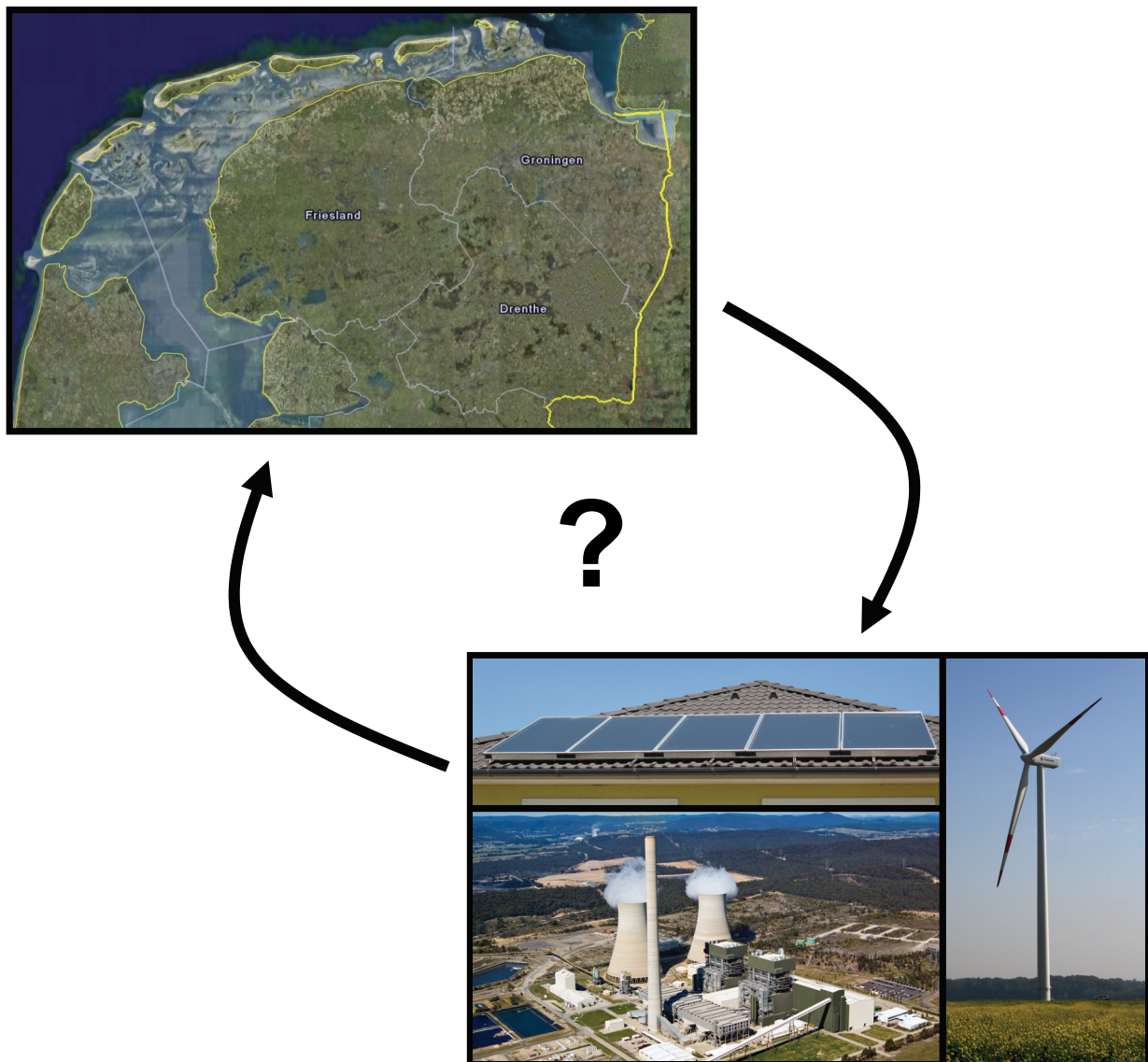


The synergy between spatial planning & energy

Emerging policy and projects



J.P. van Loon

Master's Thesis
Research Master Regional Studies
Faculty of Spatial Sciences
University of Groningen



university of
groningen

The synergy between spatial planning & energy

Emerging policy and projects

J.P. van Loon

Master's Thesis
Research Master Regional Studies
Supervisor: Prof.dr. G. De Roo

Faculty of Spatial Sciences
University of Groningen
P.O. Box 800
9700 AV Groningen



university of
 groningen

© January, 2008

Credits Cover Images:

Satellite image of the Northern Netherlands by Google Earth (Aerodata International Surveys, Europa Technologies, Tele Atlas); Image of power plant by Craig Jewell.

Abstract

Spatial planning and energy are two fields of expertise, which are not connected up until now. However, there are significant spatial and environmental impacts of the assimilation and use of energy. Besides, spatial planning can contribute to saving energy by an improved planning of spatial functions. This is all the more relevant since the energy issue gains importance, because of the attention for climate change, for example. The energy issue refers to the (future) insecurity of energy supply and the negative environmental impact of the use of fossil fuels.

The research, which is described in this report, comprises an analysis of policy development regarding the synergy between spatial planning and energy in the Netherlands, in order to provide insight into its current state of affairs and potential future development. The report contains three parts: a theoretical background of planning and policy processes, a comparison between existing themes in spatial planning and energy as a new theme, and an empirical study of the Netherlands (with special attention for the Northern Netherlands as an energy region).

The synthesis and conclusion of the research brings the three parts together. Energy appears to be a theme, which increasingly receives attention within policy making. The synergy with spatial planning comes to the fore on the local and regional levels, especially. This causes energy to be a remarkable theme, which does not have direct similarities with other themes, such as environmental quality and water management. We can state, therefore, that the development of these example themes cannot be used as an example to predict the future development of the energy theme. The relevance of the synergy between spatial planning and energy seems to be temporary (about one generation). When the energy issue is largely solved, the need for spatial planning will diminish or even disappear entirely, similar to the lack of a connection between these fields of expertise up until now. This conclusion strengthens the potential value of the transition model.

Samenvatting (Summary in Dutch)

Ruimtelijke planning en energie zijn twee verschillende expertises die tot nu toe niet tot nauwelijks met elkaar te maken hebben. Toch zijn er aanzienlijke gevolgen van de winning en het gebruik van energie voor de ruimte. Daarnaast kan ruimtelijke planning door een betere planning van locaties voor ruimtelijke functies bijdragen aan het besparen van energie. Dit is des te relevanter nu het energievraagstuk belangrijker wordt door bijvoorbeeld de groeiende aandacht voor klimaatsverandering. Het energievraagstuk omvat onder andere de (toekomstige) onzekerheid over onze energievoorziening en de negatieve gevolgen voor het milieu door het gebruik van fossiele brandstoffen.

Energie krijgt momenteel veel aandacht. Er zijn veel projecten die energie en duurzaamheid als speerpunt hebben. In sommige gevallen is er ook sprake van eerste stappen richting een synergie tussen ruimtelijke planning en energie. Het is deze ontwikkeling, waarop het onderzoek – beschreven in dit rapport – gericht is. Daarbij staat de ontwikkeling van beleid centraal. Het doel van het onderzoek is:

...de ontwikkeling van het beleid omtrent de synergie tussen ruimtelijke planning en energie in Nederland te analyseren om inzicht te kunnen verschaffen in de huidige stand van zaken en de mogelijke toekomstige ontwikkeling.

Het onderzoek is opgebouwd uit drie onderdelen:

- 1. Een theoretische achtergrond van planningsprocessen en –modellen.*
- 2. Een vergelijking tussen bestaande thema's in de ruimtelijke planning en het nieuwe thema energie.*
- 3. Een empirische studie van de huidige ontwikkelingen in Nederland met speciale aandacht voor Noord-Nederland als energieregio.*

Het eerste deel van het onderzoek – hoofdstuk 2 van dit rapport – behandelt onder andere verschillende modellen van planningprocessen, zoals een beleidslevenscyclus, en leidt uiteindelijk tot een voorstel voor een nieuwe conceptuele voorstelling van de mogelijke ontwikkeling van energie als thema binnen de ruimtelijke planning: het transitie model. Dit model representeert een periode van snelle ontwikkeling die uiteindelijk leidt tot een nieuwe stabiele situatie. Het wordt verondersteld dat dit model betere mogelijkheden biedt voor het weergeven van de toekomstige ontwikkeling van het thema energie.

In deel twee van het onderzoek – hoofdstuk 3 van dit rapport – wordt de ontwikkeling van energie als een thema binnen de ruimtelijke planning vergeleken met twee andere thema's,

die eerder een rol speelden en dat nog steeds doen: milieu en watermanagement. Deze twee thema's hebben beiden een duidelijke ontwikkeling doorgemaakt van centraal, generiek en sectoraal beleid naar decentraal, gebiedsspecifiek en integraal beleid. Het is opvallend dat het thema energie zowel centraal als decentraal wordt opgepakt in beleid, ondanks het feit dat het thema nieuw is en nog verder zal ontwikkelen. Het kan dus niet zondermeer worden aangenomen dat het thema energie dezelfde ontwikkeling zal doormaken als milieu en watermanagement.

Deel drie van het onderzoek – hoofdstuk 4 en 5 – omvat allereerst de ontwikkelingen op energiegebied in Nederland als geheel en daarbij wordt ook gerefereerd aan voorbeeldprojecten uit het buitenland, waar de ontwikkelingen soms verder zijn. Uit een analyse van deze projecten blijkt dat meervoudige, integrale projecten het meest relevant zijn voor ruimtelijke planning. Dit past goed in de huidige trend van decentralisatie van beleid die zeker in de ruimtelijke planning tot uiting komt. Ten tweede komt in deel drie een meer gedetailleerde analyse van een specifiek gebied aan bod, namelijk Noord-Nederland. Deze regio kan met recht een energieregio genoemd worden door de vele projecten die hier plaatsvinden en de samenwerking van de regionale overheden die erop gericht is het thema energie duidelijk vorm te geven. Groningen en Tytsjerksteradiel worden aangehaald als twee voorbeelden van gemeenten die beleid voeren op het raakvlak van ruimtelijke planning en energie/duurzaamheid. Hieruit blijkt dat beleid betreffende deze synergie volop in ontwikkeling is, maar dat er een paar jaar overheen gaat voordat dit beleid haar vruchten afwerpt.

De synthese en conclusie van het onderzoek – hoofdstuk 6 – brengt de drie delen van het onderzoek bij elkaar. Het blijkt dat energie een thema is dat in toenemende mate aandacht krijgt binnen beleidsvorming en dat vooral op lokale en regionale schaal de synergie met ruimtelijke planning tot uiting komt. Dat maakt, zoals eerder gezegd, energie tot een opmerkelijk thema, dat in haar ontwikkeling geen rechtstreekse overeenkomsten vertoont met andere thema's. We kunnen daarom stellen dat de ontwikkeling van deze thema's niet als direct voorbeeld gehanteerd kan worden bij uitspraken over de toekomstige ontwikkeling van het thema energie. De relevantie van de synergie tussen ruimtelijke planning en energie lijkt van tijdelijke aard (ongeveer een generatie lang). Wanneer het energievraagstuk grotendeels opgelost is, zal de behoefte voor ruimtelijke planning afnemen of zelfs geheel verdwijnen, zoals er tot voorkort ook geen koppeling was tussen deze twee expertises. Deze conclusie versterkt de potentiële waarde van het transitie-model.

Preface

In order to fulfil the requirements of the Research Master Programme at the Faculty of Spatial Sciences, University of Groningen, I performed a research of which the report is currently in your hands. This report, my Master's Thesis, is the product of working on a research for a few months, in which I was not only a student, but also involved as a researcher with the project *Synergy between Regional Planning and Exergy* (SREX). To work in a research project, together with other researchers from different disciplines, was the perfect opportunity to get a first glance at the reality of scientific research before I am even graduated. I would like to thank my supervisor Prof. dr. Gert de Roo and SREX-coordinator Dr. Nanka Karstkarel for giving me this opportunity and providing comments on my work. Furthermore, my appreciation goes to everyone, who is involved in the SREX project. Finally, I would like to express my gratitude to my family and friends, who had to listen to me a few too many times, when I was struggling with the research.

Jesper van Loon

Groningen, January 2008

Contents

Abstract	v
Samenvatting (Summary in Dutch)	vi
Preface	viii
Contents	ix
List of Figures	xi
1 Introduction	13
1.1 Spatial Planning and Energy	13
1.1.1 <i>Why Space and Energy are connected</i>	13
1.1.2 <i>Energy Projects: Combining Energy Measures with Spatial Planning</i>	15
1.2 Developments in Spatial Policy: Theory and Experience	16
1.3 The Research Outline	17
1.3.1 <i>Objective and Research Questions</i>	17
1.3.2 <i>Conceptual Model</i>	18
1.3.3 <i>Hypotheses</i>	19
1.3.4 <i>Study Design</i>	20
1.3.5 <i>Research Methods</i>	20
1.4 Structure of the Report	21
2 Policy, Planning, and Rationality	23
2.1 Introduction	23
2.2 Analysing Policy	24
2.3 Policy and Planning Processes	26
2.4 Rationality in Planning	29
2.5 The Transition Model	32
2.6 Conclusion	34
3 Themes in Dutch Spatial Planning	35
3.1 Introduction	35
3.2 Changing Importance of Themes over Time	35
3.3 Spatial Planning and Environmental Quality	36
3.4 Spatial Planning and Water Management	38
3.5 Spatial Planning and Energy	39
3.6 Conclusion	40

4	Energy Projects and Policy	41
4.1	Introduction	41
4.2	The State of Affairs concerning Energy Projects in the Netherlands	41
4.3	Development of Energy Policy on the Local Level	43
4.4	Experiences from International Examples	44
4.5	Analysing Energy Projects	47
4.6	Conclusion	50
5	Energy in The Northern Netherlands	51
5.1	Introduction	51
5.2	The Northern Netherlands as an Energy Region	51
5.3	Government and Policy in the Northern Netherlands	53
5.4	Example 1 – Municipality of Groningen	54
	5.4.1 <i>Ambitious Energy Objectives</i>	54
	5.4.2 <i>Roadmap to Groningen Energy Neutral[†] 2025</i>	55
	5.4.3 <i>Development Project Meerstad</i>	57
5.5	Example 2 – Municipality of Tytsjerksteradiel	58
	5.5.1 <i>Sustainability as a Policy Theme</i>	58
	5.5.2 <i>Collaboration and Governmental Tasks</i>	59
	5.5.3 <i>Residential Area It Súd and Business Park Quatrebras</i>	60
5.6	Conclusion	61
6	Synthesis and Conclusion	63
6.1	Introduction	63
6.2	Energy as a Field of Policy within Spatial Planning	64
6.3	Potential Future Developments	65
6.4	Conclusion	69
	References	71
	Appendix A – Overview of Spatial Planning in the Netherlands	75
	Appendix B – Special Meetings and Interviews	79
	Appendix C – Interview Questions	80

List of Figures and Boxes

Figures

1.1	Conceptual model	19
2.1	A policy life cycle	27
2.2	A conventional planning process	27
2.3	An issue attention curve	28
2.4	A framework of goals and interaction in planning	30
2.5	Different types of planning	31
2.6	The stages of a transition process	33
3.1	The relation between spatial planning and environmental quality	36
3.2	Development of environmental planning in the Netherlands	37
3.3	The relation between spatial planning and water management	38
3.4	Energy as a new field of policy within spatial planning?	40
4.1	Example projects placed in a mono-multi, sectoral-integral diagram	48
4.2	Four categories for energy policy and projects	49
5.1	An overview of biofuel projects in the Netherlands	52
5.2	Overview of policy in Groningen	55
5.3	The Sustainability Bill and other policy sectors	59
5.4	Project map It Súd	60
6.1	The position of the energy theme on the issue attention curve	66
6.2	The position of the energy theme in the transition model	67
6.3	The issue attention curve linked with the transition model	68

Boxes

2.1	Phases of a policy process	26
5.1	The 'Energy Stepladder' of Groningen	56
6.1	Hypotheses	64

1 Introduction

1.1 Spatial Planning and Energy

1.1.1 Why Space and Energy are connected

Spatial planning and energy are two fields of expertise, which are not connected, while it is believed that there is much to gain from a synergy between the two (see SREX, 2006). Some first developments towards a synergy begin to be visible in regional and local projects. In this thesis we analyse these first developments. Through a comparison with other fields of policy within spatial planning and a more theoretical line of planning processes in general, we are able to reach a synthesis. As such, we describe the most relevant and remarkable aspects of the current developments of the synergy between spatial planning and energy and how this might develop in the future.

If spatial planning and energy are so different, then why would we try to combine the two? We are currently in the midst of many new developments of, and technologies for energy production and saving. These new developments and technologies ask for new solutions in terms of planning and policy. The spatial component in this is hardly addressed, while there is a clear relation between energy and space. Moreover, there are some arguments that might convince us of the importance to look at the opportunities for incorporating energy into spatial planning.

First of all, energy needs space. This means that the production of energy has a certain impact on space. For example, the assimilation of energy from raw material, such as coal, implies large excavation areas and the assimilation of wind energy can only succeed by placing windmills at a certain distance between them, using space that cannot be used for many other purposes (Gordijn et al., 2003). The decision of where to locate windmills is almost never a simple one. Many different interests could be at stake and, therefore, planning is necessary in order to evaluate the different interests and provide a solid consideration for the location of the windmills. Often, the location for excavation of raw material cannot be chosen, because this material can only be found in a few places. Spatial planning is then useful for evaluating the impact and considering solutions for the use of the area, once it is excavated.



The impact of energy assimilation on space and environment (Photo: Craig Jewell)

Secondly, fossil fuels, on which our energy supply mainly relies, are becoming scarcer, which increases the costs of using this type of energy source. Costs might then be a reason to either save energy or use other sources for energy. These alternative sources of energy are important to spatial planning, since they generate a new spatial impact. An example of an alternative energy source is biomass, for which vast amounts of land are needed in order to produce it. Again, the choice of suitable locations for this is a planning issue, such as was addressed in the first argument.

Thirdly, the environmental impact of our current energy use is becoming a more serious problem every day. The emission of harmful gasses or small particles, such as soot, and all kinds of waste material have a spatial influence both direct and indirect. A direct spatial influence is the space that is needed for the storage of waste material. More indirect is the influence of emissions caused by the use of conventional energy sources. Spatial functions, such as industry, might conflict, because of the emissions, which form a health risk to people living in nearby residential areas. This implicates that a residential area cannot be near an industrial site. Through spatial planning, this can be regulated in the form of a land use plan or, even stricter, in the form of spatial legislation.

Fourthly, there is also geopolitics, which influences the ability of countries to import energy from other countries. For example, when the Netherlands would be depending on natural gas supply from Russia and the relationship between those two countries would not be good, the security of energy supply might be in danger. This could become a reason to decrease

dependency on other countries and on the one hand use less energy and on the other invest in national or local energy assimilation.

The arguments above contribute to, what we call, the energy issue, which is the overall reason for changing the current state of affairs regarding our energy system (i.e. the whole system of energy production and consumption). The energy issue refers to the (future) insecurity of energy supply and the negative environmental impact of the use of fossil fuels.

A different type of relation between space and energy can be found at the consumption side of the energy market, as opposed to the aspects relating to energy production, which are discussed above. This relation can be explained by the exergy principle. Without going into technical details of this principle, we can state that it refers to the quality of energy (Rosen and Dincer, 2001). This means that the potential of the same amount of energy differs between, for example, heat and electricity. While we heat many of our buildings by burning natural gas, this gas has the potential of heating to much higher temperatures, which are needed for uses, such as industrial production processes. The heat, which remains from these processes – waste heat, can be used for other purposes. This way a cascade of functions – from where high quality energy is needed to a place where low quality energy suffices – can be developed (see Lenferink et al., 2006). The total energy consumption of the cascade is then decreased because of the exergy principle. Since heat cannot be transported over long distances and the functions are usually not located close to each other, spatial planning might be needed if the energy is to be lowered.

