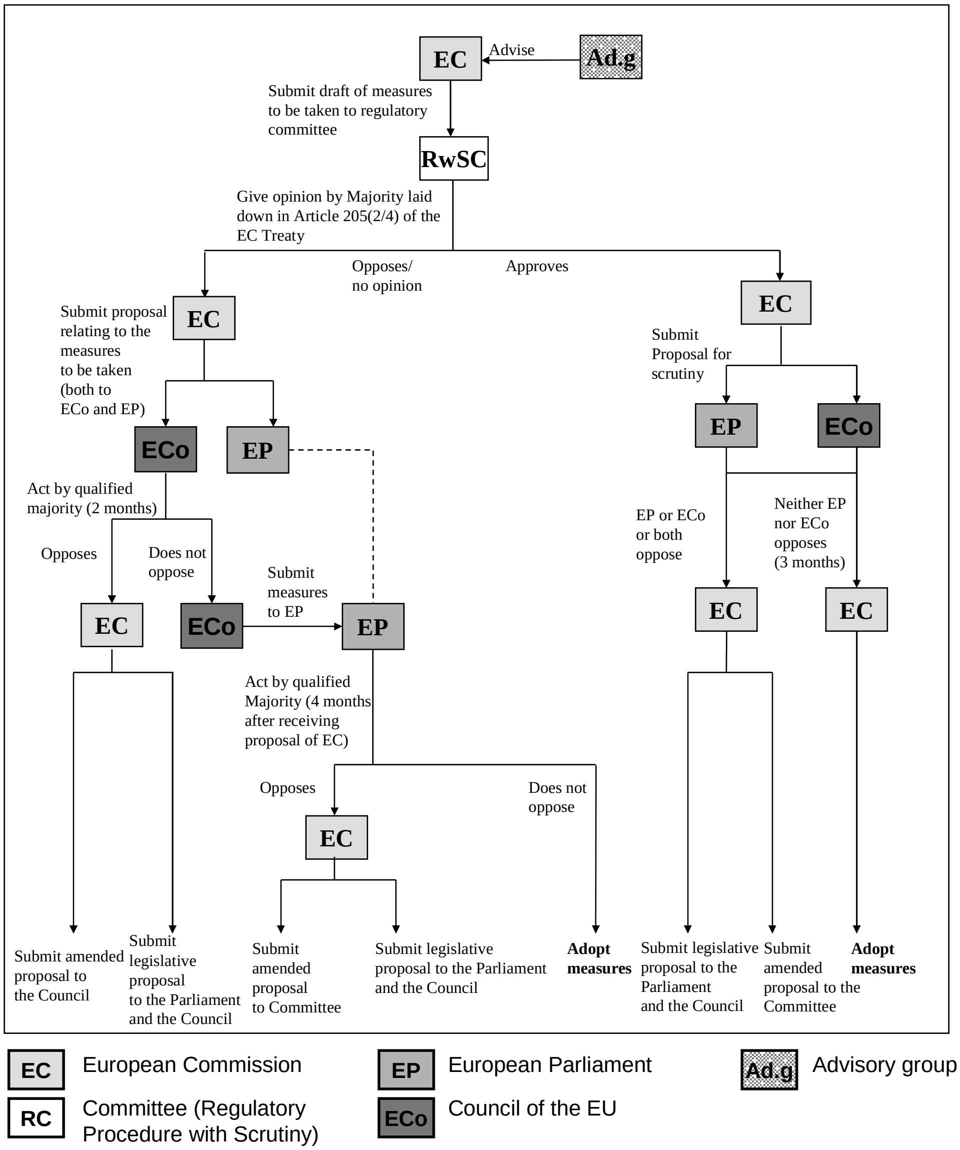


Figure 70: Comitology procedure with scrutiny

Annex 6: Interconnector economics

Consider a two-node network in which perfect competition exist in the electricity market. Generation in node A is assumed to be relatively expensive with respect to generation in node B. On *t=0* there is no interconnector while on *t=1* the two nodes are connected by a line with capacity *K*. Demand (D) and supply (S) curves (price p versus quantity q) are assumed to be linear and their slopes independent from available capacity deviations resulting from additional import or export (see Figure 71, below).

Social benefits

Analysis of importing node A

Assumptions for demand and supply curves:

$$D_A(q) = \alpha_d \; q + b$$

$$S_A(q) = \alpha_s q + c$$

$$S'_A(q) = \alpha_s q + c - \alpha_s K$$

Consumer and producer surplus at t=0

Consumer surplus (SPc) at t=0

$$SP_{c_{t=0}} = \int_0^{q_1} D_A(q)dq - p_1 q_1 = \frac{-\alpha_d\left(b^2 - 2bc + c^2\right)}{2\left(\alpha_s - \alpha_d\right)^2}$$

Producer surplus (SPp) at t=0:

$$SP_{p_{t=0}} = \int_0^{p_1} S_A(p)dp = \frac{\alpha_s^2 b^2 - 2\alpha_s^2 bc - \alpha_d^2 c^2 + 2\alpha_s \alpha_d c^2}{2\alpha_s\left(\alpha_s - \alpha_d\right)^2}$$

Change in consumer surplus (ΔSPc) due to interconnection K:

$$\Delta SP_C = SP_{c_{t=1}} - SP_{c_{t=0}} = \frac{-\alpha_s \alpha_d K(2b - 2c + \alpha_s K)}{2\left(\alpha_s - \alpha_d\right)^2}$$

Consumer and producer surplus at t=1:

Consumer surplus (SPc) at t=1:

$$SP_{c_{t=1}} = \int_0^{q_2} D(q)dq - p_2 q_2 = \frac{-\alpha_d (b^2 - 2bc + c^2 + 2\alpha_s bK - 2\alpha_s cK + \alpha_s^2 K^2)}{2\left(\alpha_s - \alpha_d\right)^2}$$

Producer surplus (SPp) at t=1*:*

$$SP_{p_{t=1}} = \int_0^{p_2} S_A(p)dp = \frac{\alpha_s^2 b^2 - 2\alpha_s^2 bc - \alpha_d^2 c^2 + 2\alpha_s \alpha_d c^2}{2\alpha_s\left(\alpha_s - \alpha_d\right)^2} + \frac{2\alpha_s^2 \alpha_d bK - 2\alpha_s^2 \alpha_d cK + \alpha_s^2 \alpha_d^2 K^2}{2\alpha_s\left(\alpha_s - \alpha_d\right)^2}$$

Change in producer surplus (ΔSPp) due to interconnection K:

$$\Delta SP_p = SP_{p_{t=1}} - SP_{p_{t=0}} = \frac{\alpha_s \alpha_d K(2b - 2c + \alpha_d K)}{2\left(\alpha_s - \alpha_d\right)^2}$$

Change in total consumer and producer surplus in node A (ΔSPt) due to interconnection K:

$$\boxed{\Delta SP_t = \Delta SP_c + \Delta SP_p = \frac{-\alpha_s \alpha_d K^2}{2(\alpha_s - \alpha_d)}}$$

Analysis of exporting node B

Assumptions for demand and supply curves:

$$S(q) = \beta_s q + e$$

$$D_B(q) = \beta_d \ q + d$$

$$D'_B(q) = \beta_d \ q + d - \beta_d K$$

Consumer and producer surplus at t=0

Consumer surplus (SPc) at t=0

$$SP_{c_{t=0}} = \int_0^{q_1} D_B(q)dq - p_1 q_1$$

$$= \frac{-\beta_d (d^2 - 2de + e^2)}{2(\beta_s - \beta_d)^2}$$

Producer surplus (SPp) at t=0:

$$SP_{p_{t=0}} = \int_0^{p_1} S_B(p)dp$$

$$= \frac{\beta_s^2 d^2 - 2\beta_s^2 de - \beta_d^2 e^2 + 2\beta_s \beta_d e^2}{2\beta_s (\beta_s - \beta_d)^2}$$

Change in consumer surplus (ΔSPc) due to interconnection K:

$$\Delta SP_C = SP_{c_{t=1}} - SP_{c_{t=0}} = \frac{\beta_s \beta_d K(2d - 2e - \beta_s K)}{2(\beta_s - \beta_d)^2}$$

Consumer and producer surplus at t=1:

Consumer surplus (SPc) at t=1:

$$SP_{c_{t=1}} = \int_0^{q'} D_B(q)dq - q' p_2$$

$$= \frac{-\beta_d (d^2 - 2de + e^2 - 2\beta_s dK + 2\beta_s eK + \beta_s^2 K^2}{2(\beta_s - \beta_d)^2}$$

Producer surplus (SPp) at t=1:

$$SP_{p_{t=1}} = \int_0^{p_2} S_B(p)dp$$

$$= \frac{\beta_s^2 d^2 - 2\beta_s^2 de - \beta_d^2 e^2 + 2\beta_s \beta_d e^2 -}{2\beta_s (\beta_s - \beta_d)^2}$$

$$\frac{2\beta_s^2 \beta_d dK + 2\beta_s^2 \beta_d eK + \beta_s^2 \beta_d^2 K^2}{2\beta_s (\beta_s - \beta_d)^2}$$

Change in producer surplus (ΔSPp) due to interconnection K:

$$\Delta SP_p = SP_{p_{t=1}} - SP_{p_{t=0}} = \frac{-\beta_s \beta_d K(2d - \beta_d K - 2e)}{2(\beta_s - \beta_d)^2}$$

Change in total consumer and producer surplus node B (ΔSPt) due to interconnection K:

$$\Delta SP_t = \Delta SP_C + \Delta SP_P = \frac{-\beta_s \beta_d K^2}{2(\beta_s - \beta_d)}$$

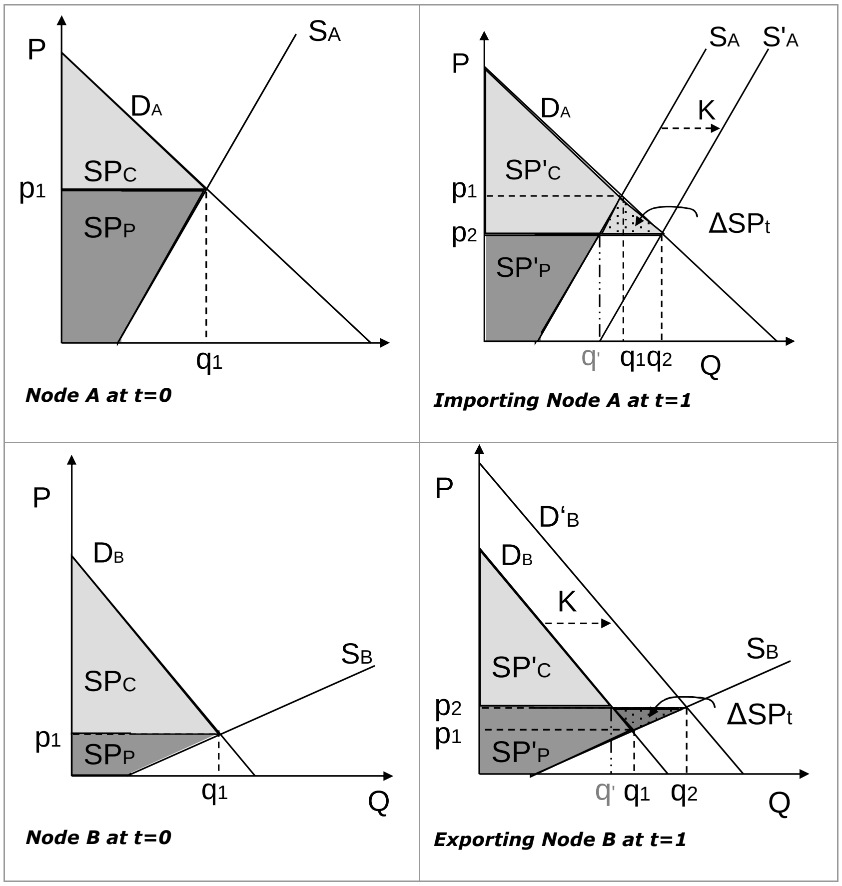


Figure 71: Visualization economic effects interconnector

Since K is not sold in node B but exported and sold in node A, the (total) benefits of the interconnection from social perspective equals the sum of *ΔSP$_t$(A)*, *ΔSP$_t$(B)* ***and K*(p$_{2A}$–p$_{2B}$[92]);***

[92] Normally K*(p$_{2A}$–p$_{2B}$) represents the congestion rents collected by the TSOs and used for (regulated) network investments or for the reduction of regulated network tariffs.

$$K*\left(P_{2A}-P_{2B}\right)$$
$$=K\left(\frac{\alpha_s b-\alpha_d c+\alpha_s\alpha_d K}{\alpha_s-\alpha_d}-\frac{\beta_s d-\beta_d e-\beta_s\beta_d K}{\beta_s-\beta_d}\right)$$
$$=\left(\frac{\alpha_s\alpha_d}{\alpha_s-\alpha_d}+\frac{\beta_s\beta_d}{\beta_s-\beta_d}\right)K^2+\left(\frac{\alpha_s b-\alpha_d c}{\alpha_s-\alpha_d}-\frac{\beta_s d-\beta_d e}{\beta_s-\beta_d}\right)K$$

The formula below then gives the social benefits of the interconnector:

$$B_{social} = \Delta SP_{t(A+B)} + K\left(p_{2A} - p_{2B}\right)$$
$$= \left(\frac{\alpha_s\alpha_d}{2\left(\alpha_s-\alpha_d\right)}+\frac{\beta_s\beta_d}{2\left(\beta_s-\beta_d\right)}\right)K^2 +$$
$$\left(\frac{\alpha_s b-\alpha_d c}{\alpha_s-\alpha_d}-\frac{\beta_s d-\beta_d e}{\beta_s-\beta_d}\right)K$$

Based on the aggregated supply- and demand curves the import- and export price dependency curves (PDC) can be constructed (see section 9.5). In Figure 72, PDC_A represents the price dependency curve in importing node A. PDC_B represents the price dependency curve of exporting node B. The area within the bold lines represents the benefits of the interconnector from a social perspective (the sum of ΔSPt(A), ΔSPt(B) and K*(P_{2A}–P_{2B})).

