SHRINKAGE

THE CHALLENGE OF RE-STRUCTURING THE CITY

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1. INTRODUCTION

How can we handle the impacts of shrinking on urban fabric? Such questions have started to take place in urban discourse in the recent years. For a long time, the fundamental matter of urban planning was how to manage the growth of cities. However, now shrinking cities are increasingly attracting the attention of researchers and urban policy makers and not without reason (Mace et al., 2007). The question of shrinking is not only raised in the classical industrial regions in the developed states of Europe, but also in North America and Asia. Recently, a number of studies are initiated to understand this world-wide phenomenon and develop creative solutions to deal with it. The IBA Urban Development 2010 and the Shrinking Cities are two comprehensive projects dedicated to the subject, which took start in 2002 and are still in progress. In addition to these, the shrinking issue has been included in EU policies for sustainable urban development.

This research focuses on the challenge to view urban development the other way around. The demographic changes (both in size and profile of population) demands creative input from urban planning and design. Till now, decline in population has been perceived as a threat against the urban character of cities. However, it is possible to view the social, economic and physical changes as a challenge. The shrinking context offers new opportunities to restructure the urban space. The key question is “how to translate these opportunities into urban development?”. That is the very aim of this research to explore.

Figure 1. The poster for the international ideas competition: “Shrinking Cities - Reinventing Urbanism” (source: http://www.shrinkingcities.com/, June 2009)
2. PROBLEM FIELD

What is meant by ‘shrinkage’?
The phenomenon of shrinking covers different definitions: from political-economic perspective shrinking cities are defined as cities with declining economy, whereas sociological and urban planning perspectives define shrinking cities as cities with a decline in population (Andersen, 2005). In this research, the term ‘shrinking’, refers to population decline and thus reduced average population densities. The demographic changes constitute the core of our discussion, together with a certain consideration of the political and economic aspects.

Why are we discussing shrinkage?
The demographic indicators point out an overall increase in the world population. The countries continue to grow, many cities are prospering and expanding (see figure 2). However, growth is only one side of the coin. On the other side, a significant number of cities are experiencing reduction in population. During the last 20 years, more than a quarter of world’s largest cities shrank (Oswalt, 2006; see figure 3). The decline of population is most severely observed in western industrialized countries, including the Netherlands. Today, for increasing number of cities especially in the northern and southern parts of the country, economic and demographic indicators point towards stagnation or shrinkage (see figure 4). However it is close and unavoidable, we are not ready to face the decline. This calls for an urgent need for developing new tools to handle the impacts of economic and demographic decline on urban environments.

Figure 2. World map of growing cities between 1980-2000 (source: Oswalt & Rieniets, 2006)
Figure 3. World map of shrinking cities between 1980-2000 (source: Oswalt & Rieniets, 2006)

Figure 4. Forecast changes in household numbers in the Netherlands between 2005-2025 (source: Van Dam et al., 2006)
Shrinking in the history of urbanization

Until the beginning of the modern age, shrinkage and growth were phases of the development of cities which were of equal significance. However, with the start of industrialization around 1800, a unique phase of urban growth was prevailing. In the following 200 years, global urbanization has progressed at a rapid pace: the number of urban residents worldwide has increased 160 times (Oswalt & Rieniets, 2006).

The continuous, intense process of urbanization began around 1750, initially in England and Wales, and gradually transformed all Europe. Between 1800-1900, many cities in Europe like Vienna, Berlin, and London have tremendously multiplied their population. Towards end of the nineteenth century, active urbanization shifted to the United States. American metropolises such as New York, Chicago, and Los Angeles, with their population of millions, epitomized a new form of urbanization and modernization (Eisinger, 2006).

However, after the first half of the twentieth century, the residential population in cities began to subside. As a result of the developments in the United States, suburbia emerged as the new prototype of western living. Under the influence of rising mass car ownership, large numbers of people moved from cities to suburbs (Eisinger, 2006). During the 1950s, the number of shrinking metropolises increased drastically, especially in the northeastern United States. After 1960, the suburbanization process affected cities in other Western industrialized nations like England and Germany, but Japan as well (Rieniets, 2006).

Following the postwar periods, another development led to the decline of cities: deindustrialization. The closure, modernization, or relocation of production locations led to massive losses of jobs; thus causing shrinkage in the former industrial cities of United States, Great Britain, Germany, Italy, France and Japan (Rieniets, 2006). In the 1970s, every third metropolis in these countries was shrinking. However, among them, some cities like London, Madrid, and Munich have managed to show continuing dynamism and avoid shrinking (Rieniets, 2006). On the other hand, other old industrial cities that could not cope with globalization and spread of knowledge economies have been shrinking since the end of 1960s till now.

At the start of 1990s, another shrinking wave struck Eastern Europe. After the collapse of the Soviet Union, many cities in Russia and eastern Germany were thrown into economic and demographic decline. More than 200 large cities in the post-Socialist countries lost population. According to negative demographic indicators, the decline will continue in the future (Rieniets, 2006).

While many Western industrialized cities are losing population, the growing urban populations are increasingly concentrated in lesser developed countries. In the last fifty years, the rate of urbanization increased remarkably in the developing counties of Latin America and Asia (Eisinger, 2006). However, according to UN’s estimates, after 2030 they will also face natural population decline. At the end of twenty-first century, the period of urban growth is expected
to come to a close. After three centuries of the modern period of growth, processes of growth and shrinkage will begin to balance each other out, as it was before the period of industrialization (Oswalt & Rieniets, 2006).

**Reasons of shrinkage**

Shrinkage is not completely a new phenomenon. Through history of urbanization, shrinkage was a part of the development of cities as growth. Cities have been shrinking due to various reasons. Wars, plagues, natural disasters, shift of trade routes have been posing threats to the population of cities (Rieniets, 2006). However, the shrinking that is observed today is distinguished from the prior developments in the contemporary driving factors:

- Low birth rates, aging population
- Increased mobility and suburbanization
- Declining demand for labour and automatization of production
- Migration to more prosperous regions

(Beyer, 2006; Akbar & Kremer, 2005)

According to Hall, shrinkage can take form of population decline, economic decline, or a combination of the two. It is not easily distinguished which is the primary force:

“Decline due to purely demographic forces, particularly diminishing birth rates, may directly lead to an economic downturn as the labour force and the market shrink. Conversely, economic decline due to the contraction of a basic industry, may lead to out-migration and population loss. In deed the two may operate in tandem, in a problematic feedback loop.” (Hall, 2006, p. 144)

**Consequences of shrinkage**

The shrinking cities do not physically shrink in space but lose population, therefore experiencing a reduction in average population densities. When uncontrolled, the decrease in density jeopardizes the quality of urban environment. Density (of inhabitants and/or buildings) can be decreased in a way to produce more livable environments - as done on purpose in some urban renewal projects. Here what we consider as problematic is the uncontrolled abandonment of urban areas by people because of the inconvenient economic, social, or environmental conditions. The unplanned, abrupt changes in population are within the problem field of this research.

In this sense, we can state the problems due to uncontrolled population decline as follows:

- Loss of urban quality and civic facilities
- Being cut off from the economic and communication network
- Discontinuous urban fabric, which creates problems in servicing, maintenance, social security, etc.

(Beyer, 2006)
Scale of shrinkage

Around the world, shrinkage is experienced on different scales. While in some areas, loss of population is observed in regional level, some others are face to local population shifts within the boundaries of the same municipal territory. It is a significant difference whether a city expands into the surrounding region and the city core loses inhabitants for that reason, or whether cities lose inhabitants, labour force, consumer potential and industry through migration to other regions (Akbar & Kremer, 2005). Sometimes these drivers together cause the shrinkage of urban areas. The focus of this research is on the regional shrinkage. Therefore the research cases and the specific study area are chosen as representatives of cities that loose population due to demographic and economic factors in their region.

3. AIMS OF THE PROJECT

Shrinking implicates a fear scenario for both urban policy makers, private investors and also citizens. From economic perspective it means lack of demand and lost profits for investors. The decline of the economic value results in high vacancy rates. The weakest building stock lose attraction, gradually decay and become abandoned. From social perspective, the increasing vacancy means a deteriorating environment. The urban area becomes perforated by abandoned buildings. The residents who prefer to stay (or do not yet have the chance to leave the area), are affected by the physical decay of their living environment both psychologically and physically through increasing crime rate or inadequate public amenities.

Despite this negative picture, it is possible to see shrinking as an opportunity for re-structuring our cities. Taking shrinkage as a form of loosening of urban space, a positive approach can be developed. ‘An orderly retreat’ may bring values that do not exist in populated areas. In this sense, the project looks for ways to direct the transformation in shrinking areas toward a less dense, more livable and healthy environment. The first target is to improve the living conditions of current residents that they no longer need to leave the area. After stabilizing the population, the second target is to attract new residents and investors through offering unique urban quality. To realize these, there is the need for developing design solutions to create places of identity and high urban quality which will increase the attractiveness of the area. On the other hand, the role of planning is to control where and to what extent demolition is undertaken, where public spaces emerge, and how they can be meaningfully linked. However, the physical transformation of shrinking areas is subject to a complex set of constraints as

- limited public funds
- high risks for private investors
- heterogeneous ownership structure
- multiplicity of actors involved and their different economic and psychological needs
- the reduced power of urban planners/designers as opposed to the unpredictable and unsystematic nature of spatial processes in shrinking.
Considering these constraints, the project aims to develop a comprehensive strategy that
• allows collaboration between the different agents involved in the urban transformation process
• consists of different interventions at different scales; from region to the building block
• brings lasting solutions rather than short-term, quick-fix ones
• uses the potentials of the specific area to reach urban distinctiveness
• makes a link between the unsystematic, self-driven processes of shrinking and the unambiguous, definitive planning control.

4. RESEARCH QUESTIONS

Main research questions
• What are the urban design tools to develop a sustainable urban structure for shrinking Heerlen?
• How can the existing housing stock and infrastructure be adapted to demographic trends and changing needs?
• What are the potentials in shrinking to rediscover the qualities of the specific Southern-Limburg landscape and incorporate it to living quality?

Secondary research questions
• How can the emerging open space be structured to create an attractive urban landscape?
• What does infrastructure mean for shrinking cities in the culture of mobility?
• How can ‘creative destruction’ and reconstruction take place at the same time?

5. DEFINITIONS

Having mentioned a comprehensive strategy and sustainable urban structure as the focus of the project, it is necessary to bring definitions to the terms “urban regeneration” and “sustainability” which will help to develop a multi-dimensional approach to shrinkage in its social, economic, and physical aspects.

Urban regeneration
The approaches and eventually the meaning of urban regeneration change in time as the areas of concern, actors involved in them and scope of regeneration process change. Within last 40 years, the idea of regeneration developed from merely physical renewal of areas towards a more comprehensive approach involving complex social and economical issues (Stouten, 2007; Tsenkova, 2002). The definitions of the term changed in time accordingly. Probably, the most inclusive definition in the literature has been raised by Robert and Sykes. They define urban regeneration as:
“comprehensive and integrated vision and action which leads to the resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social, and environmental condition of an area that has been subject to change” (Roberts & Sykes, 2000).

This definition also puts forward the basic principles of an urban regeneration practice. An important feature is the sustainability. Sustainable dimension has become a part of urban regeneration since the end of the 1980s. Urban regeneration aims lasting solutions in stead of short-term, fragmented, ad hoc and project based interventions (Stouten, 2007).

**Sustainability, Sustainable development**

In the literal sense sustainable development means “development that can be continued either indefinitely or for the implicit time period of concern.” As a term, sustainable development came into prominence in 1980, with the World Conservation Strategy (WCS) as “the overall aim of achieving sustainable development through the conservation of living resources”. Ecological sustainability was the main issue addressed, rather than sustainable development (Lele, 1991). In 1987, World Commission on Environment and Development, promoted a sustainable development: “to ensure that development meets the needs of the present generation without compromising the ability of future generations to meet their own needs.”

