The energy transition in Dutch spatial planning

Two case studies of implementing wind farms in The Netherlands

Masterthesis Urban and Regional Planning

January 2014

D.P.J. (Pim) de Leeuw Bsc

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Frontpage photo: existing Westermeerdijk wind farm in the Noordoostpolder, seen from the North
Al photos in this document are made by the author

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List of Abbreviations used

CBS	Centraal Bureau voor de Statistiek, Statistics Netherlands
CPB	Centraal PlanBureau, Netherlands Bureau for Economic Policy Analysis
DEE	Stichting Duurzame Energieproductie Exloermond
DM	Wind farm Drentse Monden
EIA	Environmental Impact Assessment
EU	European Union
EZ	Ministerie van Economische Zaken, Ministry of Economic Affairs
GHG	Greenhouse gas
IenM	Ministerie van Infrastructuur en Milieu, Minstry of Infrastructure and the Environment
IPCC	Intergovernmental Panel on Climate Change
NAM	Nederlandse Aardolie Maatschappij
NMP4	4e Nationaal Milieu Plan, 4th Environmental Policy Plan
NOP	Wind farm Noordoostpolder
OM	Wind farm OosterMoer
PBL	Planbureau voor de Leefomgeving, The Netherlands Environmental Assessment Agency
PV	PhotoVoltaic
POPII	Provinciaal OmgevingsPlan II, second provincial structure vision
RCR	Rijkscoördinatieregeling, National Coordination Regulation
RMNO	Raad voor Ruimtelijk, Milieu- en Natuuronderzoek, Dutch Advisory Council for Research on Spatial Planning, Nature and the Environment
RVS	Raad Van State, Council of State
SGB	Staatsgasbedrijf, State gas company
SVWOL	Structuurvisie Wind Op Land, Structure plan on on-shore wind
UNFCCC	United Nations Framework Convention on Climate Change
VROM	Ministerie van Volksgezondheid, Ruimtelijke Ordening en Milieu, Dutch Ministry for Housing, Planning and the Environment

Voorwoord / A word of thanks

Het doen van dit onderzoek en het schrijven van deze scriptie is in meerdere opzichten een leerproces voor mij geweest. quo op academisch als op persoonlijk vlak heb ik meer inzicht gekregen.

Ik kijk nu terug op een bewogen periode waarin leuke en minder leuke ervaringen zich afwisselden. De belangrijkste noem ik hier even kort.

De stage die ik begon heeft mij behalve het onderwerp ook een leuke baan opgeleverd, en nieuwe vrienden. Ik heb met veel plezier bij IFHP stage gelopen en gewerkt. De congressen in het buitenland en de samenwerking met collega's en gelijkgestemden waren hierin hoogtepunten.

Het overlijden van Mw. Kokx eind 2012 was een onverwachte ontwikkeling, en betekende ook een tegenslag. Hoewel er snel een andere begeleider, Dhr. Geertman, was gevonden heeft een vervangende begeleider heeft toch altijd een nieuwe kijk op de zaken.

Als laatste punt wil ik nog mijn huwelijk met Myrte noemen als het hoogtepunt tijdens deze periode. We hebben samen naar deze onvergetelijke dag toegeleefd en denken er nog dikwijls met plezier aan terug.

Dit is ook de plek om mensen te bedanken die mij in meer of mindere mate geholpen hebben tijdens het schrijven van mijn scriptie; in willekeurige volgorde:

Mijn vrouw Myrte. Familie. Vrienden. Mijn begeleiders Dr. Anita Kokx en Dr. Stan Geertman. De respondenten. De donderse afstudeergroep. De collega's en bekenden van IFHP.

During the writing of this thesis I learned a lot, not only on an academic level, but also on a personal level. It has been a period with ups-and-downs. Here I would like express my gratitude to my former colleagues (in the broadest sense) of the IFHP that I got to know and have helped me somewhere along this process!

Samenvatting: Nederlands

Er is sprake van een energietransitie, dit houdt in dat de gebruikte energiebronnen steeds meer van de hernieuwbare soort zullen zijn. De belangrijkste redenen voor deze energietransitie zijn: 1) de CO_2 beperking in het kader van de klimaatverandering, 2) de eindigheid van fossiele brandstofvoorraad, en 3) leveringszekerheid, onafhankelijkheid van geopolitieke partijen. De energietransitie ligt om deze redenen vast in nationaal en internationaal beleid.

Behalve voordelen heeft de energietransitie ook eigenschappen die nadelig uitgelegd worden. Energieopwekking uit hernieuwbare bronnen neemt meer ruimte in dan die uit fossiele brandstoffen, en heeft een decentraal karakter waardoor een groter aantal installaties verspreid door het landschap kunnen staan.