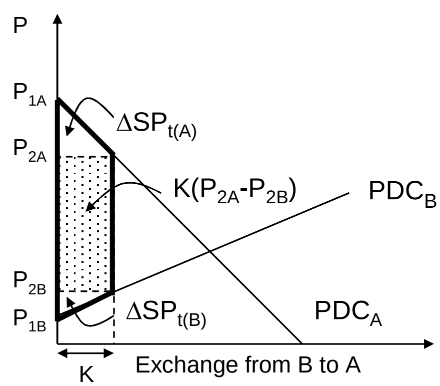


Figure 72: Social benefits interconnector

Private benefits

The benefits for a merchant (private) investor result from the price differences between the connected markets. The merchant investor profits either directly by purchasing electricity at the cheap side and selling it into the expensive market, or indirectly by selling the interconnector capacity to market parties. The private revenues of the interconnection are given by the available interconnector capacity times the value of that capacity ($K^*(P_{2A}-P_{2B})$, see Figure 73).

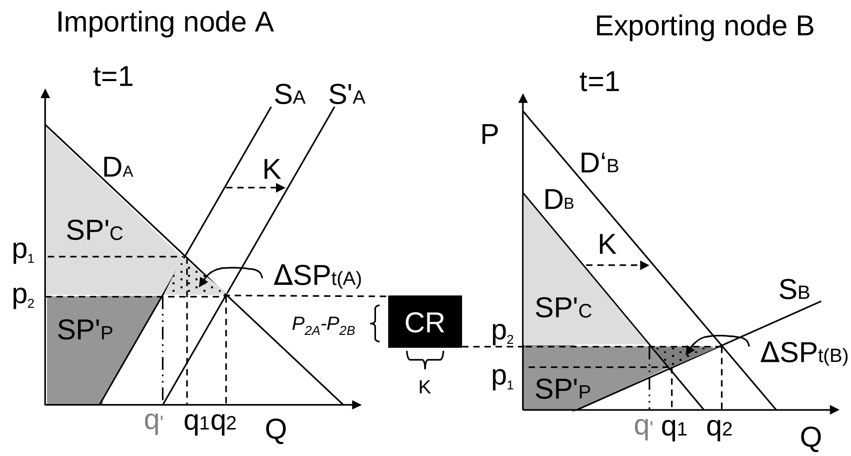


Figure 73: Private benefits interconnector

The formula below then gives the private benefits of the interconnector:

$$B_{private} = CR = K * \left(P_{2A} - P_{2B}\right)$$
$$= \left(\frac{\alpha_s \alpha_d}{\alpha_s - \alpha_d} + \frac{\beta_s \beta_d}{\beta_s - \beta_d}\right) K^2 +$$
$$\left(\frac{\alpha_s b - \alpha_d c}{\alpha_s - \alpha_d} - \frac{\beta_s d - \beta_d e}{\beta_s - \beta_d}\right) K$$

Based on the foregoing, one may derive the following relation between the social and private benefits of an interconnector investment with capacity K:

$$B_{private} = \delta K^2 + \varphi K$$
$$B_{social} = \frac{1}{2} \delta K^2 + \varphi K$$

Where:

$$\delta = \frac{\alpha_s \alpha_d}{\alpha_s - \alpha_d} + \frac{\beta_s \beta_d}{\beta_s - \beta_d}$$
$$\varphi = \frac{\alpha_s b - \alpha_d c}{\alpha_s - \alpha_d} - \frac{\beta_s d - \beta_d e}{\beta_s - \beta_d}$$

Consequently, the capacity maximizing social benefit is twice the capacity maximizing private benefit (see Figure 74). This relation however changes somewhat when taking into account the investment cost (also a function of K) (De Jong and Hakvoort, 2006).

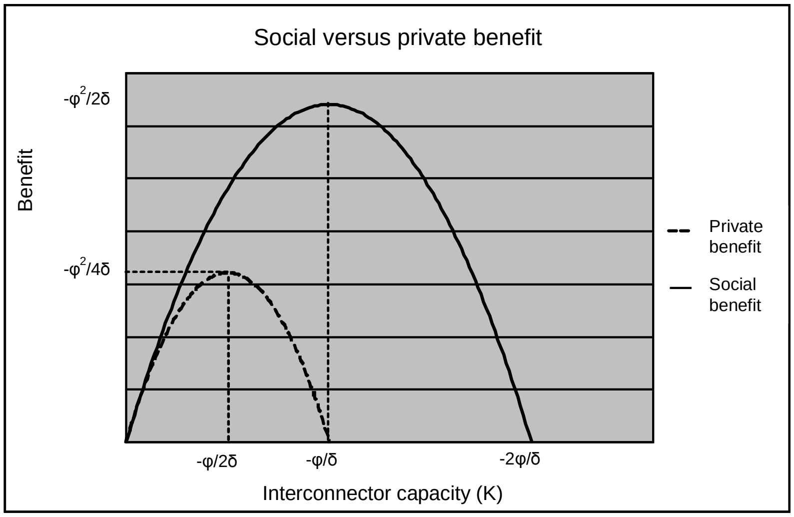


Figure 74: Optimum social versus private benefit

Annex 7: Issue-specific characteristics/regulatory needs and evaluation criteria

Issue-specific characteristics

ISC 1 *(Extent to which public interests are involved in the issue)*: when the issue at hand involves large public interests, a regulatory mode characterized by a high level of public mandate (c.1) and accountability (c.4) is desirable in order to safeguard the public interest.

ISC 2 *(Extent to which private interests are involved in the issue)*: when the issue at hand involves large private interests, the principle of substantive equality is important to avoid any distortion of competition (c.3). Furthermore, private parties should have the possibility to exercise control over the relevant regulatory authority (c.4) and, preferably, the possibility to participate in the regulatory process (c.2). Finally, in order to anticipate new rules and regulation adequately, private parties would need some level of predictability with respect to future regulatory outcomes (c.10).

ISC 3 *(Extent to which political interests are involved in the issue)*: when the issue at hand involves large political interests, a regulatory mode that ensures a high level of decision-making capacity (c.5) and implementation effectiveness (c.6) is desirable to be able to take the matter in hand, if necessary. Furthermore, given the political interests involved, the regulatory mode applied should ensure a sufficient level of public mandate (c.1) and accountability (c.4).

ISC 4 *(Extent to which the issue is technically or economically complex)*: when the issue at hand is technically, economically or otherwise complex, the participation of those affected by the rules and regulations — who usually are the relevant experts — is particularly important (c.2). Furthermore, the resulting regulatory design should be responsive to different national situations since it is difficult to gain a comprehensive view of the entire state of affairs (c.9). To allow any lessons learned to be implemented on a regular basis, a certain level of adjustment flexibility is desirable (c.7). Finally, one should be aware of the danger of regulatory capture and reduce the risk of regulatory capture as much as possible (c.8).

ISC 5 *(Extent to which the issue is characterized by <u>governmental</u> international interdependence)*: when the issue at hand is characterized by a high level of intergovernmental dependence, it is important that all governments are subjected to the same regulatory framework (c.3). Furthermore, if necessary, one should have the ability to take regulatory actions forcing (national) governments to cooperate with other governments (c.5/c.6).

ISC 6 *(Extent to which the issue is characterized by* *<u>nongovernmental</u>* *international interdependence)*: when the issue at hand is characterized by a high level of nongovernmental dependence, the regulatory mode applied should — in addition to the above-mentioned — allow for participation of the relevant nongovernmental parties in the regulatory process in order to facilitate nongovernmental international cooperation as much as possible (c.2).

ISC 7 *(Extent to which the European regulatory process depends on the* *<u>cooperation</u>* *of* *<u>many</u>* *(same and/or different kinds of) nongovernmental bodies)*: when one is dependent on the cooperation of many nongovernmental bodies to tackle the issue adequately, it is on the one hand important that these nongovernmental parties are involved in the regulatory process (c.2). On the other hand, one should assure that the various parties will actually cooperate (c.6). Finally, the regulatory mode applied should leave sufficient room for the nongovernmental bodies involved to adopt their own views (c.9).

ISC 8 *(Extent to which the European regulatory process depends on the* *<u>cooperation</u>* *of a* *<u>limited number of</u>* *(same or different kinds of) nongovernmental bodies)*: when one is dependent on the cooperation of a limited number of nongovernmental bodies, is important that the regulatory mode applied leaves sufficient room for the nongovernmental bodies involved to adopt their own views (c.9). Furthermore, one should assure that the relevant parties will actually cooperate (c.6). Finally, the regulatory mode applied should allow for the participation of this limited number of nongovernmental bodies (c.2).

ISC 9 *(Extent to which the European regulatory process depends on the* *<u>knowledge</u>* *of* *<u>multiple</u>* *(in the sense of different kinds of) nongovernmental bodies)*: when one is dependent on the knowledge of various different nongovernmental bodies to tackle the issue adequately, participation of those bodies in the regulatory process is important (c.2). However, the fact than one is dependent on the knowledge of nongovernmental parties implies vulnerability to regulatory capture (c.8). Finally, a minimum level of regulatory discretion seems desirable as one lacks the knowledge to regulate the issue in detail (c.9).

ISC 10 *(Extent to which the European regulatory process depends on the* *<u>knowledge</u>* *of a* *<u>limited number of</u>* *(one or two kinds of) nongovernmental bodies)*: when one is dependent on the knowledge of a limited number of nongovernmental bodies, one should be particularly aware of the occurrence of regulatory capture (c.8). Obviously, one should assure the participation of these nongovernmental bodies in the regulatory process (c.2). Finally, a minimum level of regulatory discretion seems desirable as one lacks the knowledge to regulate the issue in detail (c.9).

ISC 11 *(Extent to which the European regulatory process depends on country-specific knowledge)*: when one is dependent on country-specific knowledge to solve the issue adequately, it is important that, the relevant national authorities are involved in the relevant regulatory process (c.2). Furthermore, by leaving room for national interpretation, the cooperation of the relevant national authorities will be stimulated (c.9).

ISC 12 *(Extent to which different kinds (amount) of nongovernmental bodies are affected by the issue)*: when there are many actors involved in the issue, the principles of public mandate (c.1) (e.g. to protect those actors who can not actively participate in the regulatory process) and participation (c.2) are important principles. Furthermore, those affected by the rules and regulations should have the possibility to exercise control over the responsible regulatory body if they feel that their interests have not been carefully taken into account (c.4).

ISC 13 *(Extent to which the involved countries have different/diverging starting points with respect to the issue)*: when the issue at hand is characterized by path dependency — in the sense of a divergent status quo/different point of departure in the various member states — the principles of context responsiveness (c.9) and adjustment flexibility (c.7) are particularly important. These principles could facilitate the movement towards a more common basis that can be overseen more easily from a supranational perspective.

ISC 14 *(Extent to which a risk of lock-in effect exists)*: when the issue at hand is characterized by or runs the risk of lock-in effects, it is of importance that regulatory actions can be taken in the short term (c.5) and that these actions are actually compiled with (c.6). Furthermore, with respect to the risk of lock-in effects damaging the public interest, regulatory actions should be based on a solid public mandate (c.1). Finally, the regulatory framework should be flexible enough to be fine-tuned in order to minimize the risk of lock-in effects as much as possible during the course of time (c.7).

<u>Issue-specific regulatory needs</u>

ISRN 1 *(Need for international cooperation/coordination)*: when, with respect to the issue at hand, there is a need for international cooperation/coordination, it is important that all relevant governments/nongovernmental bodies are equally treated in the relevant regulatory framework (c.3). Furthermore, one should have the ability to take regulatory actions forcing governments/nongovernmental bodies to cooperate with other governments if necessary (c.5/c.6). Finally, the regulatory framework should leave sufficient room (c.9) and flexibility (c.7) for governments/nongovernmental bodies to adopt (and regularly adapt) their own views.

ISRN 2 *(Need for international harmonization)*: when, with respect to the issue at hand, there is a need for international harmonization, substantive equality with respect to the relevant regulatory framework is most important (c.3). However, in order to actually achieve harmonization in practice, it is also of importance that the relevant regulatory framework is actually compiled with (c.6).

ISRN 3 *(Need for a supranational intervention option)*: when, with respect to the issue at hand, there is a need for a supranational intervention possibility, the decision-making capacity evidently is a key principle (c.5). In addition, it is important that the decisions made are actually respected and implemented by the regulatees (c.6). The regulatees, on the other hand, should be able to challenge the decisions made by the relevant regulatory authority (c.4).

ISRN 4 *(Need for regulatory discretion)*: the need for regulatory discretion implies a need for a regulatory framework that is responsive to different national (or regional) problem constellations and leaves room for divergent regulatory interpretations (c.9).

ISRN 5 *(Need for legally binding rules)*: the need for legally binding rules is in fact a need for a high level of implementation-effectiveness (c.6).

ISRN 6 *(Need for solution flexibility)*: the need for solution flexibility suggests that one needs the possibility for swift redesign of the regulatory design (c.7).

ISRN 7 *(Need for regulatory certainty)*: the need for regulatory certainty not only calls for the predictability of regulatory outcomes (c.10) but also for implementation effectiveness (c.6); one needs certainty about both the outcomes of the relevant regulatory process and the actual results in practice.

ISRN 8 *(Need for prompt action/ a quick decision)*: the need for prompt action or a quick decision especially calls for a high level of decision-making capacity (c.5). In addition, it is important that the action/decision is actually carried out/implemented (c.6).

Annex 8: Computation of the evaluation criteria's weights

Table 31 provides an example of how the weights of the regulatory mode evaluation criteria are determined based on a specific set of relative importance figures (see example on page 207).