Still today, the word sustainability is used with different connotations. Sometimes it is used to refer “ecological sustainability”, which means “the existence of the ecological conditions necessary to support human life at a specified level of well-being through future generations”. Sometimes it is used with fundamentally social connotations, denoting “the ability to maintain desired social values, traditions, institutions, cultures, or other social characteristics” (Lele, 1991).

A recent and more comprehensive definition to sustainable development is done in the European Union Sustainable Development Strategy as follows:

“Sustainable Development stands for meeting the needs of present generations without jeopardizing the ability of future generations to meet their own needs – in other words, a better quality of life for everyone, now and for generations to come. It offers a vision of progress that integrates immediate and longer-term objectives, local and global action, and regards social, economic and environmental issues as inseparable and interdependent components of human progress.” (European Commission, 2009)
6. SOCIETAL AND SCIENTIFIC RELEVANCE

Societal relevance
The residents of the shrinking cities are negatively affected from the consequences of shrinkage in worsening living conditions, cutbacks in transportation systems, reductions in public facilities, low social security etc. On the other side of the coin, the potential growth areas continue to attract investments, thus providing better economic, cultural and social environment. On the one side there is high economic pressure and demand for space, on the other side drop in demand and retreat. This results in an increasing polarization of the social geography between growth and shrinkage regions (Oswalt, 2006). However, the aim of urban planning should be to sustain the fair distribution of opportunities. Despite the pressure for competition in the market; a balanced, even urban development approach is necessary. In this sense, the project seeks ways of balancing differences in living conditions between growth and shrinkage areas. By improving the quality of life in shrinkage areas, the situation that leads to pressure towards polarization should be counteracted.

Scientific relevance
In dealing with shrinking phenomenon, the disciplines of urban development, urban planning, and architecture, which traditionally have been guided by ideas for managing growth, reach their limits (Oswalt, 2006). The strategies pursued thus far have proved unable to formulate a satisfactory response to this unwanted urban change. This calls for an urgent need for developing creative ideas to handle the impacts of economic and demographic decline on urban environments. Accordingly, the project intends to contribute to the discussion in urban planning and design, in order to respond properly to the shrinking cities.

7. THEORETICAL FRAMEWORK

In physical terms, shrinking cities are characterized by perforating urban fabric and decreased density. Gaps in housing blocks, exposed rear walls, empty brown fields dominate the image of cities. This dispersed, haphazard vacancy brings the necessity to determine the formation of the new city structure. While theorizing the new spatial condition in shrinking cities, one should refer to the conception of urbanity in the recent decades. The urban is no longer characterized by physical density, proximity, and centrality. Instead, concepts like the ‘urban network’ or ‘urban field’ are used to define the discontinuity, heterogeneity, and fragmentation of space. Therefore, the new structure of the shrinking city should be discussed in relation to the lifestyles and spatial typologies in contemporary urban culture. Two topics are central in this discussion: mobility networks and emerging landscape patterns.
Mobility networks
As the housing and services become more decentralized and dispersed in space, the demand for transportation increases. The traditional understanding of ‘city center’ is replaced by nodal points along main infrastructures. When we consider the continuous change and dissolving in shrinking areas, the transportation networks gain more importance, not only because they connect different nodes but also because they are constants of this process on which the urban culture can still rely on.

Despite the decreasing density in housing areas, places like supermarkets, gas stations, leisure centers, or metro stations can still generate a kind of urbanity. That makes a well-developed street network and public transportation essential for shrinking cities. In the culture of mobility, spaces for transportation become a part of the public sphere. A local supermarket with its own bakery and newspaper kiosk along the road becomes a meeting point for the residents of the area and also travellers. A gas station supplemented by a book store, coffee shop, or post office becomes a social location that is open for 24-hours. Besides automobile use, the central stations of public transport have also great influence on the typology and structure of this fragmented urban landscape.

Figure 5. Gas station as an urban node (source: http://thefuntimesguide.com/, June 2009)
Emerging landscape patterns
The urban field is an undifferentiated entity without contradistinction between city, suburb and countryside. There is no longer a compact city and landscape around it. Spatial dispersion of activities and increased mobility leads to a new form of irregular landscape. This irregularity becomes more evident in the shrinking context. While the countryside is interrupted by decentralized functions, the urbanized areas are perforated by industrial wastelands and vacant building sites.

The design of open space plays a central role in shrinking areas. The abandoned land creates undefined, vague, unproductive gaps in the urban fabric. However, the emptying space offers an opportunity to restructure the city. A sustainable and attractive urban landscape can be developed through a system of public space with play grounds, communal gardens, parks, forests, agricultural and recreational areas. Finally, this emerging landscape is not patterned according to geometric and perspectival criteria, but by the uses made of it.

Figure6. Emerging landscapes in shrinking areas (source: Oswalt, 2006)

(Note: For the whole theory paper see Appendix)
8. METHOD

While taking position towards the built environment; historical-cultural, physical, functional, financial and ecological aspects need to be balanced. Besides this multidisciplinarility, the relation between research-design-policy should be defined. This project follows a design-oriented research approach which aims to set the basis for policy and strategic management of the environment.

![Diagram](image)

Figure 7. Approaches to the built environment (source: Doevendans, 2002)

The working method includes:
- overview of the recent theories on ‘urban networks’ and ‘urban field’ (theoretical framework)
- analysis of urban areas which are representative of shrinking processes in post-industrial areas and their experiences in dealing with shrinkage (case studies)
- developing scenarios for possible shrinkage patterns in Heerlen (spatial scenarios)
- analysis of the area in its different layers (cultural landscape, geomorphology, urban landscape, program, mobility networks) and on different scale levels (urban analysis)
- typological research on building and settlement history in the region Southern-Limburg (typological research)
- proposing a set of interventions at different scale levels (interventions)
- evaluation of the proposal in relation to the approaches in other shrinking cases and the policy in Heerlen (evaluation)
Figure 8. Working method
9. CASE STUDIES

About using case studies

Case studies have been used in various disciplines, particularly in sociological studies. Probably the most prominent theories about the methodology have been developed by Yin. The procedures developed by him are helpful for any scientific field. The procedures followed in this research are therefore based upon the four stages recommended by him:

1. Design the case study protocol:
   a. determine the required skills
   b. develop and review the protocol
2. Conduct the case study:
   a. prepare for data collection
   b. distribute questionnaire
   c. conduct interviews
3. Analyze case study evidence:
   a. analytic strategy

Another issue is to construct the validity of the research. Yin suggests using multiple sources of evidence to ensure validity. Accordingly, this research refers to various sources of data like: documentation, archival records, interviews, direct observation, participant observation, and physical artifacts.

The four shrinking cases

In order to understand shrinking in different contexts, four old industrial locations are studied: Manchester (England), Leipzig (Germany), Ruhr Area (Germany), and Heerlen (Netherlands), the latter is also the location of design task. The main reasons for selecting these locations are as follows:

• They reflect some common tendencies in urban development in terms of de-industrialization and population shift
• Manchester, Leipzig, Ruhr are considered as pioneer shrinking areas which started to develop strategies to deal with shrinkage before others, and already reached some results
• According to the demographic indicators, Heerlen is one of the cities in Netherlands which faces the population decline at peak. The governments have already set certain visions to overcome the negative consequences of shrinkage in regional and local level.

The cases are analysed in terms of their transformation due to demographic and economic changes. First, the urban development of each city in history is studied through maps showing different stages of the city form from the pre-industrial to the post-industrial times. The aim is to see the different patterns of growth and shrinkage in each city. Following this morphological analysis the attempts of the governments in coping with shrinkage are examined. The realized and future plans of Manchester, Leipzig, and Ruhr area are assessed in order to take
lessons for the Heerlen case. The interventions are analysed both in spatial and programmatic terms. In the conclusion part, the strategic visions and projects are compared in terms of their **financing structures, scale and scope of interventions, involved actors and their influence on processes of shrinking.**

**Case 1: Leipzig**

**History of urban development**
In 1860, before industrialization, the city had only 75,000 inhabitants. It was characterized by a city core surrounded by villages and agricultural land. However, till 1890, due to the rapid industrialization, an immense growth was experienced in population, up to 295,000. Residential quarters started to develop around the previous city core, urbanizing the villages and agricultural landscape. Plagwitz and Lindenau became the first industrial cores in the southwest of the city. By 1940, the population reached peak: 700,000. The city extended largely towards the periphery. New developments were also observed in the city center. After the war, the population decreased to 617,000. Some of the buildings were destroyed but not as severe as in other German cities. The basic spatial structure of the city was preserved. Till 1989, the population declined to 530,000. However the building activity continued, especially on the fringe of the city. Large settlements like Grünau and Paunsdorf (on the southwest and north-east) have been constructed during 1970s and 1980s. After the German reunification, the city lost 100,000 inhabitants. Suburbanization on the outskirts was dominant in 1990s. Despite the population loss, the city continued to grow in physical expanse (Plöger, 2007).

![Decaying pre-1918 housing stock and mass-built estates in Leipzig](source: Plöger, 2007)

Figure 9. Decaying pre-1918 housing stock and mass-built estates in Leipzig (source: Plöger, 2007)

The following six maps (Figure 10) display different phases during the urbanization of the city from mid-ninetieth century till now:
Figure 10. History of urban development in Leipzig (source: adapted from: City of Leipzig, 2009)
Planning and design approach to shrinkage

The urban regeneration policy in Leipzig is a part of the state development program Stadtumbau Ost (Urban Restructuring in Eastern Germany). The focus of this program is on demolishing the vacant housing stock in Germany’s shrinking cities. Accordingly, the master plan of the City Leipzig prepared in 2006 (Planwerk Stadtraum, see Figure 10) has two major aims:

• to define where the demolition (20% of total housing) will take place
• to transform the demolished building sites and left over brown fields into public space network of the city.

While doing these, the landscape design gains a central role in the master plan. The shrinkage mainly takes place along the watercourses and landscape wedges that run radially through the city. Along these green and blue belts, the urban land is given back to the natural landscape (see figure 12). On the other hand, renovation and densification strategies are applied to other housing areas, especially inner-city districts. According to the plans; 20,000 residential units will be demolished, 10,000 apartments will be refurbished, and new single-family dwellings will be developed by 2010. (City of Leipzig, 2009)

Figure 11. Developed green areas (top-left), refurbished blocks (top-right), neighbourhood parks (bottom-left) and new town-houses (bottom-right) (source: Plöger, 2007)
Figure 12. Planwerk Stadtraum Leipzig: improved green belts and new building developments (adapted from: City of Leipzig, 2009)
Case 2: Manchester

History of urban development
The world’s first industrial city, Manchester, started to take shape by 1750s. With the beginning of manufacture and trading activity, the first industrial canals were opened. The city was characterized by a central core divided by the canals. By 1800s, the city doubled its population to 80,000. During the following century, the city continued to grow at a rapid pace. As the city grew, the residential conditions in the inner city became worse, and first suburbs appeared around the city. By 1930s, the population reached a peak of 766,000, and housing problem grew as well. Therefore, new towns were planned outside the city. The garden city movement arose as a solution to the slum problem. It has been effective in building new towns in the post-1945 era. We can see from the maps (see figure 5) that after 1940s, the largest growth occurs outside the city center, while the inner city areas stagnate and even decay. Between 1954-1976, 90,000 dwelling were demolished as a solution to decaying 19th century housing stock. In stead 71,000 new houses were built beyond the city boundaries. The extensive growth of suburbs created problems in the inner city, therefore by 1980s, regeneration of the inner city became an important issue. Attention was paid on the inner city development to stop urban sprawl. By the end of 1990s, the efforts for regeneration and revitalization of city started to give results. The process of shrinkage began to slow down however the city still lost about 45,000 of its population in last 20 years (Oswalt, 2004).