Summarised, it can be said that the urgency within present-day society provides us with the ‘right conditions’ for incorporating energy in spatial planning. There is a lot of attention for the security of future energy supply and the environmental impact of energy use. In order to secure the future supply and reduce the environmental impact, spatial planning might prove to have influence on our energy system. The other way around, it is relevant for spatial planning to investigate the incorporation of energy, since there are spatial impacts of new energy measures or technologies.

1.1.2 Energy Projects: Combining Energy Measures with Spatial Planning

Whether the motivation is climate change, sustainability or something else, projects on energy are numerous. In a previous analysis, we examined various international projects on energy (see Lenferink and Van Loon, 2007). Energy projects (a term that is used frequently in this report) refer to development projects, which somehow incorporate energy measures into spatial planning and, therefore, aim at improving energy production and consumption in such a way that less fossil fuel is needed and pollution due to energy use is reduced. The international projects appeared to be different in size and scope, but provided us with the opportunity to design a framework for the categorisation of various projects (see chapter 4).

The difference between projects, which focus on one measure, and projects, which implement multiple, as well as the difference between sectoral and integral projects provided insight into various conditions, which were needed for a project to succeed.

Integral, diverse projects combine different policy fields and, therefore, have various objectives, which make a project complex. The number of actors that are involved is also much larger than in projects, which are merely technical and sectoral. This adds to the degree of complexity (see De Roo, 2001). The task of policy-making for these types of developments can be considered a difficult task, therefore.

New development projects, which focus on new techniques for assimilating energy, can also be found in the Netherlands. Especially the Northern Netherlands, consisting of the provinces of Friesland, Groningen, and Drenthe, is becoming active in the field of energy. It has set the goal of becoming one of Europe's leading regions in new energy technologies. This goal is being pursued through an institution called Energy Valley (Energy Valley, 2007). The Northern Netherlands serves as a case study within this research, because it is a progressive area when it comes to energy projects. The use of this area as a case study is also in line with the SREX research (Synergy between Regional planning and Exergy – SREX, 2006), which has a special focus on two regions: the Northern Netherlands and South Limburg.

The research in hand is part of the SREX research and is, therefore, aimed at delivering a contribution to its objective of stimulating the synergy between spatial planning and energy by developing sustainable guiding principles, design strategies, and spatial concepts. By analysing current projects on energy and spatial planning and relating this to known developments in spatial planning, as well as aggregating the developments with the highest future potential, the research described here makes a first attempt to contribute to this objective.

1.2 Developments in Spatial Policy: Theory and Experience

What is policy? Parsons formulates the definition of policy as follows: 'A policy is an attempt to define and structure a rational basis for action or inaction' (1995, p. 14). While policy on energy is at the background, the energy issue is becoming more serious for reasons we have discussed above. Policy, which directly steers the production and consumption of energy, does not exist in the Netherlands. This is left to the market economy, except for some indirect measures, such as the excise tax on fuel or environmental policy, which influences the permitted levels of pollution. The reason for the lack of direct forms of policy could be the abundance of energy up until now. We did not have to be careful with the use of energy, because for a long time people believed energy to be abundant. Of course some negative environmental effects of energy use started to become visible, but those are largely solved

with symptom control. Right now, it is no longer believed that the environmental effects can be compensated and that energy from traditional sources will be abundant in the future. Therefore, the production and consumption of energy needs to be controlled to some extent.

In this research, we are interested in the potential role of spatial planning in reducing energy consumption (through the exergy principle) and stimulating alternative sources of energy (e.g. planning locations for windmills). While policy has not had a significant role in energy, we can learn from developments in related policy fields, such as environmental quality and water management. Concern about environmental pollution and the difficulty of situating colliding land uses close to each other led to a growing attention for the environment in the 1970s. Environmental policy was developed more and more (see De Roo, 2001). This policy and the reasoning behind it changed over the past decades. It might be of use to understand this development and especially get to know the current state of affairs in this policy field, in order to place the development of a synergy between energy and spatial planning in the right context.

Initially, environmental policy was regarded as a technical exercise and it was thought that law and regulations would suffice in the control of environmental issues. Over time, however, it became clear that some issues were more complex and that the solution was not clear in advance. Slowly, it became more important to involve local stakeholders and approach decision-making in a communicative manner, which leads to a common identification of the issue at hand and to a commonly supported solution. This development can be characterised by two aspects: a change in the rationality within planning, namely from technical towards communicative, and decentralization. The latter means that lower-level governments will have to take more responsibility. Chapter 3 provides more background information about this development.

1.3 The Research Outline

1.3.1 Objective and Research Questions

Above, we have discussed the background and scope of this research. We have already learned that energy and spatial planning are not integrated yet, while there is much to gain from that synergy, it is believed. This synergy is a difficult challenge for policy makers. First attempts are made by policy makers, however, and the research that is described in this report is concerned with these early attempts of developing new policies and plans regarding spatial planning and energy. The objective of this research is, therefore...

...to analyse policy development regarding the synergy between spatial planning and energy in the Netherlands, in order to provide insight into its current state of affairs and potential future development.

This leads to the following main research question:

What is the current state of affairs regarding the development of policy on the synergy between energy and spatial planning in the Netherlands and how can we consider its potential future development?

In order to answer this main question the following three sub questions have been formulated. Together, the sub questions contribute to the answer on the main research question.

- 1. What are the current developments regarding the synergy between spatial planning and energy in the Netherlands?*
- 2. To what extent is the policy field of energy similar to other policy fields in its interaction with spatial planning?*
- 3. How can policy developments in the field of energy and spatial planning be modelled?*

1.3.2 Conceptual Model

The research outline is also displayed in the conceptual model (figure 1.1). Due to the right context, as described above, a synergy between spatial planning and energy becomes possible and leads to some first developments in the form of projects and policy proposals. This research connects these developments to existing policy fields in spatial planning and theoretical models of policy development, which eventually leads to a comparison. This comparison makes it possible to analyse trends in these developments and put forward some potential future developments.

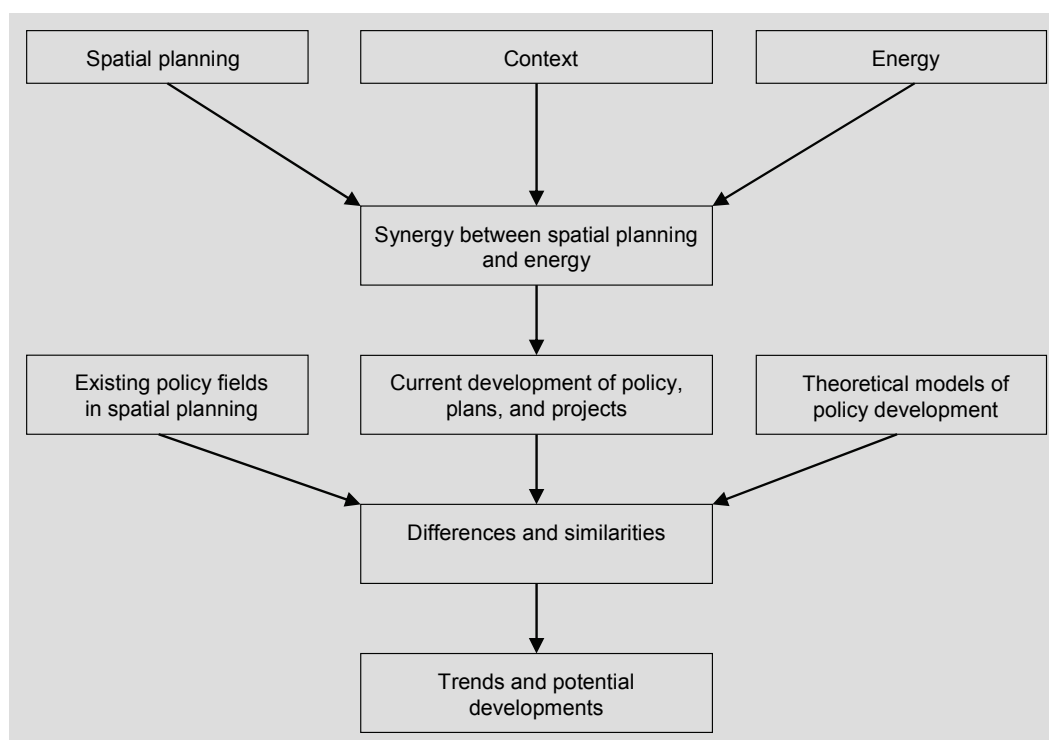


Figure 1.1 Conceptual model

1.3.3 Hypotheses

Based on the research questions and also the background of this research we can formulate three hypotheses, which will be either confirmed or rejected:

1. *The way in which energy is currently being approached as a theme within spatial planning is different from other, existing themes; energy is immediately addressed on regional and local levels of scale, while themes, such as environmental quality and water management, first played a central and generic role.*
2. *The current attention for the energy issue causes all kinds of developments (policies, projects, collaborations), but a strategic pathway is still lacking due to the uncertainty towards technological innovation, availability of traditional sources of energy, and a lack of knowledge.*
3. *Spatial planning is needed in both the development of new ways of energy assimilation (locations for windmills, biomass, etc.) and saving energy (the exergy principle), but will be less relevant once energy is available in unlimited amounts, without negative impacts (e.g. 'the hydrogen economy').*

1.3.4 Study Design

We will now describe what methods are used to perform the research and, consequently, answer the research questions. The research is built up of three main parts, which all contribute to an answer on the main research question and more or less represent the three sub questions. These are:

4. *Theoretical background of planning processes and models.*
5. *A comparison between existing themes in spatial planning and the new theme of energy.*
6. *An empirical study of the current developments in the Netherlands with special attention for the Northern Netherlands as an energy region.*

The three parts will be linked to each other in the synthesis at the end of this report. It is in this synthesis that we will be able to identify some first hints of a potential future development by comparing the current development with previous developments in spatial planning and adding a theoretical perspective of planning processes and models. For this the qualitative approach is applied in order to provide insight into the reasons for certain developments or ways of acting by stakeholders, instead of making a statistical overview. The question of why something is happening is, therefore, most important. We will now describe the methods in some more detail.

1.3.5 Research Methods

For the first part of the research this consists of a short study and analysis of planning theory. Over time, many models of planning processes and policy development have been developed and by analysing this development we will be able to provide a basis for the development of a model, which incorporates the potential future development of energy as a field of policy within spatial planning.

The second part of the research, which is concerned with analysing existing fields of policy within spatial planning, is based on a literature review. The policy fields of environmental quality and water management are two reference fields, with which the policy field of energy is compared. Much is already written about these two topics in other research reports and policy documents. Since the research is not mainly about these reference fields of policy, a literature review suffices.

Finally, we reach the more empirical part of the research in part three, which is concerned with the analysis of current developments regarding the synergy between spatial planning

and energy. A description of the current state of affairs in the Netherlands is first provided and is mainly based on a review of policy documents. We also describe and analyse some international examples of projects and policies on spatial planning and energy, in order to be able to place the Dutch examples in perspective.

However, part three focuses on the developments in the Northern Netherlands, which has a special relevance regarding the topic of research. This region is deemed an energy region within the Netherlands and even in Europe (Energy Valley, 2007 and Ministerie van Economische Zaken, 2005). Developments on spatial planning and energy are clearly visible here and go further than in other parts of the Netherlands. Two cases within this region, the municipalities of Groningen and Tytsjerksteradiel, which are both active in setting and achieving energy objectives, are further analysed. Relevant conferences and gatherings were attended and interviews with some key persons involved in the policies, plans and projects in these municipalities were held to provide a better understanding. List of attended conferences/interviewed persons and interview questions can be found respectively in appendix B and C.

1.4 Structure of the Report

In this first chapter, we have discussed the potential of a synergy between spatial planning and energy. We have also touched upon the existence of various national international projects on energy and the Northern Netherlands as the energy region of Europe. Together with the overview of the developments in spatial policy, this provides an overall background of our research. Before we get to the actual analysis of policy on energy and spatial planning in the Northern Netherlands, however, there is the need for some further knowledge about policy and spatial planning in general.

In chapter 2 we will take a look into policy analysis and planning processes. This will serve as a theoretical basis of the research. The development of models of planning processes and the background of planning theory is central to this chapter. In this light, the relevance of a changing rationality in planning and policy is also discussed. The chapter can be seen as a search for a model, which is suitable for representing the potential development of energy as a theme within spatial planning. The transition model is eventually presented as a possibility. Chapter 3, as the second pillar on which the research is built, provides an analysis of two existing themes in spatial policy in the Netherlands. The examples of two policy fields that interact with spatial planning – environmental quality and water management – are used to further explore the developments in spatial planning over time. A comparison between previous development of these policy fields and energy is provided. This chapter also includes two developments in spatial planning – decentralization and integration – as a reaction to the changed circumstances and different theoretical insights, which are discussed

in chapter 2. The policy field of environmental planning forms a good example to explain these two developments and why this is relevant for energy as a theme in spatial planning.

Chapter 4 will then focus on the role of energy in projects and policy in the Netherlands. In order to be able to categorize different projects, we will make use of a previous analysis of international projects. This analysis is also provided in chapter 4 and it leads to the categorisation of energy projects and this helps us to structure other energy projects, initiatives, and policies. Once it is clear that integral and area specific projects are most relevant for spatial planning, we zoom in on a specific area: the Northern Netherlands. Projects and policy in this case study are analysed in chapter 5, which then also focuses on two specific cases within this area – the municipality of Groningen and the municipality of Tytsjerksteradiel – in order to further explore current policy developments

Chapter 6 concludes the analysis of planning and policy regarding energy. Here, we provide a synthesis, in which the current state of affairs of energy projects and policy is connected to the (past) development of other policy fields. The first conclusions about energy as a field of interest within spatial policy are drawn.

2 Policy, Planning, and Rationality

2.1 Introduction

The potential synergy between energy and spatial planning raises new questions with regard to spatial policy. While new policy concerning energy in relation to spatial planning is being developed, this synergy is mainly becoming reality in the form of new development projects, such as new residential or business areas. The research, which is described in this report, is an analysis of current developments and policy action on the synergy between spatial planning and energy. This analysis is needed before insight into the potential future development of the synergy between spatial planning and energy can be provided, which is part of the objective of the research. However, before it is possible to provide a potential future development, it is useful to learn more about the background of planning and policy processes, in order to ground the conclusion of the research in theory. This chapter, therefore, provides a theoretical perspective on policy analysis and planning processes.

Since policy is central to spatial planning (see Voogd, 2001) and a main topic in this report, policy analyses is discussed in section 2.2, in order to provide us with a solid base for studying spatial policy and its potential future development concerning energy. Section 2.3 will then continue with a discussion of planning and policy processes, in order to better understand how policy and planning projects are developed. However, believes in how these processes actually work changed over time. The debate in planning theory, concerning technical and communicative rationality, provides more insight into various discourses and helps to discern different approaches to different types of planning issues. This is explained in section 2.4.

After describing some of these different approaches in spatial planning over time, we focus on energy and how this new theme could be regarded from a theoretical perspective. In order to achieve this, a new model or theoretical framework might prove to be relevant: the transition model. Section 2.5 discusses this model. In the conclusion (section 2.6) we will place the analysis of energy projects in the broader perspective of policy and planning that is provided in this chapter and shortly touch upon the role of the theory, discussed in this chapter, in the remaining of the report.

2.2 Analysing Policy

Literature shows some consensus about the origin of policy science as a separate branch of social science. This was in the years following World War II. At that time, society started to change fundamentally, as were its problems, leading to the necessity of new knowledge, which was much more specialized than before (Dunn, 1994). It was during this same period that scientists made the first attempts of formulating different stages in the policy process, Harold D. Lasswell being one of the first (Parsons, 1995). These stages will be addressed in the next section.

In his discussion of the term *policy analysis*, Lasswell (1970) makes a distinction between 'knowledge of the policy process' and 'knowledge in the process'. However intertwined, the former refers to *policy science* or *policy research* and the latter to policy analysis. In order to improve our understanding of this difference, we have to regard policy research as a meta analysis. In the practice of policy analysis, various methods and concepts are used to achieve a better knowledge of the subject at hand, based on which policy can be drawn up, evaluated, and improved. Policy science is concerned with the generalization of these methods and concepts, making it possible to develop theories and overall conceptions of how policy analysis should be performed and how the policy process should be designed. In other words, policy research is embedded in general social science and on a higher level (meta analysis level), overlooking policy analysis, which is practical and not necessarily scientific. A definition of policy research provides more insight:

Policy research is applied research, often in the sphere of gamma sciences, and is executed on behalf of authorities that develop, implement, and evaluate policy for society (translated from Van Hoesel and Leeuw, in: Van Hoesel et al., 2005, p.35).

It should be noted here that the terms policy analysis and policy research are often used interchangeably. Since an analysis of the theme energy within spatial planning without the direct input for policy development is at the core of the research, which is described here, we use policy research as the overall conception of analysing policy developments and trends. However, we can learn from policy analysis in terms of the approaches and aims. When looking at policy analysis as a profession, the questions of what policy analysis exactly is and what a policy analyst does, come to mind. Let us explore some definitions and to start with a rather extensive one:

Policy analysis goes beyond traditional disciplinary concerns with the explanation of empirical regularities by seeking not only to combine and transform the substance and methods of several disciplines, but also to produce policy-relevant information that may be utilized to resolve problems in specific political settings [and it] includes policy evaluation as well as policy recommendation (Dunn, 1994, p.62).

Thus, policy analysis is not merely concerned with facts, but also information about societal values and the various ways to achieve those. Policy analysis is regarded as an applied social science and includes different disciplines, professions and sciences. According to Dunn (1994, p.62), 'the policy analyst may therefore be expected to produce information and plausible arguments about three kinds of questions regarding: (1) values whose attainment is the main test of whether a problem has been resolved, (2) facts whose presence may limit or enhance the attainment of values, and (3) actions whose adoption may result in the attainment of values'. This definition of the work of a policy analyst shows the direct practical relevance of policy analysis.

When applied to the synergy between spatial planning and energy, the three questions stated above can also be answered. In developing policy for the enhancement of the synergy between spatial planning and energy, objectives for what should be reached by the policy represent the values. For example, this could be the amount of energy that should be saved by stimulating the synergy. The current conditions of public and political attention for climate change and energy is an example of a fact, which favours the synergy, while financial costs of such a policy limit the possibilities. Finally, the content of the policy, which results in concrete actions, is in need of solid arguments. In the example of the synergy, this could be for example that strict land use planning and permitting is proven to be needed when an energy cascade is to be developed. As we see here, policy analysis can be of use in the synergy between spatial planning and energy, since this is in fact a synergy between various disciplines, professions and sciences and that is exactly what policy analysis is in place for: bridging the worlds of these disciplines. But what is policy analysis exactly?

Williams (1971) explains the aim of policy analysis, providing a more detailed and practical description. According to him, this aim is threefold:

1. Making comparisons between alternatives through quantitative and qualitative analysis in order to facilitate decision-making concerning policy;
2. Determining organisational goals and criteria for the evaluation of the organisation;
3. Determining the need for additional information in order to facilitate future policy analysis and decision-making (Williams, 1971).

Now, we have seen the main differences between policy analysis and policy research and how our research related to this. Policy analysis directly facilitates the development, implementation, evaluation, and improvement of policy, through the use of knowledge about a specified subject. Policy research, on the other hand, applies scientifically grounded theories and methodology and makes use of a higher level of generalization, while not having the direct responsibility to provide an outcome to policy makers. The research, which is described here, does not have the purpose of facilitating policy-making directly, but attempts to analyse trends and potential future developments in the spatial planning – energy relation and can therefore be considered policy research.

2.3 Policy and Planning Processes

Above, we have come to understand what policy analysis is and how this relates to the synergy between spatial planning and energy. In this section, we will further analyse existing conceptions of policy and planning processes, in search of representations (models) of reality, which could incorporate the synergy between spatial planning and energy. There are many generalizations of processes, which help us understand how policy and planning processes work. Here, we will describe and analyse a few of these, while working towards models, which are applicable on the energy theme.

While policy analysis was evolving as a science, the need for structuring the field of policy had grown. The reality of policy-making was captured in all kinds of concepts, structures, and models. In 1956, Lasswell was one of the first to formulate a series of stages within a policy process (Parsons, 1995). Dunn (1994) determines five phases in a policy process. Both lists are displayed in box 2.1.