Table 31: Example computation of the evaluation criteria's weights

	C.1	C.2	C.3	C.4	C.5	C.6	C.7	C.8	C.9	C.10	RI
ISC 1	3/28	-	2/28	-	-	-	-	-	-	-	**5/28**
ISC 2	-	-	-	-	-	-	-	-	-	-	**0**
ISC 3	1/28	-	-	1/56	1/16	1/16	-	-		-	**5/28**
ISC 4	-	3/280	-	-	-	-	1/112	1/140	1/112	-	**1/28**
ISC 5	-	-	-	-	-	-	-	-	-	-	**0**
ISC 6	-	1/70	3/140	-	1/56	1/56	-	-	-	-	**1/14**
ISC 7	-	1/14	-	-	-	3/70	-	-	1/35	-	**1/7**
ISC 8	-	1/140	-	-	-	3/280	-	-	1/56	-	**1/28**
ISC 9	-	-	-	-	-	-	-	-	-	-	**0**
ISC 10	-	-	-	-	-	-	-	-	-	-	**0**
ISC 11	-	-	-	-	-	-	-	-	-	-	**0**
ISC 12	-	-	-	-	-	-	-	-	-	-	**0**
ISC 13	-	-	-	-	-	-	-	-	-	-	**0**
ISRN 1	-	-	1/70	-	1/70	1/70	1/70	-	1/70	-	**1/14**
ISRN 2	-	-	-	-	-	-	-	-	-	-	**0**
ISRN 3	-	-	-	3/56	1/14	3/56	-	-	-	-	**5/28**
ISRN 4	-	-	-	-	-	-	-	-	3/28	-	**3/28**
ISRN 5	-	-	-	-	-	-	-	-	-	-	**0**
ISRN 6	-	-	-	-	-	-	-	-	-	-	**0**
ISRN 7	-	-	-	-	-	-	-	-	-	-	**0**
Weights (w_i)	**1/7**	**29/280**	**3/28**	**1/14**	**93/560**	**113/560**	**13/560**	**1/140**	**99/560**	**0.0**	**Σ=1**
	0.14	**0.10**	**0.11**	**0.07**	**0.17**	**0.20**	**0.02**	**0.01**	**0.18**	**0**	

Annex 9: Input for dominance and inferiority matrix

Figure 75 provides the relevant paired comparisons (based on preference function type A (see Annex 3)) of the qualitative non-weighted scorecard that is presented in section 7.6.

Dominance comparison

A1	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	0	1	1	1	1	**4**
C2	0	0	0	1	0	1	**2**
C3	0	1	1	0	1	1	**4**
C4	0	0	1	0	1	0	**2**
C5	0	0	0	0	0	0	**0**
C6	0	1	1	0	1	0	**3**
C7	0	0	0	0	0	0	**0**
C8	0	0	0	0	0	0	**0**
C9	0	0	0	0	0	0	**0**
C10	0	1	1	1	1	1	**5**

A2	A1	A2	A3	A4	A5	A6	**Σ**
C1	1	0	1	1	1	1	**5**
C2	1	0	1	1	1	1	**5**
C3	0	0	0	0	0	0	**0**
C4	1	0	1	1	1	1	**5**
C5	1	0	0	0	0	0	**1**
C6	0	0	1	0	1	0	**2**
C7	1	0	0	0	0	0	**1**
C8	1	0	1	1	0	1	**4**
C9	1	0	0	1	0	0	**2**
C10	0	0	0	0	1	0	**1**

A3	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	0	0	0	0	0	**0**
C2	0	0	0	1	0	1	**2**
C3	0	1	0	0	0	0	**1**
C4	0	0	0	0	0	0	**0**
C5	1	1	0	1	1	1	**5**
C6	0	0	0	0	0	0	**0**
C7	1	1	0	1	0	1	**4**
C8	1	0	0	0	0	0	**1**
C9	1	1	0	1	0	1	**4**
C10	0	0	0	0	1	0	**1**

A4	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	0	1	0	0	1	**2**
C2	0	0	0	0	0	1	**1**
C3	0	1	1	0	1	1	**4**
C4	0	0	1	0	1	0	**2**
C5	1	1	0	0	0	1	**3**
C6	0	1	1	0	1	0	**3**
C7	1	1	0	0	0	0	**2**
C8	1	0	0	0	0	0	**1**
C9	1	0	0	0	0	0	**1**
C10	0	1	1	0	1	1	**4**

Inferiority comparison

A1	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	1	0	0	0	0	**1**
C2	0	1	0	0	0	0	**1**
C3	0	0	0	0	0	0	**0**
C4	0	1	0	0	0	0	**1**
C5	0	1	1	1	1	1	**5**
C6	0	0	0	0	0	0	**0**
C7	0	1	1	1	1	1	**5**
C8	0	1	1	1	1	1	**5**
C9	0	1	1	1	1	1	**5**
C10	0	0	0	0	0	0	**0**

A2	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	0	0	0	0	0	**0**
C2	0	0	0	0	0	0	**0**
C3	1	0	1	1	1	1	**5**
C4	0	0	0	0	0	0	**0**
C5	0	0	1	1	1	0	**3**
C6	1	0	0	1	0	1	**3**
C7	0	0	1	1	1	1	**4**
C8	0	0	0	0	1	0	**1**
C9	0	0	1	0	1	0	**2**
C10	1	0	0	1	0	0	**2**

A3	A1	A2	A3	A4	A5	A6	**Σ**
C1	1	1	0	1	1	0	**4**
C2	0	1	0	0	0	0	**1**
C3	1	0	0	1	0	1	**3**
C4	1	1	0	1	0	1	**4**
C5	0	0	0	0	0	0	**0**
C6	1	1	0	1	0	1	**4**
C7	0	0	0	0	0	0	**0**
C8	0	1	0	0	1	0	**2**
C9	0	0	0	0	0	0	**0**
C10	1	0	0	1	0	0	**2**

A4	A1	A2	A3	A4	A5	A6	**Σ**
C1	1	1	0	0	1	0	**3**
C2	1	1	1	0	1	0	**4**
C3	0	0	0	0	0	0	**0**
C4	0	1	0	0	0	0	**1**
C5	0	0	1	0	0	0	**1**
C6	0	0	0	0	0	0	**0**
C7	0	0	1	0	1	1	**3**
C8	0	1	0	0	1	0	**2**
C9	0	1	1	0	1	1	**4**
C10	1	0	0	0	0	0	**1**

Dominance comparison

A5	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	0	1	1	0	1	**3**
C2	0	0	0	1	0	1	**2**
C3	0	1	0	0	0	0	**1**
C4	0	0	0	0	0	0	**0**
C5	1	1	0	0	0	1	**3**
C6	0	0	0	0	0	0	**0**
C7	1	1	0	1	0	1	**4**
C8	1	1	1	1	0	1	**5**
C9	1	1	0	1	0	1	**4**
C10	0	0	0	0	0	0	**0**

A6	A1	A2	A3	A4	A5	A6	**Σ**
C1	0	0	0	0	0	0	**0**
C2	0	0	0	0	0	0	**0**
C3	0	1	1	0	1	0	**3**
C4	0	0	1	0	1	0	**2**
C5	1	0	0	0	0	0	**1**
C6	0	1	1	0	1	0	**3**
C7	1	1	0	1	0	0	**3**
C8	1	0	0	0	0	0	**1**
C9	1	0	0	1	0	0	**2**
C10	0	0	0	0	1	0	**1**

Inferiority comparison

A5	A1	A2	A3	A4	A5	A6	**Σ**
C1	1	1	0	0	0	0	**2**
C2	0	1	0	0	0	0	**1**
C3	1	0	0	1	0	1	**3**
C4	1	1	0	1	0	1	**4**
C5	0	0	1	0	0	0	**1**
C6	1	1	0	1	0	1	**4**
C7	0	0	0	0	0	0	**0**
C8	0	0	0	0	0	0	**0**
C9	0	0	0	0	0	0	**0**
C10	1	1	1	1	0	1	**5**

A6	A1	A2	A3	A4	A5	A6	**Σ**
C1	1	1	0	1	1	0	**4**
C2	1	1	1	1	1	0	**5**
C3	1	0	0	1	0	0	**2**
C4	0	1	0	0	0	0	**1**
C5	0	0	1	1	1	0	**3**
C6	0	0	0	0	0	0	**0**
C7	0	0	1	0	1	0	**2**
C8	0	1	0	0	1	0	**2**
C9	0	0	1	0	1	0	**2**
C10	1	0	0	1	0	0	**2**

Figure 75: Paired comparisons based on qualitative non-weighted scorecard

Annex 10: Application STARMODE to case study

Questionnaire issue 1: *Stimulation interconnector investment*

Part 1: Characteristics of the issue (questions 1-14)

Please answer the following questions for the issue at hand:

	NO	YES limited		average	*increasing extent* →	high	
1. Are public interests (interests of the civil society) involved, and if yes, to what extent? (e.g. does the issue at hand affect consumer prices, security of supply, etc?)	○	○	○	○	○	●	ISC1
2. Are corporate interests involved (the commercial interests of companies), and if yes, to what extent?	○	○	○	○	○	●	ISC2
3. Are EU-level political interests involved, and if yes, to what extent? (e.g. does the issue at hand relate to a European (key) policy value/objective)	○	○	○	○	○	●	ISC3
4. Is the issue technically and/or economically complex, and if yes, to what extent? (difficult to fully grasp/understand for (European) policy makers)	○	○	○	●	○	○	ISC4
5. Is the issue characterized by *governmental* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between different national governments?)	○	○	○	○	○	●	ISC5
6. Is the issue characterized by *nongovernmental (market or regulated parties)* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between nongovernmental bodies?)	○	○	○	○	○	●	ISC6
7. Does the European regulatory process depend on the cooperation of many (same and/or different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (many = 8 or more)	●	○	○	○	○	○	ISC7
8. Does the European regulatory process depend on the cooperation of a limited number (same and/or different categories) of non-governmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited = 7 or less)	○	○	○	○	○	●	ISC8
9. Does the European regulatory process depend on the knowledge of multiple (in the sense of different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (multiple = 3 or more)	●	○	○	○	○	○	ISC9
10. Does the European regulatory process depend on the knowledge of a limited number (in the sense of different categories) of nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited number = 1 or 2)	○	○	○	●	○	○	ISC10
11. Does the European regulatory process depend on country-specific information to achieve progress, and if yes, to what extent? (country-specific information means information that can only be provided by or with the help of the relevant national government)	○	○	○	○	●	○	ISC11
12. Does the issue affect more than one category of nongovernmental bodies (e.g consumers, producers, TSOs, traders, exchanges, etc), and if yes, to what extent (2 categories = limited, 4 categories=average, 6 or more = high)	○	○	○	●	○	○	ISC12
13. Do the involved countries have different/diverging starting conditions with respect to the issue (e.g. different rules, diverging system)	●	○	○	○	○	○	ISC13
14. Is there a risk of lock-in effects (damaging public, private, and/or political interests), and if yes, to what extent? (when policy/regulatory decisions with respect to the issue at hand will most likely lead to a situation that cannot easily be undone/altered)	○	○	○	○	○	●	ISC14

Part 2: Regulatory needs to achieve progress (questions 15-22)

Please indicate for each of the aspects mentioned below whether the aspect is relevant (needed), for achieving progress on the issue at hand, and if yes, how important you consider this aspect.

	NOT RELEVANT / NEEDED	RELEVANT/ NEEDED *increasing level of importance* slightly		average		highly	
15. (Increased) international cooperation and/or coordination	○	○	○	○	●	○	ISRN1
16. (Increased) international harmonization (i.e. identical standards/rules for all countries/market participants)	●	○	○	○	○	○	ISRN2
17. The establishment of a supranational intervention option to decide on any international disputes	●	○	○	○	○	○	ISRN3
18. Regulatory discretion (leeway of member states/ nongovernmental actors in the implementation of EU rules/policies)	●	○	○	○	○	○	ISRN4
19. The establishment of legally binding rules	○	○	○	●	○	○	ISRN5
20. Solution flexibility (the extent to which rapid redesign of regulation is possible)	●	○	○	○	○	○	ISRN6
21. Regulatory certainty (consistent regulatory decisions, predictable regulatory outcomes, and/or a stable regulatory framework)	○	○	○	○	○	●	ISRN7
22. Prompt regulatory action (e.g. when the security of supply is in danger)	○	●	○	○	○	○	ISRN 8

Computation weights issue 1: *Stimulation interconnector investment*

Table 32 shows the computation of weights based on the relative importance figures derived from the questionnaire and the profiles describing the relation between the issue-specific characteristics/regulatory needs and the evaluation criteria (see Table 14).

Table 32: Computation of weights issue 1 — Stimulation interconnector investment

		Regulatory mode evaluation criteria										
		C1. *Public mandate*	***C2.*** *Participation*	***C3.*** *Substantive equality*	***C4.*** *Accountability*	***C.5*** *Decision-making capacity*	***C.6*** *Implementation effectiveness*	***C.7*** *Adjustment flexibility*	***C.8*** *Regulatory capture*	***C.9*** *Context responsiveness*	***C.10*** *Outcome predictability*	Relative imp. fig.
Issue-specific characteristics	ISC1	0,049180328			0,032786885							0,081967
	ISC2		0,012295082	0,028688525	0,028688525						0,012295082	0,081967
	ISC3	0,016393443			0,008196721	0,028688525	0,028688525					0,081967
	ISC4		0,014754098					0,012295082	0,009836066	0,012295082		0,04918
	ISC5			0,032786885		0,024590164	0,024590164					0,081967
	ISC6		0,016393443	0,024590164		0,020491803	0,020491803					0,081967
	ISC7		0				0			0		0
	ISC8		0,016393443				0,024590164			0,040983607		0,081967
	ISC9		0						0	0		0
	ISC10		0,019672131						0,024590164	0,004918033		0,04918
	ISC11		0,039344262							0,026229508		0,065574
	ISC12	0,017213115	0,017213115		0,014754098							0,04918
	ISC13							0		0		0
	ISC14	0,012295082				0,028688525	0,028688525	0,012295082				0,081967
Issue-specific regulatory needs	ISRN1			0,013114754		0,013114754	0,013114754	0,013114754		0,013114754		0,065574
	ISRN2			0			0					0
	ISRN3				0	0	0					0
	ISRN4									0		0
	ISRN5						0,049180328					0,04918
	ISRN6							0				0
	ISRN7						0,024590164				0,057377049	0,081967
	ISRN8					0,01147541	0,004918033					0,016393
	Weights (wi)	**0,10**	**0,14**	**0,10**	**0,08**	**0,13**	**0,22**	**0,04**	**0,03**	**0,10**	**0,07**	**1,00**

Final preference assessment issue 1: *Stimulation interconnector investment*

Based on the weights of the regulatory mode evaluation criteria, Table 33 and Table 34 present the corresponding dominance and inferiority matrix leading to the final preference order (see section 12.4).