Figure 13. Vacant tower block and old warehouses in Manchester (source: Oswalt, 2004)
Figure 14. History of urban development in Manchester
(source: drawn from the base maps available at: www.rural-roads.co.uk/.../manchester.shtml, January 2009)
Planning and design approach to shrinkage

The response of Manchester to the shrinking phenomenon is characterized by the attempt to introduce new economies and attract residents back from its suburban hinterland. The aim is to produce 15,000 new jobs and double the population. The idea of compact city is highly promoted.

The revival of the inner city is based on a series of strategic large projects such as Commonwealth Games, Millennium Stadium, The Bridgewater Concert Hall and the Imperial War Museum. These projects aim to transform the image of the city and invite exogenous users. The long-term vision is to change from an industrial city to a service-based city. Thus, the strategies are centered on promoting the city’s cultural, high-tech, and scientific base, and emphasizing the role of the airport to attract international investments.

The regeneration plans also include construction of 12,500 new houses and improvement of the degraded ones. An area with a mix of new housing types is designed next to the city center. Housing developments aim to create the city center living idea and attract new residents (Oswalt, 2004).

Figure 15. Imperial War Museum (top-left), Millennium Stadium (top-right), luxury flats (bottom-left) and public space developments (bottom-right) (source: http://www.panoramio.com/, June 2009)
**Case 3: Ruhr Area**

**History of urban development**
Before industrialisation began in the early 19th century, the region was mostly agrarian. Duisburg and Dortmund were the main urban centers. By 1800s, the coal mining and iron/steel industry started. By the expansion of industry and increase of population, former villages experienced rapid growth and developed into cities. Between 1840-1890 the population of the region raised from 100,000 to half a million. During industrialization, the individual city boroughs and urban districts of the Ruhr Area grew independently of one another. The economic boom raised the number of workers so much that housing facilities couldn’t be found in the existing rural settlements. Therefore, the coal mining industry was forced to build new housing quarters (colonies) in the neighbourhood of the shafts, which were far away from existing settlements. This resulted in a new, irregular mosaic of industrial and housing areas scattered according to the geographic conditions.

The area stayed as the largest industrial region in Europe, till the World War 2 when 30% of the region was destroyed because of bombing attacks. After 1940s, the industrial activity, thus urban growth stagnated. The region has been losing population due to de-industrialization since 1960s. (Wehling, 1982)

![Industrial landscape of Ruhr Area before regeneration (source: http://yclee2cents.blogspot.com/2008/06/2-cents-same-but-different.html, June 2009)](image-url)
Figure 17: History of urban development in Ruhr Area (source: adapted from Wehling, 1982)
Planning and design approach to shrinkage

The regeneration approach in Ruhr area can be defined as a real “regeneration without growth”. Here it is realized that traditional principles of urban redevelopment could not be applied. At the programmatic level the mission of Ruhr area is to facilitate the reuse of the massive industrial wastelands into a network of regional open space and recreational areas using sound ecological planning principles. In stead of searching means of urban growth, the former urbanized (and vacant) land is given back to the landscape. The brownfield land is replanted to create new parks and recreation areas. By this way, a high quality living environment is created for the current population living in the area. Besides the Landscape Park and preservation of industrial monuments, there are projects concerning new housing development and rehabilitation of existing ones. Their planning strategy contains the following fundamental elements:

• Re-utilizing land to prevent additional exploitation of “greenfields”, or previously undeveloped land.
• Employing maintenance, modernization, and re-use strategies for existing buildings to extend the life of buildings.
• Incorporating ecologically-sound construction practices for both new buildings and adaptive reuse.
• Transforming the region’s production structure towards environmentally friendly production methods. (Internationale Bauausstellung Emscher Park, 2009)

![Image](http://www.archined.nl/, June 2009)

Figure 18. Duisburg-nord Landscape Park (top, bottom-left) and Zollverein in Essen (bottom-right) (source: http://www.archined.nl/, June 2009)
Figure 19. Regeneration strategy in Emscher Park; participants, master plan and leading projects (Atelier Zuidvleugel, 2009)
Case 4: Heerlen

History of urban development

Before industrialization Heerlen was a small settlement lying on the intersection of transport routes. The rural landscape around this intersection was characterized by smaller developments scattered through the agricultural land. The total population together with the hamlets was only 3,000. By the introduction of first mining industries at the end of 19th century, the city got its first railway connection to allow the transportation of coal from the first coal mines. The urban development was still slow in early 1900; however the state-operated coal mines triggered the sharp increase of population to 32,000 in 1930s. The city expanded along north-west and south-east axis, along which the main mining colonies were placed. The development continued until 1950s. The age of coalmining ended in Heerlen because of the competition from cheaper energy sources in other locations. Between 1965-1975 most of the coalmines were closed. Due to the job loses, the city lost population. Accordingly, the urban development stagnated since 1960s. Still some small neighbourhoods were developed on the periphery in the last 50 years. As a result the city reached its current fragmented form with isolated residential quarters, vacant brownfield areas, stream valleys and landscape corridors (Gemeente Heerlen, 2009).

Figure 20. The former mining area Oranje Nassau I (top), demolition of mining towers (bottom) (source: http://www.verreverwanten.nl/radio/2339.html, June 2009)
Figure 21. History of urban development in Heerlen
Planning and design approach to shrinkage

The focus of regeneration plans in Heerlen is on the improvement of housing areas. While the general expected population decline is about 17% in the whole city, in certain districts the shrinking provision reaches 25%. Among these districts, MSP (Meezenbroek, Schaesbergerveld, Palemig) is chosen as one of the ‘40 krachtwijken’ in the Netherlands which calls for urgent transformation plans. The housing stock of the area consists of mostly apartments (33%) and row housing (55%). The vacancy rates are highest in apartments therefore their demolition is in the agenda. There are already plans made by the municipality in collaboration with the housing companies for their demolition and reconstruction of new housing and commercial complexes. In addition to these, other houses which are in bad condition will be renovated.

Another important issue in governmental plans is the improvement of the mobility networks. A ring road (Parkstadring) is planned around Parkstad Limburg, that will connect Heerlen, Brunssum, Landgraaf and Kerkrade. The implementation of a new tram line from Heerlen to Aachen has been discussed for a long time. Till 2013, the tram line is planned to be realized together with a business campus (AVANTIS European Science & Business Park) on the Netherlands-Germany border that the line will pass through.
Comparison and conclusions

In terms of general visions;
In the case of Manchester, we cannot speak of a ‘shrinking city’ vision, because the regeneration strategies are centered on repopulating the city, thus still growth-oriented. In Leipzig, population loss is accepted and plans are towards downscaling the housing stock. In Ruhr Area, the vision is based on preservation of existing buildings and introducing new economies. The general strategy in Heerlen is on planning for future shrinkage.

In terms of financing structures;
The funding issue is a major problem in transformation of shrinking areas. In the Leipzig case, the large scale demolition costs are financed by the national program Stadtumbau Ost. On the other hand, Manchester displays a more free-market orientation. The large, flagship projects are realized by public-private partnerships. Similarly, Emscher Landschafts Park is subsidized by a collaboration between European Union, national government, local units from 20 cities, and many private investors. In Heerlen, the transformation of bad housing stock is planned to be made together with housing companies.

In terms of interventions, their scale and target groups;
There is a clear difference between regeneration policies in England and Germany. In northern England strategic visions are based on large, symbolic projects that target exogenous users. On the other hand, practices in eastern Germany have endogenous stimuli; thus aim to improve the conditions for current residents. Due to limited public funds in Heerlen, the interventions are small and fragmented that can have narrow effects on residents of the surrounding area.

In terms of user-participation;
In Manchester, due to the scale and ambition of the projects, there is not much civic engagement in the transformation process. However in Leipzig, the future of the demolished building sites are sometimes determined by the community as different interim uses. The sub-projects realized under Emscher Landscape Park Master Plan include varying public participation depending on the project. In Heerlen, local communities are allowed to express their ideas on, especially, the regeneration of demolition areas.

Lessons from the cases;

Avoid quick, ‘paint-job’ renovation of bad housing stock. Only high quality, diverse housing can stand up the competition over the long term.

Demolition and re-construction should take place at the same time. While the vacant housing stock is extracted, new strategic projects should be planned that would stimulate possible future developments.

Focus the investments to areas where intervention should take place. The limited financial sources should be strategically distributed to achieve effective solutions.
The plans should have a mixture of exogenous and endogenous basis, to keep the existing population and then invite new-comers.

There should be a balance between top-down and bottom-up processes during transformation. While in some cases the state takes action to determine developments, in other cases the authorities can fix their plans to the community-driven developments, thus a combination of state action and citizen’s self-organization.

Develop a comprehensive strategy that covers interventions at various scales. Regeneration should start from the region and work in coordination with solutions at lower scales.

10. ANALYSIS OF THE PROJECT AREA

Selection of design location
In Heerlen, shrinking is not happening homogeneously. Some areas experience higher population loss than the city average. In terms of shrinkage, the most problematic living areas are located on the north side of the railway. The centers of Hoensbroek and Heerlen are performing relatively well. However the spatial consequences of shrinking are most severely observable in the area between the two centers, including the neighbourhoods Beersdal, Zeswegen, Grasbroek, Musschemig, Schandelen, Meezenbroek, Schaesbergveld and Palemig. Therefore the 375ha area is chosen for the design task, that epitomizes the problems related to shrinking.

Following is the analysis of the area through its economy, demography, mobility networks, landscape and programme at different scale levels of the region, city and the district:
Economy
The monoindustrial cities of Western and Eastern Europe were once the engines of national economies, today they are locations in crisis suffering a loss of purchasing power, emigration, and aging populations (Fassmann, 2006). Therefore, the inhabitants of these cities prefer to move to service-industry cities. Likewise, Heerlen used to be an important mining city till 1960s. However, the industry could not compete with the rise of cheaper energy sources. This resulted in the loss of economic vitality. What we observe today is out-migration of young population because of inadequate job opportunities. The decline in the potential labour force leads the region towards a worsening economic performance in the future.

Figure 23. Heerlen in regional economic networks
Besides this industrial decline, Heerlen is located strategically in good connection with the cross-border urban networks. It is in the middle of Eindhoven-Aachen-Liege triangle, which are centers of knowledge-based development. Also, the city has an important role in the Maastricht-Aachen-Hasselt-Heerlen-Liege (MAHHL) urban network. Among them, the proximity to Aachen, which is the center of IT development in Germany, offers potentials for Heerlen. In addition, the AVANTIS European Science & Business Park on the border of Heerlen and Aachen is a promising development for the future economy of the city.

Demography
The economic and demographic factors together lead to the decline of cities in Zuid-Limburg. The economic activities are decreasing, people are leaving the region, and the population is aging. Below tables indicate the expected population losses in Zuid-Limburg and Heerlen between 2005-2025. The region and the city are both leading the declining list in the country.

<table>
<thead>
<tr>
<th>corop-regio</th>
<th>2005</th>
<th>2025</th>
<th>Absolute afname</th>
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<th>2005</th>
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Table 1. Forecast of top ten COROP-regions with greatest absolute and relative population loss between 2005-2025 (source: Van Dam et al., 2006)

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<tr>
<th>Gemeente</th>
<th>2005</th>
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<th>Absolute afname</th>
<th>Gemeente</th>
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<td>-17,1</td>
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</tbody>
</table>

Table 2. Forecast of top ten municipalities with greatest absolute and relative population loss between 2005-2025 (source: Van Dam et al., 2006)
Within next 15 years, the population of Zuid-Limburg is expected to shrink about 11.8%. In the region, Heerlen stands for one of the most critical cities expecting the largest population loss, about 17.3%, in the coming years (See figure 24).

**Figure 24. Expected population shrinkage in the region and in Heerlen**
Mobility networks

Heerlen is connected to the high-speed lines in Aachen and Liége. The travel time from Heerlen to the important economic hubs in the region (Maastricht, Aachen and Sittard-Geleen) is about half an hour by train.