<u>Phases of a Policy Process</u>	
<u>Lasswell (1956):</u>	<u>Dunn (1994):</u>
Intelligence	Agenda setting
Promotion	Policy formulation
Prescription	Policy adoption
Invocation	Policy implementation
Application	Policy assessment
Termination	
Appraisal	

Box 2.1 Phases of a policy process.

While there are many more of these lists, it is interesting to see that in a 40-year time period stages in a policy process are still quite similar on the one hand. On the other hand, the context in which these 'stagist' approaches function changed and insight into other approaches gained interest as we will see further on. While criticism towards these kinds of models developed, they are continued to be used under certain conditions. As such, they could also function as a way to view the new developments of policy on energy and spatial planning.

Another way to represent the stages of a policy process is a cycle; a so-called policy life cycle (see figure 2.1). This way of representation adds to the dynamic of the policy process, suggesting that policy is always succeeded by evaluation and new policy.

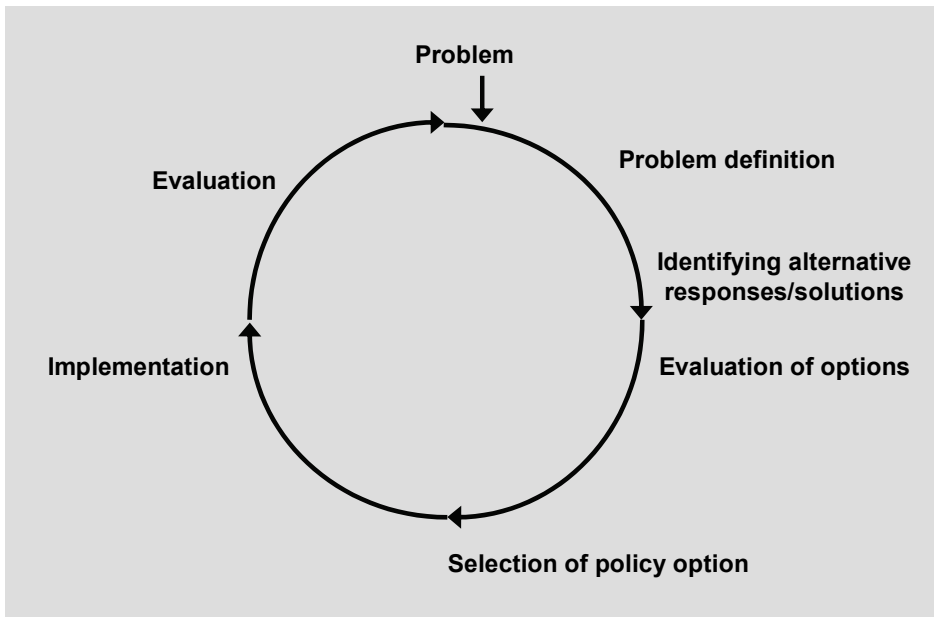


Figure 2.1 A policy life cycle. Source: Parsons, 1995, p.77.

Figure 2.2 also shows various stages of a process, but this time it concerns a planning process as it is conventionally used in spatial planning. The stages are similar to those of a policy process. This illustrates that policy-making and plan-making do not differ much. The mere difference is the output; instead of a generic policy, the planning process has a specific plan as a result.

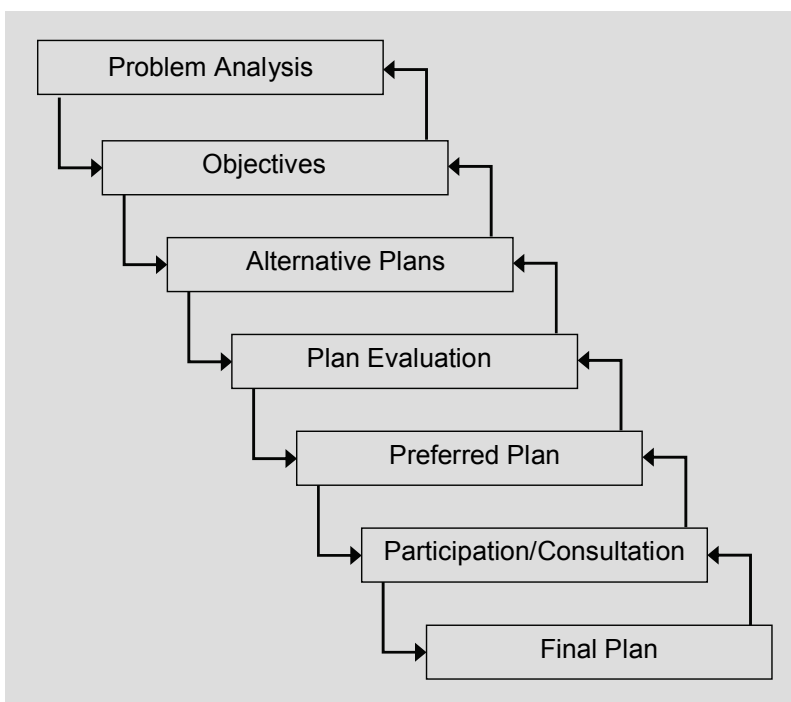


Figure 2.2 An example of a conventional planning process. Source: De Roo and Voogd, 2004.

Over time, criticism towards the 'stagist' models developed. The stages or phases, as proposed by many scientists, cannot be found back in reality, which consists of complex interrelations. In reality, policy-making is not as rational as presented in the models, since agenda setting or evaluation are not limited to respectively the beginning and the end of the process, critics state (Parsons, 1995). Input of new ideas and the evaluation of the policy-making process occur throughout the process; it is more dynamic than these 'stagist' models imply. This provided opportunities for other approaches, as displayed above. Nevertheless, representing the policy process as a series of stages remains of value, as long as we grasp its limitations and the complexity of the real world. Besides, Lasswell already incorporated the context of problems as well as social values and institutional settings as relevant to policy-making (Lasswell, 1970).

Despite the limitations of 'stagist' models, it is useful for us to keep these kinds of models in mind when analysing energy projects. It helps us place the initial steps of policy or a project in a broader perspective. Although it might be too soon to be talking about development of policy in general, specific energy projects could tell us something about the initial stages in the policy process and especially about the decision-making process behind it. Let us explain this with figure 2.3. This figure provides the public attention in different stages of a policy process and is based on Downs' issue attention cycle (see Parsons, 1995).

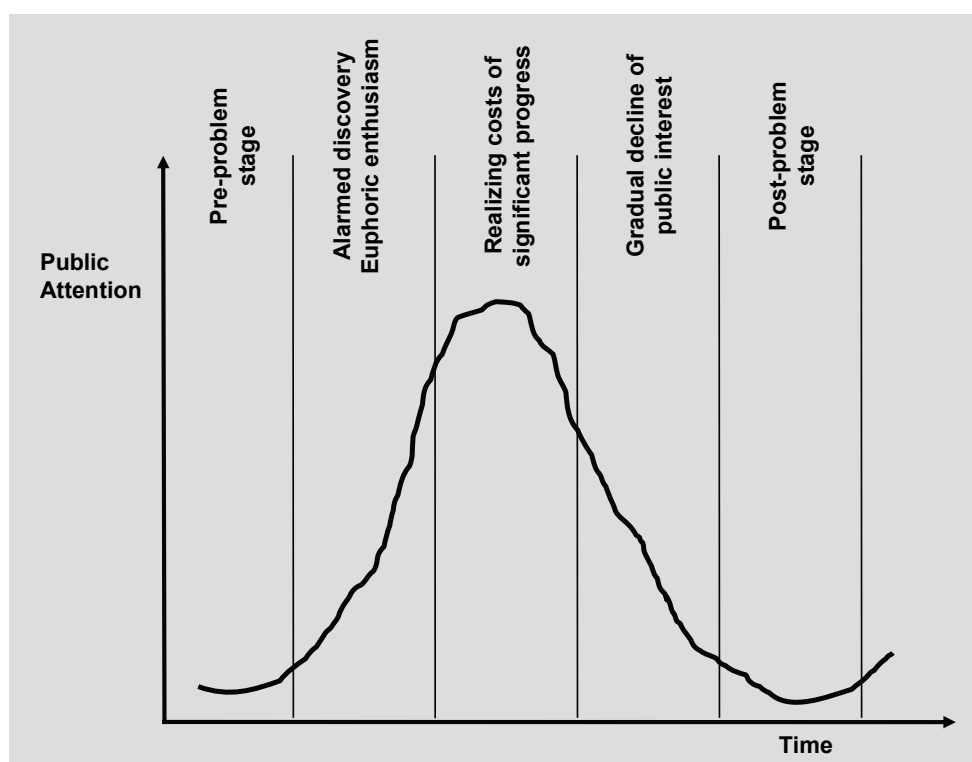


Figure 2.3 An issue attention curve. Based on Downs, 1972 in: Parsons, 1995.

Energy is receiving much attention at the moment (see the introduction of chapter 1). The synergy between spatial planning and energy, however, is hardly being addressed, while

projects on energy are becoming more and more common. Therefore, we can state that the problems concerning energy are being recognised, but that we are no further than some 'euphoric enthusiasm'. Consequently, it is still impossible to research the policy process concerning energy as a whole, simply because this process is far from being completed. Policy analysis based on the current experience, which is slowly built up through example projects, is possible, however. And this is where this research makes a first effort. Since the issue attention curve only provided us with a general view on the potential development of energy as a theme within spatial planning, the remaining of this chapter presents the search for a model, which is more suitable for this representation.

2.4 Rationality in Planning

The various analytical frameworks, which were described in the previous section, have been relevant to the development of planning theory over time. As is the case in policy processes, decision-making is essential to planning. In order to support decisions, there is a need for rationality. This rationality, therefore, is central to the planning debate over time (Friedman, 1987 in: De Roo, 2001). After World War II, there was a need for structure and quick rebuilding. A functional approach was needed and in planning this became known as (among other options) technical rationality, referring to a direct causal relationship between means and ends and the belief that things could be controlled with the right planning (De Roo, 2001). This was far from true in many cases, however, and did not take long before the first criticism came to the fore. Simon (1967 in: De Roo, 2001) raises questions related to the possibility of having complete knowledge over things in order to make rational choices. He, therefore, refers the term 'bounded rationality', because nobody can have perfect knowledge over things (see also Parsons, 1995). This critique has the same roots as that on the 'stagist' view of the policy process (see section 2.4). Both are an oversimplified representation of reality.

Over time, more approaches to the rationality of planning came into existence (see section 2.4). The opposite of technical rationality became known as communicative rationality and especially gained interest in the 1990s. This approach is more concerned with the process, institutions, and interactions within planning than the facts and outcomes. Healey (1997) as a major contributor to this thought refers to this as 'collaborative planning'. De Roo (2001) places the two extremes in a framework of goals and interaction in planning (figure 2.4). By placing two pairs of extremes in planning opposite to each other, a theoretical idea of the field of planning comes into existence. One line is between central guidance, referring to for example blueprint planning, and participatory interaction, which is practically only possible in decentralized settings. Another line is between mono functional, fixed goals and multi functional dependant goals. Together, these two lines lead to a synthesis of a decision line between technical rationality and communicative rationality.

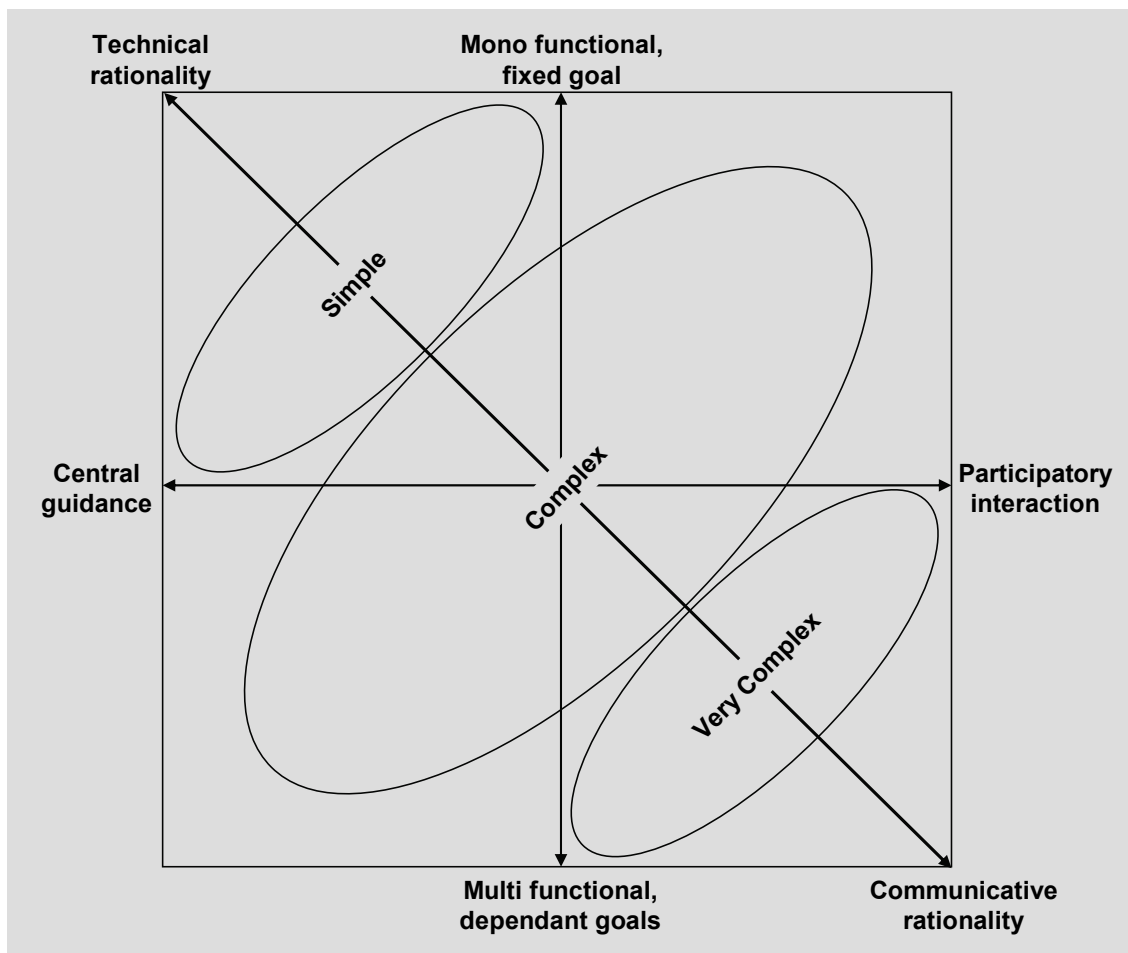


Figure 2.4 A framework of goals and interaction in planning based on rationality and complexity.

Source: De Roo, 2001.

Eventually, this led to the idea that different kinds of planning issues, differentiated by the degree of complexity, are in need of different planning approaches. When the issue is relatively simple and the solution for it is known, it is sufficient to use a technical approach. But when this is not the case and there are many actors involved with wide ranging interests, communicative action is more suitable. Figure 2.5 provides a better understanding of various planning approaches, viewed in the perspective of technical and communicative rationality. A and C represent both extremes, while B and D are somewhere in between. The field of issues in between the extremes is actually where, in reality, most planning issues can be situated. This is illustrated by figure 2.4, in which the complex issues form the largest part. B represents the scenario approach, which is used when insecurity about policy outcomes exists, usually the case with strategic policy (Dammers, 2000). The scenario approach is designed to overcome some of the failures of the technical approach by accepting the possibility for various outcomes of planning action. However, the issues are still predefined (De Roo, 2006). In his explanation of the figure, De Roo further argues that there is a need for a less extreme approach at the communicative side of planning, such as the scenario approach evolved from technical rationality. Therefore, D proposes another approach as a

reaction to communicative rationality: the actor-consulting model. This model concerns a decision-making tool 'capable of handling issues where the content and goals are more or less accepted, but where an insight into the way actors should act, could act, or are willing to act is lacking' (De Roo, 2006).

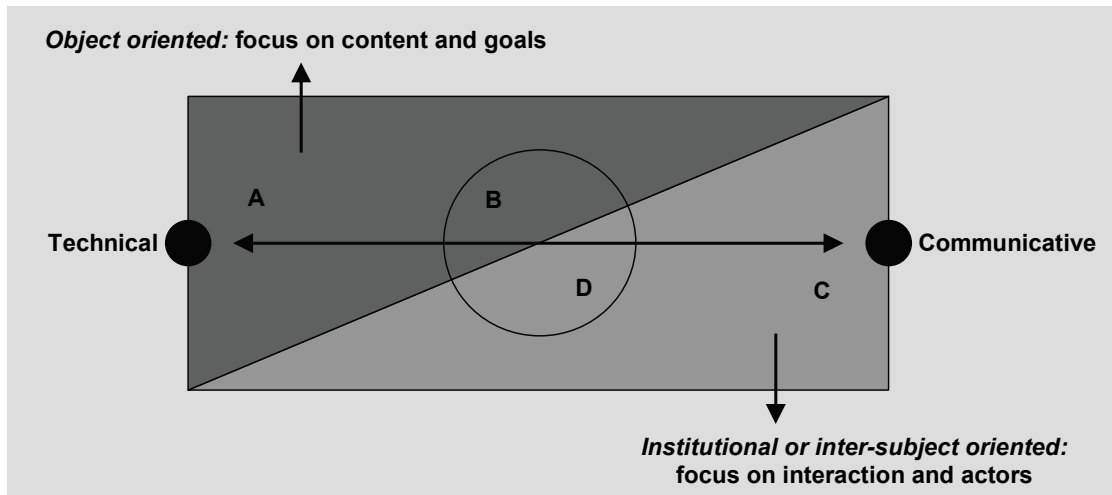


Figure 2.5 Different types of planning. Source: De Roo, 2006.

Of course there are many other, slightly different approaches to planning. As a matter of fact, an endless number of approaches is possible in theory; each at another position in the diagram of figure 2.5 (De Roo, 2001). While communicative action is needed in many cases, it is not sufficient in itself. Knowledge about an issue and some 'technical' insight are necessary in order to support arguments for a proposed action. As will appear further on in this research report, the energy issue is a good example of the need for both technical and communicative elements in a planning process. On the one hand, there is still debate about the urgency and size of the energy issue and on the other, there is no technical solution capable of resolving the issue. Technical interventions are needed, but collaboration and communication is needed to bring these rather innovative technologies, which are still in development, into practice.

In the introduction (chapter 1), it already became clear that there are a lot of developments within spatial planning regarding the theme energy. Implicitly, we mentioned that many of these developments take place on a regional or local level of scale. This shows that the energy issue is already (at least partly) dealt with in a decentralized way or, in other words, the decision-making has partly been delegated to lower levels of governments (the subsidiarity principle). Compared to the maturity of the energy theme this is a remarkable development. Previous developments in spatial planning, such as described above and presented in the next chapter, show a centralized approach at first and a slow evolvement through integration and area specific approaches towards decentralization. The energy issue appears to be more urgent, however, and even takes a form of hype. This causes the energy

issue to be present in all kinds of forms and on various levels of scale at the same time. A dynamic, self organising, and seemingly chaotic reality is the result.

The 'new' issue of energy fits into the models, which are discussed in this chapter so far. These models provide us with some more insight into the energy issue from a theoretical perspective. However, the urgency of the energy issue could even be more difficult to define than previous issues, such as environmental quality. The interconnectedness of energy with all kinds of other interests, such as climate change, economy, and politics is one aspect that increases the complexity of the issue. The dual (proposed) solution to the issue – introducing new forms of energy assimilation and saving energy – is another (see chapter 1). Therefore, the theoretical representation of a mere linear development from technical rationality to communicative rationality might not do justice to the reality of the energy issue.

2.5 The Transition Model

While the above provided several abstractions of the reality of planning and policy processes, it is also argued that the energy issue might even exceed these ways of thinking (see also chapter 3). And thus is energy, as a theme in spatial planning, in need of a new model for representing its development. It is providing some first potential future developments that this research has as its objective. In this section, we discuss a new theory, which could be suitable for representing these developments: the transition model. After introducing this model here, it is used in chapter 6 – the conclusion – in order to synthesize the research and provide an answer to the research questions and reflect upon the hypotheses.