De Nederlandse overheid zet op dit moment in op grootschalige windenergie op land, omdat dit een van de meest voordelige manieren is om aan de ambities te voldoen. In 2020 moet er 6000 MW op land geïnstalleerd zijn. Windenergie op land is voorlopig de goedkoopste vorm van hernieuwbare energie, en de grootschaligheid van de projecten zorgt ervoor dat er zo min mogelijk landschappen aangetast worden en er stappen in het realiseren van de 6000 MW gezet kunnen worden. Lokaal en regionaal leidt dit tot spanningen omdat een flink deel van een nationale ambitie in een klein gebied gerealiseerd moet worden, in het geval van windparken met grote landschappelijke impact tot gevolg.

Dit leidt tot de hoofdvraag:

Wat zijn de ruimtelijke gevolgen van de huidige energietransitie, en hoe kan het ruimtelijk beleid hier beter mee omgaan?

In dit onderzoek wordt er naar 2 van deze projecten gekeken. Het eerste project is het Drentse Monden project in noordoost Drenthe, het tweede de windparken in de Noordoostpolder.

Omdat ik geïnteresseerd was in de standpunten van verschillende partijen is gekozen voor een kwalitatieve onderzoeksopzet.

Voor beide casestudies is contact gezocht met een aantal stakeholders; uit verschillende overheidslagen, protestgroepen en omwonenden, en de initiatiefnemers. In het geval van het Drentse Monden project zijn er 9 interviews afgenomen, in het geval van de Noordoostpolder zijn er 3 telefonische interviews, een vragenlijst en een face-to-face interview afgenomen.

Een antwoord op de vraag is uiteindelijk lastig te geven maar geconcludeerd word dat de recente beleidsinspanningen in combinatie met goed overleg op lokaal niveau waar het nog wel eens aan schort, al een groot deel van de spanningen kunnen wegnemen. De nationale overheid moet een duidelijk beleid hebben waar initiatiefnemers en lokale overheden en burgers naar kunnen refereren zodat niet steeds de nut en noodzaak discussie gevoerd hoeft te worden.

Summary: English

Currently there is an energy transition going on. This energy transition entails the change of energy sources to more and more renewable sources. The reasons for this energy transition are: 1) CO_2 emission reduction in the context of climate change, 2) the running out of fossil fuels, and 3) energy security, i.e. decreasing dependence on geopolitical parties. Because of these three arguments the energy transition is part of national and international policies.

Apart from the advantages of the transition, there are some downsides too: renewable energy sources have a lower energy density than fossil fuels; more space is needed. Another characteristic is that renewable energy sources can be used to generate electricity in a decentralised manner.

The Dutch government currently chooses to implement large-scale on-shore wind projects. It is deemed to be one of the most viable options for renewable energies in The Netherlands. The national ambition is to have an installed capacity of 6000 MW in 2020. On-shore wind energy is currently the cheapest renewable energy and the large-scale approach aims to affect as few sites as possible, while making significant process towards the goal of 6000 MW. Locally and regionally this causes tensions; Local sites are affected heavily when a large wind park is projected there.

This leads to the main research question:

What are the spatial consequences of the current energy transition, in what way can the Dutch spatial policy deal better with these?

In this research 2 Dutch large scale wind projects are looked at: 1) The Drentse Monden in the north-east of the Province of Drenthe and 2) the wind park developments in the Noordoostpolder.

Due to the fact that I was interested in personal opinions from various stakeholders, a qualitative research approach was chosen.

Stakeholders from all three layers of government, national, regional and local, have been approached, as well as protest groups and local inhabitants and the initiators of the projects. In the case of the Drentse Monden 9 interviews were held. In the Noordoostpolder case, 3 telephonic interviews, one face-to-face interview and a questionnaire was used.

In an effort to answer the main research question it is concluded that the recent policy measures in combination with good local consultation can provide for at least part of the solution. Furthermore, the national government should clearly state her policy, local governments, initiators and citizens alike can than refer to this national policy without having to question the use and usefulness of on-shore wind time and again.

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Chapter 1 Introduction

Section 1.1 Relation between energy and space

The notion that the future of energy production lays more and more with renewable energy sources brings challenges to our (perhaps desired) use of space.

To start a research about energy and space is to ask oneself the question whether there is a relation between the two. Looking at the controversies surrounding new wind farms, the academic world's attention for this subject (see for example: Agterbosch & Breukers, 2008; Barry & Chapman, 2009; Firestone & Kempton, 2007; Warren & Birnie, 2009; all studies that research public opposition to windmill projects) clearly has its roots in non-academic, everyday life. Taking the multitude of publications in account, it is clear that energy has got a spatial impact. The answer to the above question in short should be: yes, there is a relation between energy and space!