Figure 25. Heerlen in regional mobility networks
The old Heerlen-Sittard tramline

In 1916, an electric tramline between Sittard and Heerlen was opened by the Limburgse Tramweg Maatschappij (LTM). However, due to decreasing number of passengers, the tram stopped working in 1950.

Figure 26. The former electric tram between Heerlen and Sittard (source: http://www.parkstad.com/, June 2009)

Figure 27. The track of the former tramline, 1925 (source: drawn on the map available at: http://watwaswaar.nl/, June 2009)
Figure 28. The road network (left) and the public transport (right) of the city: The highways A76 and A79 connect the city to Sittard-Geleen, Aachen and Maastricht. There are two train stations: Station Hoensbroek and Station Heerlen. The rest of the city is reached by bus lines.

Figure 29. The infrastructure network in the study area: The area on north of the railway is the specific design location. It is a semi-urban zone between the urban centers Heerlen on the south and Hoensbroek on the north-west. The primary roads run though the green arteries separately. Access roads link the local street net of the neighbourhoods to the primary roads.
Landscape
The landscape between Maastricht-Heerlen-Sittard triangle is considered as the National Landscape of South-Limburg. It is characterized by stream valleys, agricultural land and villages, also called ‘heuvelland’ (hilly land). In addition, the nature area between Heerlen and Brunssum (Brunssummerheide) is a part of the main ecological structure of the region.

Figure 30. Heerlen in regional water&green networks
Figure 31. The water-green network (left) and the relief (right) of the city:
In Heerlen, a number valleys (some are dry) run through the living areas. The main creek valley lies on the south-west edge. On the north, there is a sand plateau with lakes which is connected to the forestry Brunssummerheide.

Figure 32. The water-green network in the study area:
Two stream valleys run parallel to the major roads on the west and east. The green areas serve as a buffer between the infrastructure and the housing areas. On the north is a village with the agricultural land around, and the sand plateau which will be transformed into recreational use in the future.
Program

The daily life of an inhabitant in Heerlen is spread in the region (see figure 33). **Mobility is essential**, therefore the good living is based on the transport networks between these important activity places. Within the city, the commercial functions are concentrated in the city center and along the highway. Housing, industrial, and recreational areas are distributed to the rest of the city (see figure 34).

Figure 33. Everyday space of a Heerlen citizen in the region

Figure 34. The major activity nodes in the city
11. SPATIAL SCENARIOS

The shrinking expectation in Heerlen is about 17% till 2025. The form of shrinkage that is experienced today is rather haphazardly distributed in the city, without state intervention. Some areas lose population in higher rates, while others seem to be less affected by shrinkage. There are various factors influencing where shrinkage would take place, such as housing quality, proximity to major transport lines/nodes, or public space quality in the neighborhood, all resulting in different patterns of shrinkage. Below are three scenarios displaying different forms of shrinkage which may arise in case of no authority control:

Scenario 1: two contracting centers

In this scenario, shrinkage occurs from periphery towards the attractive urban cores. As a result, the city takes the form of two concentrations: centers of Hoensbroek and Heerlen. While these centers become more compact and stronger, the semi-urban area in between slowly diffuses and finally disappears. The motorway link becomes a ‘parkway’ through the landscape, with new roadside program and typologies.
Regional Scale

City Scale

District Scale

Block Scale

Figure 37. Impact of Scenario 1 through scales
Scenario 2: fragmented city

The neighbourhoods forming the city begin to shrink separately towards their local centers. The neighbourhood edges disappear. The city becomes a conglomerate of urban fragments or villages, the landscape and transport lines flowing between them. The resulting urban landscape resembles the rural pattern in Heuvelland, between Maastricht and Heerlen.
Scenario 3: mobile city

The mobility determines the transformation of the city. Areas close to the main transport lines becomes desirable and strong, while the rest shrinks. The most accessible zones such as station areas, cross-roads and roadside urban strips generate the new pattern of new urban landscape.
Figure 41. Impact of Scenario 3 through scales.
Evaluation and the concluding scenario

The three scenarios give us ideas about possible shrinkage forms without state intervention. We can evaluate them according to the existing urban and landscape structure of the city together with the social-economic aspects:

The first scenario offers a compact urban form, which is desirable because of centralizing public services. However it neglects the suburban preferences of the inhabitants. The second scenario is the opposite of the first one, introducing complete decentralization. The resulting patchwork of built and open space offers potentials for bringing landscape quality to living areas. The third scenario is relevant to the ‘network city’ concept of mobility based urban structure. Here, the good living is dependent on how accessible and well-connected the area is.

These scenarios are extreme illustrations of factors directing shrinkage that are tested separately. In reality, the behaviour of residents and investors is more complicated to predict. Different factors work together; while the behaviour of housing companies is economically driven, the owners of the houses behave according to both economic and psychological needs. Therefore, the new structure of the shrinking city would arise from the balance between authority decisions and individual choices.

In this sense, another case can be imagined where state action orients self-driven processes: a regional tramline. Similar to the third scenario, the proposal promotes connectivity. Here, a specific public transport line is used as a tool to guide shrinkage indirectly. The light rail system leads to a linear, multi-nodal urban structure, which is consistent with the current situation in the region. The impact of the intervention is promising in all scales from the region to the block (see figure 43). A 35km-long tramline is implemented from Sittard to Aachen, having Heerlen in the center. The catchment area of each tram stop is 1 km. While living areas within this radius are accessible by tram, areas out of this distance loose attractiveness and become abandoned in time.

Figure 42. Scheme of the regional tram
Figure 43. Impact of the regional tram through scales.
12. INTERVENTIONS

In the region: a new tram line
Following the study done in Spatial Scenarios, a regional tram line proved to have potentials for both the region and the city itself. Besides guiding the consolidation and shrinking areas, the line would contribute to the region working as one whole, strong conglomeration.

Reemergence of ‘Limburgse Tram’
As mentioned previous chapters, there used to be an electric tramway connecting Heerlen to Sittard between 1916-1950. The project re-introduces a regional tram line between Sittard to Aachen to make best use of the regional potentials and cope with shrinkage.

Last years, it is possible to see similar cases in Europe where the trams are brought back to the cities after years of car dominance. French towns are good examples for the recent tram developments. Starting from 1837, trams become the main form of public transport in cities like Marseille, Bordeaux, Toulouse, and Lyon. From the 1950s, tramways could not compete with the buses with improved technology and low implementation costs. Due to that, tramways were dismantled and investments were focused on road infrastructure for cars and buses. However, because of the oil crisis and growing urban congestion mobility policies changed. Public transport gained importance again and modern tramways were introduced starting from 1985. Among others, Bordeaux, Strasbourg and Lyon are some cities where tramway development projects were realized during the last years. In France, there are still plans to extend the tram networks in the future. (Labbouz & Diab, 2007)

The story is similar in Heerlen, except the decreasing population. Till 1950, the ‘Limburgse Tram’ used to carry the workers of the mining industry from their work to the mining colonies they were living. After 60 years, the project brings the tramways back to Southern-Limburg, this time targeting diverse users; commuters between the different living, work and recreational areas in the region.

The the aimed impact of the tramway in the region can be mentioned under the two major topics sustainability and urbanity:

Tramway as a mean for sustainable development
Compared to other transport types, tramway is more sustainable in terms of environmental benefits. This is the reason for its reemergence in mobility policies of Europe, where sustainable urban development becomes increasingly important. Since they are powered by electricity, they are more environmental friendly than petrol or diesel vehicles. Air and noise pollution caused by cars are decreased. The Transport Development Areas (TDA) around good public transport nodes contribute to sustainability objectives by integrating landuse and transport, reducing both the need to travel and reliance on private transport (Hine et al., 2005).
When we have a look at the modal split in South-Limburg, we see that the dependency on private car is quite higher than the rest of the country. The reasons are not only the scattered urban structure or the preferences of passengers, but also the limited public transport system in the region. The proposed tram line aims to bring tramway service to important living areas along Sittard-Aachen strip and thus change the modal split.

**Tramway as a backbone for urbanism**

The second advantage of traways is the functional link they make between transport and urbanism (Labbouz & Diab, 2007). They influence the development of urban structure. The real estate values of the areas along the tramlines increase and disadvantageous districts are opened up for development. That is the reason why a tramway can be used as a tool to direct shrinkage. By enabling financially more attractive (or at least less uncertain) development opportunities along the new tramline, the unsystematic, random abandonment of the city can be guided.

Building a light rail is not only a question of connecting nodes. It is also about improving quality of life and offering new locations for urban development (Galser et al., 2008). In this sense, the proposed tramline aims to improve the urban landscape along the route from Sittard to Aachen. When transit is brought to more people, the services and facilities in the region are delivered better. The mixed-use areas around tram stops also support the multinodal urban structure.

**Tramway in the region Limburg**

Regarding the scattered condition in the region, the light rail network is important in order to provide access to all important destinations including shops, leisure facilities, business and residential areas. The low density urban landscape is not only special to the Dutch province Zuid-Limburg, it also visible in Flemish Limburg; in Belgium the diffuse situation is even more obvious.

Despite the low population densities, the government of Belgium has set plans to realize a series of tramway projects in Limburg, in collaboration with the Dutch province. In 2004, a comprehensive public transport plan (*Spartacus Plan*) was prepared which includes 3 high speed tramlines between important cities in Belgium and the Netherlands. Coming 10 years, the following tramways will be implemented:

- Hasselt – campus Diepenbeek – Genk – Maasmechelen Leisure Valley – Sittard
- Hasselt – Lommel, Neerpelt, Overpelt urban area– Eindhoven

(De Lijn Limburg, 2004)

The largest cities in the region are Hasselt and Genk having populations of 70,000 and 64,000 respectively. The project proposes another tramline between Sittard (pop. 96,000), Heerlen (pop. 90,000) and Aachen (pop. 257,000); which provides a complete lightrail network in Limburg (Dutch&Flemish) together with the 3 future trams mentioned above (see figure44).
Figure 44. The new tram line in the region
With the light rail system, a direct link between Sittard and Aachen is introduced. Heerlen lies on the intersection of the existing west-east railway (Heuvellijn) and this new tram line along north-south direction.

**Why is a new tram line necessary?**

- To link the region in the north-south direction

- To link the ‘Avantis European Science and Business Park’ to the rest of the region

- To provide public transport to the rest of the city, which is car dependent now

- To link the northern and southern districts of the city
The length of the tram line is about 35 km from Sittard to Aachen, sometimes following the route of current railway. The travel time is an hour, having 16 stops. The type of tram chosen is the one in Bordeaux without wires.

Figure 45. The reference tram type; the tram without wires in Bordeaux (source: http://media-cdn.tripadvisor.com/, June 2009)
Different conditions along the tramline

The tramline not only connects urban, populated districts but also passes through semi-urban and rural areas. On the left is the map displaying these different sections. The semi-urban area on the north of Heerlen center, around tramstop Beersdal, is the location of design task.

An example from the rural section:

Figure 47. Map (top), photos (bottom-left & middle) from the rural area, and the reference tram stop from “Kustlijn” in Belgium (bottom-right)
(source: http://www.panoramio.com/, June 2009)
An example from the semi-urban section:

Figure 48. Map (top), photos (bottom-left & middle) from the semi-urban area, and the reference tram stop from Heddernheim in Frankfurt (bottom-right) (source: http://www.panoramio.com/, June 2009)

An example from the urban section:

Figure 49. Map (top), photos (bottom-left & middle) from the rural area, and the reference tram stop from Les Halles in Paris (bottom-right) (source: http://www.panoramio.com/, June 2009)
Tramline as a link in recreational networks

The strip between Sittard and Aachen is close to important recreational locations in the region. One is the creek valley that runs parallel to the tramline. Many historical monuments (castles, farmhouses, windmills, etc.) are spread along this valley. Brunsummeheide is the nature area on the north of Heerlen, which is linked to the sand plateau which will become a beach in the future. Another leisure area is the one around the Snowworld hill, with parks, gardens, and sport complexes. A network of recreational routes passes through these areas and the tram stops.