The change, which is necessary to go from a society largely based on fossil fuels to one that is sustainable and makes use of renewable energy sources, is not so much a change within the current energy system, but a change of the energy system. A new energy system is the goal, therefore. The change could be regarded a transition; a transition from one stable situation to another. 'A transition can be defined as a gradual, continuous process of structural change within a society or culture' and 'can be described as a set of connected changes, which reinforce each other but take place in several different areas, such as technology, the economy, institutions, behaviour, culture, ecology and belief systems' (Rotmans et al., 2001, p.2). This relates well to the developments we now see in reality. It is now believed that the use of fossil fuels harm our environment (e.g. pollution, climate change), technologies for sustainable energy assimilation are innovated at increasing rates, companies and governments take their responsibilities, etc, etc.

A transition model can be displayed in a diagram (see figure 2.6). The model incorporates several phases of the transition. Four different transition phases can be distinguished (Parto, 2003 and Rotmans et al., 2001):

1. *The predevelopment phase*: the system does not change, but a certain dynamic that stimulates new developments is growing.
2. *The take-off phase*: the system begins to change; some first developments become visible.
3. *The acceleration phase*: changes are visible in all kinds of areas, which reinforce each other.
4. *The stabilization phase*: the speed of changes decreases and a new stable situation is reached.

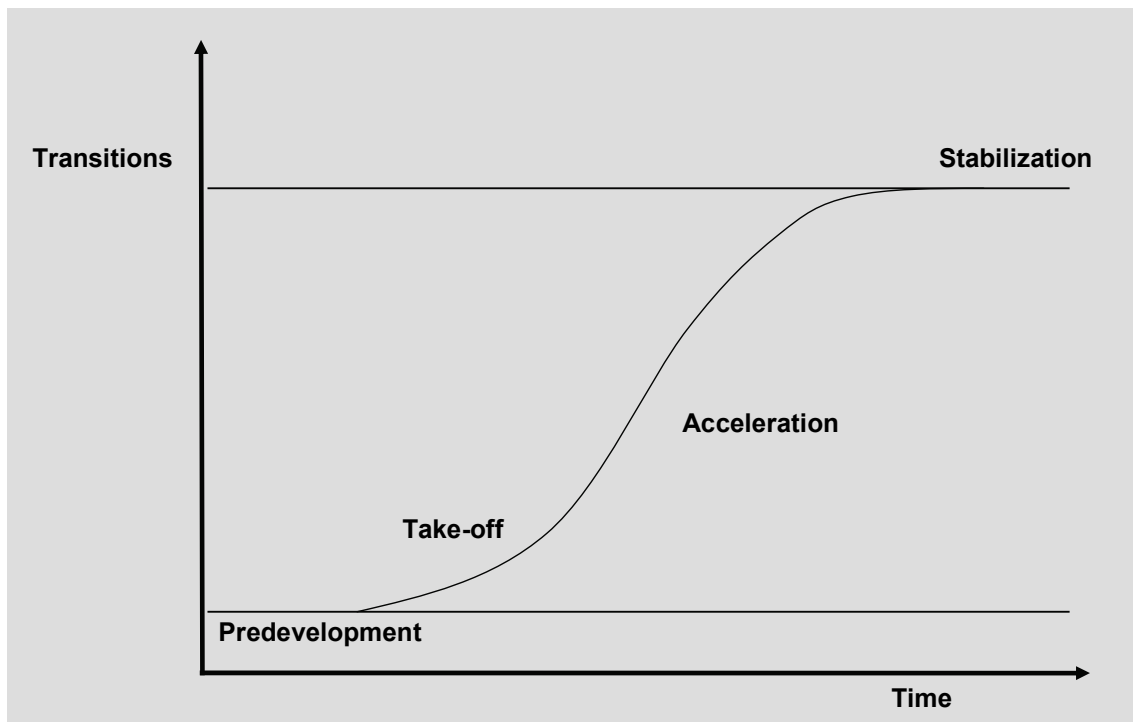


Figure 2.6 The stages of a transition process. Adapted from Rotmans et al., 2001.

Important to note is that the time period, in which a transition takes place is quite long, at least one generation (Rotmans et al., 2001). Although the figure might convince us of the opposite, a transition is not a revolution, but rather an evolution with slow and fast periods.

Now that we shortly explained the concept of the transition model, it becomes possible to further apply it to the current developments regarding the synergy between spatial planning and energy. Perhaps the model is suitable to explain current developments and provide potential future developments. It is not before it becomes clear whether the transition model suits these developments, before it can be used to manage the changes in society, such as is done in transition management (see Kemp et al., 2001).

2.5 Conclusion

This chapter has provided a concise overview of policy and planning in general, connected to a key element: rationality. All this is quite abstract; it is mainly a theoretical discussion. However, it makes it possible to place new issues and developments in policy and planning in a larger contextual perspective. Energy is such a new issue and, although the solution for this issue is far from being found, new developments concerning energy are increasing. These developments should be placed in the context of the changed rationality in planning, namely a more communicative one.

Since communicative rationality could be regarded as a trend in planning, new issues, such as energy, are affected by this trend. In other words, while energy would have been regarded as a mere technical issue 30 years ago, now it is seen as an issue which needs a communicative approach. Besides, as a more practical reaction to the changed rationality in planning, the regional and local levels of scale have an increased responsibility. How this change in planning thought led to an increased attention for the local and regional levels of scale in spatial planning is discussed in the next chapter.

We have also seen in this chapter that thoughts concerning planning and policy processes changed quite a bit over time. The development of models to grasp at least part of the complex reality keeps going and new issues can cause older theories to be considered in a new perspective. This is also true for the new issue of energy within spatial planning. It could be said that the model that represents a development from technical rationality and centralized policy towards communicative rationality and decentralized policy falls short in case of the energy issue. A new model for the development of the energy issue, the transition model, is proposed, therefore, and in the conclusion of the research we assess its suitability.

Statements about potential future developments of the synergy between spatial planning and energy become more viable when we compare energy to other fields of influence on spatial planning, such as the care for environment and water management. These fields have had influence for quite some time now and therefore, it might be interesting to analyse similarities with energy. The next chapter will go further into these comparisons and forms an addition to grounding the conclusion of the research in theory and previous developments in spatial planning, with which this chapter made a beginning.

3 Themes in Dutch Spatial Planning

3.1 Introduction

Unlike energy, the policy fields of water and environment have some history within spatial planning. In this chapter, we use these two policy fields as examples of the incorporation and evolution of a new theme in spatial planning. The examples of water management and environmental quality provide a look into the developments over time in Dutch spatial planning. Whereas energy is a rather new theme in spatial planning, there is experience with other themes, from which we might be able to learn if we want to say something sensible about the potential future development of energy as a theme within spatial planning.

Section 3.2 provides a short analysis of the Dutch field of spatial planning from a more abstract point of view. In section 3.3 and 3.4, we respectively focus on the themes environmental quality and water management and their development over time. This provides more information about Dutch spatial planning and underlines its change from a centralized, sectoral to a decentralized, integral approach, as we have discussed in the previous chapter. Then section 3.5 takes a first step in describing the relation between spatial planning and the new theme energy. Finally, section 3.6 concludes the review of example themes in spatial planning in the Netherlands. Here, we discuss the relevance of spatial planning in terms of the developments of energy as a new theme in spatial planning.

3.2 Changing Importance of Themes over Time

Guiding and steering developments and the believe that these developments can be influenced is at the heart of spatial planning. Voogd (2001-5) phrases this as follows: spatial planning is the systematic preparation of actions, which shape and implement policy, focussed on deliberate interventions in the spatial structure and on the organisation of these interventions, in order to preserve and, if possible, improve spatial quality. In this definition of spatial planning there is more than just the interventions in the spatial structure; it has a clear goal: the preservation or improvement of spatial quality. In order to achieve this, the field of Dutch spatial planning makes use of several methods for guiding and steering spatial developments (Spit en Zoete, 2002). Appendix A provides an overview of interventions and the organisation of spatial planning in the Netherlands.

In achieving the preservation or improvement of spatial quality different themes are important: human health, environmental quality, infrastructure, water management, ecological diversity, sustainability etc. Spatial planning already has a long history and over time various themes temporarily received an above average amount of attention. Because of external developments or events (e.g. health risks, natural disasters, accidents) a theme can

become of high interest and evolve within spatial planning. For example, health problems among people living along a specific highway might cause infrastructure in densely populated areas to be high on the spatial planning agenda. At this time, energy, and on a more abstract level sustainability and climate change, are such new themes, which receive a lot of attention. It is possible to discuss some potential developments of these themes based on previous developments of other themes in spatial planning. Two examples are used here: environmental quality and water management. In the next two paragraphs, we will shortly describe the developments of these two themes.

3.3 Spatial Planning and Environmental Quality

As described in the previous chapter, the approach to planning issues changed quite a bit in the period after World War II. Technical rationality in planning was questioned and this led to reactions, most notable the opposite: communicative rationality. This also had its impact on spatial planning in the Netherlands. Environmental planning, which started to receive much attention in the 1970s, is a good example of a changing approach in spatial planning. This field of policy was characterized by a centralized, sectoral approach up until the 1990s, after which a movement towards decentralization and integration can be detected (e.g. De Roo, 2001 and Kamphorst, 2006).

When environmental conflicts between various land uses became visible in the 1960s, especially in larger urban areas, the need for spatial planning became clear. As figure 3.1 shows, spatial planning was needed where conflicts of environmental quality existed. Policy on environmental quality was developed and in the 1970s this policy can be characterised by strict norms regarding environmental nuisances, such as noise and odour (De Roo, 2001). Sometimes, the high standards for environmental quality did not go together well with intensive land use and that is why environmental policy was in need of spatial planning (Needham, 2007).

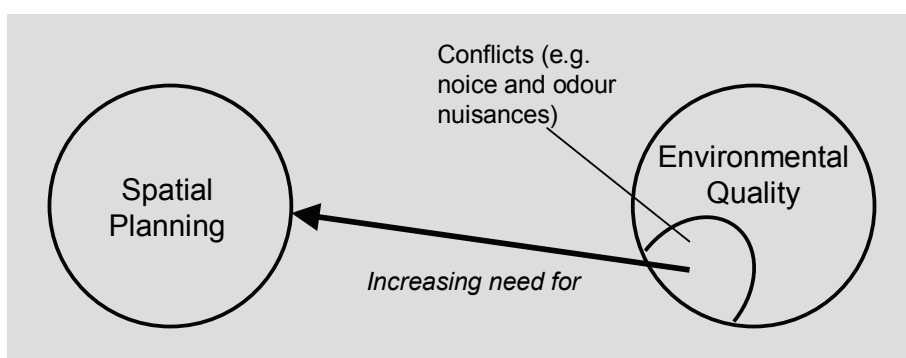


Figure 3.1 The relation between spatial planning and environmental quality

In the 1980s, it was recognised that part of the environmental issues were often too complex to be solved by strict norms. Integration with other, related policy fields was thought to be necessary in order to reach a compromise, which was overall desirable. Later, in the 1990s, this thought continues to be important and the desirability of area specific approaches is added to that. The communicative approach, such as we have discussed in section 2.4, gained attention, therefore.

According to Kamphorst (2006), there is a growing attention for the context of issues as opposed to centralized, generic policy (see also section 2.4). Therefore, attention for the 'specific' in issues is rising, which means that local situations and actors are regarded to be important. The governmental transition that followed this conception can be marked as from 'government' to 'governance' (see e.g. Healey, 1997 and Allmendinger, 2002). Governance is thought to bring more flexibility and efficiency to policy-making, which makes up for the flaws of centrally governed planning activities. The belief is that planning should be done on the lowest possible level of scale, which is suitable for reaching the best possible results, the subsidiarity principle.

The first steps towards integration of environmental policy in the Netherlands have been taken in the 1980s. This started with internal integration of policy and later continued with external integration of policy, mainly concerning the integration between environmental and spatial policy (De Roo, 2001). The process of external integration had not really started before the end of the 1980s. This process continued in the 1990s and was connected to the process of decentralization. Figure 3.2 provides a schematic overview.

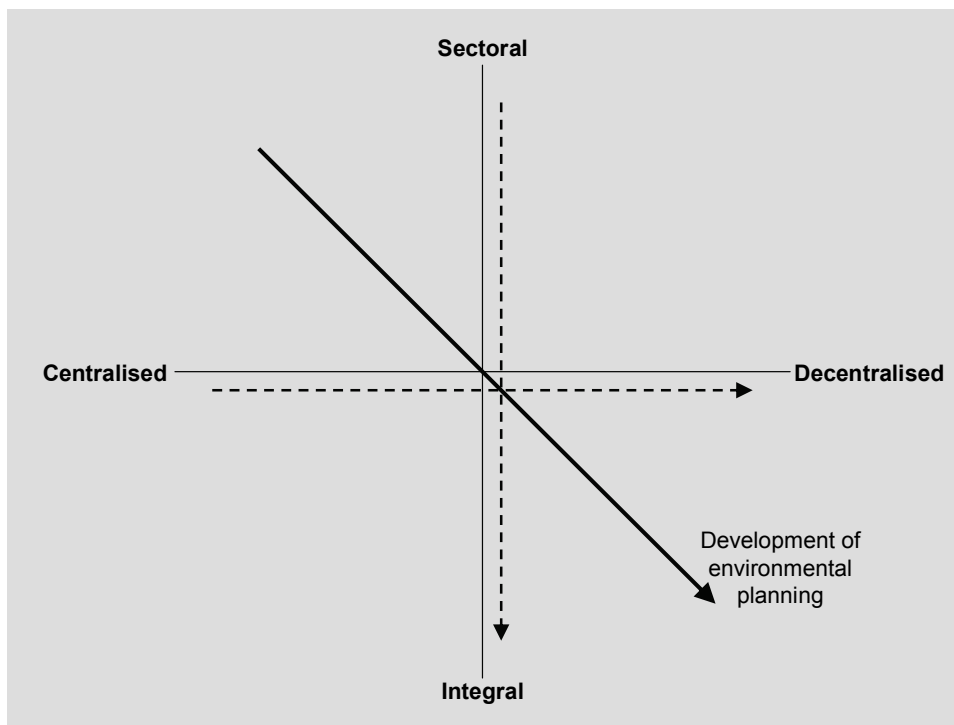


Figure 3.2 Development of environmental planning in the Netherlands from the 1970s onwards.

3.4 Spatial Planning and Water Management

The Netherlands have a strong tradition in water management. Being in the delta of four river systems, the Dutch have always lived with water and developed a large and complex physical infrastructure as well as regional water boards and a national water management agency (Hidding and Van der Vlist, 2003). Policy used to be sectoral and technical in a centralized approach. There was hardly any connection with other policy fields such as spatial planning.

However, in spatial planning, modernism in the first half of the twentieth century and system theory in the 1960s and 1970s led to an increasing interest in water management. The soil and subsoil (the 'layer-cake' model) as a guiding principle for plan making became of importance (Van Buuren, 2003). Water is an important part in this and spatial planning 'reached out for' water management (see figure 3.3). In the 1980s and 1990s more integral spatial concepts become popular and water is still regarded as an important element of spatial development. In the Supplement to the Fourth National Policy Document on Spatial Planning, the physical system is put central and water is even the main element in that. This 'steering philosophy' is also part of the currently valid policy, the National Spatial Strategy (Nota Ruimte, Ministeries VROM, LNV, VenW, and EZ, 2004).

Another, even stronger reason for the connection between water management and spatial planning is the space that is needed for safety against flooding (see figure 3.3). The immediate cause for this is the flooding of the river Meuse in 1995 en 1998 (Alberts, 2003). A less visible and more abstract cause is climate change, which has gained interest in the last few years. In the Netherlands, the most relevant consequences of climate change are the rising sea level and higher amounts of rainfall. In order to anticipate on these changes, more space for water is needed (Pols et al., 2007).

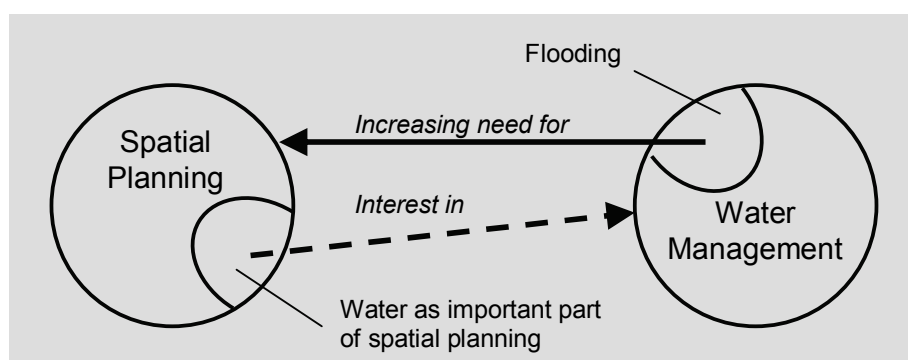


Figure 3.3 The relation between spatial planning and water management

Currently, 'new policy is to 'live with water' instead of fighting against it' (Needham, 2007, p.94). Or, in other words, this is a change from prevention (through technology) to adaptation. It is now legally required to include water in the early stages of planning

processes, also on the local level of scale. However, the field of water management is still characterised by mainly technical interventions. And while the Dutch still have to get used to the fact that traditional water management will not suffice in the future, they still seem to like depending on technical interventions, albeit in a more integral manner.

It can be stated that water management and spatial planning both require a relation with each other. Besides, water management as a theme shows similarity with environmental quality: decentralization is clearly visible. However, decentralization did not go as far as within environmental planning, simply because many aspects of water management are of national importance and are not specific to local situations. Nevertheless, integration with other policy fields is a fact. And while adaptation truly is a different approach to water management, the effects of this approach are only moderately visible in reality.

3.5 Spatial Planning and Energy

Based on the two previous sections, we can state that environmental planning and water management have changed substantially in the past decades and that both themes obtained a strong position within spatial planning. Energy, however, is a new field of policy within spatial planning. And while there is a relation between energy and the use of space, as we have discussed in chapter 1, it is still difficult to analyse how energy interacts with spatial planning, since developments in this field of policy are so recent. However, we can say something about why energy and spatial planning could interact and how this is done, following the line of reasoning from environmental quality and water management.

The main reason for the potential synergy between the energy and spatial planning is two-folded: On the one hand there is a need to reduce the negative impacts (e.g. CO₂ emissions) of the current energy system, which is largely based on fossil fuels. On the other hand, however, there are changes in the energy system, through incentives such as resource scarcity and new technologies. Following figures 3.1 and 3.3, we show energy as 'reaching out for' spatial planning (see figure 3.4), since there is a clear similarity with environmental quality and, partly, with water management. The need for the incorporation of energy in spatial planning does not come from spatial planning itself, but comes from 'the field of energy'. Solutions for the problems of a changing energy system, which is in search of innovation and reduction of the use of traditional energy sources, could perhaps be found in spatial planning.

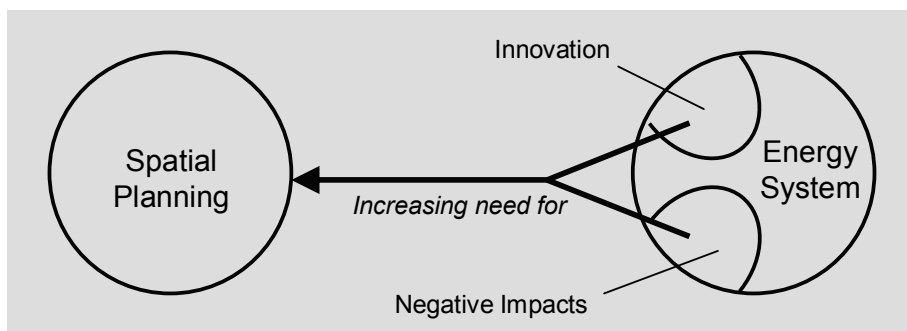


Figure 3.4 Energy as a new field of policy within spatial planning?

Finally, we have to make note of one rather remarkable aspect of the current role of energy within spatial planning. While energy is a new theme, it is already being approached in a decentralized way. Local governments even take up the challenge of incorporating energy objectives in spatial policies, while the National Government is merely concerned with general regulations, information sharing, and subsidizing technological innovation in the field of energy. Therefore, energy might be significantly different from our two examples in spite of the above argumentation, as was also stated in the previous chapter. In chapter 5 we will focus on this development.