Arguably this has always been the case. With the introduction of new energy production modes however, the relation is changing. Currently renewable energy sources are put forward to play an important role in the future energy production (see § 1.2).

The spatial impact of energy is significant. Power structures like high voltage power lines, gas pipes, oil refineries, power plants, amongst others, require (spatial) hinder zones to prevent hinder like (low-frequency) noise, and shadow flicker, and safety zones which limit the use of those spaces (see for example: Braam et al., 2005; Gordijn et al., 2003). On the other hand, the usage of energy itself is spatially limited. This differs from one type of energy to another (Stremke, 2010). Electricity for example can be transferred without problems over hundreds of kilometres, heat in the form of warm water should not be transferred over more than 10 kilometres.

So in a way spatial characteristics influence energy, or at least the possible use of it, as well. On top of that the energy supply is starting to change with different spatial consequences as a result.

Section 1.2 The transition

The way energy is produced and consumed changes over time in a society. With it, the 'energy system' changes, this includes production, transportation and consumption of energy, as well as all the actors and cultural and institutional factors (Loorbach, 2007). In the early 1900s the Dutch energy system was "small-scale, extensive, and based on coal and renewables" (Loorbach, 2007, p. 257). This was a reasonably stable system, which began to change rather quickly after WWII. The post war economic growth led to increased consumption and energy use, amongst other things due to more domestic electric appliances. On top of that the discovery of large amounts of natural gas changed the way people heated their homes (see also § 2.1.3).

At the beginning of the 1970s a new reasonably stable phase began, during which the existing infrastructure was improved and made use of more and more efficiently. To a large extent, this system based on fossil fuels is still present.

The driving force behind the past energy transitions was the development of technology and society (economic and demographic growth). However, environmental concerns, alongside energy security issues have introduced a call for a more sustainable energy system (Loorbach, 2007). This is what can be called the current energy transition and is the focus of this thesis. From this point onward 'energy transition' is used in this thesis to refer to the current energy transition.

For a long time, since the discovery of oil and gas, the spatial claim of our energy sources has been limited; a lot of the activities surrounding the production of these sources take place underground or at least on concentrated spots out of sight of most people (Noorman & de Roo, 2011; Gordijn et al., 2003).

With the introduction of technologies like windmills, solar panels and biomass fermentation installations, the production of energy will take up more and more space (see § 2.2). In addition to that, because the new technologies are better suited for decentralized production of energy, energy-production sites will likely become more dispersed throughout space, changing the way people will be affected by them.

Besides normal progression of technology, there are various reasons for this energy transition that is actively pushed by public and scientific bodies.

First, one of the reasons can be clearly found in the conclusion of the Intergovernmental Panel on Climate Change (IPCC) in their 2007 synthesis report. In this report they not only concluded with “high confidence” that the climate is changing and affecting many natural systems, but also that with “very high confidence that the global average net effect of human activities [is] one of warming” (IPCC, 2007, p. 37). This asks for increased use of renewable energy sources, thus reducing CO_2 emissions.

A second reason for the energy transition is the growing doubts about the fossil fuel stocks, or to put it differently: the notion that the winning of economically viable fossil fuels will be very hard in a couple of decades (Noorman & de Roo, 2011).

A third reason mentioned, is the autarchy ideal (being-self-supportive), with as a positive side-effect the decreasing dependence on geopolitical instable relationships (Gordijn et al., 2003; VVD & CDA, 2010).

Section 1.3 The problem with the current energy transition

The energy transition can be justified by the three arguments stated in section 1.2 (see also § 2.1.2). Governments have put forward ambitions like lower CO_2 emissions and a higher portion renewable energy production.

Although there seem to be reasons for an energy transition and interest from certain groups and at certain governmental levels, at the same time there is resistance causing delays. This is also seen in the studies mentioned on windmill projects (see the second paragraph of the introduction), and often this leads to a longer duration or adaptation of the project. And although everyone seems to agree on the need for the energy transition, these lengthy procedures are more a rule than an exception and often unnecessary (B4-Werkgroep, 2004). According to Stremke, “too often, interventions that are needed to develop a sustainable physical environment are dismissed for aesthetic reasons” (Stremke, 2010, p. 156). Apparently there are plenty initiatives of which some are frustrated due to their 'ugly' appearance.

The ambitions of the Dutch government, as stated in the Clean and Efficient working programme, (a 30% reduction of CO_2 emissions and 20% renewable energy in 2020 (VROM, 2007)), are not helped by this resistance, in fact: after a change of government ambitions were loosened, it was decided only to follow the European goal of 14% renewable energy (and a reduction of 20% CO_2) (CBS et al. 2011; VVD & CDA 2010). The current coalition again was a bit more ambitious stating a share of 16% renewable energy in 2020 (VVD & PvdA, 2012) however this goal will be delayed to 2023 while adhering to the 14% share in 2020 (CBS et al., 2013; SER, 2013).