Table 33: Dominance matrix issue 1 — Stimulation interconnector investment

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,076065574	0,095081967	0	0,038032787	0,05704918	0
C2. Participation	0,05442623	0,136065574	0,05442623	0,027213115	0,05442623	0
C3. Substantive equality	0,079344262	0	0,019836066	0,079344262	0,019836066	0,059508197
C4. Accountability	0,033770492	0,08442623	0	0,033770492	0	0,033770492
C5. Decision-making capacity	0	0,025409836	0,12704918	0,076229508	0,076229508	0,025409836
C6. Implementation effectiveness	0,131311475	0,087540984	0	0,131311475	0	0,131311475
C7. Adjustment flexibility	0	0,007540984	0,030163934	0,015081967	0,030163934	0,022622951
C8. Regulatory capture	0	0,027540984	0,006885246	0,006885246	0,03442623	0,006885246
C9. Context responsiveness	0	0,039016393	0,078032787	0,019508197	0,078032787	0,039016393
C.10 Outcome predictability	0,069672131	0,013934426	0,013934426	0,055737705	0	0,013934426
nj+	**0,444590164**	**0,516557377**	**0,330327869**	**0,483114754**	**0,350163934**	**0,332459016**

Table 34: Inferiority matrix issue 1 — Stimulation interconnector investment

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,019016393	0	0,076065574	0,05704918	0,038032787	0,076065574
C2. Participation	0,027213115	0	0,027213115	0,108852459	0,027213115	0,136065574
C3. Substantive equality	0	0,099180328	0,059508197	0	0,059508197	0,039672131
C4. Accountability	0,016885246	0	0,067540984	0,016885246	0,067540984	0,016885246
C5. Decision-making capacity	0,12704918	0,076229508	0	0,025409836	0,025409836	0,076229508
C6. Implementation effectiveness	0	0,131311475	0,175081967	0	0,175081967	0
C7. Adjustment flexibility	0,037704918	0,030163934	0	0,022622951	0	0,015081967
C8. Regulatory capture	0,03442623	0,006885246	0,013770492	0,013770492	0	0,013770492
C9. Context responsiveness	0,097540984	0,039016393	0	0,078032787	0	0,039016393
C.10 Outcome predictability	0	0,027868852	0,027868852	0,013934426	0,069672131	0,027868852
nj–	**0,359836066**	**0,410655738**	**0,44704918**	**0,336557377**	**0,462459016**	**0,440655738**
nj	**0,084754098**	**0,105901639**	**-0,11672131**	**0,146557377**	**-0,112295082**	**-0,10819672**

Part 1: Characteristics of the issue (questions 1-14)

Please answer the following questions for the issue at hand:

	NO	YES limited		average		high	
		increasing extent →					
1. Are public interests (interests of the civil society) involved, and if yes, to what extent? (e.g. does the issue at hand affect consumer prices, security of supply, etc?)	○	●	○	○	○	○	ISC1
2. Are corporate interests involved (the commercial interests of companies), and if yes, to what extent?	○	○	○	○	○	●	ISC2
3. Are EU-level political interests involved, and if yes, to what extent? (e.g. does the issue at hand relate to a European (key) policy value/objective)	○	○	○	○	●	○	ISC3
4. Is the issue technically and/or economically complex, and if yes, to what extent? (difficult to fully grasp/understand for (European) policy makers)	○	●	○	○	○	○	ISC4
5. Is the issue characterized by *governmental* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between different national governments?)	○	○	○	○	○	●	ISC5
6. Is the issue characterized by *nongovernmental (market or regulated parties)* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between nongovernmental bodies?)	○	○	○	○	○	●	ISC6
7. Does the European regulatory process depend on the cooperation of many (same and/or different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (many = 8 or more)	●	○	○	○	○	○	ISC7
8. Does the European regulatory process depend on the cooperation of a limited number (same and/or different categories) of non-governmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited = 7 or less)	○	○	○	○	●	○	ISC8
9. Does the European regulatory process depend on the knowledge of multiple (in the sense of different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (multiple = 3 or more)	●	○	○	○	○	○	ISC9
10. Does the European regulatory process depend on the knowledge of a limited number (in the sense of different categories) of nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited number = 1 or 2)	●	○	○	○	○	○	ISC10
11. Does the European regulatory process depend on country-specific information to achieve progress, and if yes, to what extent? (country-specific information means information that can only be provided by or with the help of the relevant national government)	○	○	●	○	○	○	ISC11
12. Does the issue affect more than one category of nongovernmental bodies (e.g consumers, producers, TSOs, traders, exchanges, etc), and if yes, to what extent (2 categories = limited, 4 categories=average, 6 or more = high)	○	○	○	●	○	○	ISC12
13. Do the involved countries have different/diverging starting conditions with respect to the issue (e.g. different rules, diverging system)	○	○	○	●	○	○	ISC13
14. Is there a risk of lock-in effects (damaging public, private, and/or political interests), and if yes, to what extent? (when policy/regulatory decisions with respect to the issue at hand will most likely lead to a situation that cannot easily be undone/altered)	○	●	○	○	○	○	ISC14

Part 2: Regulatory needs to achieve progress (questions 15-22)

Please indicate for each of the aspects mentioned below whether the aspect is relevant (needed), for achieving progress on the issue at hand, and if yes, how important you consider this aspect.

increasing level of importance →

	NOT RELEVANT / NEEDED	RELEVANT/ NEEDED slightly		average		highly	
15. (Increased) international cooperation and/or coordination	○	○	○	○	●	○	ISRN1
16. (Increased) international harmonization (i.e. identical standards/rules for all countries/market participants)	○	○	○	○	●	○	ISRN2
17. The establishment of a supranational intervention option to decide on any international disputes	○	○	○	○	○	●	ISRN3
18. Regulatory discretion (leeway of member states/ nongovernmental actors in the implementation of EU rules/policies)	○	○	○	●	○	○	ISRN4
19. The establishment of legally binding rules	○	○	○	●	○	○	ISRN5
20. Solution flexibility (the extent to which rapid redesign of regulation is possible)	○	○	○	○	●	○	ISRN6
21. Regulatory certainty (consistent regulatory decisions, predictable regulatory outcomes, and/or a stable regulatory framework)	○	○	○	○	●	○	ISRN7
22. Prompt regulatory action (e.g. when the security of supply is in danger)	○	○	○	●	○	○	ISRN 8

<u>Computation weights issue 2: *Definition regulatory regime new interconnector*</u>

Table 35 shows the computation of weights based on the relative importance figures derived from the questionnaire and the profiles describing the relation between the issue-specific characteristics/regulatory needs and the evaluation criteria (see Table 14).

Table 35: Computation of weights issue 2 — Regulatory regime new interconnector

		Regulatory mode evaluation criteria										
		C1. *Public mandate*	**C2.** *Participation*	**C3.** *Substantive equality*	**C4.** *Accountability*	**C.5** *Decision-making capacity*	**C.6** *Implementation effectiveness*	**C.7** *Adjustment flexibility*	**C.8** *Regulatory capture*	**C.9** *Context responsiveness*	**C.10** *Outcome predictability*	Relative imp. fig.
Issue-specific characteristics	ISC1	0,009375			0,00625							0,015625
	ISC2		0,01171875	0,02734375	0,02734375						0,01171875	0,078125
	ISC3	0,0125			0,00625	0,021875	0,021875					0,0625
	ISC4		0,0046875					0,00390625	0,003125	0,00390625		0,015625
	ISC5			0,03125		0,0234375	0,0234375					0,078125
	ISC6		0,015625	0,0234375		0,01953125	0,01953125					0,078125
	ISC7		0				0			0		0
	ISC8		0,0125				0,01875			0,03125		0,0625
	ISC9		0						0	0		0
	ISC10		0						0	0		0
	ISC11		0,01875							0,0125		0,03125
	ISC12	0,01640625	0,01640625		0,0140625							0,046875
	ISC13							0,01875		0,028125		0,046875
	ISC14	0,00234375				0,00546875	0,00546875	0,00234375				0,015625
Issue-specific regulatory needs	ISRN1			0,0125		0,0125	0,0125	0,0125		0,0125		0,0625
	ISRN2			0,04375			0,01875					0,0625
	ISRN3				0,0234375	0,03125	0,0234375					0,078125
	ISRN4									0,046875		0,046875
	ISRN5						0,046875					0,046875
	ISRN6							0,0625				0,0625
	ISRN7						0,01875				0,04375	0,0625
	ISRN8					0,0328125	0,0140625					0,046875
	Weights (wi)	**0,04**	**0,08**	**0,14**	**0,08**	**0,15**	**0,22**	**0,10**	**0,00**	**0,14**	**0,06**	**1,00**

Final preference assessment issue 2: *Definition regulatory regime new interconnector*

Based on the weights of the regulatory mode evaluation criteria, Table 36 and Table 37 present the corresponding dominance and inferiority matrix leading to the final preference order (see section 12.4).

Table 36: Dominance matrix issue 2 — Regulatory regime new interconnector

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,0325	0,040625	0	0,01625	0,024375	0
C2. Participation	0,031875	0,0796875	0,031875	0,0159375	0,031875	0
C3. Substantive equality	0,110625	0	0,02765625	0,110625	0,02765625	0,08296875
C4. Accountability	0,0309375	0,07734375	0	0,0309375	0	0,0309375
C5. Decision-making capacity	0	0,029375	0,146875	0,088125	0,088125	0,029375
C6. Implementation effectiveness	0,1340625	0,089375	0	0,1340625	0	0,1340625
C7. Adjustment flexibility	0	0,02	0,08	0,04	0,08	0,06
C8. Regulatory capture	0	0,0025	0,000625	0,000625	0,003125	0,000625
C9. Context responsiveness	0	0,0540625	0,108125	0,02703125	0,108125	0,0540625
C.10 Outcome predictability	0,05546875	0,01109375	0,01109375	0,044375	0	0,01109375
nj+	**0,39546875**	**0,4040625**	**0,40625**	**0,50796875**	**0,36328125**	**0,403125**

Table 37: Inferiority matrix issue 2 — Regulatory regime new interconnector

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,008125	0	0,0325	0,024375	0,01625	0,0325
C2. Participation	0,0159375	0	0,0159375	0,06375	0,0159375	0,0796875
C3. Substantive equality	0	0,13828125	0,08296875	0	0,08296875	0,0553125
C4. Accountability	0,01546875	0	0,061875	0,01546875	0,061875	0,01546875
C5. Decision-making capacity	0,146875	0,088125	0	0,029375	0,029375	0,088125
C6. Implementation effectiveness	0	0,1340625	0,17875	0	0,17875	0
C7. Adjustment flexibility	0,1	0,08	0	0,06	0	0,04
C8. Regulatory capture	0,003125	0,000625	0,00125	0,00125	0	0,00125
C9. Context responsiveness	0,13515625	0,0540625	0	0,108125	0	0,0540625
C.10 Outcome predictability	0	0,0221875	0,0221875	0,01109375	0,05546875	0,0221875
nj–	**0,4246875**	**0,51734375**	**0,39546875**	**0,3134375**	**0,440625**	**0,38859375**
nj	**-0,02921875**	**-0,11328125**	**0,01078125**	**0,19453125**	**-0,07734375**	**0,01453125**

Part 1: Characteristics of the issue (questions 1-14)

Please answer the following questions for the issue at hand:

increasing extent →

Question	NO	YES limited		average		high	
1. Are public interests (interests of the civil society) involved, and if yes, to what extent? (e.g. does the issue at hand affect consumer prices, security of supply, etc?)	○	○	●	○	○	○	ISC1
2. Are corporate interests involved (the commercial interests of companies), and if yes, to what extent?	○	○	○	○	●	○	ISC2
3. Are EU-level political interests involved, and if yes, to what extent? (e.g. does the issue at hand relate to a European (key) policy value/objective)	○	○	○	○	●	○	ISC3
4. Is the issue technically and/or economically complex, and if yes, to what extent? (difficult to fully grasp/understand for (European) policy makers)	○	○	○	○	○	●	ISC4
5. Is the issue characterized by *governmental* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between different national governments?)	○	○	○	○	○	●	ISC5
6. Is the issue characterized by *nongovernmental (market or regulated parties)* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between nongovernmental bodies?)	○	○	○	○	○	●	ISC6
7. Does the European regulatory process depend on the cooperation of many (same and/or different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (many = 8 or more)	○	○	○	●	○	○	ISC7
8. Does the European regulatory process depend on the cooperation of a limited number (same and/or different categories) of non-governmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited = 7 or less)	●	○	○	○	○	○	ISC8
9. Does the European regulatory process depend on the knowledge of multiple (in the sense of different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (multiple = 3 or more)	●	○	○	○	○	○	ISC9
10. Does the European regulatory process depend on the knowledge of a limited number (in the sense of different categories) of nongovern-mental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited number = 1 or 2)	○	○	○	○	○	●	ISC10
11. Does the European regulatory process depend on country-specific information to achieve progress, and if yes, to what extent? (country-specific information means information that can only be provided by or with the help of the relevant national government)	○	○	○	○	●	○	ISC11
12. Does the issue affect more than one category of nongovernmental bodies (e.g consumers, producers, TSOs, traders, exchanges, etc), and if yes, to what extent (2 categories = limited, 4 categories=average, 6 or more = high)	○	○	○	○	○	●	ISC12
13. Do the involved countries have different/diverging starting conditions with respect to the issue (e.g. different rules, diverging system)	○	○	○	○	●	○	ISC13
14. Is there a risk of lock-in effects (damaging public, private, and/or political interests), and if yes, to what extent? (when policy/ regulatory decisions with respect to the issue at hand will most likely lead to a situation that cannot easily be undone/altered)	○	○	○	●	○	○	ISC14

Part 2: Regulatory needs to achieve progress (questions 15-22)

Please indicate for each of the aspects mentioned below whether the aspect is relevant (needed), for achieving progress on the issue at hand, and if yes, how important you consider this aspect.