3.6 Conclusion

Overlooking the developments of the themes environmental quality and water management, we can see a relation with the changed rationality in planning, such as was described in chapter 2. Considering the above, we can argue that the reaction to this in planning practice – decentralization and integration – is clearly visible in the two examples.

Although energy has not played a major role in spatial planning up until now, it is useful to see how this new subject is now placed into the field of spatial planning. Maybe we are able to see the same kind of development as is the case for environmental planning and water management, but it is also possible that the energy issue evokes the need for a different approach to spatial planning. A difference with the two example themes was already pointed out: energy is addressed in both a centralized and decentralized way even before it could develop as a theme within spatial planning.

Before we can consider possible future developments of energy as a theme within spatial planning, we have to look at the current state of affairs concerning energy and spatial planning. In the next chapter we describe the situation in the Netherlands, while at the same time placing this situation in a broader, international context. After that we focus on a special area of interest, the Northern Netherlands, in order to further determine the real developments of the theme energy within spatial planning.

4 Energy Projects and Policy

4.1 Introduction

Energy, as a theme in spatial planning, is still in a premature phase. Nevertheless, it is starting to have a significant role, both international and national, in individual, separate projects. More and more example projects come to the fore, in which classic planning activities, such as planning a new neighbourhood or business area, are combined with energy related issues. This leads to new and creative ideas about the potential of energy to contribute to spatial quality, since maintaining or improving spatial quality is at the heart of spatial planning (see Voogd, 2001). In order to learn more about the incorporation of energy in spatial planning in the Netherlands, we take a look at Dutch policy concerning energy and spatial planning in section 4.2 and some examples of projects in section 4.3. Here, we do not limit our view to projects in the Northern Netherlands, which is the main area of interest for the analysis in this study (see chapter 5), but touch upon some remarkable projects in the remaining parts of the Netherlands as well some international projects in order to present a general and more complete overview and analysis.

Once we have seen that there is a variety of different initiatives and projects concerning energy and spatial planning in the Netherlands, it becomes interesting to see whether a general direction of developments can be distinguished. For example, the local level seems to be important, since various municipalities are coming up with their own individual policies for the energy issue. An analysis of developments outside the Netherlands will provide a broader view to this. Therefore, we analyse some international projects (including two Dutch cases) in section 4.4. These projects have been the subject of previous research and have led to essential conditions for the successful implementation of these projects. Based on the characteristics of the projects, we were able to make a generalisation and categorisation of the projects. Section 4.5 provides an explanation. Section 4.6 concludes this chapter and brings the findings, resulting from the international analysis, together with the developments in the Netherlands

4.2 The State of Affairs concerning Energy Policy in the Netherlands

In the introduction of chapter 1, we mentioned the attention energy is currently receiving worldwide. This is not different for the Netherlands. In the past few years the attention for potential future energy issues and the amount of research programmes, initiatives, and projects have increased. New developments on energy are stimulated or executed by various organisations and through different means. In the following, we present a concise overview of the situation in the Netherlands.

As we have stated in the introduction, energy is not part of spatial planning or policy. In the Netherlands, the Ministry of Economic Affairs handles all energy related issues (Ministerie van Economische Zaken, 2007a). The development and implementation of policy on energy is supervised by the *Directorate General Energy and Telecom* of this ministry. Two separate boards of directors, namely *Energy and Sustainability* and *Energy Market*, plus a special board of directors called *Interdepartmental Programme Direction Energy Transition* are responsible for the execution of all policy related to energy (Ministerie van Economische Zaken, 2007b).

Current national policy on energy is described in the policy document 'Now for Later: Energy Report 2005' (Nu voor later: Energierapport 2005, Ministerie van Economische Zaken, 2005). In this document, it is stated that an international and integral policy approach is needed in order to effectively tackle the energy issue (also in relation to the climate issue). The Dutch national government sees the European Union as important in making energy policy and providing a solid base for international guidelines for the solution to the energy issue. Besides this focus on European collaboration, the national government focuses on innovation of technology, by providing subsidies. This rather special form of policy can be regarded as a highly indirect approach. By stimulating research and innovation, the national government believes that energy efficiency and production of sustainable energy increase and consequently that the energy issue becomes less urgent. SenterNovem coordinates the subsidy programme.

SenterNovem of the Dutch Ministry of Economic Affairs, is an agency for sustainability and innovation and has energy as one of its main objectives (SenterNovem, 2007d). Research programmes and concrete projects are subsidised through this agency, which functions as a network of information and experience. It is also a platform for the latest expertise on energy in the Netherlands.

One type of regulation on the national level is worth mentioning here. This is the *Building Regulation* (het Bouwbesluit), which incorporates conditions for energy efficient building. The *EPN* (Energieprestatienormen – Energy Achievement Norms) are developed to set overall boundaries to the energy efficiency of buildings, without exactly prescribing measures (SenterNovem, 2006b). It is up to the responsible parties to include measures in buildings that contribute to the overall energy efficiency in such a way that the norms are not crossed. The *EPL* (Energieprestatie op Locatie – Energy Achievement on Location) is a variation on the EPN and is used for the monitoring of building areas in order to measure their overall energy achievements. While the regulation of energy efficiency is a national policy, the exact interpretation is up to regional and local parties.

In terms of energy, private companies are also relevant. Energy suppliers, manufacturers of energy technologies, and energy advice bureaus are examples of these. It is quite obvious that these companies have a large stake in the energy issue. However, when it comes to the

synergy between energy and spatial planning and the development of policy, they have a minor role, except maybe for the advice bureaus, which often work for a government.

Most new initiatives and projects on energy take place at the regional and local levels of scale. The national government specifically provides space to these levels of government in developing their own policies. The *BANS* (Bestuursakkoord Nieuwe Stijl – Governmental Agreement New Style) Climate Covenant provides subsidies for local and regional governments to intensify their climate policies (VROM, 2007). Together with all regulations, which exist on a national level (e.g. through SenterNovem), this clearly shows that there is a special relevance for the regional and local levels of scale. The next section focuses on that.

4.3 Development of Energy Policy on the Local Level

New policy and project developments concerning energy in the Netherlands can be noticed on the local level of scale especially. Here, we focus on this level of scale, because these initiatives affect larger areas, results are often more substantial, and, most importantly, the character of these initiatives is more generic, as opposed to individual projects and initiatives. The size of a municipality or city and thus its organisational capacity seems to influence the way, in which the energy issue is approached. While there are exceptions, small municipalities have an attitude of waiting and following developments, the large municipalities or urban cores start discussion about creating solutions to the energy issue. This is proven by the fact that most small municipalities do not have any kind of documents outlining policy initiatives in the field of energy. Opposite to this is the ambition of several of the larger cities/municipalities, which sometimes even reaches further than national or European guidelines. However, policy development on these higher levels can supersede local initiatives eventually.

The region of the Northern Netherlands has a leading role when it comes to projects and initiatives with regard to energy and spatial planning (see chapter 5). The three largest cities in this region, Leeuwarden, Groningen, and Emmen are no exception to this. These are also active in developing new initiatives and policy on energy. Each city's approach differs. Groningen is the most ambitious and plans to be energy neutral by the year 2025 (Gemeente Groningen, 2007), in which energy neutral is seen as carbon dioxide neutral. Cities, such as Breda, Tilburg, Heerhugowaard, Etten-Leur, and Apeldoorn, have similar ambitions. Each city approaches the issue differently, which underlines the unknown character of the energy issue. There is not a single method or technology that will be the solution, but a mix of interventions and changes in policy could make it possible to reach the objectives. This is not even for sure, since it is unknown whether it is possible to keep our current standard of living without the use of fossil fuels.

An example of the uncertainty towards solutions is the city of Breda, which states that it wants to be an energy neutral city, but does not say when this should be the case. The *Milieuvisie Breda 2015* (Environmental Vision Breda 2015 – Gemeente Breda, 2002) does not go further than the statement of 'being on the way to becoming an energy neutral city by 2015'. The city of Heerhugowaard already sets a strong example of what is possible by realising a major residential area, *Stad van de Zon* (City of the Sun), in which many energy measures are implemented, most notably solar collectors (Gemeente Heerhugowaard, 2007). However, this one project, albeit large and unique within the Netherlands and even Europe, does not yet lead to Heerhugowaard being energy neutral. In Rotterdam, a start has been made to use the energy that is left over from large production processes, such as the oil refineries in the harbour area (SenterNovem, 2007a). Parts of the city are heated by the waste heat and greenhouses also use the carbon dioxide, which is a waste product in these production processes.

However, the examples of concrete development projects all show that it is still difficult to create situations, in which all energy is produced CO₂ neutral, let alone renewable. Even with the latest technology and without financial limitations, it seems impossible to reach the objective that many cities are striving for. Development of strong policy is needed to even implement the currently available technologies. While the development of initiatives to become energy neutral can be found on the local level of scale, it is still the question, whether this can be fully achieved at that level alone.

Overlooking the developments in the Netherlands, one might wonder whether these are specific to this country or not. Maybe similar developments can be noticed in other countries and an analysis of these developments could help us interpret the Dutch developments within a broader perspective. The next section provides an analysis of some international examples.

4.4 Experiences from International Examples¹

In previous research (also part of the SREX project; see chapter 1), international examples of energy projects have been analysed. Part of the outcome of this analysis are several essential conditions or main elements that appeared to be important in most examples (for an extended description of these examples, see Lenferink and Van Loon, 2007).

¹ The text in this section is adapted from part of an earlier published paper titled 'Towards a future energy system related to regional planning in the Netherlands: Analysing energy projects in Europe' by Karstkarel, Van Loon, and De Roo (presented at the 2007 AESOP Conference in Naples, Italy).

Some essential conditions or main elements that can be distinguished from the international examples are:

- International attention and ambitious plans based on energy as the main objective.
- International attention and ambitious plans based on large events, which incorporate energy measures.
- 'Outside' factors lead to, for example, redevelopment, while energy is made part of the objectives.
- Regulations and contracts are put in place to enforce energy measures.
- Funding and private investments are needed for development.
- Public support is important for a successful implementation.
- District heating systems are often used.

This list is not complete, but presents the outcome of case study analyses (see Lenferink and Van Loon, 2007). It helps us understand various energy projects and facilitates the search for different types of energy projects. In the following, we will discuss these conditions in further detail.

Two cases in Denmark provide clear examples of energy projects that are ambitious and attract international attention, purely based on their energy objectives. The first is Aalborg, which created strategic plans in 1994 in order to achieve a sustainable future. This was done during a European conference, the Aalborg Charter, driving many cities to follow the example of Aalborg, which still has the role of being an ambitious city, concerning sustainability and energy objectives (City of Aalborg, n.d.). Samsø, a small Danish island, forms the second example. The island won a competition to become the nation's first example a 'renewable energy island'. Developments started in 1997 and 10 years later the island has become self-sufficient in its energy supply, except for the fuel for transportation (Nunnally, 2006). Incorporated energy measures include solar (active and passive) and wind energy, geothermal heat, district heating, and low energy architecture. The experience that has been built up over the past ten years is an incentive for international visitors to visit the island of Samsø.

There are also projects, in which energy is not the (main) attraction, but energy objectives are made part of the projects. These projects can be large events that attract (international) attention. Barcelona, Spain was host to 'Forum 2004', a major cultural event. The necessity of constructing many new building was used as an opportunity to incorporate energy measures, such as solar energy and energy efficient designs (Barcelona City Council, 2004). Malmö, Sweden is another example. This city organised the 'European Home Exhibition' in 2001 on the location of a former harbour: Västra Hamnen. Energy objectives, such as an environmentally friendly and self-sufficient area were made part of the overall goals of combining residential, retail, service, and educational functions (Malmö Stad, 2006).

The 'outside' factors, of which 'Forum 2004' and the 'European Home Exhibition' are examples, show that energy measures can well be combined with other objectives. An integral approach is the result. A smaller development project in Schoonebeek, The Netherlands underlines that energy goes together well with other objectives. Quality of life, sustainability and environmental care go together in this residential development (Gemeente Emmen, 2006). The other Dutch example, which is part of the research of international energy projects, is the municipality of Heerlen. Here, a pilot project started, in which the water in former mines is used to heat houses (see Lenferink and Van Loon, 2007). Although the project is small and does not substantively contribute to energy savings, it has great value in educating people and setting an example for other developments. The project can be regarded integral, because an educational function is combined with a technological pilot.

The incorporation of energy objectives is also enforced sometimes by regulations or contracts. 'In Barcelona, for example, there is the 'Solar Thermal Ordinance', which states that new buildings and buildings undergoing major reconstruction, with a certain daily hot water volume, are obliged to heat 60% of their hot running water with solar energy (ManagEnergy, 2004). In Malmö, energy measures are not enforced by law, but by contracts with the developers, in which the objectives for energy efficiency and supply are established (Dalman, 1999). This can be identified as some sort of Public-Private Partnership (PPP), because the municipality and private companies together accomplish the goals of the project' (Karstkarel et al., 2007).

Financing is another important aspect, because the high development costs of energy projects. The Västra Hamnen project in Malmö was financed in a PPP construction in order to enable private investments in a public project. Funding is another option. This is provided, for example, by the European Union (EU), which also facilitates the exchange of experience between projects. The POLYCITY programme is an example of such a funding/experience sharing facility. Besides the development area Cerdanyolla del Vallès near Barcelona, this programme also includes projects in Stuttgart, Germany and Turin, Italy (POLYCITY, 2007).

A successful implementation of energy projects cannot go without public support, because an attitude change among citizens is essential when they are faced with new alternative fuels and saving measures, which ask for a behavioural change. The regional government of Catalonia, Spain, actively involved in 'the energy transition of the region', underlines this in her plans and projects regarding energy (Generalitat de Catalunya, 2006). Samsø, the renewable energy island, forms a good example once more. Its 4300 inhabitants were all actively involved in the energy transition, through participation in the planning processes. To a large extent, this participation accounted for the success of the project (Nunnally, 2006).

Finally, we have to mention the use of one particular energy measure. In many analysed examples, district heating is implemented (e.g. Aalborg and Samsø (Denmark), Malmö (Sweden), Barcelona (Spain)). District heating 'is a form of heating buildings through a grid of

pipelines with centrally heated water. With modern technology, this heat can be generated by bio fuels in Combined Heat Power plants or by waste heat from other production processes' (Karstkarel et al., 2007).

From the examples, we could distinguish three conditions for the application of this measure:

- Nearby industries are needed to provide the system with enough waste heat.
- Outside of dense urban areas, district heating is less efficient, due to relatively high heat losses during transport of heat.
- An existing grid of heat transportation pipelines increases the financial feasibility of implementation.

The description of some key elements of energy projects, based on international examples, provides us with a basis for further analysis. The next section outlines the attempt to find regularity in the energy projects through a categorisation.

4.5 Analysing Energy Projects

While the description of all these essential conditions is relevant in itself, in order to learn more about the example projects, it is useful to see all this in a broader perspective. We first place the various examples on a spectrum from a sectoral approach to integral approach (see figure 11). The sectoral approach illustrates projects or parts of projects, which are mainly focussed on energy, without addressing other issues, such as social deprivation, economic revitalisation, rebuilding degenerated areas, and nature protection. An integral approach addresses at least two of these issues in an integrated plan or project and can, for example, be recognised from terms, such as 'sustainability' and 'urban regeneration'.

Secondly, we categorise the examples in terms of energy measures or technologies (see figure 11). By energy measures we mean, for example, wind energy, solar energy, district heating, heat pumps, and biomass. If there is a focus on only one type of energy measure, we will identify such a project as mono functional. On the other hand, if several measures are incorporated in one plan or project, these will be identified as multi functional.

Now, we have two spectra; one from sectoral to integral and one from mono to multi. It is possible to place the ten example projects from previous research on both spectra and thus categorize them in four groups. However, it might be that different projects within one larger whole, e.g. a city, have to be placed in different categories, because one example (city) can include projects or plans in more than one category. These examples have been placed in each category, in which they belong. Therefore, it is possible that one city name appears more than once. In figure 4.1, the two spectra are displayed in a diagram; the sector-integral spectrum as the x-axis and the mono-multi spectrum as the y-axis. Some projects, which are

not being addressed here previously, are included in the diagram, because these were part of the research, from which the diagram has been taken (for more information see Lenferink and Van Loon, 2007).



Figure 4.1 Example projects placed in a mono-multi, sectoral-integral diagram.

Based on the analysis of the ten projects, it seems likely that a project, which incorporates multiple energy measures, takes other fields of policy, besides energy, into account in an integral approach. And if only one energy measure is being implemented, it is likely that this will be done in a sectoral approach. The logical options are, therefore, in the diagonal from the upper left corner to the bottom right corner of the diagram. However, as figure 4.1 shows, there are exceptions. Figure 4.2 displays the same diagram, but now includes a general description of the type of projects that can be found in each quarter of the diagram.

Figure 4.2 provides more insight into which energy related developments are relevant for spatial planning, since each quarter represents a type of project with different characteristics. The left side of the diagram represents the implementation of energy measures in a sectoral manner. Spatial planning is then relevant in for example the choice of location for wind turbines, but often measures can be implemented without the need for spatial policies. An example of this is the installation of solar panels on the roofs of buildings, which has no addition impact on space.

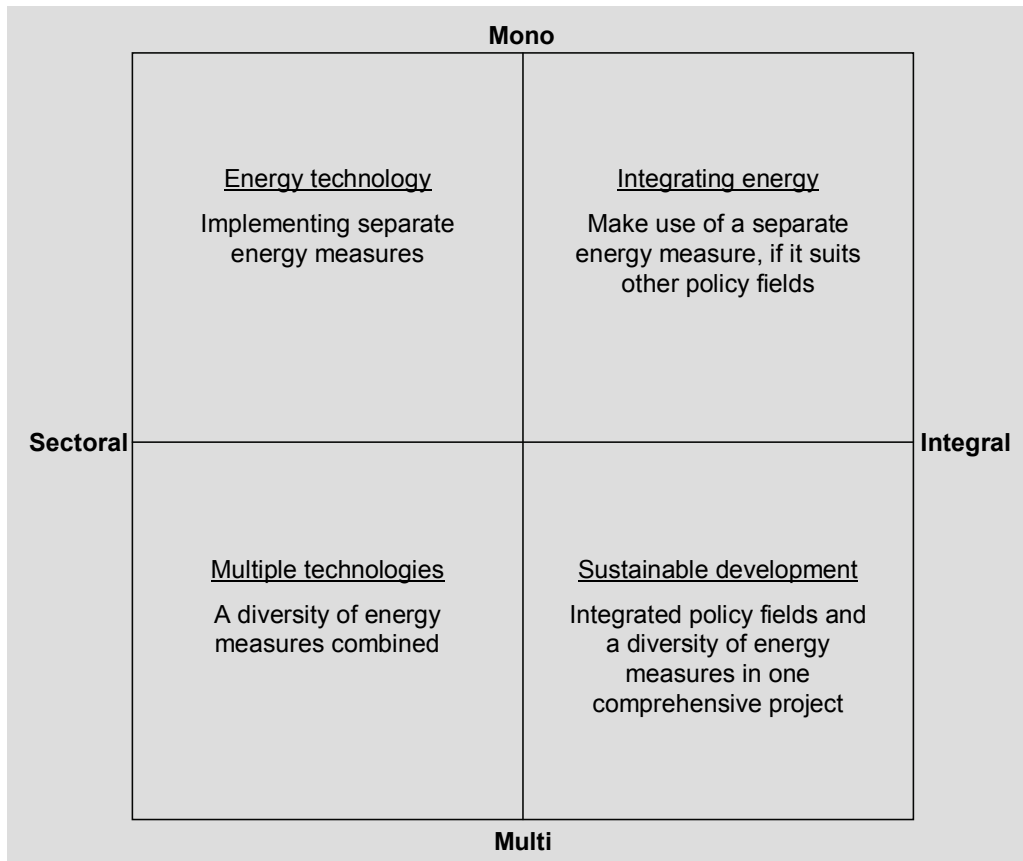


Figure 4.2 Four categories for energy policy and projects.