Figure 50. The recreational network that the tramline passes through
Tramline as a link between business areas

The main business areas and services are concentrated in city centers Sittard, Heerlen, and especially in Aachen. There are also large industrial parks like Avantis located along the strip outside cities. The tram line connects these important work nodes with the residential areas.

Figure 51. The business areas that the tramline passes through
In the district: two complementary zones

The introduced tram line passes through the design area which is located on the north of Heerlen central station. According to the planning assumption, the areas within the 1km-radius catchment of each tram stop will get stronger, and outer areas will experience shrinking. Thus, the 375ha design area is divided into two zones, which need to be dealt with different strategies. While one is getting stronger, the other loses its attraction and gradually shrinks. Due to the different character of these two processes, the design approach will differ as: ‘top-down’ and ‘bottom-up’.

Figure 52. Tramline as a shrinking guide in the city

Figure 53. Design area divided into two strategy zones
Why are the two different strategies necessary?

- The Zone 1 has more potentials in terms of mobility, thus urban development. Besides the new tramline, the area is more accessible by primary road system of the city.

- The Zone 2 has the potential to become a part of the chain of recreational areas on the north.

- The housing quality in Zone 2 is strikingly lower than the Zone 1. The district is one of the ‘krachtwijken’ in the Netherlands.

(Source: Transformatieopgave Parkstad Limburg, Gemeente Heerlen, 2008)
Because of the reasons mentioned above, Zone 1 will be treated as the urban development area where the investments will be concentrated. A master plan will be developed for the area with a top-down approach. On the other hand, Zone 2 will be treated as a shrinking area. Considering the behaviour of residents and housing companies, a possible down-grading scenario will be developed with a bottom-up approach. Finally, the Zone 1 will become a strong urban entity while Zone 2 is given back to the landscape.

**Zone 1: top-down approach**
The area consists of four housing clusters located on two sides of the main road. There are also some industry and office buildings along the road. The green structure extends between the housing areas and the road. On the north-east is the sand-plateau. The lowest part of the topography is the stream. The housing are situated on the slopes of the valley.

![Figure 54. Existing situation](image-url)
Problematique
The main spatial problem of the area can be summarized as the functional isolation of road, green and living areas. The housing clusters are introverted and set back from the road. The only roadside programme is the industry area. The green between the housing is a buffer without public use.

Approach
The general approach to the design problem is towards vitalizing the road and bringing programme to the landscape. In order to do these, a roadside development is introduced. The area in the middle around the tram stop is developed as a public node. In addition, four landscape links are added which lead to the future recreational sand area.
Before-now-after: typological research

In order to develop unique design solutions to current problems, references are searched in the cultural history of South-Limburg. The design proposal aims to reflect the spatial identity of the region.

Building typology

- **Before modernization:**
  The farmhouses, castles, country estates and cloisters are characteristic building types in the history of South-Limburg. The common features are monumentality, compactness, and secured situation in the open landscape.

**Farmhouses**

![Figure 57. ‘Hoeve Geleenhof’ in Heerlen](image)

**Cloisters**

![Figure 58. ‘Klooster Sint Benedictusberg’ in Vaals](image)
Castles

Figure 59. ‘Kasteel Hoensbroek’ in Heerlen

- Now:
  After industrialization, the housing development gained speed. From 1920s, many residential neighbourhoods have been built as ‘mining colonies’ and ‘garden villages’. They display a sprawled, repetitive patterns, with certain house types as below:

  4-under-1-roof

Figure 60. From the mining colony in Beersdal, Heerlen

Row houses

Figure 61. From the garden suburb in Zeswegen, Heerlen
After shrinkage:
Decreasing population density offers an opportunity to introduce the lost historical typologies of South-Limburg. Compact, courtyard housing types make it possible to provide an urban quality within the plot, while the surrounding landscape is left free. Here are some examples for the new interpretations of these typologies:
Figure 65. ‘Saynatsalo Town Hall’ by Alvar Aalto, in Finland

Settlement typologies

- Before modernization:

Villages
The characteristic of agrarian villages in the region is their linear arrangement along main roads. They are situated on slopes of valleys. While on the front side buildings have direct access from the road, on the back side the open landscape is in reach.

Figure 66. Examples of villages on valleys of South-Limburg
Farms
The ‘carré hoeve’ type, courtyard farmhouses are organized along narrow access roads. Their facades are aligned with the road. There are small orchards close to the buildings at the back. The farms are parcelled in long linear forms, parallel to the slopes.

Figure 67. A typical South-Limburg farm

Now:
The housing areas developed after 1920s are introverted clusters that have poor relationship with the landscape around. The relation with the main road is also broken. The clusters are detached from the road.

Figure 68. A modern residential area
Settlement typologies according to the topography:

**BEFORE**
- web-form villages
- forestry
- grassland
- ribbon villages
- farmland

**NOW**
- garden suburb
- forestry with villas
- recreation area
- road with industry
- garden suburb

- After shrinkage:
  The major aim is to relate the settlement to the road and landscape again. In order to this, the old roadside and farmland building typologies are utilized:

Figure 69. Ribbon village and ‘carré hoeve’ as shrinking typologies

---

65
**Demolition**

Some of the problematic building stock is demolished to enable reconstruction of new buildings. These include the industry and office buildings along the road, the housing along the desired landscape links, and finally some neighbourhood edges.

**Total demolition:**
- 448 dwellings
- 14,700 m² office space
- 34,700 m² industry space

**Tram stop catchment area**

The impact of the tram stop in the areas is considered in two ways: the 1km-radius represents the zone in reach of public transport. On the other hand, within the second circle of 500m radius, the real estate value of the land increases, therefore it becomes more attractive for building development. The scheme below shows how these are reflected to the design of the strip along the tramline:

Figure 70. Demolished buildings

Figure 71. Impact of the tram stop

Figure 72. Differing roadside typology within and out of the 500m radius
Reference: Courtyard type residential clusters located on slight slopes of the valley, in the middle of agricultural or park land.

Reference: Linear roadside development parallel to the stream valley, direct access from the road, private gardens and public green at the back.

Figure 73. The master plan
The design of the ‘500m-radius’ area
Along the linear building development, different housing typologies are introduced. While the urban ensembles are developed by housing companies, the single family houses are privately commissioned. The housing are accessed from the main road. At the back of the housing strip, there are private gardens, allotments, parkland along the stream, and sports areas. In the middle is the tramstop and the public node with housing and commercial functions.
For the privately commissioned houses, some rules are set about the streets’ appearance, parking places and building pressure on the landscape:

Rule 1:
Buildings should form the space of the street. In some parcels, the houses have to be aligned to the road. In some others, there is a flexibility of 3-6m set back from the road. However, in this case a continuous hedge defines the road edge.

Rule 2:
Parking space is designed in the individual lot, if the lot width is at least 9m, and underground parking is possible. If not roadside parking space is be provided.
Rule 3:
The open character of the landscape should be preserved. The pressure of the building should be restricted. Therefore, a minimum Open Space Ratio of 1 is introduced. On the right is the illustration of possible building height and areas under this constraint.

Figure 75. The linear development within 500m radius

Figure 76. The scattered development outside 500m radius
The design of the public node

The tram stop is located in the middle of a half roundabout, through which routes lead to the public space on two sides. Diverse functions are brought together including: housing, supermarket, bank, post office, day-care, cafe-restaurant, gas station, and parking space for bikes. Orchards are designed within the public space that lead to the landscape at the back. The gas station provides a secure environment around the tram stop working 24/7. The public node is the meeting point of not only the residents living in the area but also drivers stopping at the pump station.

Figure 77. The plan of the public node

Figure 79. Bird view of the node
Figure 80. Impressions from the area; the square next to the gas station (top), the orchards (middle), square with the commercial complex (bottom)
Figure 81. Sections through the public node
Zone 2: bottom-up approach
The east part of the study area is treated as the shrinking zone, which is called MSP (Meezenbroek, Schaesbergerveeld, Palemig) district. It is surrounded by green structures, stream valleys, and the railway on the south edge. On the south and north of the district, it is possible to see the pattern of old linear ribbon developments. The rest is post-war housing area.

Figure 82. Existing situation
Problematique
Due to the poor housing and public space quality, the district is being rapidly abandoned. The shrinking expectation till 2025 is about 25%, which is quite higher than the average population loss in the city. The vacancy of housing causes problems for security and maintenance. In addition, the decaying image of the environment affects the psychology of the residents who are left behind.

Figure 83. Images of decay
**Housing indicators**

The total housing in the area is about 3500. Majority of the houses are owned by 3 housing companies in the area: Woonpunt, Welleren and De Voorzorg. The houses consist of apartments and row houses in general. Among them, apartments are the least desirable to live. According to an investigation made through the occupants, 41% of them want to move within the following years. They are not satisfied with the living conditions. 55% of them want to move to a better are in Heerlen.

<table>
<thead>
<tr>
<th>Housing stock</th>
<th>total</th>
<th>rental</th>
<th>owner-occupied</th>
<th>unknown</th>
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<tr>
<td>3483</td>
<td>59%</td>
<td>34%</td>
<td>7%</td>
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</table>

<table>
<thead>
<tr>
<th>Housing types</th>
<th>apartment</th>
<th>row houses</th>
<th>half-free standing</th>
<th>free standing</th>
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<tbody>
<tr>
<td>33%</td>
<td>55%</td>
<td>9%</td>
<td>3%</td>
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<table>
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<tr>
<th>Moving</th>
<th>want to move in 2 years</th>
<th>looking for a house to rent</th>
<th>looking for a house to buy</th>
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</thead>
<tbody>
<tr>
<td>41%</td>
<td>51%</td>
<td>32%</td>
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</table>

<table>
<thead>
<tr>
<th>Reason for moving</th>
<th>health</th>
<th>work</th>
<th>current house</th>
<th>current neighbourhood</th>
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</thead>
<tbody>
<tr>
<td>16%</td>
<td>12%</td>
<td>15%</td>
<td>26%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Destination to move</th>
<th>in the same neighbourhood</th>
<th>center of Heerlen</th>
<th>somewhere in Heerlen</th>
<th>somewhere in Parkstad</th>
<th>somewhere in Limburg</th>
<th>somewhere in Netherlands</th>
<th>abroad</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>12%</td>
<td>23%</td>
<td>22%</td>
<td>19%</td>
<td>3%</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

Table3. *The current housing stock and moving tendencies (Source: Parkstad Limburg Buurtmonitor, 2009)*

**Shrinking scenario**

The poor housing quality and high moving tendency show that the future of the area is shrinking. The houses are mostly rental and owned by housing companies, that makes a shrinking vision applicable in coordination with the housing companies. Currently the area has a decaying image. However, the process of shrinking does not have to be catastrophic. With small initiatives from the government, private developers, and particularly the community, the area can gradually downgrade and gain a different use as a part of landscape. Following is the scenario developed for the area to experiment with the different dynamics effective in shrinking and a possible sequence of events that can take place:
Half of the apartments are already vacant now. The rest of the inhabitants are encouraged by compensation to move to the new housing area.
The housing companies demolish the vacant housing stock. The government claims the land back and offers new land in Zone 1 to the housing companies.

The emerging 7.8ha empty space is developed as gardens by the residents.
With the aging population in the area, the need of health care increases. The excess of service buildings are transformed into care centers by the government.

Around the care centers, the housing are transformed into care houses by private developers.

Number of houses: 2328
Levels of action: GOVERNMENT CIVIC ENGAGEMENT PRIVATE DEVELOPERS

Number of houses: 2298
Levels of action: GOVERNMENT CIVIC ENGAGEMENT PRIVATE DEVELOPERS
The inner district starts to perforate randomly. Government opens vacant land to claim. Individuals can rent the land temporarily. Orchards and small farms are developed.