	NOT RELEVANT / NEEDED	RELEVANT/ NEEDED *increasing level of importance* → slightly		average		highly	
15. (Increased) international cooperation and/or coordination	○	○	○	○	○	●	ISRN1
16. (Increased) international harmonization (i.e. identical standards/rules for all countries/market participants)	○	○	●	○	○	○	ISRN2
17. The establishment of a supranational intervention option to decide on any international disputes	●	○	○	○	○	○	ISRN3
18. Regulatory discretion (leeway of member states/ nongovernmental actors in the implementation of EU rules/policies)	○	○	○	○	●	○	ISRN4
19. The establishment of legally binding rules	○	○	●	○	○	○	ISRN5
20. Solution flexibility (the extent to which rapid redesign of regulation is possible)	○	○	○	○	○	●	ISRN6
21. Regulatory certainty (consistent regulatory decisions, predictable regulatory outcomes, and/or a stable regulatory framework)	○	○	●	○	○	○	ISRN7
22. Prompt regulatory action (e.g. when the security of supply is in danger)	○	●	○	○	○	○	ISRN 8

<u>Computation weights issue 3: *Development regional congestion management mechanism*</u>

Table 38 shows the computation of weights based on the relative importance figures derived from the questionnaire and the profiles describing the relation between the issue-specific characteristics/regulatory needs and the evaluation criteria (see Table 14).

Table 38: Computation of weights issue 3 — Development new CM mechanism

		Regulatory mode evaluation criteria										
		C1. *Public mandate*	***C2.*** *Participation*	***C3.*** *Substantive equality*	***C4.*** *Accountability*	***C.5*** *Decision-making capacity*	***C.6*** *Implementation effectiveness*	***C.7*** *Adjustment flexibility*	***C.8*** *Regulatory capture*	***C.9*** *Context responsiveness*	***C.10*** *Outcome predictability*	Relative imp. fig.
Issue-specific characteristics	ISC1	0,017142857			0,011428571							0,028571
	ISC2		0,008571429	0,02	0,02						0,008571429	0,057143
	ISC3	0,011428571			0,005714286	0,02	0,02					0,057143
	ISC4		0,021428571					0,017857143	0,014285714	0,017857143		0,071429
	ISC5			0,028571429		0,021428571	0,021428571					0,071429
	ISC6		0,014285714	0,021428571		0,017857143	0,017857143					0,071429
	ISC7		0,021428571				0,012857143			0,008571429		0,042857
	ISC8		0				0			0		0
	ISC9		0						0	0		0
	ISC10		0,028571429						0,035714286	0,007142857		0,071429
	ISC11		0,034285714							0,022857143		0,057143
	ISC12	0,025	0,025		0,021428571							0,071429
	ISC13							0,022857143		0,034285714		0,057143
	ISC14	0,006428571				0,015	0,015	0,006428571				0,042857
Issue-specific regulatory needs	ISRN1			0,014285714		0,014285714	0,014285714	0,014285714		0,014285714		0,071429
	ISRN2			0,02			0,008571429					0,028571
	ISRN3				0	0	0					0
	ISRN4									0,057142857		0,057143
	ISRN5						0,028571429					0,028571
	ISRN6							0,071428571				0,071429
	ISRN7						0,008571429				0,02	0,028571
	ISRN8					0,01	0,004285714					0,014286
	Weights (wi)	**0,06**	**0,15**	**0,10**	**0,06**	**0,10**	**0,15**	**0,13**	**0,05**	**0,16**	**0,03**	**1,00**

Final preference assessment issue 3: *Development regional CM mechanism*

Based on the weights of the regulatory mode evaluation criteria, Table 39 and Table 40 present the corresponding dominance and inferiority matrix leading to the final preference order (see section 12.4).

Table 39: Dominance matrix issue 3 — Development new CM mechanism

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,048	0,06	0	0,024	0,036	0
C2. Participation	0,061428571	0,153571429	0,061428571	0,030714286	0,061428571	0
C3. Substantive equality	0,083428571	0	0,020857143	0,083428571	0,020857143	0,062571429
C4. Accountability	0,023428571	0,058571429	0	0,023428571	0	0,023428571
C5. Decision-making capacity	0	0,019714286	0,098571429	0,059142857	0,059142857	0,019714286
C6. Implementation effectiveness	0,090857143	0,060571429	0	0,090857143	0	0,090857143
C7. Adjustment flexibility	0	0,026571429	0,106285714	0,053142857	0,106285714	0,079714286
C8. Regulatory capture	0	0,04	0,01	0,01	0,05	0,01
C9. Context responsiveness	0	0,064857143	0,129714286	0,032428571	0,129714286	0,064857143
C.10 Outcome predictability	0,028571429	0,005714286	0,005714286	0,022857143	0	0,005714286
nj+	**0,335714286**	**0,489571429**	**0,432571429**	**0,43**	**0,463428571**	**0,356857143**

Table 40: Inferiority matrix issue 3 — Development new CM mechanism

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,012	0	0,048	0,036	0,024	0,048
C2. Participation	0,030714286	0	0,030714286	0,122857143	0,030714286	0,153571429
C3. Substantive equality	0	0,104285714	0,062571429	0	0,062571429	0,041714286
C4. Accountability	0,011714286	0	0,046857143	0,011714286	0,046857143	0,011714286
C5. Decision-making capacity	0,098571429	0,059142857	0	0,019714286	0,019714286	0,059142857
C6. Implementation effectiveness	0	0,090857143	0,121142857	0	0,121142857	0
C7. Adjustment flexibility	0,132857143	0,106285714	0	0,079714286	0	0,053142857
C8. Regulatory capture	0,05	0,01	0,02	0,02	0	0,02
C9. Context responsiveness	0,162142857	0,064857143	0	0,129714286	0	0,064857143
C.10 Outcome predictability	0	0,011428571	0,011428571	0,005714286	0,028571429	0,011428571
nj–	**0,498**	**0,446857143**	**0,340714286**	**0,425428571**	**0,333571429**	**0,463571429**
nj	**-0,162285714**	**0,042714286**	**0,091857143**	**0,004571429**	**0,129857143**	**-0,10671429**

Part 1: Characteristics of the issue (questions 1-14)

Please answer the following questions for the issue at hand:

NO | YES | *increasing extent* →

Question	NO	limited		average		high	
1. Are public interests (interests of the civil society) involved, and if yes, to what extent? (e.g. does the issue at hand affect consumer prices, security of supply, etc?)	○	○	●	○	○	○	ISC1
2. Are corporate interests involved (the commercial interests of companies), and if yes, to what extent?	○	○	○	○	●	○	ISC2
3. Are EU-level political interests involved, and if yes, to what extent? (e.g. does the issue at hand relate to a European (key) policy value/objective)	○	○	○	○	●	○	ISC3
4. Is the issue technically and/or economically complex, and if yes, to what extent? (difficult to fully grasp/understand for (European) policy makers)	○	○	○	○	○	●	ISC4
5. Is the issue characterized by *governmental* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between different national governments?)	○	○	○	○	○	●	ISC5
6. Is the issue characterized by *nongovernmental (market or regulated parties)* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between nongovernmental bodies?)	○	○	○	○	○	●	ISC6
7. Does the European regulatory process depend on the cooperation of many (same and/or different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (many = 8 or more)	○	○	○	○	●	○	ISC7
8. Does the European regulatory process depend on the cooperation of a limited number (same and/or different categories) of non-governmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited = 7 or less)	●	○	○	○	○	○	ISC8
9. Does the European regulatory process depend on the knowledge of multiple (in the sense of different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (multiple = 3 or more)	●	○	○	○	○	○	ISC9
10. Does the European regulatory process depend on the knowledge of a limited number (in the sense of different categories) of nongovern-mental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited number = 1 or 2)	○	○	○	●	○	○	ISC10
11. Does the European regulatory process depend on country-specific information to achieve progress, and if yes, to what extent? (country-specific information means information that can only be provided by or with the help of the relevant national government)	○	○	●	○	○	○	ISC11
12. Does the issue affect more than one category of nongovernmental bodies (e.g consumers, producers, TSOs, traders, exchanges, etc), and if yes, to what extent (2 categories = limited, 4 categories=average, 6 or more = high)	○	○	○	○	○	●	ISC12
13. Do the involved countries have different/diverging starting conditions with respect to the issue (e.g. different rules, diverging system)	○	○	○	●	○	○	ISC13
14. Is there a risk of lock-in effects (damaging public, private, and/or political interests), and if yes, to what extent? (when policy/ regulatory decisions with respect to the issue at hand will most likely lead to a situation that cannot easily be undone/altered)	○	○	○	●	○	○	ISC14

Part 2: Regulatory needs to achieve progress (questions 15-22)
Please indicate for each of the aspects mentioned below whether the aspect is relevant (needed), for achieving progress on the issue at hand, and if yes, how important you consider this aspect.

	NOT RELEVANT / NEEDED	RELEVANT/ NEEDED slightly	*increasing level of importance*	average		highly	
15. (Increased) international cooperation and/or coordination	○	○	○	●	○	○	ISRN1
16. (Increased) international harmonization (i.e. identical standards/rules for all countries/market participants)	○	○	○	○	○	●	ISRN2
17. The establishment of a supranational intervention option to decide on any international disputes	○	○	○	●	○	○	ISRN3
18. Regulatory discretion (leeway of member states/ nongovernmental actors in the implementation of EU rules/policies)	○	●	○	○	○	○	ISRN4
19. The establishment of legally binding rules	○	○	○	○	●	○	ISRN5
20. Solution flexibility (the extent to which rapid redesign of regulation is possible)	○	○	○	○	●	○	ISRN6
21. Regulatory certainty (consistent regulatory decisions, predictable regulatory outcomes, and/or a stable regulatory framework)	○	○	○	●	○	○	ISRN7
22. Prompt regulatory action (e.g. when the security of supply is in danger)	○	○	○	●	○	○	ISRN 8

<u>Computation weights issue 4: *Implementation advanced CM mechanism*</u>

Table 41 shows the computation of weights based on the relative importance figures derived from the questionnaire and the profiles describing the relation between the issue-specific characteristics/regulatory needs and the evaluation criteria (see Table 14).

Table 41: Computation of weights issue 4 — Implementation new CM mechanism

		Regulatory mode evaluation criteria										
		C1. *Public mandate*	***C2.*** *Participation*	***C3.*** *Substantive equality*	***C4.*** *Accountability*	***C.5*** *Decision-making capacity*	***C.6*** *Implementation effectiveness*	***C.7*** *Adjustment flexibility*	***C.8*** *Regulatory capture*	***C.9*** *Context responsiveness*	***C.10*** *Outcome predictability*	Relative imp. fig.
Issue-specific characteristics	ISC1	0,016901408			0,011267606							0,028169
	ISC2		0,008450704	0,01971831	0,01971831						0,008450704	0,056338
	ISC3	0,011267606			0,005633803	0,01971831	0,01971831					0,056338
	ISC4		0,021126761					0,017605634	0,014084507	0,017605634		0,070423
	ISC5			0,028169014		0,021126761	0,021126761					0,070423
	ISC6		0,014084507	0,021126761		0,017605634	0,017605634					0,070423
	ISC7		0,028169014				0,016901408			0,011267606		0,056338
	ISC8		0				0			0		0
	ISC9		0						0	0		0
	ISC10		0,016901408						0,021126761	0,004225352		0,042254
	ISC11		0,016901408							0,011267606		0,028169
	ISC12	0,024647887	0,024647887		0,021126761							0,070423
	ISC13							0,016901408		0,025352113		0,042254
	ISC14	0,006338028				0,014788732	0,014788732	0,006338028				0,042254
Issue-specific regulatory needs	ISRN1			0,008450704		0,008450704	0,008450704	0,008450704		0,008450704		0,042254
	ISRN2			0,049295775			0,021126761					0,070423
	ISRN3				0,012676056	0,016901408	0,012676056					0,042254
	ISRN4									0,014084507		0,014085
	ISRN5						0,056338028					0,056338
	ISRN6							0,056338028				0,056338
	ISRN7						0,012676056				0,029577465	0,042254
	ISRN8					0,029577465	0,012676056					0,042254
	Weights (wi)	**0,06**	**0,13**	**0,13**	**0,07**	**0,13**	**0,21**	**0,11**	**0,04**	**0,09**	**0,04**	**1,00**

Final preference assessment issue 4: *Implementation advanced CM mechanism*

Based on the weights of the regulatory mode evaluation criteria, Table 42 and Table 43 present the corresponding dominance and inferiority matrix leading to the final preference order (see section 12.4).