On the right side of the diagram energy is part of more policy goals; it is integrated in projects that are not just about implementing new energy technologies, but are devoted to using energy measures in smart combinations with for example spatial design improvements. The comprehensive character of these projects creates a more important role for spatial planning, since there are more stakes at hand and not only can energy measures be adapted to a fixed spatial design, it is also possible to adapt spatial designs to energy measures. This interrelation makes planning more complex in these cases and a more decentralized and area specific approach to spatial planning is often the result.

As in the international examples, we are able to distinguish different types of energy projects and policy within the Netherlands. Some directed towards the implementation of a specific measure or technology and others focussed on achieving a maximum result in overall sustainability. Most initiatives are on the local (municipal) or regional levels of scale. In the next chapter we are therefore focussing on these levels by analysing the Northern Netherlands as an energy region.

Another reason for the relevance of the integral projects is the interference of energy measures with other policy goals, such as environmental quality, liveability, economical prosperity, and safety. Spatial planning is then, as stated in the previous section, more complex and area specific. This causes regional and local levels of scale to be relatively

important in terms of the synergy between energy and spatial planning, all the more because of the fact that these levels are already gaining attention in spatial planning as a whole, as we have seen in the previous chapter.

4.6 Conclusion

The examples in this chapter prove that energy is gaining attention. While most of the efforts are stand-alone projects, some attempts to generate more general policies within local or regional governments come to the fore as well. Clear differences can be found between various types of projects. Some of the projects focus on just one measure and implement this in a sectoral manner, while other ones implement various measures in an integral way, with overall sustainability as the objective. Variations of these two extremes have also been found.

It can be concluded that the integral projects form a relevant research object in terms of policy-making. The reason for this is partly embedded in the contemporary context of spatial planning and government. As described in chapter 3, processes of decentralization and integration have been going on for the past decades. The way, in which local governments approach the energy issue, can be seen as a result of this, since bottom-up initiatives are numerous. Whether this is desirable or not is still questionable, since knowledge about energy in relation to spatial planning is far less progressed than the knowledge about other policy fields. And these fields (e.g. water management and environmental quality) needed many years before a decentralized approach was applied.

The diversity and number of energy projects, which we described and analysed in this chapter, strengthen the relevance of the suggested transition model, which is proposed in chapter 2. There, it was stated that the energy issue is urgent and takes a form of hype, which causes a dynamic, self organising, and seemingly chaotic reality. The international and national examples in this chapter are, first of all, different in scale, varying from pilot projects in neighbourhoods to region-wide subsidy programs or municipal initiatives. Secondly, they are different in scope, varying from becoming climate neutral to improvements in quality of life or sustainability objectives. Each scale and scope is valuable in itself, regarding the search for solutions for the energy issue. The examples therefore underline what is stated before: the urgency and complexity of the energy issue cannot only be represented in a linear model. A transition towards a new stability, slowly evolving from the dynamic and diverse reality of today, shows more potential of capturing the development of the energy issue.

5 Energy in the Northern Netherlands

5.1 Introduction

In the previous chapter we have seen that there is a strong tendency towards the development of projects and policy with regard to energy and spatial planning on the local and regional levels. For a closer look at this development, this chapter focuses on a region, which is active in the field of new energy projects and initiatives: the Northern Netherlands. In section 5.2 we will see why this region stands out in terms of projects and initiatives on energy. In section 5.3 we focus on the policy in this region, with special relevance to regional collaboration in the field of energy.

In this chapter we focus on two case studies, in which energy is addressed in an integral manner, since it appeared in the previous chapter that integral and multi-functional projects are most relevant in terms of spatial implications. These projects are within the municipalities of Groningen (section 5.4) and Tytsjerksteradiel (section 5.5). The former is an urban municipality, which has 'energy' ambitions for the whole municipal area, and the latter is a rural one, with less institutional capacity to start innovative policies and projects, but is nevertheless active in the field of energy. These two examples within the Northern Netherlands are chosen for their different characteristics, but at the same time for their significant efforts to incorporate 'energy' ambitions in their policies and plans. Section 5.6 concludes the chapter. It provides insight into the current approaches towards the synergy between energy and spatial planning in the Northern Netherlands.

5.2 The Northern Netherlands as an Energy Region

The Northern Netherlands stands out within the Netherlands and even within Europe as an energy region. This is mainly due to the effort of local and regional governments and other stakeholders. An example of the result of this effort is the distribution of projects on biofuels (both production and distribution). These projects are part of GAVE², which is 'a government programme to support the implementation of the European Biofuels Guideline' (SenterNovem, 2007b). The number of projects in the Northern Netherlands is higher and the projects are more diverse (see figure 5.1). The main reason for this is the active role that the northern regional governments and private companies play in developing activities on energy. The main catalyst of all projects and activities on energy is *Energy Valley*, which is a collaboration between private and public parties. *Bio Energie Noord*, a project to promote the production and distribution of biofuels (running till the end of 2007), is part of the *North Sea Bio Energy* project and is maintained as part of Energy Valley (Bio Energie Noord, 2007).

² GAVE stands for 'Gasvormige en vloeibare klimaatneutrale energiedragers' (Climate neutral gaseous and liquid energy carriers)

This specific part of Energy Valley can be hold responsible for the relative success of bio energy in the Northern Netherlands.

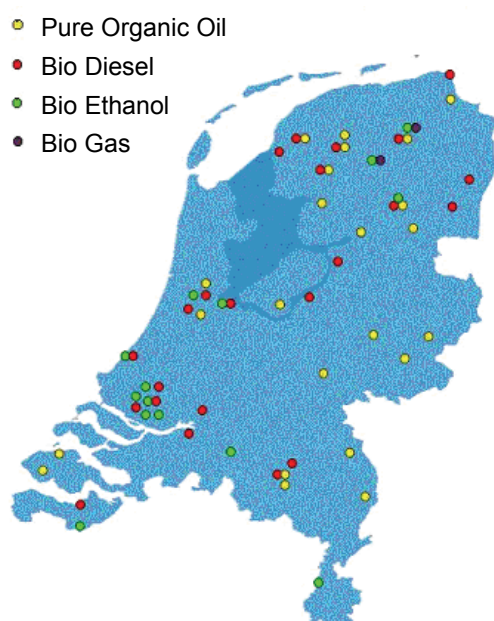


Figure 5.1 An overview of bio fuel projects in the Netherlands. Source: SenterNovem, 2007b.

The Northern Netherlands does not have a large urban area, such as in the Western part of the Netherlands, but every function is present in the area, from urban centres and large hospitals to industry and a harbour. Many projects concerning energy have been developed recently and more initiatives come to the fore every day. The difference is not the type of projects and initiatives, but the amount, which is relatively high compared to the population density in the region. It can be stated, therefore, that the approach that has been started in the Northern Netherlands is quite effective. The indirect or sometimes even bottom-up forms of policy, such as these are used in the Northern Netherlands at this moment by providing subsidies and knowledge, seem to generate innovation and progress in the field of energy. However, this does not exceed stand-alone projects in such a way that more generic principles are already developed. It can be noticed that governments struggle with developing generic policy.

Groningen is a good example of a city that has set its own objectives for becoming energy neutral by 2025. This is an objective, comparable to previously mentioned cities, such as Apeldoorn. Besides, energy is not the only point of attention. The energy issue is often seen in the broader perspective of sustainability. Sustainability has been used in policy for a while now and also includes ecological, social, and cultural elements, besides the environment and energy. The city of Groningen attaches her ambitions in terms of energy to already known policy intentions of the city, such as the importance of bicycle and pedestrian areas, green areas in the city, compact building, and good public transportation. The overarching term

sustainability stresses the needed integrated character of policy on energy. The example of Schoonebeek in the Municipality of Emmen underlines this (see section 4.2).

Different from the generic policy, with which the larger municipalities and regional collaborations are coming up, are pilot projects. These projects remind us of the fact that not everything needs to be guided by generic policy. It is this knowledge that also helps local and regional governments to make choices about what is not in need of policy. An example illustrates this argument: greenhouses in Berlikum in the Province of Friesland. On this location, it is being researched, with the help of subsidies from SenterNovem (2006a and 2007c), whether the use of fossil fuels for heating greenhouses can be reduced to a minimum. This appears to be possible by using thermal heat and, on a smaller scale, by using 'waste wood' in a combined heat and power incinerator. These pilot projects are rather successful and it is expected that it will become economically feasible to implement these technologies on a larger scale within a few years. Subsidies are no longer necessary in the future. The projects in Berlikum are examples of the potential of technological interventions. This is relevant for governments, since it provides them with arguments for not incorporating everything in their policies. It also proves that subsidies can be an effective form of policy, when desirable measures need to be stimulated as long as they are not economically feasible yet.

5.3 Government and Policy in the Northern Netherlands

The Northern Netherlands is defined as the joint area of three provinces: Friesland, Groningen, and Drenthe. In the previous section we have seen that this area has a special role when it comes to energy projects and initiatives. However, the region has been relevant for a longer time in terms of collaboration between different governments and private parties.

In general, the structure of spatial policy in the Northern Netherlands is equal to other parts of the Netherlands. Each province has a regional plan of its own. However, in Groningen and Drenthe this is a *provincial environment plan* (provinciaal omgevingsplan). The difference with a regional plan is not its legitimacy, because in fact it still is a regional plan, but it also incorporates the provincial water management plan and environmental policy plan. Furthermore, the Northern Netherlands comprises 68 municipalities, of which Leeuwarden, Groningen, and Emmen are the three largest in terms of inhabitants (CBS Statline, 2007).

Since 1992, the three Northern provinces have teamed up in the *Northern Netherlands Collaboration* (Samenwerkingsverband Noord-Nederland), which is not an official board, but can be seen as a consultation establishment. It is occupied with the spatial-economic structure of the Northern Netherlands; for which the plans are described in the document *Compass for the North* (Kompas voor het Noorden). The actual work is done by civil servants of the three provinces (SNN, 2007).

Besides the overarching function of the Northern Netherlands Collaboration, there are more regional or inter-municipal collaborations, such as *Region Groningen-Assen*, *Eemsdelta*, *Northern Groningen Region*, *Sustainable Together* (Samen Duurzaam), and the *Westergo Zone*. These collaborations aim at adjusting the municipal policies and forming stronger alliances in the region and prevent, for example, competition between municipalities, which are similar and situated closely together.

In the field of energy, there is collaboration in the region as well. We already mentioned Energy Valley. This is a public private partnership, which aims at stimulating energy activities in the Northern Netherlands and improving the economy and employment in the region because of that (Energy Valley, 2007). The collaboration involves governments, energy companies, advisory bureaus and knowledge institutes. It is a catalyst for all energy related projects and initiatives in the Northern Netherlands and provides subsidies for research and pilot projects.

EnergieKompas is another collaboration in the Northern Netherlands and is an initiative of the three Northern *Milieufederaties* (Environmental Federations – EnergieKompas, 2003). It also supports energy projects and seeks collaboration with Energy Valley as well. The *Energy Agreement Groningen* (Energieconvenant Groningen, Provincie Groningen, 2007) is again a different collaboration in the form of a public private partnership. The goal is to stimulate projects on energy saving and alternative energy sources. The collaboration ends in 2007.

Energy is even mentioned in the *National Spatial Strategy* (Nota Ruimte – VROM, 2004) as a special development theme for the Northern Netherlands. This underlines the importance of energy for the region. The above and the previous section gave some more insight into this importance. We continue with the analysis of two specific examples within the Northern Netherlands: the municipality of Groningen and a business park in the municipality of Tytsjerksteradiel.

5.4 Example 1 – The Municipality of Groningen³

5.4.1 Ambitious Energy Objectives

After the 2006 municipal elections in Groningen, the new college of aldermen and the major started with the development of new policy proposals. These proposals are the prove of the first more major steps of the municipality of Groningen towards sustainability and energy conscious policies. At this moment, policies and work programmes are developed in further detail, but it is already clear that Groningen has high ambitions on sustainability and energy.

³ This section makes use of information and insights obtained from interviews (see appendices B and C).

In this section we provide a small overview of the most relevant developments in this municipality.

The policy framework *duurzaamstestad.groningen.nl* (most-sustainable-city.groningen.nl – Gemeente Groningen, 2007a) provides a general overview of the ambitions of the municipality. Besides the general ambitions, energy and the broader theme of sustainability are explained and positioned within existing policies for spatial development. The existing structure plan for spatial development is seen as the main guiding plan for spatial development and the new sustainability program is positioned next to that in order to provide the opportunities for making the spatial development sustainable (see figure 5.2).

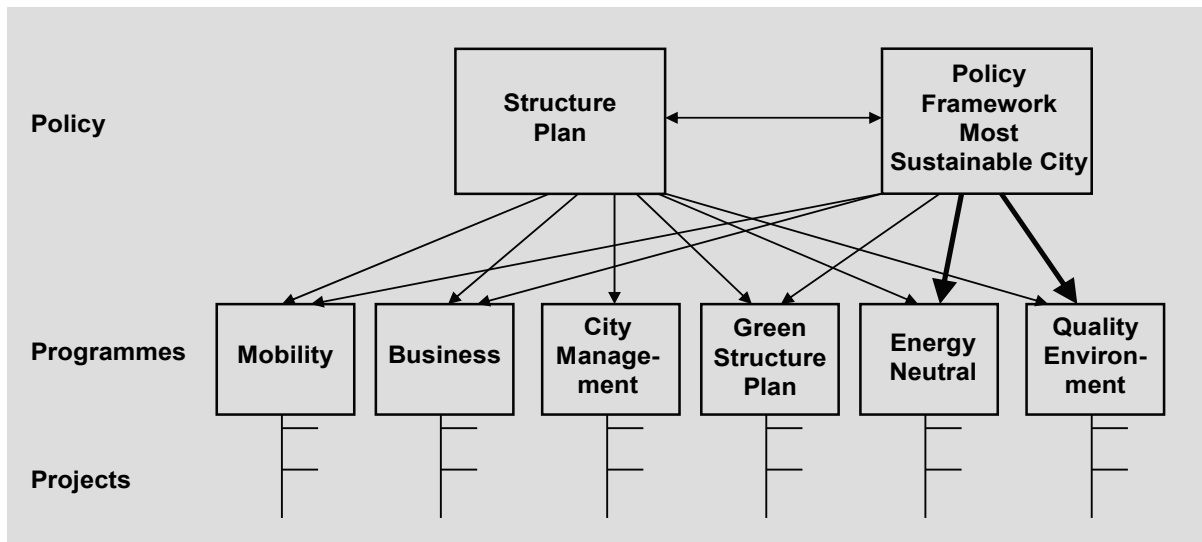


Figure 5.2 Overview of policy in Groningen. Source: Gemeente Groningen, 2007a.

The policy framework further describes several themes or the more concrete policy programmes, in which the sustainability issue plays a role. While all themes and programmes are interrelated somehow, the most interesting policy programme for this research is the *Roadmap to Groningen Energy Neutral⁺ 2025* (Routekaart Groningen Energieneutraal⁺ 2025 – Gemeente Groningen, 2007c), because it focuses entirely on energy and uses that perspective to address other, existing themes and programmes. The next sub section will deal with this policy programme.

5.4.2 Roadmap to Groningen Energy Neutral⁺ 2025

As mentioned in section 5.2 the municipality of Groningen has set the objective of becoming energy neutral by the year 2025. While there are a few other municipalities with similar initiatives, it is a highly ambitious objective, because of the large gap between objective and reality and the relatively short period to achieve it in. In the policy programme *Roadmap to Groningen Energy Neutral⁺ 2025* the municipality clarifies its ambitions. ‘Energy neutral plus’

is explained as no CO₂ emissions (in balance) and a focus on avoidance of energy use and energy saving. It is argued that a new way of thinking is needed in order to achieve this. That is why the 'Energy Stepladder' (Groningse energieladder) was developed (see box 5.1).

The 'Energy Stepladder' of Groningen

1. Zero Energy Use

The highest preference is given to activities, which cost zero energy. Bicycling is a good example of this, when we are looking at sustainable mobility

2. Decreasing Energy Use

Most activities are in need of energy (gas, electricity, fuel). That is why the demand for energy should be decreased as much as possible. Significant steps to energy neutrality can be made by saving energy. In this matter we need, among others, technological innovations, adapted building regulations, climate adaptations and behavioural changes.

3. Use and Production of Sustainable Energy

The remaining energy demand is preferably fulfilled by sustainable energy. We then aim at energy from sustainable sources, such as the sun, wind, water and thermal heat, but also energy from waste, such as biomass, bio ethanol, and green gas.

4. Efficient Use of Fossil Fuels

It is expected that part of the energy demand will still be fulfilled by fossil fuels for quite some time. This results in CO₂ emissions. We therefore work on the efficient use of fossil fuels.

5. Compensation of Fossil Energy Sources

In the coming years we will be dependent on fossil fuels. It is the objective to compensate this use as much as possible. This could be done by creating additional green space locally, but also by investing in local sustainable energy facilities. A temporary solution is the catching and storing of CO₂.

Translated from Routekaart Groningen Energieneutraal⁺ 2025 (Gemeente Groningen, 2007c)

Box 5.1 The 'Energy Stepladder' of Groningen. Source: Gemeente Groningen, 2007c.

The five steps in the 'Energy Stepladder' are accompanied with a solid reasoning and are the prove of some theoretical background of the policy programme. The stepladder is applied to five themes: Space and Climate, Residential Areas, Sustainable Mobility, Business and Work, and the Municipal Organisation. For each of these themes an inventory of tasks, challenges, opportunities, and existing projects has been made.

The presentation of the policy framework and programme was accompanied by several public debates and, more recently, by the year programme for 2008 (Jaarprogramma Duurzaamste Stad 2008 – Gemeente Groningen, 2007b). Both the debates and the year programme show the discrepancy between reasonably possible actions and interventions and the ultimate objectives. For example, energy neutral housing is the objective and the current action is consultation of stakeholders, while financial support is lacking. Besides, the

policy departments and especially the departments directed at implementation are still in search of knowledge and methods for incorporating energy and sustainability in their work. The municipality has no legal and hardly any financial tools to oblige energy measures in, for instance, privately owned houses.

At this moment, the role of the municipality is not the direct steering of developments, but rather agenda-setting and stimulating new initiatives from other stakeholders. It is the belief that something like a snowball effect will eventually appear. While the municipality comes with an overall framework of policy and takes the first steps in positioning energy and sustainability as important societal themes, it is recognised that the businesses, private parties and the citizens are needed to accomplish the final objectives (Gemeente Groningen 2007a & 2007c). Besides, energy and sustainability will not all of a sudden become the main task of the municipality. Existing fields of policy do not lose their importance, but are viewed in a broader, more integral perspective than before. Slowly, these existing fields of policy will adapt to the implications of energy and sustainability objectives.

While the above is proof of the explicit effort by the municipality to seek cooperation with other local stakeholders, the role of other governments, such as the Province of Groningen, neighbour municipalities, and the National Government, is limitedly visible in the policy. As discussed in section 5.3, there are some collaborations, but the common experience of the policy-making staff is that as soon as things get a little complicated the different stakeholders fall back to their own jurisdictions and their individual objectives.⁴ The role of the National Government does not go further than general subsidies and regulations. Groningen does make use of the agency SenterNovem (see chapter 4) for getting pilot projects financed and as an information platform.

5.4.3 Development Project Meerstad

In its policy documents, the municipality of Groningen names many projects, which are somehow related to energy and sustainability. The development project *Meerstad* is mentioned several times throughout the documents. This large development project consists of 10.000 houses, business areas, and 'new nature and water' (Bureau Meerstad, 2007). Besides ambitions in the fields of housing, business, nature, and recreation, there are high ambitions for energy in Meerstad. However, the ambitions on energy were too vague and became concrete too late, according to research.

During the development of the Masterplan Meerstad there was no concrete attention for sustainability and energy objectives. It was not until after this plan was being established that energy became an object of interest. Various studies, such as the *Energy Study Meerstad*, resulted in the *Action Programme and Plan Sustainability* (Van Schoonhoven, 2007).

⁴ This information is obtained from interviews (see Appendix B and C).