Number of houses: 1850
Levels of action:  

- **GOVERNMENT**
- **CIVIC ENGAGEMENT**
- **PRIVATE DEVELOPERS**

Now:  
- apartments are abandoned  STAGE 1  
- apartments are demolished  STAGE 2  
- communal gardens develop  STAGE 3  
- public buildings are transformed into care centers  STAGE 4  
- care clusters develop  STAGE 5  
- 'claiming land' initiative  STAGE 6  
- public routing  STAGE 7  
- patchwork landscape  STAGE 8  
- garden estates develop  STAGE 9

The pieces of greenery are connected through a chain of public space.

Number of houses: 1600
Levels of action:  

- **GOVERNMENT**
- **CIVIC ENGAGEMENT**
- **PRIVATE DEVELOPERS**

Now:  
- apartments are abandoned  STAGE 1  
- apartments are demolished  STAGE 2  
- communal gardens develop  STAGE 3  
- public buildings are transformed into care centers  STAGE 4  
- care clusters develop  STAGE 5  
- 'claiming land' initiative  STAGE 6  
- public routing  STAGE 7  
- patchwork landscape  STAGE 8  
- garden estates develop  STAGE 9
Now

Number of houses: 550
Levels of action: GOVERNMENT CIVIC ENGAGEMENT PRIVATE DEVELOPERS

Apartments are abandoned
Stair 1
Apartments are demolished
Stage 2
Communal gardens develop
Stage 3
Public buildings are transformed into care centers
Stage 4
Care clusters develop
Stage 5
'Claiming land' initiative
Stage 6
Public routing
Stage 7
Patchwork landscape
Stage 8
Garden estates develop
Stage 9

Some residents leave, some decide to stay. The area transforms into a patchwork of new built houses, old housing clusters, camping grounds and sports areas.

The parcels on the periphery are transformed into garden estates.

Now

Number of houses: 1450
Levels of action: GOVERNMENT CIVIC ENGAGEMENT PRIVATE DEVELOPERS

Apartments are abandoned
Stage 1
Apartments are demolished
Stage 2
Communal gardens develop
Stage 3
Public buildings are transformed into care centers
Stage 4
Care clusters develop
Stage 5
'Claiming land' initiative
Stage 6
Patchwork landscape
Stage 8
Garden estates develop
Stage 9

Some residents leave, some decide to stay. The area transforms into a patchwork of new built houses, old housing clusters, camping grounds and sports areas.

The parcels on the periphery are transformed into garden estates.
13. TRANSFORMATION OF THE AREA IN TIME LINE

<table>
<thead>
<tr>
<th>ZONE 1</th>
<th>ZONE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>- tram line is developed</td>
<td>- vacancy increases</td>
</tr>
<tr>
<td>- housing ensembles are built</td>
<td>- apartment residents move to Zone 1</td>
</tr>
<tr>
<td>- public node is developed</td>
<td>- communal gardens are developed</td>
</tr>
<tr>
<td>- single family houses are built</td>
<td>- inner district is demolished</td>
</tr>
<tr>
<td>- courtyard villas are built in the landscape</td>
<td>- green areas are developed</td>
</tr>
<tr>
<td>- landscape links are introduced</td>
<td>- camping &amp; sports park is developed</td>
</tr>
<tr>
<td>- neighbourhood edges are built</td>
<td>- garden estates are developed</td>
</tr>
</tbody>
</table>

- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 5
- PHASE 6

2009

2030
14. EVALUATION OF THE PROJECT

In comparison with the shrinking policies in Leipzig, Manchester, and Ruhr Area

In terms of general visions;
The general vision of the project is to stabilize the population flows by introducing high quality living areas and then create opportunities to invite new people to the area. While doing these, the necessity of downscaling the bad housing stock is accepted. However, the demolition is accompanied by reconstruction.

This shrinking vision is in contrast with Manchester ‘entrepreneurial city’ model where the plans are based on introducing new economies, and hopes placed in growth. It is also different than the urban policy in Leipzig that is exclusively based on demolition.

In terms of financing structures;
Depending on the type of intervention, the project offers a combination of public, private and civic partnerships. Only the tramline is dependent on provincial funding and partially on the German government. The demolition of housing in Heerlen is done under private and public partnership. There are already agreements made with the housing companies to carry the demolition together with the municipality. In the reconstruction of new building areas and development of landscape, the government, private developers, and sometimes citizens are involved. The general expectation is that public funding will attract subsequent private investment.

The demolition in Leipzig case is quite larger than in Heerlen. Therefore it is dependent on special national subsides. In Manchester, public-private partnerships are the most important institutions for funding regeneration projects.

In terms of interventions, their scale and target groups;
The project includes a chain of interventions at different scales from the region to the local. The largest project is the tramline and the improvement of regional recreational networks. These are linked to the development of new housing and public space at lower scales. The interventions target both the current residents of the area, the tourists and possible new residents.

What we see in Manchester is the dominance of large scale flagship projects targeting exogenous users. On the other hand, the policies in Leipzig include small pieces of developments limited to the improvement of public space at local scales. The regional landscape development in Ruhr area is comparable to the proposal.
In terms of user-participation;
The project encourages civic engagement in both demolition and reconstruction areas. Especially, in the shrinking zone the locals actively participate in shaping the future use of the emerging open space. The ‘claiming land’ initiative gives the opportunity to the locals to bring interim uses to the demolished lots. Also, within the housing development along the tramline, there are single family housing lots commissioned by individuals, offering a flexible architecture.

In contrast, the locals are hardly involved in the development of large scale projects in Manchester. The community developed open spaces in demolished sites of Leipzig are similar to the proposed approach.

In comparison with the shrinking policies in Heerlen

The policies in Heerlen approach shrinking as a problem of housing quality. A housing vision is developed depending on the investigations made on the condition of housing, types and user satisfaction. As a result, regeneration decisions are taken to improve the residential areas. The investment is distributed through the city, concentrating on areas with worst conditions. In these areas, some houses are refurbished, the apartments are usually demolished. Then new houses are developed at the same locations, with a change in housing type. In stead of the demolished flats, single family houses are introduced. However, the urban structure of the problematic area is rarely questioned. The interventions are limited to bringing new housing types within the boundaries of previous housing area.

In contrast, the shrinking strategy of this project is based on a choice between areas that needs to consolidate and areas to shrink. Here, the tramline determines which areas should be strengthened and invested; and which areas should shrink and gain other landscape uses. The city is designed as a whole, the shrinking and consolidation areas working together. The reconstruction takes place in areas that have potentials in terms of accessibility in urban networks. Where as, areas that are disadvantageous in public transport and have poorest housing quality are given back to the landscape to become a part of the regional green networks.

The choice of demolition and re-construction areas differs from the urban policies which aim to develop different housing types at the sites of demolished apartments. The project offers an alternative land development strategy: realizing the demolition in partnership with the housing companies, then claiming the demolished site as public space and giving the landowners in return other land in the tramline zone which has indeed higher potentials and land value. The total budget of demolition and re-construction is distributed strategically to two zones.

In addition, the project offers development of new housing types taking reference from the history of the region, which are not possible to develop in the shrinking district. An alternative for road-landscape-building relation is realized which
brings high accessibility and incorporates the landscape qualities into the residential area, that are lost in the mass housing developments of last decades.

A regional tramline between Heerlen and Aachen does also exist in governmental plans. The line is expected to be implemented till 2013. It follows the Heerlen-Landgraaf-Eygelshoven-Kerkrade-Aachen route with a total length of 25 km. On the other hand, the tramline proposed in this project connects Sittard to Aachen, passing through Heerlen. The total length is 35 km.

To conclude, in the project the shrinking problem is not narrowed down to the housing condition itself, but seen as improving urban quality in the widest sense, which requires to be dealt at different scales from region to the housing types. The interventions in public transport and open space networks affect the whole urban structure, which will sustain itself despite decreasing densities.

**Evaluation of the research questions**

*What are the urban design tools to develop a sustainable urban structure for shrinking Heerlen?*

The different interventions in the project all aim to bring lasting solutions to the area rather than quick-fix ones. To mention first, the tramline aims to sustain the link between the important destinations in the region, where good life is increasingly dependent on accessibility. In addition, high quality living areas with good public transport are introduced rather than short term renovations of the bad housing. Sustainable urban structure is searched through the interrelationships between accessibility, location and design. Also to contribute to the sustainability objectives, the reliance on private transport is reduced by increasing public transport service.

*How can the existing housing stock and infrastructure be adapted to demographic trends and changing needs?*

The project aims to integrate landuse and transport. While doing this, the present infrastructure is taken advantage of. The new building developments are concentrated along the major infrastructures. The housing stock is transformed according to a smaller and aging population. The existing housing stock is partly preserved and partly demolished depending on the position of the area in relation to the transport and landscape networks. New housing types with better access to public transport and green are introduced in stead of the housing that don’t meet the current requirements anymore.

*What are the potentials in shrinking to rediscover the qualities of the specific Southern-Limburg landscape and incorporate it to living quality?*

The strategy in coping with shrinkage is to use the regional spatial identity to reach urban distinctiveness and stand up the competition. The decreasing urban densities offer the opportunity to bring landscape back into living areas. The scattered typologies that offer the direct relation of the housing and landscape around become possible to realize again after shrinkage. Therefore the design
of new living areas stress the unique features of the Southern-Limburg landscape through low density (courtyard and ribbon) housing typologies along valley courses and slopes.

**How can the emerging open space be structured to create an attractive urban landscape?**
The network of open space has a central role in the project, both in the tramline and shrinking area. Meaningful links are created between different scales of landscapes from neighbourhood gardens to the regional recreation areas. The program of the emerging landscapes is essential here; the open space takes form from its programmatic content like agriculture, parkland, sports area, allotments, communal gardens, or large scale recreation. The relation between the housing and open space is diverse; while in some cases houses are situated in the middle of open landscape, in some others they are organized along an allotment strip.

**What does infrastructure mean for shrinking cities in the culture of mobility?**
In the project, the infrastructures (both tram line and roads) are treated as the constants of the urban structure that urbanity can rely on. Despite the fluctuations in the population (either decrease or increase), the functional zones around these major transport lines will remain as the backbones of the urban structure. Besides being a transport means, the infrastructure itself defines a space, which is a part of the public sphere.

**How can ‘creative destruction’ and reconstruction take place at the same time?**
Two complementary zones are defined: while one is being gradually abandoned and given back to the landscape, new developments take place in the other zone with potentials. The city is downscaled in balance rather than catastrophically.

**Strengths of the project:**
- Emphasized regional identity
- Using landscape and geomorphology as an anchoring element of building development
- Bringing formal and informal processes together in urban development
- Using shrinking as an opportunity to get rid of problematic, monotonous, and anonymous massive urban mistakes of the past housing stock and offer alternative living spaces of greater value

**Weaknesses of the project:**
- There are problems due to heterogenous ownership structure in shrinking area. The demolition site has an abundance of rental houses. These inhabitants can be encouraged to move by small compensations. However it is still problem to claim the land from the owner occupied part, that is 34%.
- The tram line is a big investment for an area which already suffers from lack of financial sources. But from another perspective, the line will bring economic value in the long term. Although the implementation requires an initial investment, it will bring economic dynamism to the region not only in housing and business developments but also in the tourism sector.
SHRINKAGE: THE NEW URBAN PARADIGM OR OPPORTUNITY?

Abstract:

Much of the studies on shrinking cities are concerned with the ways and strategies about how to return to former thriving periods. However, is it possible to develop perspectives to plan for decline? If so, what are the opportunities that shrinking itself offers for the urban development? This paper approaches shrinking from the point of changing meaning of density and conception of contemporary urban space. As a result, it shows that instead of a threat against urban quality, shrinking presents values that are placed in the spatial patterns of the late modern urbanity.