Table 42: Dominance matrix issue 4 — Implementation new CM mechanism

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,047323944	0,05915493	0	0,023661972	0,035492958	0
C2. Participation	0,052112676	0,13028169	0,052112676	0,026056338	0,052112676	0
C3. Substantive equality	0,101408451	0	0,025352113	0,101408451	0,025352113	0,076056338
C4. Accountability	0,028169014	0,070422535	0	0,028169014	0	0,028169014
C5. Decision-making capacity	0	0,025633803	0,128169014	0,076901408	0,076901408	0,025633803
C6. Implementation effectiveness	0,128450704	0,085633803	0	0,128450704	0	0,128450704
C7. Adjustment flexibility	0	0,021126761	0,084507042	0,042253521	0,084507042	0,063380282
C8. Regulatory capture	0	0,028169014	0,007042254	0,007042254	0,035211268	0,007042254
C9. Context responsiveness	0	0,036901408	0,073802817	0,018450704	0,073802817	0,036901408
C.10 Outcome predictability	0,038028169	0,007605634	0,007605634	0,030422535	0	0,007605634
nj+	**0,395492958**	**0,464929577**	**0,378591549**	**0,482816901**	**0,383380282**	**0,373239437**

Table 43: Inferiority matrix issue 4 — Implementation new CM mechanism

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,011830986	0	0,047323944	0,035492958	0,023661972	0,047323944
C2. Participation	0,026056338	0	0,026056338	0,104225352	0,026056338	0,13028169
C3. Substantive equality	0	0,126760563	0,076056338	0	0,076056338	0,050704225
C4. Accountability	0,014084507	0	0,056338028	0,014084507	0,056338028	0,014084507
C5. Decision-making capacity	0,128169014	0,076901408	0	0,025633803	0,025633803	0,076901408
C6. Implementation effectiveness	0	0,128450704	0,171267606	0	0,171267606	0
C7. Adjustment flexibility	0,105633803	0,084507042	0	0,063380282	0	0,042253521
C8. Regulatory capture	0,035211268	0,007042254	0,014084507	0,014084507	0	0,014084507
C9. Context responsiveness	0,092253521	0,036901408	0	0,073802817	0	0,036901408
C.10 Outcome predictability	0	0,015211268	0,015211268	0,007605634	0,038028169	0,015211268
nj–	**0,413239437**	**0,475774648**	**0,406338028**	**0,338309859**	**0,417042254**	**0,427746479**
nj	**-0,017746479**	**-0,01084507**	**-0,02774648**	**0,144507042**	**-0,033661972**	**-0,05450704**

Part 1: Characteristics of the issue (questions 1-14)
Please answer the following questions for the issue at hand:

	NO	YES — limited	(increasing extent)	average		high	
1. Are public interests (interests of the civil society) involved, and if yes, to what extent? (e.g. does the issue at hand affect consumer prices, security of supply, etc?)	○	○	○	●	○	○	ISC1
2. Are corporate interests involved (the commercial interests of companies), and if yes, to what extent?	○	○	○	○	○	●	ISC2
3. Are EU-level political interests involved, and if yes, to what extent? (e.g. does the issue at hand relate to a European (key) policy value/objective)	○	○	○	○	●	○	ISC3
4. Is the issue technically and/or economically complex, and if yes, to what extent? (difficult to fully grasp/understand for (European) policy makers)	○	●	○	○	○	○	ISC4
5. Is the issue characterized by *governmental* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between different national governments?)	○	○	○	○	●	○	ISC5
6. Is the issue characterized by *nongovernmental (market or regulated parties)* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between nongovernmental bodies?)	○	○	○	●	○	○	ISC6
7. Does the European regulatory process depend on the cooperation of many (same and/or different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (many = 8 or more)	○	○	○	○	○	●	ISC7
8. Does the European regulatory process depend on the cooperation of a limited number (same and/or different categories) of non-governmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited = 7 or less)	●	○	○	○	○	○	ISC8
9. Does the European regulatory process depend on the knowledge of multiple (in the sense of different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (multiple = 3 or more)	○	○	○	○	●	○	ISC9
10. Does the European regulatory process depend on the knowledge of a limited number (in the sense of different categories) of nongovern-mental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited number = 1 or 2)	●	○	○	○	○	○	ISC10
11. Does the European regulatory process depend on country-specific information to achieve progress, and if yes, to what extent? (country-specific information means information that can only be provided by or with the help of the relevant national government)	○	○	○	○	●	○	ISC11
12. Does the issue affect more than one category of nongovernmental bodies (e.g consumers, producers, TSOs, traders, exchanges, etc), and if yes, to what extent (2 categories = limited, 4 categories=average, 6 or more = high)	○	○	○	○	○	●	ISC12
13. Do the involved countries have different/diverging starting conditions with respect to the issue (e.g. different rules, diverging system)	○	○	○	○	●	○	ISC13
14. Is there a risk of lock-in effects (damaging public, private, and/or political interests), and if yes, to what extent? (when policy/ regulatory decisions with respect to the issue at hand will most likely lead to a situation that cannot easily be undone/altered)	○	○	○	●	○	○	ISC14

Part 2: Regulatory needs to achieve progress (questions 15-22)

Please indicate for each of the aspects mentioned below whether the aspect is relevant (needed), for achieving progress on the issue at hand, and if yes, how important you consider this aspect.

increasing level of importance →

	NOT RELEVANT / NEEDED	RELEVANT/ NEEDED slightly		average		highly	
15. (Increased) international cooperation and/or coordination	○	○	○	○	○	●	ISRN1
16. (Increased) international harmonization (i.e. identical standards/rules for all countries/market participants)	○	○	●	○	○	○	ISRN2
17. The establishment of a supranational intervention option to decide on any international disputes	●	○	○	○	○	○	ISRN3
18. Regulatory discretion (leeway of member states/ nongovernmental actors in the implementation of EU rules/policies)	○	○	○	●	○	○	ISRN4
19. The establishment of legally binding rules	○	○	●	○	○	○	ISRN5
20. Solution flexibility (the extent to which rapid redesign of regulation is possible)	○	○	○	○	○	●	ISRN6
21. Regulatory certainty (consistent regulatory decisions, predictable regulatory outcomes, and/or a stable regulatory framework)	○	○	●	○	○	○	ISRN7
22. Prompt regulatory action (e.g. when the security of supply is in danger)	●	○	○	○	○	○	ISRN 8

Computation weights issue 5: *Definition new market transparency requirements*

Table 44 shows the computation of weights based on the relative importance figures derived from the questionnaire and the profiles describing the relation between the issue-specific characteristics/regulatory needs and the evaluation criteria (see Table 14).

Table 44: Computation of weights issue 5 — Definition transparency requirements

		Regulatory mode evaluation criteria										
		C1. *Public mandate*	***C2.*** *Participation*	***C3.*** *Substantive equality*	***C4.*** *Accountability*	***C.5*** *Decision-making capacity*	***C.6*** *Implementation effectiveness*	***C.7*** *Adjustment flexibility*	***C.8*** *Regulatory capture*	***C.9*** *Context responsiveness*	***C.10*** *Outcome predictability*	Relative imp. fig.
Issue-specific characteristics	ISC1	0,028125			0,01875							0,046875
	ISC2		0,01171875	0,02734375	0,02734375						0,01171875	0,078125
	ISC3	0,0125			0,00625	0,021875	0,021875					0,0625
	ISC4		0,0046875					0,00390625	0,003125	0,00390625		0,015625
	ISC5			0,025		0,01875	0,01875					0,0625
	ISC6		0,009375	0,0140625		0,01171875	0,01171875					0,046875
	ISC7		0,0390625				0,0234375			0,015625		0,078125
	ISC8		0				0			0		0
	ISC9		0,0375						0,01875	0,00625		0,0625
	ISC10		0						0	0		0
	ISC11		0,0375							0,025		0,0625
	ISC12	0,02734375	0,02734375		0,0234375							0,078125
	ISC13							0,025		0,0375		0,0625
	ISC14	0,00703125				0,01640625	0,01640625	0,00703125				0,046875
Issue-specific regulatory needs	ISRN1			0,015625		0,015625	0,015625	0,015625		0,015625		0,078125
	ISRN2			0,021875			0,009375					0,03125
	ISRN3				0	0	0					0
	ISRN4									0,046875		0,046875
	ISRN5						0,03125					0,03125
	ISRN6							0,078125				0,078125
	ISRN7						0,009375				0,021875	0,03125
	ISRN8					0	0					0
	Weights (wi)	**0,08**	**0,17**	**0,10**	**0,08**	**0,08**	**0,16**	**0,13**	**0,02**	**0,15**	**0,03**	**1,00**

Final preference assessment issue 5: *Definition new market transparency requirements*

Based on the weights of the regulatory mode evaluation criteria, Table 45 and Table 46 present the corresponding dominance and inferiority matrix leading to the final preference order (see section 12.4).

Table 45: Dominance matrix issue 5 — Definition transparency requirements

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,06	0,075	0	0,03	0,045	0
C2. Participation	0,066875	0,1671875	0,066875	0,0334375	0,066875	0
C3. Substantive equality	0,083125	0	0,02078125	0,083125	0,02078125	0,06234375
C4. Accountability	0,0303125	0,07578125	0	0,0303125	0	0,0303125
C5. Decision-making capacity	0	0,016875	0,084375	0,050625	0,050625	0,016875
C6. Implementation effectiveness	0,0946875	0,063125	0	0,0946875	0	0,0946875
C7. Adjustment flexibility	0	0,0259375	0,10375	0,051875	0,10375	0,0778125
C8. Regulatory capture	0	0,0175	0,004375	0,004375	0,021875	0,004375
C9. Context responsiveness	0	0,0603125	0,120625	0,03015625	0,120625	0,0603125
C.10 Outcome predictability	0,03359375	0,00671875	0,00671875	0,026875	0	0,00671875
nj+	**0,36859375**	**0,5084375**	**0,4075**	**0,43546875**	**0,42953125**	**0,3534375**

Table 46: Inferiority matrix issue 5 — Definition transparency requirements

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,015	0	0,06	0,045	0,03	0,06
C2. Participation	0,0334375	0	0,0334375	0,13375	0,0334375	0,1671875
C3. Substantive equality	0	0,10390625	0,06234375	0	0,06234375	0,0415625
C4. Accountability	0,01515625	0	0,060625	0,01515625	0,060625	0,01515625
C5. Decision-making capacity	0,084375	0,050625	0	0,016875	0,016875	0,050625
C6. Implementation effectiveness	0	0,0946875	0,12625	0	0,12625	0
C7. Adjustment flexibility	0,1296875	0,10375	0	0,0778125	0	0,051875
C8. Regulatory capture	0,021875	0,004375	0,00875	0,00875	0	0,00875
C9. Context responsiveness	0,15078125	0,0603125	0	0,120625	0	0,0603125
C.10 Outcome predictability	0	0,0134375	0,0134375	0,00671875	0,03359375	0,0134375
nj–	**0,4503125**	**0,43109375**	**0,36484375**	**0,4246875**	**0,363125**	**0,46890625**
nj	**-0,08171875**	**0,07734375**	**0,04265625**	**0,01078125**	**0,06640625**	**-0,11546875**

Part 1: Characteristics of the issue (questions 1-14)

Please answer the following questions for the issue at hand:

Question	NO	YES: limited		average		high	
		increasing extent →					
1. Are public interests (interests of the civil society) involved, and if yes, to what extent? (e.g. does the issue at hand affect consumer prices, security of supply, etc?)	○	○	○	●	○	○	ISC1
2. Are corporate interests involved (the commercial interests of companies), and if yes, to what extent?	○	○	○	○	○	●	ISC2
3. Are EU-level political interests involved, and if yes, to what extent? (e.g. does the issue at hand relate to a European (key) policy value/objective)	○	○	○	○	●	○	ISC3
4. Is the issue technically and/or economically complex, and if yes, to what extent? (difficult to fully grasp/understand for (European) policy makers)	○	●	○	○	○	○	ISC4
5. Is the issue characterized by *governmental* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between different national governments?)	○	○	●	○	○	○	ISC5
6. Is the issue characterized by *nongovernmental (market or regulated parties)* international interdependence, and if yes, to what extent? (is the issue characterized by a need for cross-border cooperation between nongovernmental bodies?)	○	○	○	●	○	○	ISC6
7. Does the European regulatory process depend on the cooperation of many (same and/or different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (many = 8 or more)	○	○	○	○	○	●	ISC7
8. Does the European regulatory process depend on the cooperation of a limited number (same and/or different categories) of non-governmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited = 7 or less)	●	○	○	○	○	○	ISC8
9. Does the European regulatory process depend on the knowledge of multiple (in the sense of different categories) nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (multiple = 3 or more)	○	○	●	○	○	○	ISC9
10. Does the European regulatory process depend on the knowledge of a limited number (in the sense of different categories) of nongovernmental bodies to achieve progress on the issue, and if yes, to what extent is one dependent on these bodies? (limited number = 1 or 2)	●	○	○	○	○	○	ISC10
11. Does the European regulatory process depend on country-specific information to achieve progress, and if yes, to what extent? (country-specific information means information that can only be provided by or with the help of the relevant national government)	○	●	○	○	○	○	ISC11
12. Does the issue affect more than one category of nongovernmental bodies (e.g consumers, producers, TSOs, traders, exchanges, etc), and if yes, to what extent (2 categories = limited, 4 categories=average, 6 or more = high)	○	○	○	○	○	●	ISC12
13. Do the involved countries have different/diverging starting conditions with respect to the issue (e.g. different rules, diverging system)	○	○	○	●	○	○	ISC13
14. Is there a risk of lock-in effects (damaging public, private, and/or political interests), and if yes, to what extent? (when policy/regulatory decisions with respect to the issue at hand will most likely lead to a situation that cannot easily be undone/altered)	○	○	○	●	○	○	ISC14

Part 2: Regulatory needs to achieve progress (questions 15-22)
Please indicate for each of the aspects mentioned below whether the aspect is relevant (needed), for achieving progress on the issue at hand, and if yes, how important you consider this aspect.

	NOT RELEVANT / NEEDED	RELEVANT/ NEEDED slightly		average		*increasing level of importance* highly	
15. (Increased) international cooperation and/or coordination	○	●	○	○	○	○	ISRN1
16. (Increased) international harmonization (i.e. identical standards/rules for all countries/market participants)	○	○	○	○	○	●	ISRN2
17. The establishment of a supranational intervention option to decide on any international disputes	●	○	○	○	○	○	ISRN3
18. Regulatory discretion (leeway of member states/ nongovernmental actors in the implementation of EU rules/policies)	○	●	○	○	○	○	ISRN4
19. The establishment of legally binding rules	○	○	○	○	○	●	ISRN5
20. Solution flexibility (the extent to which rapid redesign of regulation is possible)	○	○	○	●	○	○	ISRN6
21. Regulatory certainty (consistent regulatory decisions, predictable regulatory outcomes, and/or a stable regulatory framework)	○	○	○	○	●	○	ISRN7
22. Prompt regulatory action (e.g. when the security of supply is in danger)	○	○	●	○	○	○	ISRN 8

<u>Computation weights issue 6: *Implementation new market transparency requirements*</u>

Table 47 shows the computation of weights based on the relative importance figures derived from the questionnaire and the profiles describing the relation between the issue-specific characteristics/regulatory needs and the evaluation criteria (see Table 14).