However, research points out that concrete decisions on energy objectives are taken too late. When these objectives were established during the initial stages of planning, results would have been better. Sustainability thus asks for attention throughout the entire planning process, in order to reach significant results (Van Schoonhoven, 2007). Summarised, we can state that the discrepancy between ambitions and reality becomes clearly visible, also in the Meerstad project.

5.5 Example 2 – The Municipality of Tytsjerksteradiel⁵

5.5.1 Sustainability as a Policy Theme

The municipality of Tytsjerksteradiel is less explicit in its ambitions regarding energy and sustainability than Groningen, but does give these themes more than average attention. Tytsjerksteradiel is a small municipality and therefore has fewer possibilities to incorporate the same type of ambitions as Groningen. However, with this in mind, the municipality is active in the field of sustainability and energy. Similar to Groningen, it is working on policy, which provides a more strategic vision to these themes. Concrete development projects with a focus on these themes are also being planned. In the next sub section, we will take a look at these projects, but first we will review the policy action that has been taken so far.

The immediate cause of the reinforcement of attention for sustainability and energy was the municipal election in 2006, just like in Groningen. Although energy was not new as a policy theme, it is now a locally supported issue, partly due to the (international) attention. Knowledge about sustainability and energy was only partly present within the municipal organisation. This knowledge is now being enlarged by a special sustainability coordinator and a core team with members of all policy departments. An integration of policy action is sought after in this way. Being a small municipality, Tytsjerksteradiel has chosen to get some outside help. The advice agency *KNN Advies* helped structuring the policy into a strategic vision: the Sustainability Bill.

The concept of the Sustainability Bill, which is being processed in the Municipal Board at the time this report is written, contains all ambitions and strategic visions of the municipality on the themes of sustainability and energy. Similar to the policy programmes in the strategic policy of Groningen, Tytsjerksteradiel works with a number of policy sectors, through all of which the Sustainability Bill plays a role (Gemeente Tytsjerksteradiel, 2007a). Figure 5.3 shows these policy sectors and the existing policies/plans that cover these sectors. The figure also displays the Structure Vision, which is currently in development. Both the Sustainability Bill and the Structure Vision make use of the same general themes: Housing and Facilities, Business, Infrastructure, Environment. The Sustainability Bill only adds 'The

⁵ This section makes use of information and insights obtained from interviews (see appendices B and C).

Own Organisation'. These two strategic policies are not connected in a hierarchical manner, but rather support and complete each other on different aspects.

It can be stated that solid strategic frameworks for generating a more sustainable and energy efficient Tytsjerksteradiel are in development. And while the value of these frameworks still has to be proven in the future, the first steps towards concrete action have already been taken. The next two sub sections will review these developments.

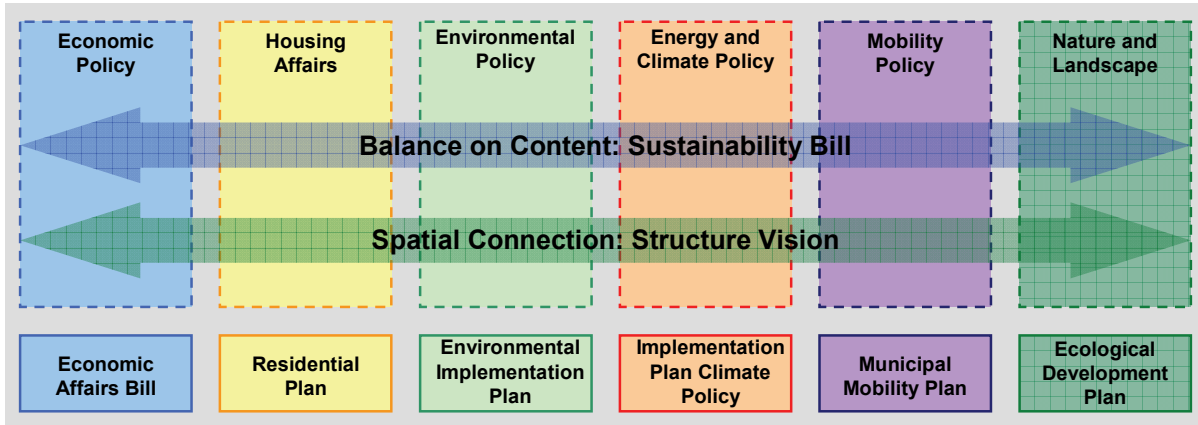


Figure 5.3 The Sustainability Bill and other policy sectors. Source: Gemeente Tytsjerksteradiel, 2007a.

5.5.2 Collaboration and Governmental Tasks

While Tytsjerksteradiel may be an ambitious municipality on the themes sustainability and energy, it is, as stated before, not unique in this. That is why the municipality seeks collaboration in all kinds of forms with other parties. The most direct form of collaboration is in concrete development projects. Two examples of this are discussed in the next sub section. However, most collaborations are still incidental and unofficial. Nevertheless, they are relevant in terms of information exchange and knowledge building. An good example is the contact with the Municipality of Sneek, which should lead to the prohibiting of making similar mistakes in the relatively new field of sustainability and energy projects and thus the use of each other's experiences. This contact also led to thoughts about the need for some kind of inter municipal platform on provincial level in order to be able to exchange information on a larger scale. Another official and regular governmental conference is not favourable according to Tytsjerksteradiel, but a more structured manner of information exchange could be helpful. Contact with the Province of Fryslân is also well underway and is meant to look into the possibilities for governmental and financial support from the provincial level. And although the province does not have focussed policy on energy or sustainability, the information exchange with Tytsjerksteradiel might lead to this.

The relation with the Dutch National Government is a difficult one in the eyes of the policy makers of Tytsjerksteradiel. The focus of the National Government is on information exchange and research subsidies. Norms for energy use are also put in place, in order to decrease the negative effect of energy consumption. While these are in principle good instruments, the implementation of measures to achieve norms is left to the municipalities. In Tytsjerksteradiel it is seen as a difficult, if not impossible, task to comply with these norms, when financial support and strict rules and regulations are lacking. The discrepancy between ambitions on a national level and the potential for operationalization on a local level is too large, therefore.⁶

5.5.3 Residential Area It Súd and Business Park Quatrebras

In the previous sub section, we discussed some general collaboration initiatives. Here, we focus on two more concrete projects. The first is residential area It Súd in the small village of Hurdegaryp. The municipality has a plan to build an extension to this village in order to accommodate new housing developments (see figure 5.4). Important aspect of the spatial planning of this residential area is the fit into the existing landscape structures. In general, spatial planning in Tytsjerksteradiel has an integrative character and a tradition of addressing aspects such as environment, wellbeing and cultural history. While this tradition is still applied to It Súd, objectives for sustainability have been added.



Figure 5.4 Project map It Súd. Source: Gemeente Tytsjerksteradiel, 2007b.

⁶ This information and the position of Tytsjerksteradiel is obtained from interviews (see Appendix B and C).

In cooperation with a project developer that is also interested in sustainable development and a housing corporation, the municipality is attempting to establish real commitments on sustainability. This appears to be a difficult process, since the financial feasibility of the project is regarded most important. Although the low energy use of the potential houses is cheaper on the long term, the initial costs are higher, which causes the project developer to lower its sustainability ambitions. The final result of the negotiation between municipality and project developer is uncertain, since this is still taking place, according to the responsible employees of the municipality.

The plan making for business park Quatrebras is even in an earlier stage than It Súd. This business park is planned alongside a highway, which will be built between Dokkum and Drachten, the so-called Centrale As. A landscape plan had already been made, before the ambition of making this business park energy neutral came to the fore. The landscape plan was designed to minimize the impact on the currently natural environment and existing developments. The plan formed the basis for a two-day design workshop under the supervision of *KNN Advies*, the same advice bureau that worked on the Sustainability Bill. In the workshop various experts from outside the municipality worked on plans to make the future business park energy neutral. This led to some first thoughts on how to approach the challenge of meeting the objective of making Quatrebras energy neutral (KNN Advies, 2008).

A significant difference with It Súd is that the municipality is able to exploit the business park herself, which makes it a lot easier to regulate developments. Potential energy measures could, therefore, be made obligatory for the users of the business park. Meeting energy objectives seems to be easier in that case. However, the difference with a residential area is that businesses usually demand more energy than houses, which makes the challenge for sustainability bigger. Also, the lobby and thus power of businesses to avoid high investments in energy measures is quite strong. And since it is impossible to know beforehand which businesses will be interested in moving to the new business park, it is difficult to involve this group of stakeholders in the early stages of planning.⁷

5.6 Conclusion

In this chapter we have seen that energy receives a lot of attention in the Northern Netherlands. Section 5.2 explained the role of the Northern Netherlands as energy region (it is even regarded as such on a national level) and provided us with prove of the important role of energy in this region. In section 5.3, we addressed the governmental bodies within the region and we saw that many cooperation initiatives are present in the Northern Netherlands, also with a focus on energy. However, in order to further explore energy in this region, we focussed on two examples: the municipalities of Groningen and Tytsjerksteradiel.

⁷ This information is gathered during a two-day design studio about Quatrebras (see appendix B).

Groningen has major ambitions on the themes of energy and sustainability, as we came to know in this section. The *Roadmap to Groningen Energy Neutral* 2025* does put forward some initial steps towards the achievement of this objective, but lacks to provide concrete measures. Since this document is merely a proposal for policy, this is understandable. The participation sessions, organised by the municipality, were a first step towards concrete action. This communicative approach could lead to some concrete measures, which are supported by several stakeholders. The year programme for 2008 goes further with determining key projects and concrete interventions and gives meaning to the broader policy ambitions.

Overall, the municipality is making significant progress on the themes of energy and sustainability, but it will take time before these efforts can be found back in the reality of everyday society. A big challenge seems to be the cooperation with other stakeholders. These have to be convinced of the necessity of sustainability. And while the various collaborations, in which Groningen is involved, might make us think this cooperation will not be a problem, the reality is more difficult, since every stakeholder seems to choose for their own profits eventually, instead of integral and optimal collective results.

Slightly lower energy and sustainability ambitions are present in the municipality of Tytsjerksteradiel, but nevertheless many of the same difficulties as in Groningen appear. These are mainly the discrepancy between ambitions and reality, the difficulty to get commitment from various stakeholders, and financial matters. That last aspect becomes clear in the project *It Súd*, in which the project developer is hesitant to commit to energy objectives due to the higher investments needed for achieving those. Another aspect that came to the fore in Tytsjerksteradiel is the relation between the National Government and the municipality. There is too much discrepancy between national objectives and local implementation in terms of regulations and financing.

Summarised, we can state that policies on the themes sustainability and energy are more and more developed and integrated with existing policy sectors. At the same time various development projects with a focus on energy are being planned. Before this reflects upon concrete developments, a few years have gone by. And besides, it is still to be seen how these projects eventually turn out, because the dynamic reality of technological innovation and changing context (e.g. higher energy demand and availability of conventional energy) influence the eventual outcome of the projects. Therefore, the examples of Groningen and Tytsjerksteradiel fit into the broader conception of reality, which we proposed in chapter 2. Both examples are proof of rapid policy development, underlining the urgency of the energy issue. This could be equal to the take-off phase of the transition model. The examples did not provide more than a confirmation of the chaotic reality of today, however. To see that policy regarding the energy issue is rapidly developed and a solution to the issue is actively pursued is merely a hint towards a potential transition in planning.

6 Synthesis and Conclusion

6.1 Introduction

This report has the intention of providing insight into the current state of affairs concerning the development of policy on the synergy between energy and spatial planning. It also puts forward a model for representing the potential future development of this synergy: the transition model. Chapter 2 provides an overview of policy development and planning processes in general. This formed the basis for an explanation of rationality in planning and changing thoughts about this in planning theory. Through time, the changing rationality led to a change in planning practice, which started to incorporate decentralized and integrated approaches. This development is further illustrated in chapter 3, where the policy fields of environmental quality and water management come to the fore.

Chapter 4 focused on energy projects and policy in the Netherlands and Europe. Existing policy on energy is discussed as well as (inter)national projects in order to find a structure in the projects that develop seemingly at random. This led to the identification of various types of projects and the outcome that integral and area specific projects are most relevant to spatial planning. The reason for this is twofold: the trend of decentralization in spatial planning in general and the area specific character of energy measures in itself. Therefore, chapter 5 was devoted to the description of a specific area, namely the region of the Northern Netherlands, which has a leading role on energy projects and initiatives. Two examples were further analysed.

Finally, we will generate a synthesis in this chapter by linking developments in spatial planning in general to the current state of affairs concerning energy projects and initiatives, based on the history of planning, contemporary planning practice and studied examples. The hypotheses (see box 6.1), which were presented in chapter 1, form a guideline and will be discussed. A representation of the (future) development of energy within spatial planning in the form of a transition model is the final result.

Hypotheses

1. The way in which energy is currently being approached as a theme within spatial planning is different from other, existing themes; energy is immediately addressed on regional and local levels of scale, while themes, such as environmental quality and water management, first played a central and generic role.
2. The current attention for the energy issue causes all kinds of developments (policies, projects, collaborations), but a strategic pathway is still lacking due to the uncertainty towards technological innovation, availability of traditional sources of energy, and a lack of knowledge.
3. Spatial planning is needed in both the development of new ways of energy assimilation (locations for windmills, biomass, etc.) and saving energy (the exergy principle), but will be less relevant once energy is available in unlimited amounts, without negative impacts (e.g. 'the hydrogen economy').

Box 6.1 Hypotheses

6.2 Energy as a Field of Policy within Spatial Planning

Policy on energy (as a separate policy sector) used to be mainly developed on the national level of scale. Energy is a field of policy, which is part of the Ministry of Economic Affairs. Since the supply of energy has not been an issue until now, energy was regarded in terms of economics and market and there was no need to strictly control this. Taxes were the main concern in this field of policy. Over the last decade or so, this slowly started to change. Innovation of energy technologies became a point of concern and the national agency SenterNovem was put in place to stimulate research and technological innovation by means of subsidies and as an information facility. This indirect form of policy has already led to many new initiatives and pilot projects on energy.

However, a rather surprising phenomenon is taking place at the same time. Local governments, also concerned about future energy supply, climate change and environmental pollution, start development of policy for mitigating these issues. Some municipalities even create objectives of becoming energy neutral within the coming decades. To a certain extent, this development is unexpected. In order to explain this, we needed to go back to rationality in planning.

Spatial planning used to be ruled by technical planning approaches. People believed in functional approaches with predictable outcomes. We refer to this causal way of reasoning as technical rationality. Nevertheless, this often led to an oversimplified representation of reality and soon a reaction to this type of planning came to the fore. In short, communicative rationality was developed as opposite to technical rationality (see section 2.4). By focussing on processes, institutions, and interactions as opposed to direct causal relationships, a whole new approach to planning issues was developed.

This change of thought about rationality had its impact on planning practice. Since the communicative approach focussed on the importance of, for example, interaction, planning practice shifted from a mainly centralized approach to a more decentralized approach. At the same time, integration of policy became popular, once people came to realise that many things are interrelated. The examples of two policy fields that have influenced spatial planning – environmental quality and water management – underline this. A clear trend of decentralization of policy is visible in these policy fields.

Energy is a field of policy unknown to spatial planning. As we have described in this report, actual policy on energy in relation to spatial planning is hardly present. However, policy development is taking place, but it is still in a preliminary phase, in which policy makers are in search of methods and directions. At the same time, technological development is increasing at a fast rate and, therefore, there is the constant risk of putting effort into technological measures, which are surpassed by superior technologies. We can argue, therefore, that energy, as a policy field, is far less developed than environmental quality and water management.

Policy on energy might thus be expected on a centralized level in a sectoral approach. Due to the immature technological development in the field of energy, it is unexpected that policy is developed on a local level of scale. On the other hand, the trend of decentralization and integration in spatial planning in general causes that energy is also taken on in that policy setting. The complexity of interrelations between energy and other policy fields adds up to this. This complexity is enlarged by the fact that the overall objective of all policy efforts not straightforward. First of all, the problem is complex in itself, because it consists of climate change, environmental pollution and security of energy supply. Secondly, the solution is two folded – saving energy and renewable energy – and dependent on other interests, such as climate change, economy, and politics. An area-specific approach, in which local or regional characteristics of the problem and the possible solutions are being recognised, might therefore be needed for the energy issue as well. Overall, energy proves to be a remarkable theme and at least different from other themes, which confirms the first hypothesis.

6.3 Potential Future Developments

Throughout the report and especially in chapters 4 and 5 we have discussed the development of policy on energy and spatial planning. It appeared that a lot is going on. In some cases the developments are ad hoc and unplanned, while in other cases we found strategic plans and well-designed policies. However, one remark with regard to strategic policies of, for example, the municipalities of Groningen and Tytsjerksteradiel has to be made. While strategic policies have been developed and are still in development, uncertainty towards technological innovation, availability of traditional sources of energy, and a lack of

knowledge are important factors in the difficulty of specifying these strategic policies. We can argue, therefore, that the second hypothesis is partly confirmed. Strategic policies do exist regardless the fact that uncertainties exist, but the same uncertainties cause difficulties in making real choices within the policy. And thus, there is a growing need for direction in strategic policies. In an abstract form, the proposed transition model might provide this direction.

The current situation of energy within spatial planning, for which chapters 4 and 5 provided us with examples, marks the first stage of the development of energy as a theme. The attention, which the energy issue is receiving within spatial planning, is increasing, proved by among others, the examples of Groningen and Tytsjerksteradiel. When we apply this to the model of the issue attention curve, energy as a theme can be placed somewhere in the pre-problem stage and the alarmed discovery/euphoric enthusiasm stage (see figure 6.1). The same can be done for the transition model, which we presented as a potential valuable model for the representation of the energy theme within spatial planning. Since the new developments on the synergy between spatial planning and energy are increasing, the energy theme is in the take-off phase of its development path in spatial planning (see figure 6.2).

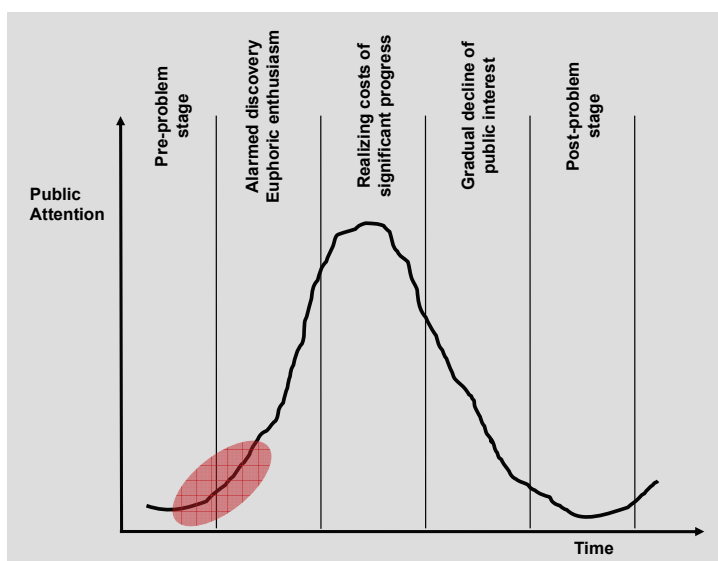


Figure 6.1 The position of the energy theme (red oval) on the issue attention curve.

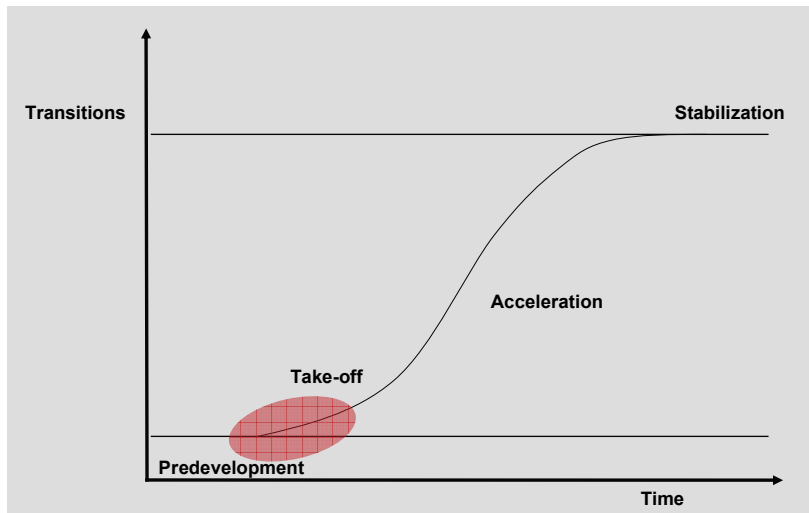


Figure 6.2 The position of the energy theme (red oval) in the transition model.