Keywords: shrinking, urban decline, urban growth, density, opportunities, urban field, urban network, Netherlands, Heerlen

I. INTRODUCTION

How can we handle the impacts of shrinking on urban fabric? Such questions have started to take place in urban discourse in the recent years. For a long time, the fundamental matter of urban planning was how to manage the growth of cities. However, now shrinking cities are increasingly attracting the attention of researchers and urban policy makers and not without reason (Mace et al., 2007). The question of shrinking is not only raised in the classical industrial regions in the developed states of Europe, but also in North America and Asia. Recently, a number of studies are initiated to understand this worldwide phenomenon and develop creative solutions to deal with it. The IBA Urban Development 2010 and the Shrinking Cities are two comprehensive projects dedicated to the subject, which took start in 2002 and are still in progress. In addition to these, the shrinking issue has been included in EU policies for sustainable urban development.

Till now the urban discourse has been dominated by the image of the ‘boontown’. Consequently, the methods and instruments developed so far are meant for promoting urban growth. The processes in shrinking cities contradict the notion of growth. It is no longer possible to use the existing tools to handle the problems in shrinking context. That is the main reason why shrinking is perceived as a symptom of crisis. There is common tendency in urban policy makers and planners to avoid shrinking and direct the urban development into growth again. However, instead of struggling against it, shrinking should be perceived as a positive challenge for urban planning and design. Here lies the very aim of this paper, to stimulate a change in perception from bewailing shrinkage to valuing the potentials in it. In order to view urban development the other way around, it is necessary to explore the possible qualities in the shrinking context. Therefore, the focus of the paper is the question: “What are the chances that shrinking offers for the revaluation of the urban?”
The conclusions of the paper are aimed to shed light to the design of a shrinking city in the Netherlands: Heerlen. In the last 50 years, the city has lost a large amount of its population and the indicators show the decrease will go on in the future. The problems due to shrinking are already identifiable in the social and spatial context of the city. While dealing with these, it is pointless to consider the situation as a question of how to resurrect the urban economy and stop shrinkage. The efforts in the past have proved that traditional principles of urban growth cannot be applied here. On the contrary, it is necessary to pursue realistic goals, which means to accept and plan for decline. The essential challenge of shrinking is to reinvent and rediscover the values in the context of new urban conditions. In this sense, Heerlen is the urban laboratory to test the hypothesis that it is possible to shrink without spoiling the urban quality.

Three basic discussions in the urban discourse are included in the paper: first the dichotomy between growth and shrinkage, second the theory of contemporary city, and last perspectives on positive shrinking. The literature chosen for the first theme consists of critics over the predominance of growth notion in the field. The second theme comes from the necessity to incorporate shrinking phenomenon into the general understanding of the contemporary city. Therefore, the paper refers to literature on both traditional approaches to city based on physical density and proximity (like Mumford and Jacobs), and the contemporary concepts on urban field and networks (like Corboz and Castells). The third theme includes propositions of Lynch and other authors towards an escape from pessimism and release creative possibilities for spatial development in shrinking.

The paper is structured into five parts. First part looks at the definition of the problem associated with shrinking. The second part consists of an overview of shrinking and growth as phases of equal significance in the history of urbanization, followed by a critique of the obsession with growth. The third part considers physical understanding of the city in terms of changing meaning of urban density and concept of the city as an urban landscape. In the fourth part, we discuss the chances that shrinking offers for contemporary city. Finally, in the fifth part, we reflect our conclusions to a real shrinking case: incorporate the concept of designing for and with shrinkage in Heerlen.

II. DEFINING THE SHRINKING PHENOMENON
The phenomenon of shrinking covers different definitions: from political-economic perspective shrinking cities are defined as cities with declining economy, whereas sociological and urban planning perspectives define shrinking cities as cities with a decline in population (Andersen, 2005). In this paper, the term ‘shrinking’ refers to population decline and thus reduced average population densities. The demographic changes constitute the core of our discussion, together with a certain consideration of the political and economic aspects.

Cities in crisis: a brief overview of contemporary developments
The demographic indicators point out an overall increase in the world population. The countries continue to grow, many cities are prospering and expanding. However, growth is only one side of the coin. On the other side, a significant
number of cities are experiencing reduction in population. During the last 20 years, more than a quarter of world’s largest cities shrank (Oswalt, 2006). The decline of population is most severely observed in western industrialized countries, including the Netherlands. Today, for increasing number of cities especially in the northern and southern parts of the country, economic and demographic indicators point towards stagnation or shrinkage.

**Reasons of shrinking**

Shrinkage is not completely a new phenomenon. Through history of urbanization, shrinkage was a part of the development of cities as growth. Cities have been shrinking due to various reasons. Wars, plagues, natural disasters, shift of trade routes have been posing threats to the population of cities (Rieniets, 2006). However, the shrinking that is observed today is distinguished from the prior developments in the contemporary driving factors:

- Low birth rates, aging population
- Increased mobility and suburbanization
- Unemployment in the industrial sector due to the transition to service economy
- Migration to more prosperous regions

(Beyer, 2006; Akbar & Kremer, 2005)

According to Hall, shrinkage can take form of population decline, economic decline, or a combination of the two. It is not easily distinguished which is the primary force:

“Decline due to purely demographic forces, particularly diminishing birth rates, may directly lead to an economic downturn as the labour force and the market shrink. Conversely, economic decline due to the contraction of a basic industry, may lead to out-migration and population loss. In deed the two may operate in tandem, in a problematic feedback loop.” (Hall, 2006, p. 144)

**Consequences of shrinking**

The shrinking cities do not physically shrink in space but lose population, therefore experiencing a reduction in average population densities. When uncontrolled, the decrease in density jeopardizes the quality of urban environment. Density (of inhabitants and/or buildings) can be decreased in a way to produce more livable environments - as done on purpose in some urban renewal projects. Here what we consider as problematic is the uncontrolled abandonment of urban areas by people because of the inconvenient economic, social, or environmental conditions.

In this sense, we can state the problems experienced due to uncontrolled population decline as follows:

- Loss of urban quality and civic facilities
- Being cut off from the economic and communication network
- Discontinuous urban fabric, which creates problems in servicing, maintenance, social security, etc.

(Beyer, 2006)
III. SHRINKING VERSUS GROWTH

Phases of shrinking and growth in the history of urbanisation
Until the beginning of the modern age, shrinkage and growth were phases of the development of cities which were balancing each other out. However, with the start of industrialization around 1800, a unique phase of urban growth was prevailing. In the following 200 years, global urbanization has progressed at a rapid pace: the number of urban residents worldwide has increased 160 times (Oswalt & Rieniets, 2006).

The intense process of urbanization began around 1750, initially in England and Wales, and gradually transformed all Europe. Towards end of the nineteenth century, active urbanization shifted to the United States, and American metropolises epitomized a new form of urbanization and modernization. However, after the first half of the twentieth century, the residential population in cities began to subside. Under the influence of rising mass car ownership, large numbers of people moved from cities to suburbs (Eisinger, 2006). Following the postwar periods, another development led to the decline of cities: deindustrialization. The closure, modernization, or relocation of production locations led to massive losses of jobs; thus causing shrinkage in the former industrial cities of United States, Great Britain, Germany, Italy, France and Japan. In the 1970s, every third metropolis in these countries was shrinking. At the start of 1990s, a new shrinking wave struck Eastern Europe. After the collapse of the Soviet Union, many cities in Russia and eastern Germany were thrown into economic and demographic decline. More than 200 large cities in the post-Socialist countries lost population (Rieniets, 2006).

What we see today is an increasing polarization in the social geography around the world. While many old industrialized cities are losing population, other cities, mostly in lesser developed countries, are experiencing high economic pressure and growing urban populations. The indicators show that in the coming decades, the polarization within countries and cities will become more pronounced, and growth and shrinkage will coexist with climbing inequality (Oswalt & Rieniets, 2006).

The simultaneity of the opposites
Theories and strategies of urban development are dominated by growth. A successful city or region is most often described by a growing population and a growing economy. Although highly desirable, continuous urban growth is not possible. The possibility of decline is not well recognized in the theory and policy practice (Bontje, 2004). However, in reality growth and shrinking are processes taking place parallel, at different locations. While some cities experience exploding populations, some others suffer from high unemployment and declining population. As Sassen (1991) says, the growth of some cities very much rests on the shrinkage of other places. Therefore, the economic and social transformations must be seen as the simultaneity of the opposites: growth and shrinkage. It is necessary to understand growth and shrinkage as one closely interwoven process. We should neither be overwhelmed with the notion of
continuous growth, nor announce the end of growth and the beginning of the age of shrinking as a new paradigm (Korfmacher, 2005). Instead, we should be able to include shrinking into our theory of urban development for the future, the same way as growth. The contemporary city should be seen under the influence of dynamic processes of both growth and decline.

The reasons behind ‘growth obsession’ or ‘shrinking phobia’
In the recent years, the international discourses have concentrated on ways how to deal with growing megapolises and urban agglomerations, which are the centres of economic networks. This interest in absolute growth is strongly connected to the liberalization and privatization that occurred in the 1990s. Due to the international competitiveness in world’s economy, the role of the cities changed into engines of economic growth (Jessop, 2004). That is the underlying reason for current planning wisdom to be growth-oriented. As Rosemann (2006, p.14) puts it “globalization is strengthening the competition between countries, regions, and cities”. Therefore cities are in stress of attracting investments and keeping up with continuous growth. These influence policy makers and planners to stress the necessity of growth and set objectives to realize growing population and employment.

This continuous prospect of growth is also dominant in the Netherlands. The mindset of Dutch planning has been focused on problems of growth and overpopulation ever since the Nota Westen des Landes from 1953 (Salewski & Bodammer, 2008). Starting from 1950s, the country underwent enormous expansion, and the idea of growth is still prevailing today. Due to the increase in overall population and shortage of housing, there is massive government subsidization for the construction of new dwellings. Accordingly, development of land for new growth areas constitutes the main financial source of local governments. This can be seen as another reason for shrinking phobia in urban planning. Shrinking brings the decrease in demand for land and lack of investors. Therefore, it threatens the important economic resource coming from land development.

The difficulties in handling the shrinking situation
The first difficulty of urban discourses when facing shrinkage is the lack of experience in this new type of development. In dealing with shrinking phenomenon, the disciplines of urban development, urban planning, and architecture, which traditionally have been guided by ideas for managing growth, reach their limits (Oswalt, 2006). The current methods and instruments have been shaped by the notion of growth, thus not applicable for the shrinking problem. The strategies pursued thus far have proved unable to formulate a satisfactory response to this unwanted urban change. As a result, the planning discipline is urgently compelled to producing fresh perspectives and creative ideas for shrinking cities.

Another difficulty in dealing with shrinkage is the limited financing possibilities. Due to declining economic activity and private investments, realizing interventions in shrinking context becomes more and more difficult. Planners
and administrators are forced to solve large amount of problems associated with shrinking, despite a minimum of economic power. Therefore, it is not possible to realize large-scale development plans. The solutions should consist of small-scale projects that require minimum cost but result in maximum effect.

IV. PERSPECTIVES ON DECREASING DENSITIES

The urban form in declining city

Besides the economic and social issues, shrinking also poses a question about the spatial/physical configuration of the cities: what kind of urban form results from urban decline? Shrinking cities are characterized by perforating urban fabric with increasing vacancy and deteriorating urban environment. Abandoned building sites and former industrial areas become weakly defined open spaces that create physical discontinuity within the urban fabric. The terms ‘dispersion’ and ‘fragmentation’ which are frequently used to define shrinking context, actually correspond to the broader transformations of the city in the 21st century. Therefore it is necessary to see the patterns of spatial development in shrinking cities within the frame of contemporary urban environment.

Until recent times, urban sprawl has been discussed as a by-product of growth of cities with increasing mobilization. However, today we observe a new type of sprawl in declining context. Either resulting from growth or shrinkage, sprawl can be generally defined as:

“a pattern of land use in an urbanised area that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity” (Galster et al. 2001, p. 685).