Table 47: Computation of weights issue 6 — Definition new transparency requirements

		Regulatory mode evaluation criteria										
		C1. *Public mandate*	***C2.*** *Participation*	***C3.*** *Substantive equality*	***C4.*** *Accountability*	***C.5*** *Decision-making capacity*	***C.6*** *Implementation effectiveness*	***C.7*** *Adjustment flexibility*	***C.8*** *Regulatory capture*	***C.9*** *Context responsiveness*	***C.10*** *Outcome predictability*	Relative imp. fig.
Issue-specific characteristics	ISC1	0,031034483			0,020689655							0,051724
	ISC2		0,012931034	0,030172414	0,030172414						0,012931034	0,086207
	ISC3	0,013793103			0,006896552	0,024137931	0,024137931					0,068966
	ISC4		0,005172414					0,004310345	0,003448276	0,004310345		0,017241
	ISC5			0,013793103		0,010344828	0,010344828					0,034483
	ISC6		0,010344828	0,015517241		0,012931034	0,012931034					0,051724
	ISC7		0,043103448				0,025862069			0,017241379		0,086207
	ISC8		0				0			0		0
	ISC9		0,020689655						0,010344828	0,003448276		0,034483
	ISC10		0						0	0		0
	ISC11		0,010344828							0,006896552		0,017241
	ISC12	0,030172414	0,030172414		0,025862069							0,086207
	ISC13							0,020689655		0,031034483		0,051724
	ISC14	0,007758621				0,018103448	0,018103448	0,007758621				0,051724
Issue-specific regulatory needs	ISRN1			0,003448276		0,003448276	0,003448276	0,003448276		0,003448276		0,017241
	ISRN2			0,060344828			0,025862069					0,086207
	ISRN3				0	0	0					0
	ISRN4									0,017241379		0,017241
	ISRN5						0,086206897					0,086207
	ISRN6							0,051724138				0,051724
	ISRN7						0,020689655				0,048275862	0,068966
	ISRN8					0,024137931	0,010344828					0,034483
	Weights (wi)	**0,08**	**0,13**	**0,12**	**0,08**	**0,09**	**0,24**	**0,09**	**0,01**	**0,08**	**0,06**	**1,00**

Final preference assessment issue 6: *Implementation new transparency requirements*

Based on the weights of the regulatory mode evaluation criteria, Table 48 and Table 49 present the corresponding dominance and inferiority matrix leading to the final preference order (see section 12.4).

Table 48: Dominance matrix issue 6 —Implementation new transparency requirements

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,066206897	0,082758621	0	0,033103448	0,049655172	0
C2. Participation	0,053103448	0,132758621	0,053103448	0,026551724	0,053103448	0
C3. Substantive equality	0,09862069	0	0,024655172	0,09862069	0,024655172	0,073965517
C4. Accountability	0,033448276	0,08362069	0	0,033448276	0	0,033448276
C5. Decision-making capacity	0	0,01862069	0,093103448	0,055862069	0,055862069	0,01862069
C6. Implementation effectiveness	0,142758621	0,095172414	0	0,142758621	0	0,142758621
C7. Adjustment flexibility	0	0,017586207	0,070344828	0,035172414	0,070344828	0,052758621
C8. Regulatory capture	0	0,011034483	0,002758621	0,002758621	0,013793103	0,002758621
C9. Context responsiveness	0	0,033448276	0,066896552	0,016724138	0,066896552	0,033448276
C.10 Outcome predictability	0,061206897	0,012241379	0,012241379	0,048965517	0	0,012241379
nj+	**0,455344828**	**0,487241379**	**0,323103448**	**0,493965517**	**0,334310345**	**0,37**

Table 49: Inferiority matrix issue 6 — Implementation new transparency requirements

	Joint Decision	*New Instruments*	*Self-regulation*	*Comitology*	*Open Method of Coordination*	*Regulatory Agency*
C1. Public mandate	0,016551724	0	0,066206897	0,049655172	0,033103448	0,066206897
C2. Participation	0,026551724	0	0,026551724	0,106206897	0,026551724	0,132758621
C3. Substantive equality	0	0,123275862	0,073965517	0	0,073965517	0,049310345
C4. Accountability	0,016724138	0	0,066896552	0,016724138	0,066896552	0,016724138
C5. Decision-making capacity	0,093103448	0,055862069	0	0,01862069	0,01862069	0,055862069
C6. Implementation effectiveness	0	0,142758621	0,190344828	0	0,190344828	0
C7. Adjustment flexibility	0,087931034	0,070344828	0	0,052758621	0	0,035172414
C8. Regulatory capture	0,013793103	0,002758621	0,005517241	0,005517241	0	0,005517241
C9. Context responsiveness	0,08362069	0,033448276	0	0,066896552	0	0,033448276
C.10 Outcome predictability	0	0,024482759	0,024482759	0,012241379	0,061206897	0,024482759
nj–	**0,338275862**	**0,452931034**	**0,453965517**	**0,32862069**	**0,470689655**	**0,419482759**
nj	**0,117068966**	**0,034310345**	**-0,13086207**	**0,165344828**	**-0,13637931**	**-0,04948276**

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SUMMARY

I RESEARCH GOAL AND METHOD

This thesis focuses on the processes through which the rules and regulations that govern European electricity markets — and inherently, their integration process — are established. So far, European policy makers have largely followed a 'trial-and-error' approach to finding an appropriate mode of regulation for dealing effectively with market integration issues. This unstructured approach to regulatory mode selection may lead to several problems:

- Today's trial-and-error strategy of shifting from one regulatory mode to another is time-consuming.
- In the regulatory mode selection process, certain key principles of good governance are insufficiently considered.
- European regulatory processes are experienced as vague, intransparent, and illegitimate by 'outside' stakeholders.

Given this problem perception, the main research goal is:

> To develop ***a structured approach to European regulatory mode decision-making*** in order to enable and encourage the European Commission to make more informed decisions, on an ex ante basis, about the way in which it creates the rules and regulations that govern the European electricity markets and inherently, their integration process

With respect to this research goal, it is assumed that the generally agreed principles of good governance, covering both effectiveness and legitimacy, shape the central problem owner's framework of interest and, consequently, form the regulatory mode evaluation criteria. The challenge for the problem owner — the European Commission — can therefore be rephrased as '*selecting a European mode of regulation through which the specific market integration issue at hand can be tackled in effective way, while ensuring a sufficient level of legitimacy'.*

The theory of *Decision Modelling in Policy Management* focuses on policy related decision problems. By using its conceptual and theoretical handles, this study develops a structured approach to European regulatory mode decision-making, which is largely based on the decision support method of multi-criteria analysis.

II RESEARCH QUESTIONS AND RESULTS

To reach its goal of developing a structured approach to regulatory mode decision-making (STARMODE), this study discusses the following five research questions:

1. How can the European electricity system be described and who are the main actors within this system?

The European electricity system is not only characterized by rather complex technical and economic subsystems on a national level but also by several technical, economic, and technical-economic interrelations between these national subsystems. With respect to the European integration of electricity markets, these international relations are becoming increasingly important and, as a result, ask for a more supranational approach of regulation. In fact, the multi-level regulatory framework governing the European electricity system includes an increasing share of rules and regulations that originates, either directly or indirectly, from a European level.

The European Union is a somewhat strange mixture of supranational and inter-governmental bodies. Consequently, no such thing as 'the interest of the EU' exists. Besides the various bodies of the European Union, the European electricity market actor network consists of national governments and the various representative organizations of market parties, transmission system operators, and national regulatory authorities. These different actors all take part in the process of improving the institutional environment of the European electricity system. Consequently, the European electricity market actor network adds yet another complex dimension to the European electricity system.

2. What are the relevant alternatives (*the existing European modes of regulation*) and evaluation criteria (*the general principles of good governance*) in view of the process of regulatory mode decision-making?

Four traditional European modes of regulation can be distinguished (*see Table 2, page 70*). During the course of time, the multi-level character of the European Union's administrative system has resulted in a complex interplay of powers and competencies of public and private actors at various administrative levels. In addition, the type of issues on the European political agenda has changed and EU decision-making has been increasingly criticized. In this setting, new European modes of regulation have emerged over the last decades. These new modes are generally characterized by a high level of flexibility, a relatively low level of direct obligation, a high level of discretion, experimentalism, and coordination, as well as a decentralized participation of stakeholders. Presently, six of such new modes of European regulation can be identified (*see Table 3, page 78*).

To select the appropriate regulatory mode to apply, the alternatives are to be evaluated in terms of the principles of good governance. These principles of good governance can be divided into two categories: criteria that determine the legitimacy of regulation (input factors) and criteria that determine the effectiveness of regulation (output factors).

3. What are the most prominent modes of regulation in view of the European process of electricity market integration and how do these prominent modes of regulation perform on the regulatory mode evaluation criteria?

In view of the European process of electricity market integration, this study identifies the modes of Joint Decision, Comitology, New Instruments, Self-regulation, and the Open Method of Coordination as the most prominent modes regulation. Additionally, the Regulatory Agency is expected to be an important mode of regulation in the future.

A descriptive evaluation of the prominent modes of regulation in terms of the general principles of good governance — the regulatory mode evaluation criteria — reveals that each mode of regulation has its own strengths and weaknesses. Any final evaluation of the regulatory modes therefore depends on the weighing of the individual principles of good governance (criteria), which in turn will be based on the particular policy context of the market integration issue at hand as well as on individual and/or cultural preferences.

4. What features typical of market integration issues and relevant for the process of regulatory mode decision-making can be identified and how can the relation between these features and the regulatory mode evaluation criteria be described?

Increased insight into the relation between the policy context of a market integration issue at hand and the principles of good governance — the regulatory mode evaluation criteria — may help the European Commission choose between the various regulatory mode alternatives. Two types of features describe the relevant policy context of a market integration issue: (i) its issue-specific characteristics and (ii) its issue-specific regulatory needs.

To stimulate and assist the decision maker in translating the nature of a market integration issue at hand into these types of features, this study makes a general inventory of characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making (*see Table 13, page 206*). This inventory is made by means of case study exploring three market integration issues (cases) in the field of electricity, i.e. (i) *interconnector investment*, (ii) *congestion management*, and (iii) *market transparency*. The central idea behind this case study is that the relevant features can only be identified if one dives sufficiently deep into the individual cases. In order to attain such level of depth, an explicit present-day question of importance is examined in detail for each case (*see chapters 9-11*). These questions[93] are:

- *Interconnector investment:* can the (perceived) lack of interconnector investment be explained based in its economic rationale and/or relevant regulatory framework?
- *Congestion management:* what will be the technical and economic effects of introducing flow-based market coupling in the Central-West European region?
- *Market transparency*: what are the aspects to consider in the process of increasing the level of market transparency in today's European electricity wholesale markets?

In addition to the general inventory of features which are typical of market integration issues and relevant for the process of regulatory mode decision-making, this study develops a set of profiles describing the relation between these features and the general principles of good governance (the regulatory mode evaluation criteria).

5. Can a structured approach to European regulatory mode decision-making (STARMODE) be established, and if yes, is the approach considered useful with respect to its goal?

To facilitate the practical application of the STARMODE approach, a decision support tool is built in Microsoft Excel. In this tool, the general inventory of characteristics and regulatory needs typical of market integration issues and relevant for the process of regulatory mode decision-making is translated into a set of twenty-two explicit (multiple-choice) questions. By means of these questions, the decision maker indicates which issue-specific characteristics and/or regulatory needs he considers relevant (applicable) with respect to the market integration issue at hand. Furthermore, the decision maker specifies (i) to what extent he considers the relevant issue-specific characteristics applicable to the issue at hand, and (ii) how important he judges the relevant regulatory needs. Based on this input of the decision maker, the decision support tool automatically computes the final preference order of the regulatory mode alternatives.

Two test sessions (including both scientists and professionals) show that the STARMODE approach can be applied in practice and that the approach is considered of use with respect to the four objectives of:

- Creating a common, structured, and comprehensive basis for discussing regulatory mode decisions,
- Helping European policy makers to examine the specific policy context of a certain market integration at hand in a more structured and informed way,

[93] See section 13.3 (page 237) for the answers to these three specific questions.

- Stimulating a careful consideration of all principles of good governance (including legitimacy principles), and
- Contributing to a higher level of European transparency with respect to regulatory mode decisions.

In particular, the STARMODE approach may be of use during the preparation of European regulatory proposals by contributing to an improved impact assessment (discussed below).

III RECOMMENDATIONS TO THE EUROPEAN COMMISSION

Currently, the analytical steps of the impact assessment accompanying a regulatory proposal of the European Commission are: (i) identifying the problem, (ii) defining the policy objectives, (iii) developing policy options, (iv) analyzing their impacts, (v) comparing the policy options, and (vi) organizing future monitoring and evaluation. With respect to this impact assessment, this study suggests that:

- The STARMODE approach is used as a tool to systematically describe a market integration issue at hand in terms of its specific characteristics and regulatory needs,
- The choice of which regulatory mode to apply forms an explicit and separate step of the impact assessment, and that
- The STARMODE approach is used to provide a structured and well-founded explanation of why one has decided to apply (or not to apply) a particular regulatory mode.

With respect to these recommendations, it is emphasized that:

- The main intention of the STARMODE approach is to induce a mind shift concerning the way in which the process of European regulatory mode decision-making is performed and to create a common, structured, and comprehensive basis for discussing regulatory mode decisions. The objective of STARMODE's rather arithmetical approach to regulatory mode decision-making is explicitly not that European policy makers indiscriminately apply the regulatory mode that is most preferred according to STARMODE's final preference assessment.
- The STARMODE approach evaluates the modes of regulation on an individual basis. However, in practice, the regulatory strategy mostly consists of a combination of regulatory modes. This notion once again emphasizes the importance of considering the STARMODE approach not more than a decision support tool.
- Only when the decision maker has substantive knowledge of the market integration issue at hand, the STARMODE approach can bring real benefit to the process of regulatory mode decision-making.

SAMENVATTING

I DOEL VAN ONDERZOEK EN ONDERZOEKSMETHODE

Dit proefschrift richt zich op de processen waarmee het reguleringskader met betrekking tot de Europese elektriciteitsmarkten — en daarmee hun integratieproces — wordt ontwikkeld. Europese beleidsmakers hebben tot dusver hoofdzakelijk een 'trial-and-error' benadering gevolgd voor het vinden van de juiste reguleringsmethodiek om marktintegratie-issues effectief het hoofd te kunnen bieden. Deze ongestructureerde selectie van de te volgen reguleringsmethodiek kan tot verschillende problemen leiden:

- De huidige 'trial-and-error' strategie van het verspringen van de ene reguleringswijze naar de ander is tijdrovend.
- In het selectieproces wordt onvoldoende rekening gehouden met bepaalde beginselen van good governance.
- Belanghebbenden buiten de Europese politieke arena beschouwen Europese reguleringsprocessen als vaag, intransparant en onrechtmatig.