The fact that it is possible to position the energy theme in the transition model presents a first argument in favour of the use of the transition model for the representation of the future development of the energy theme. If we then apply the transition model, we can state that the synergy between spatial planning and energy is only of temporal importance, since a new level of stability will be reached eventually, according to this theory.

The argument above is strengthened by the issue attention curve, which displays a temporary attention for an issue. Eventually, when solutions for the issue are found, it will go to the background and perhaps disappear entirely. Figure 6.3 displays a connection between the issue attention curve and the transition model. While this conceptual way of thinking is quite abstract, it underlines the relevance and applicability of the transition model. We could say that graph A in figure 6.3 represents the speed of developments, which are displayed in graph B. The triangle in graph A represents the time span, in which the energy issue is present and thus in which the synergy between spatial planning and energy is especially relevant in order to come up with solutions for the energy issue. As was explained in chapter 2, this period is usually about one generation in length, in accordance with the typical span of a transition. Whether this will actually be the case is to be seen, since the energy issue and therefore its solutions are difficult to define, as was discussed in the previous section.

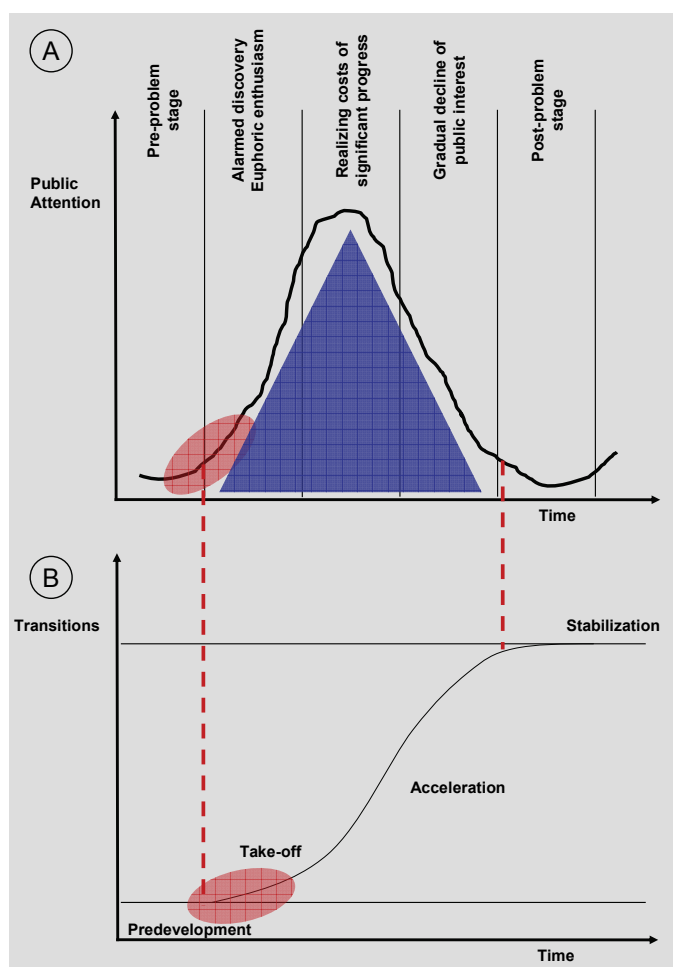


Figure 6.3 The issue attention curve linked with the transition model, providing insight in the potential temporary role of energy as a theme within spatial planning.

There is also an argument against the eventual disappearance of energy as a theme within spatial planning. Themes of environmental quality and water management continue to play a role in spatial planning and, based on that experience, it might be expected that the same goes for energy in the future. While the theme of environmental quality disappeared to the background, standard with which spatial planning needs to comply are still in place. And water management has obtained a strong position in spatial planning. Spatial developments cannot proceed without address water quality and quantity issues. Despite the continued importance of these two examples, this might be different in the case of energy due to future technological innovation. A now almost unthinkable scenario, in which energy is available in unlimited amounts, at every location, without negative impacts, might become reality and drastically diminish the need for spatial planning. This is less unlikely than one might think. After all, a couple of decades ago oil, gas and coal fulfilled that role, without much involvement of spatial planning, although ignorance of the negative impacts was present.

Overall, hypothesis three can be confirmed, because of the acceptance of the transition model as a suitable representation of the future development of the energy theme. A certain degree of uncertainty is unavoidable, however. The future is and continues to be

unpredictable, but the transition model provides us with a solid frame of reference for further research.

6.4 Conclusion

Summarised, it has become clear that policy-making on energy and spatial planning has taken off almost as in a form of hype. Governments on all levels of scale are searching for direction. While local governments start developing policy in a rather communicative way, the European Union designs strict norms and regulations in a sectoral and centralized manner. This leads to a diverse and complex set of measures that affect our society and it seems that we need all these efforts to be able to facilitate a decrease in the dependency on fossil fuels and a solution for the energy issue.

The research has shown that initiatives and projects on the local and regional levels of scale are most noticeable. An overall trend of decentralization in government in general and spatial planning in particular is present. Policy on energy is also dealing with delegating the responsibility of reaching objectives of energy efficiency to the regional and local levels of scale, for example. Consequently, it is up to these governments how they reach those objectives.

Finally, we can conclude that energy is a remarkable theme within spatial planning and that it is still difficult to provide concrete future developments of this theme. The uncertainty about the future is nothing unusual, but the number of important variables that determine the role of energy within our society is large, adding to the complexity of the energy issue (e.g. technological innovation, resource scarcity, growth of energy demand). Therefore, the exact role of energy within spatial planning is also uncertain. However, significant efforts to include energy in spatial policy are taken and, on a conceptual level, the issue attention curve and the transition model seem appropriate for displaying a potential future development of these efforts.

References

- Alberts, F. (2003), "Ruimte voor de rivier: trendbreuk en meervoudige kwaliteitsopgave", in: M.C. Hidding and M. van der Vlist, eds., *Ruimte en water: planningsopgaven voor een rode delta*, Sdu Uitgevers, Den Haag, pp. 47-68.
- Allmendinger, P. (2002), *Planning Theory*, Palgrave Publishers Ltd., Hampshire and New York.
- Barcelona City Council (2004), *Sustainable Energy Measures in the Forum 2004 Area, Barcelona*. Retrieved January 11, 2007, from http://www.erecrenewables.org/documents/Berlin_2004/pwp/Monday_Session_1/Session%201/Panel%201a/Richard_Frigola.pdf.
- Bio Energie Noord (2007), *Organisatie*, <http://www.bioenergienoord.nl/index.php?id=14> (accessed August 29, 2007).
- Bureau Meerstad (2007), *Meerstad*, <http://www.meerstad.eu/meerstad/> (accessed December 16, 2007).
- CBS Statline (2007), *Bevolking per regio naar leeftijd, geslacht en burgerlijke staat*. Retrieved August 16, 2007, from <http://statline.cbs.nl>.
- City of Aalborg (n.d.), *The Aalborg Commitments*, Retrieved January 10, 2007, from <http://www.aalborgplus10.dk/default.aspx?m=2&i=361>.
- Dalman, E. (Ed.) (1999), *Quality Programme: Bo01 City of Tomorrow*. Retrieved January 5, 2007, from http://www.malmo.se/download/18.4a2cec6a10d0ba37c0b800012615/kvalprog_bo01_dn_eng.pdf.
- Dammers, E. (2000), *Leren van de toekomst: Over de rol van scenario's bij de strategische beleidsvorming*, Uitgeverij Eburon, Delft.
- De Roo, G. & G. Porter (2006), *Fuzzy Planning: The Role of Actors in a Fuzzy Governance Environment*, Ashgate Publishing Limited, Hampshire, England.
- De Roo, G. & H. Voogd (2004), *Methodologie van Planning: Over processen ter beïnvloeding van de fysieke leefomgeving*, 2 edn, Uitgeverij Coutinho, Bussum.
- De Roo, G. (2001), *Planning Per Se, Planning Per Saldo*, Sdu Uitgevers bv, Den Haag.
- Dunn, W.N. (1994), *Public Policy Analysis: An Introduction*, 2 edn, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- Easton, D. (1965), *A Framework for Political Analysis*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- EnergieKompas (2003), *Het EnergieKompas, samen naar een duurzame energievoorziening in Noord-Nederland*. Retrieved June 14, 2007, from <http://www.mfgroningen.nl/eindrapport.pdf>.
- Energy Valley (2007), *De missie van Energy Valley*, <http://www.energyvalley.nl/index.php?id=294> (accessed September 2, 2007).
- European Commission (2007), *EU Policies*, http://ec.europa.eu/policies/index_en.htm (accessed August 20, 2007).
- Gemeente Breda (2002), *Milieuvisie Breda 2015*. Retrieved September 16, 2007, from <http://www.breda.nl/index.php?simaction=content&mediumid=1&fontsize=12&onderdeel=bri&stuki d=19440>.
- Gemeente Emmen (2006), *Ecologisch wonen in het Stroomdal in Schoonebeek*, <http://www.emmen.nl/nl/pagina/Wonen+en+leven/Informatie+over+wonen+%3E/Woningbouwprojecten+%3E/1099/7487/Ecologisch+wonen+in+het+Stroomdal+in+Schoonebeek.html> (accessed December 28, 2006).

- Gemeente Groningen (2007a), *Beleidskader duurzaamstestad.groningen.nl*, Gemeente Groningen, Groningen.
- Gemeente Groningen (2007b), *Jaarprogramma Duurzaamste Stad 2008*, Gemeente Groningen, Groningen.
- Gemeente Groningen (2007c), *Routekaart Groningen Energieneutraal* 2025*, Gemeente Groningen, Groningen.
- Gemeente Heerhugowaard (2007), *Stad van de zon*, http://www.heerhugowaard.nl/web/show/id=78631/Stad_van_de_Zon.html (accessed September 3, 2007).
- Gemeente Tytsjerksteradiel (2007a), *Concept Duurzaamheidsnota: It kin oars, it moat oars! Duorsumens yn Tytsjerksteradiel*, Gemeente Tytsjerksteradiel, Burgum [unpublished].
- Gemeente Tytsjerksteradiel (2007b), Hurdegaryp It Súd, fase II en III, <http://www.t-diel.nl/infotype/webpage/view.asp?objectID=2479> (accessed December 17, 2007).
- Generalitat de Catalunya (2006), *Catalonia Energy Plan 2006-2015* [Presentation]. Retrieved January 11, 2007, from <http://www.rug.nl/energyconvention/Looking-back/speakersAZ>.
- Gordijn, H.E., F.Verwest, A. van Hoorn & S.J. Langeweg (2003), *Energie is ruimte*, NAI Uitgevers, Rotterdam.
- Healey, P. (1997), *Collaborative Planning: Shaping Places in Fragmented Societies*, Palgrave Publishers Ltd., Hampshire and New York.
- Hidding, M.C. and M. van der Vlist (2003), "Ruimte en water in Nederland; opgaven voor een rode delta", in: M.C. Hidding and M. van der Vlist, eds., *Ruimte en water: planningsopgaven voor een rode delta*, Sdu Uitgevers, Den Haag, pp. 11-27.
- Kamphorst, D.A. (2006), *Veranderend milieubeleid*, Geo Pers, Groningen.
- Kemp, R., A. Rip & J. Schot (2001), "Constructing Transition Paths through the Management of Niches", in: R. Garud & P. Karnøe, eds., *Path Dependence and Creation*, Lawrence Erlbaum Associates Inc. Publishers, Mahwah, New Jersey.
- Karstkarel, N., J.P. van Loon & G. de Roo (2007), *Towards a future energy system related to regional planning in the Netherlands: Analysing energy projects in Europe*, University of Groningen, Groningen [unpublished].
- KNN Advies (2008), KNN Project – Energie en klimaat: charrette bedrijventerrein Quatrebras, <http://www.knnadvies.nl/pages/main/frame.php?group=3&ID=1&subID=63&lang=nl&status=2> (accessed January 22, 2008).
- Lasswell, H.D. (1970), The Emerging Conception of the Policy Sciences. *Policy Sciences* 1[1], 3-14. 1970. New Haven, Connecticut, American Elsevier Publishing Company, Inc.
- Lasswell, H.D. (1971), *A Pre-View of Policy Sciences*, American Elsevier Company Publishing, Inc., New York.
- Lenferink, S., J. Lingbeek & J.P. van Loon (2006), Incorporating the Energy Concept in Spatial Design: The Usefulness of Geographic Information Systems based on the Case Study Groningen, University of Groningen, Groningen [unpublished].
- Lenferink, S. & J.P. van Loon (2007), Energy Cascading as a Spatial Concept, University of Groningen, Groningen [unpublished].
- Lerner, D. & H.D. Lasswell (1951), *The Policy Sciences* Stanford University Press, Stanford, California.
- Lindblom, C.E. 1(980), *The Policy-Making Process*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.

- Malmö Stad (2006), *Västra Hamnen The Bo01-area: A City for People and the Environment*. Retrieved January 7, 2007, from <http://www.malmo.se/servicemeny/cityofmalmo/sustainablecitydevelopment/westernharbourbo01.4.1dacb2b108f69e3b8880001970.html>.
- ManagEnergy (2004), *Solar Thermal Ordinance: Sustainable Energy Strategies in Barcelona* [Presentation]. Retrieved January 11, 2007, from <http://managenergy.net/conference/2004/ruyet.pdf>.
- Ministerie van Economische Zaken (2005), *Nu voor later: Energierapport 2005*. Retrieved September 10, 2007, from <http://www.ez.nl/content.jsp?objectid=141318>.
- Ministerie van Economische Zaken (2007a), *Energie*, <http://www.ez.nl/content.jsp?objectid=141318> (accessed September 10, 2007)
- Ministerie van Economische Zaken (2007b), *Organogram met namen*. Retrieved September 10, 2007, from <http://www.minez.nl/content.jsp?objectid=152635&rid=152172>.
- Ministeries VROM, LNV, VenW, and EZ (2004), *Nota Ruimte*, Government's notion, The Hague.
- Needham, B. (2007), *Dutch Land Use Planning*, Sdu Uitgevers bv, Den Haag.
- Nunnally, S.R. (2006), *How Denmark is leading the way in renewable energy*. Retrieved December 28, 2006, from MoneyWeek website: <http://www.moneyweek.com/file/10587/how-denmark-is-leading-the-way-in-renewable-energy.html>.
- Parsons, D.W. (1995), *Public policy: An Introduction to the Theory and Practice of Policy Analysis*, Edward Elgar, Cheltenham, UK.
- Parto, S. (2003), *Transitions: An Institutional Perspective*, MERIT, Maastricht.
- Pols, L., P. Kronberger, N. Pieterse & J. Tennekes (2007), *Overstromingsrisico als ruimtelijke opgave*, NAI Uitgevers, Rotterdam.
- POLYCITY (2007), *Program*, <http://www.polycity.net/en/index.html> (accessed January 12, 2007).
- Provincie Groningen (2007), *Energieconvenant Groningen*, <http://www.provinciegroningen.nl/veiligheidsmilieu/energie/energieconvenant> (accessed September 18, 2007).
- Ranney, A. (1968), "The Study of Policy Content: A Framework for Choice", in: A. Ranney, ed., *Political Science and Public Policy*, Markham Publishing Company, Chicago, pp. 3-21.
- Regio Groningen-Assen (2007), *Ambities: kansen benutten, identiteit bewaren*, <http://www.regiogroningenassen.nl/de-regio-groningen-assen-2003/ambities/> (accessed June 20, 2007).
- Rosen, M.A. & I. Dincer (2001), Exergy as the Confluence of Energy, Environment and Sustainable Development. *Exergy International Journal*, vol. 1, no. 1, pp. 3-13.
- Rotmans, J., R. Kemp & M. van Asselt (2001), More Evolution than Revolution: Transition Management in Public Policy. *The Journal of Future Studies, Strategic Thinking and Policy*, vol. 3, no. 1, pp. 1-17.
- SenterNovem (2006a), *Demo Berlikum*, http://www.senternovem.nl/eos/Projecten/EOS_Demonstratie/2006/Demo_Berlikum.asp (accessed September 14, 2007).
- SenterNovem (2006b), EPC/EPN, <http://www.senternovem.nl/kompas/woningbouw/epc-epn/index.asp> (accessed October 13, 2007).
- SenterNovem (2007a), *Duurzame warmte en koudevoorziening op een locatie met restwarmte*, http://www.senternovem.nl/eos/projecten/ukr/2006/duurzame_warmte_en_koudevoorziening_op_een_locatie_met_restwarmte.asp (accessed September 14, 2007).
- SenterNovem (2007b), GAVE: Biofuels in the Netherlands, http://gave.novem.nl/novem_2005/index.asp?id=43 (accessed August 29, 2007).

- SenterNovem (2007c), *Kleinschalig gebruik van warmte uit biomateriaal - uitgebreid*, http://www.senternovem.nl/duurzameenergie/projecten/Zoeken_in_werkvelden/Kleinschalig_gebruik_van_warmte_uit_biomateriaal_uitgebreid.asp (accessed September 14, 2007).
- SenterNovem (2007d), *Over SenterNovem*, http://www.senternovem.nl/senternovem/over_senternovem/index.asp (accessed September 2, 2007).
- Schoonhoven, M.H. van (2007), *Meerstad, meer duurzame energie: Duurzame energie in het planproces van een nieuwbouwwijk*, Rijksuniversiteit Groningen/Van Werven, Groningen [unpublished].
- SNN (2007), *Wat is SNN*, <http://www.snnonline.nl/>, (accessed September 18, 2007).
- Spit and Zoete (2002), *Gepland Nederland: Een inleiding in ruimtelijke ordening en planologie*, Sdu Uitgevers bv, Den Haag.
- SREX (2006), *Synergie tussen regionale planning en exergie: Geïntegreerde Exergetische Conceptvorming voor Duurzame Regionale en Stedelijke Ontwikkeling*. Projectplan EOS-SenterNovem: Lange Termijn onderzoeksprojecten [unpublished].
- Van Buuren, M. (2003), "Ruimtelijke concepten op waterbasis", in: M.C. Hidding and M. van der Vlist, eds., *Ruimte en water: planningsopgaven voor een rode delta*, Sdu Uitgevers, Den Haag, pp. 117-138.
- Van Hoesel, P.H.M. & F.L. Leeuw (2005), "Wat is beleidsonderzoek?," in: P.H.M. van Hoesel, F.L. Leeuw, & J.W.M. Mevissen, eds., *Beleidsonderzoek in Nederland*, Koninklijke Van Gorcum, Assen, pp. 36-48.
- Voogd, H. (2001), *Facetten van de planologie*, Kluwer, Alphen aan den Rijn.
- VROM (2004), *Nota Ruimte: Ruimte voor ontwikkeling*, Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, Sdu Publishers, The Hague.
- VROM (2007), *Dossier klimaatverandering*, <http://www.vrom.nl/pagina.html?id=9231> (accessed October 13, 2007)
- Weimer, D.L. & A.R. Vining (1999), *Policy Analysis: Concepts and Practice*, 3 edn, Prentice-Hall Inc., Upper Saddle River, New Jersey.
- Wet ruimtelijke ordening (2006), Accessed through <http://www.vrom.nl/Docs/publicaties/w951.pdf> (September 2, 2007).
- Williams, W. (1971), *Social Policy Research and Analysis*, American Elsevier Publishing Company, Inc., New York.
- Zonneveld, W. (1991), *Conceptvorming in de ruimtelijke planning: Patronen en processen*, UvA: Planologisch en Demografisch Instituut, Amsterdam.
- Zonneveld, W. & F. Verwest (2005), *Tussen droom en retoriek: De conceptualisering van ruimte in de Nederlandse planning*, NAI Uitgevers, Rotterdam.