The sprawl in shrinking cities appears in the form of mostly decreasing densities, continuity, and centrality. Deindustrialization and population decline result in large amounts of underutilized or vacant industrial and residential land. With respect to the change of urban densities, a perforation process within urbanized area becomes visible, which we call the “shrinkage sprawl”. A dispersed and fragmented pattern of urban land use can be found in areas with an intensive growth pressure as well as in areas with severe decline of population and employment. In this sense, we can conclude that “growth sprawl” and “shrinkage sprawl” have similar effects on the urban form; however they are totally different in their causative factors (Siedentop & Fina, 2008). Therefore, while we are discussing the patterns of spatial development in shrinking cities, we should not isolate it from general dynamics of sprawl.

The urban characterized by physical density

As a result of shrinking, the cities are threatened by the loss of density which constitutes the genuine urban character of the “European city”. The traditional city concept consists of “a dense, urban settlement structure or multi-functional mixed-surface usage.” It has a holistic character covering the political, cultural, and social conceptions of urbanity (Hesse, 2006). In the urban discourse, there have been opinions supporting this traditional city concept:
Lewis Mumford, among others, considers the medieval city as the basis of “ideal city”, which is a physically dense settlement. Although he favours decentralization, he strongly argues against the urban sprawl. He claims the structure of the modern city is close to sprawling megalopolis of Roman times. Like the Roman city, modern cities which lack the dense urban patterns, will end in collapse. Also he relates social problems of the modern society to the current development of cities (Lewis, 1961).

Likewise, for Jacobs, successful urban places are based predominantly on diversity, density and dynamism. She argues that a high concentration of people is vital for city life, economic growth, and prosperity, so she advocates dense, mixed-use neighbourhoods. To achieve urbanity, she identifies four essential determinants: a mixture of primary use, permeability of urban form, a mixture of building type and finally intensity. In a city district, there must be a sufficiently dense concentration of people using it for a range of reasons, including residence. That is to say a relatively high density is needed to generate vitality (Jacobs, 1961).

Montgomery goes parallel with Jacobs in defining the physical conditions for making a city. He thinks urbanity consists of three main aspects: activity, image, and form. Table 1 is his list of essential conditions to achieve urbanity. In order to generate sufficient activity, he mentions the need of a density of population. He does not give an arithmetic answer to optimum city density, however he underlines the problems when densities are too low or too high (Montgomery, 1998).

**The notion of the urban in the late modern society**

In the recent decades, urban society has changed radically both in social and spatial sense. Accordingly, the conception of urban space and form shifted from that of the ‘traditional’ city. Today, we can conceive urbanity without the dense structure of the past. The developments in the fields of information technology and communications are the main reasons for the transformation in the social and spatial patterns of the late-modern urban society. Together with the increased mobility, mass consumption and recreation, the sphere of public life has reached beyond the historic city centers.

The urban is no longer characterized by physical density, proximity, and centrality. Instead, concepts like the ‘urban network’ or ‘urban field’ are used to define the current spatial reality. The urban field is an undifferentiated ‘urban sprawl’ without contradistinction between city, suburb and countryside. As Hajer and Reijndorp put it, the urban field seems to be:

“a random collection of a few old urban cores, villages, in the midst of suburban residential areas, shopping centers, airports, brainparks, educational institutions, motorways, hotels, railways and metro lines, nature areas, motorway services, discos, museums, amusement parks, recreation areas, country estates, stadiums, golf courses, distribution centers, leisure facilities, multiplex cinemas and so on.”

(Hajer & Reijndorp, 2001, p29-32)
From this whole variety of elements and locations in the urban field, the individuals assemble their own city, a combination of the various places that are important for themselves.

Corboz mentions the rise of the urban field as a new stage of urban development starting from 1990s. He puts forward the notion of the territorial city which consists of a city that no longer has territorial boundaries, where ‘centrality’ and the city as a ‘place’ loose significance. It becomes a potentially unlimited urbanized entity that is neither city nor countryside. This situation is referred also by different names in the discourse such as landscape city, network city, patchwork city, the carpet metropolis, etc. depending on the emphasized aspects (Corboz, 1992).

The contemporary city is defined by discontinuity, heterogeneity, fragmentation and unlimited transformation. In the world of movement and mixtures, concept of the city is usually linked to metaphors of ‘fluid’ or ‘network’. Networks, as introduced by Castells (1996), are “dynamic open structures, which are able to effect communication with new node and to innovate”. The understanding of networks is useful to place the idea of urban field in a broader framework. In the network society, the traditional city dissolves into an irregular urban landscape. The spatial dispersion of activities and increasing mobility leads to a new urban form (Hajer & Reijndorp, 2001). As a result, the urban space becomes functionally interrelated beyond physical continuity. These processes can be observed in spatial restructuring of cities; in the form of inner-city decay, fast exurban development, and obsolescence of the suburban built environment.

While developing an approach to shrinkage, we should place it within the frame of above mentioned concepts ‘urban network’ and ‘urban field’. If we continue to identify the urban with traditional aspects (like physical density or continuity), we are blocking the opportunity to recognize certain qualities in shrinkage. Thus, we need to develop insights into the new requirements for the urban space.

V. OPPORTUNITIES IN SHRINKING

Accepting and planning for decline
Urban decline is difficult to accept for policy makers and planners, due to the reasons mentioned in the previous chapters. The general tendency is to develop strategies to change the direction of population decline. However, the past experiences in shrinking cities showed that optimistic growth scenarios are unsuccessful to reverse the decline. Declining cities should not anticipate a return to their former thriving periods. Efforts to attract investors and develop big infrastructures cannot stop decline. On the contrary, the urban planners should find proper ways of downsizing infrastructure and adapting the housing stock to the changing needs of a declining population. Dealing with shrinking requires an urban restructuring based on realism, in stead of ‘boom-town-hopes’ (Couch et al. 2005).
In his ‘Good City Form’, Lynch introduces the idea of potential decline in urban planning. He relates the obsession with growth to the metaphor that we see a settlement as an organism and if it decreases in bulk, we comprehend that it is about the die. However, decline is an intrinsic feature of urban form, like the way growth is, with multiple and interesting consequences. Planners should not perceive it as source of alarm, but be able to accept and plan for it. Instead of pursuing a defensive strategy against shrinkage, the cities should be openly creative in conceiving their future as shrinking.

“All planners bewail decline. Our theories analyze growth, not loss. Yet, while rapid decline (like rapid growth) may be a catastrophe, there are values in a moderate, negative rate of growth, including such things as good access to an abundance of space and facilities, low stress, increased adaptability and control, and strong historical legibility (…)Could we plan for decline, to realize those values?” (Lynch, 1998).

**Less is more: the chances that shrinking offers**

Shrinking cities are presented in discourse as symptom of crisis and “as a general loss, as the deprivation of social classes, as a decline in culture that is rooted in the urban”. This perception comes from still being focused on the traditional images of the urban. However, shrinking cities do not only display tendencies of decline, but also potentials for new dynamism in urban development, which must be promoted and emphasised (Akbar & Kremer, 2005).

Emptiness, resulting from industrial wastelands and vacant building sites, is the dominant physical feature of declining cities. These abandoned areas create voids in the urban fabric, which are undefined, vague, and unproductive. However, these empty lands contain the possibility for new interpretations. They can be incorporated in the urban fabric offering the values in their vacancy (Andersen, 2005). The open structures in the city can be reorganized in a way to contribute to life quality and sustainability. As we already stated, the contemporary city is an urban landscape, which consists of enclaves connected through networks. In this context, the physical structure of shrinking cities can be interpreted as a patchwork of open structures, buildings and infrastructure. In addition to these, the problems of suburbanization and population aging offer us opportunities to re-examine the relation between the countryside, suburb, and centre. As the city and countryside blend, new building and open space typologies can be experimented both in the inner cities and in the periphery.

In shrinking context, infrastructure presents another field of experimentation, which is already a rich topic discussed in relation to diffuse cities. In the contemporary city, the increasing level of mobility coupled with the scattering of activities adds new meaning to infrastructures beyond simple transport lines connecting nodes. The interaction of motorways with built environment and landscape produce a new form of urban vitality and quality. These new types of spaces for mobility become a part of the public sphere, giving rise to sociability and interaction among citizens (Artgeineering, 2007). Therefore, infrastructure presents a potential for defining the new urban life in declining cities.
VI. CONCLUSIONS AND RECOMMENDATIONS FOR THE PROJECT

In the light of the discussions above, we can develop an approach to work with the shrinking phenomenon in the city Heerlen. However, while doing this, we need to be aware that there is no single recipe for dealing with the problem. Every shrinking city requires its own way of problem solving. Thus, we need to incorporate our general concept over shrinkage with the local characteristics of the specific place we are dealing with.

Heerlen is a city with 92,600 inhabitants located in the south-eastern Netherlands. It is one of the most often mentioned cities in relation to population shrink in the country. Before 1960s, the city used to have an important role as a major mining location. However, the industry could not compete with the rise of cheaper energy sources. By the closure of the coalmines, a number of 60,000 job losses occurred. The decline in economic vitality gave way to migrations form the city, which still continues. In the last 10 years, the city lost 4% of its population, moreover 17% population decline is expected till 2025 (Van Dam et al., 2006). Today the city suffers various problems in economic, social, and spatial terms.

The unemployment seems to be an important problem, especially from the political-economic perspective. It is crucial that the necessity of creating new jobs is not narrowed to the boundaries of the city - if we can speak of real boundaries. Because cities are no longer independent enclaves. In the network society, cities, regions, countries are connected through different flows and networks, which influence their development (Andersen, 2005). In this sense, it is relevant to consider the economic problems of Heerlen in relation to its position within these networks. Actually, the city is strategically in good connection with important urban networks. It is in the middle of Eindhoven-Aachen-Liege triangle, which are centers of knowledge-based development. The Maastricht-Aachen-Hasselt-Heerlen-Liege (MAHHL) network is also a promising opportunity for the city’s future. Regarding these, although Heerlen itself is not the center of economic development, it can benefit from the job opportunities created within these urban networks.

The spatial dimension of shrinking constitutes our main focus as urban designers. Like other shrinking cities, the industrial wastelands and abandoned building sites create problems for the physical structure of Heerlen. In the city, there are four major old mining areas which stand unused and empty. They have no relation with the rest of the urban fabric. In addition to these brownfields, within the residential quarters a perforation process going on. As a result of the population decline, the vacancy rate in the housing stock is increasing. The first buildings to be abandoned are the high rise apartment blocks, which were build before 1960s to meet housing need of mining labours, and following them are the degraded row houses in the suburbs. These form random gaps in the fabric and in some areas the building density is critically low. Above all, the city has unique landscape qualities. However in the current situation the landscape do not contribute to the living conditions. If we think of the further population
decrease and accordingly reduced building needs in the following years, the
design of open structures becomes a major issue for the city. As a first task, the
current and future emptying spaces need to be incorporated to the urban fabric.
While unbuilding the city, the relation of built and open structures should be
carefully worked out.

The concept of an urban landscape or urban field is relevant in such diffuse
condition in Heerlen, which can present a scattered urban quality. An urban
landscape with “enclaves connected through networks” exactly defines the
spatial structure of the city. The mining colonies, which were built close to the
industrial areas in the past, are now standing as urban fragments separated with
landscape corridors and traffic infrastructures. The in-between areas flowing
through these “urban archipelagos” are formless and monofunctional. However,
the interaction of infrastructure with the landscape and built areas presents
an opportunity to generate a new kind of urban vitality. The roads can be
transformed to potential public spaces with increased program and relation to
the urban fabric.

To conclude, while drawing our strategy in Heerlen, first we have to escape
the pessimism towards shrinkage that overshadows its potentials. We have to
think positive, and try to work with shrinkage, instead of against it. Considering
the demographic forecast, we have to set realistic goals and plan the city for
its shrinking future. For this, we need an open creativity to explore the specific
potentials in the declining context of Heerlen. Finally, we need to comprehend
the problem at different scales; both globally, nationally, regionally, and locally.

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