Gegeven deze probleemstelling is het hoofddoel van dit onderzoek:

> Het ontwikkelen van een ***gestructureerde methode voor het selecteren van de te volgen Europese reguleringsmethodiek*** met het doel de Europese Commissie in staat te stellen evenals te stimuleren om vooraf meer doordachte beslissingen te nemen over de wijze waarop zij het reguleringskader met betrekking tot Europese elektriciteitsmarkten — en daarmee hun integratieproces — creëert

Hierbij wordt de aanname gemaakt dat de algemene beginselen van good governance, bestaande uit zowel effectiviteits- als legitimiteitsaspecten, het afwegingskader van de probleemeigenaar vormen en daarmee ook de criteria waarop de verschillende Europese reguleringsmethodieken worden getoetst. De uitdaging voor de probleemeigenaar — de Europese Commissie — kan daarom worden geherformuleerd als '*het selecteren van een reguleringsmethodiek waarmee het voorliggende marktintegratie-issue op een effectieve wijze kan worden opgelost waarbij tegelijkertijd een voldoende niveau van legitimiteit wordt gewaarborgd*'.

De theorie van '*Decision Modelling in Policy Management'* richt zich op beleidsgerelateerde besluitvormingsvraagstukken. Door middel van haar conceptuele en theoretische handvatten, ontwikkelt dit onderzoek een gestructureerde methode ten behoeve van het besluitvormingsproces over de te volgen reguleringsmethodiek, welke grotendeels is gebaseerd op de besluitvormingsmethode van multicriteria-analyse.

II ONDERZOEKSVRAGEN EN RESULTATEN

Om zijn doel te bereiken beantwoordt dit onderzoek de volgende vijf onderzoeksvragen:

1. Hoe kan het Europese elektriciteitssysteem worden beschreven en wie zijn de belangrijkste actoren in dit systeem?

Het Europese elektriciteitssysteem wordt niet alleen gekarakteriseerd door vrij complexe technische en economische subsystemen op nationaal niveau maar ook door diverse technische, economische en technisch-economische relaties tussen deze nationale subsystemen. Met het oog op de Europese integratie van elektriciteitsmarkten worden deze internationale relaties steeds belangrijker en groeit de behoefte aan een meer supranationale wijze van regulering. Het gelaagde reguleringskader met betrekking tot Europese elektriciteitsmarkten bevat dan ook steeds meer wet- en regelgeving die direct dan wel indirect afkomstig is van Europees niveau.

De Europese Unie is een wat vreemde mengelmoes van supranationale en intergouvernementele instanties. Als gevolg hiervan bestaat er niet zoiets als 'het belang van de EU'. Naast de verschillende instanties van de Europese Unie, bestaat het actorennetwerk van de Europese elektriciteitsmarkt uit de nationale overheden en de verschillende representatieve organisaties van marktpartijen, TSOs en nationale toezichthouders. Al deze verschillende actoren participeren in het proces tot verbetering van de institutionele omgeving van het Europese elektriciteitssysteem. Het actorennetwerk van de Europese elektriciteitsmarkt voegt daarom nog een complexe dimensie toe aan het Europese elektriciteitssysteem.

2. Wat zijn de relevante alternatieven (bestaande Europese reguleringsmethodieken) en toetsingscriteria (de algemene beginselen van good governance) met het oog op het besluitvormingsproces betreffende de te volgen reguleringsmethodiek?

Vier traditionele Europese reguleringsmethodieken kunnen worden onderscheiden (*zie Table 2, pag. 70*). In de loop der jaren, heeft het gelaagde karakter van het bestuurlijke system van de Europese Unie geresulteerd in een complexe wisselwerking tussen de invloeden en bevoegdheden van de verschillende publieke en private actoren in de verschillende bestuurlijke lagen. Daarbij is de aard van de issues op de Europese politieke agenda veranderd en is het Europese besluitvormingsproces steeds meer bekritiseerd. In deze setting zijn gedurende de laatste decennia verschillende nieuwe Europese reguleringsmethodieken ontstaan. In het algemeen worden deze nieuwe reguleringsmethodieken gekarakteriseerd door een hoge mate van flexibiliteit, een relatief laag niveau van verplichting, een hoge mate van discretie, experimentatie en coördinatie, alsmede een gedecentraliseerde participatie van belanghebbenden. Momenteel kunnen er zes van dergelijke nieuwe reguleringsmethodieken worden onderscheiden (*zie Table 3, pag. 78*).

3. Wat zijn de meest prominente reguleringsmethodieken met het oog op het Europese integratieproces van elektriciteitsmarkten en hoe scoren deze prominente reguleringsmethodieken op de verschillende toetsingscriteria?

Met betrekking tot het Europese integratieproces van elektriciteitsmarkten identificeert dit onderzoek Joint Decision, Comitology, New Instruments, Self-regulation en de Open Method of Coordination als de meest prominente reguleringsmethodieken. Daarbij wordt verwacht dat de Regulatory Agency een belangrijke reguleringsmethodiek zal vormen in de toekomst.

Een descriptieve toetsing van de prominente reguleringsmethodieken op de algemene beginselen van good governance — de toetsingscriteria — laat zien dat elke reguleringsmethodiek haar eigen sterktes en zwaktes heeft. Een beslissend oordeel zal daarom afhangen van het gewicht dat aan elk individueel beginsel van good governance (toetsingscriteria) wordt toegekend. Dit gewicht zal op zijn beurt weer afhangen van de specifieke beleidscontext van het voorliggende marktintegratie-issue en van individuele en/of culturele voorkeuren.

4. Welke aspecten kenmerkend voor marktintegratie-issues en relevant voor het besluitvormingsproces betreffende de te volgen reguleringsmethodiek kunnen worden geïdentificeerd en hoe kan de relatie tussen deze aspecten en de criteria (waarop de reguleringsmethodieken worden getoetst) worden beschreven?

Meer inzicht in de relatie tussen de beleidscontext van een voorliggend marktintegratie-issue en de beginselen van good governance — toetsingscriteria — zou de Europese Commissie kunnen helpen kiezen tussen de verschillende reguleringsmethodieken. Twee soorten aspecten beschrijven de relevante beleidscontext van een marktintegratie-issue: (i) zijn issuespecifieke eigenschappen en (ii) zijn issuespecifieke regulatorische behoeftes.

Om de besluitvormer te helpen en stimuleren de aard van een voorliggend marktintegratie-issue te vertalen in dergelijke aspecten maakt dit onderzoek een algemene inventarisatie van eigenschappen en regulatorische behoeftes kenmerkend voor marktintegratie-issues en relevant voor het besluitvormingsproces betreffende de te volgen reguleringsmethodiek (*zie Table 13, pag. 206*). Deze inventarisatie wordt gemaakt door middel van een casestudy waarbij drie marktintegratie-issues (casussen) op het gebied van elektriciteit worden onderzocht, te weten (i) *investeringen in interconnectoren*, (ii) *congestiemanagement* en (iii) *markttransparantie*. Het centrale idee achter deze casestudy is dat de relevante aspecten alleen maar kunnen worden geïdentificeerd wanneer men diep genoeg in de individuele casussen duikt. Om een dergelijk niveau van diepte te bereiken wordt voor elke casus een belangrijk, expliciet en hedendaags vraagstuk in detail bestudeerd (*zie hoofdstukken 9-11*). Deze vraagstukken[94] zijn:

- *Investeringen in interconnectoren:* kan het gebrek aan investeringen in interconnectoren worden verklaard op basis van economische gronden en/of het relevante reguleringskader?
- *Congestiemanagement:* wat zullen de technische en economische effecten zijn van de introductie van flow-based congestiemanagement in de 'Central-West' Europese regio?
- *Markttransparantie*: met welke aspecten dient men rekening te houden in het proces ter verhoging van het niveau van markttransparantie in de huidige Europese elektriciteitsgroothandelsmarkten?

Naast de algemene inventarisatie van aspecten kenmerkend voor marktintegratie-issues en relevant voor het besluitvormingsproces betreffende de te volgen reguleringsmethodiek, ontwikkelt dit onderzoek een aantal profielen welke de relatie beschrijven tussen deze aspecten en de algemene beginselen van good governance (de toetsingscriteria).

5. Kan een gestructureerde methode voor het selecteren van de te volgen Europese reguleringsmethodiek (STARMODE) worden ontwikkeld, en zo ja, wordt een dergelijke methode bruikbaar geacht met het oog op zijn doel?

Om de toepassing van de STARMODE-methode in praktijk te faciliteren is een beslisondersteunende tool gemaakt in Microsoft Excel. In deze tool is de algemene inventarisatie van eigenschappen en regulatorische behoeftes kenmerkend voor marktintegratie-issues and relevant voor het besluitvormingsproces betreffende de te volgen reguleringsmethodiek vertaald in een reeks van tweeëntwintig expliciete (meerkeuze)vragen. Door middel van deze vragen kan een besluitvormer aangeven welke issuespecifieke eigenschappen en/of regulatorische behoeftes hij relevant acht met betrekking tot het voorliggende marktintegratie-issue. Voorts kan de besluitvormer met het oog op het voorliggende issue aangeven (i) in welke mate hij de relevante eigenschappen van toepassing acht en (ii) hoe belangrijk hij de relevante regulatorische

[94] Zie paragraaf 13.3 (pagina 237) voor de antwoorden op deze drie specifieke vragen.

behoeftes acht. Op basis van deze input van de besluitvormer berekent de tool automatisch wat de uiteindelijke voorkeursvolgorde is van de verschillende reguleringsmethodieken.

Twee testsessies (met daarin zowel wetenschappers als professionals) laten zien dat de STARMODE-methode kan worden toegepast in praktijk en dat de methode bruikbaar wordt geacht met betrekking tot de volgende vier doelstellingen:

- Het creëren van een algemene, gestructureerde en uitgebreide basis om beslissingen over de te volgen reguleringsmethodiek te bediscussiëren,
- Het helpen van Europese beleidsmakers om de specifieke beleidscontext van een voorliggend marktintegratie-issue op een meer gestructureerde en doordachte wijze te onderzoeken,
- Het stimuleren van een zorgvuldige afweging van alle beginselen van good governance (inclusief legitimiteitsbeginselen), en
- Het bijdragen aan een hoger niveau van transparantie betreffende Europese beslissingen over de te volgen reguleringsmethodiek.

De STARMODE-methode kan vooral van nut zijn bij de voorbereiding van Europese reguleringsvoorstellen door bij te dragen aan een verbeterde 'impact assessment' (zie hieronder).

III AANBEVELINGEN AAN DE EUROPESE COMMISSIE

Momenteel bestaan de analytische stappen van de 'impact assessment' die een reguleringsvoorstel van de Europese Commissie vergezeld uit: (i) het identificeren van het probleem, (ii) het definiëren van de beleidsdoelen, (iii) het ontwikkelen van beleidsalternatieven, (iv) het analyseren van hun effecten, (v) het vergelijken van de beleidsalternatieven, en (vi) het organiseren van toekomstige monitoring en evaluatie. Met oog op deze 'impact assessment' stelt dit onderzoek voor dat:

- De STARMODE-methode wordt gebruikt als een tool om een voorliggend marktintegratie-issue systematisch te beschrijven in termen van zijn specifieke eigenschappen en regulatorische behoeftes,
- De keuze van de te volgen reguleringsmethodiek een separate en expliciete stap vormt in de 'impact assessment', en dat
- De STARMODE-methode wordt gebruikt om een goed gestructureerde en gefundeerde verklaring te geven over waarom men heeft besloten om een bepaalde reguleringsmethodiek toe te passen (of niet toe te passen).

Met betrekking tot deze aanbevelingen wordt benadrukt dat:

- Het primaire doel van de STARMODE-methode is om een 'mind shift' teweeg te brengen met betrekking tot de wijze waarop het besluitvormingsproces over de te volgen Europese reguleringsmethodiek plaatsvindt en om een algemene, gestructureerde en uitgebreide basis the creëren om beslissingen met betrekking tot de te volgen reguleringsmethodiek te bediscussiëren. Het doel van STARMODE's vrij rekenkundige aanpak ten aanzien van het besluitvormingsproces over de te volgen reguleringsmethodiek is expliciet niet dat Europese beleidsmakers lukraak de reguleringsmethodiek toepassen die de meeste voorkeur geniet op basis van STARMODE's definitieve voorkeursbepaling.
- De STARMODE-methode evalueert de verschillende reguleringsmethodieken op een individuele basis. In praktijk bestaat de regulatorische strategie echter veelal uit een combinatie van reguleringsmethodieken. Deze notie benadrukt nogmaals het belang om de STARMODE-methode als niets meer dan een beslisondersteunende tool te beschouwen.
- De STARMODE-methode kan alleen een positieve bijdrage leveren aan het besluitvormingsproces omtrent de te volgen reguleringsmethodiek wanneer de besluitvormer beschikt over substantiële kennis over het voorliggende marktintegratie-issue.

CURRICULUM VITAE

Hanneke de Jong was born on 2 August 1979 in Bleskensgraaf, the Netherlands. From 1997 until 1998, she studied Economics at the Erasmus University Rotterdam. After receiving her 'propadeuse', she moved to Delft to continue her study at the Faculty of Technology, Policy, and Management of the Delft University of Technology. Her main interest was in energy technology and energy markets. During her internship in 2002, she designed a sustainable energy system for Plantages Portomari in Curacao. Hanneke performed her Master's thesis — focussed on distributed generation — at the Transmission & Distribution department of KEMA Nederland. She graduated in 2003 (cum laude). From 2003 to 2008, Hanneke worked for the Dutch Office of Energy Regulation. In 2004, she commenced her Ph.D. studies with the Energy & Industry section of the Faculty of Technology, Policy, and Management (TU Delft) on a part-time basis. Hanneke left the Dutch Office of Energy Regulation in April 2008 to finish her PhD thesis on a fulltime basis. In April 2009, she joined energy company Essent as a Senior Officer Regulatory Affairs.

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