In the Netherlands, the government has chosen to concentrate their efforts on the implementation of on-shore wind energy for the following years. It is deemed the currently cheapest potential to realize renewable energy (EL&I, 2011).

At the same time, there is a lack of support for on-shore wind energy in areas where projects are proposed. Apart from their visual impact, wind energy projects are opposed because of (expected) effects on well-being such as noise hindrance, and environmental effects such as negative effects on migratory birds (IenM & EZ, 2013a, p. 7).

Because of the disruptive nature of large scale developments (not necessarily energy), rules and regulations dealing with them are complicated and characterized by their long duration. This is because stakeholders have to be able to have input in the process, people living in the neighbourhood of a proposed project can for instance object to certain aspects of the project.

The long durations of such projects was recognized by the Ministry of Economic Affairs (Economische Zaken, EZ) in 2002 as a factor in not attaining the goals set out (B4-Werkgroep, 2004). In a study looking at regulations concerning the exploration of natural gas and the development of wind energy projects the conclusion was that wind energy projects took two to five years longer than was theoretically necessary (EZ, 2002 in EZ, 2008).

In an attempt to improve procedures involved in energy infrastructure projects the Electricity law of 1998 was altered to include the National Coordination Regulation (rijkscoördinatieregeling, RCR). The aim of this amendment was to shorten and streamline the procedures involved in the energy infrastructure projects (EZ, 2008).

Section 1.4 Research questions

§ 1.4.1 Aim and research questions

In the previous section a policy problem has been identified, as well as a possible solution by the government. This research aims to address this apparent policy stagnation from a spatial point of view which gives us the following main research question:

What are the spatial consequences of the current energy transition, in what way can the Dutch spatial policy deal better with these?

This main research question has been broken down in 5 sub questions. The first two look for answers to the first part of the research question and together provide a solid, theoretic basis.

1. What is the current energy transition?

2. What are the spatial consequences of the current energy transition?

The first one is mainly answered through literature. The basis for the second question is also given through literature, the empirical part of the research will further this.

The third question is answered empirically, both through the analysis of policy documents and the case studies. The analysis of policy documents, done in chapter 4 gives an answer to question 3, while the two Dutch case studies presented in chapter 5 provide insight in how some of these projects are actually being developed.

3. In what way does Dutch spatial policy deal with the energy transition now?

As recognized by the second research question, local inhabitants (see sources mentioned above), policy makers (IenM, 2011) and scientists (Kann, 2010; Stremke, 2010; Hoorn & Spek, 2010) the landscape is affected. Given this recognition, what is done by policy makers to address this issue? The RCR as a possible solution will also be looked at.

A majority of the comments issued during consultation for the environmental impact analysis report (Milieu Effect Rapport) scoping process for the Dutch 'structure plan on on-shore wind' (Structuurvisie Windenergie op Land, SVWOL) contained concerns that had to do with the affection of the landscape (IenM & EZ, 2013b).

It is thus interesting to see how landscape is considered by policy makers as it may be one of the most pressing arguments of local inhabitants against proposed wind farms.

4. In what way is 'landscape quality' taken into account in current policy making?

The fear of negative affection of the landscape is one of the main reasons for people to object to wind farms. Section 2.2.3 gives a theoretical background on why landscape is seen as important. During the empirical research phase, this subject has been discussed with respondents too.

The question that remains is arguably the most interesting and at the same time hardest to answer:

5. How could the way Dutch spatial policy deals with the energy transition be improved?

This thesis will try to give some handles as a start in answering this question. Insights from the two Dutch case studies (chapter 5), the 1960s natural gas transition (§ 2.1.3) and the German approach (§ 4.2) act as input for answering this question.

§ 1.4.2 Relevance

Energy, and specifically electricity is important to our society. With the energy transition, wind turbines will take up more and more space. Because of policy choices by the Dutch government, the aim is to have 6000 MW of installed capacity in wind power by 2020. This means a doubling of the number of wind turbines that are present today.

In this thesis the focus lies with the spatial aspects, as identified by Kann (2010), Stremke (2010) and the former Dutch Minister of Infrastructure and Environment (Ministerie van Infrastructuur en Milieu, IenM) Ms. Schultz Verhagen, the change from 'traditional' fossil fuel supply systems to decentralized renewable energy systems will have significant impact on our landscapes (IenM, 2011, p. 5).

The Netherlands Environmental Assessment Agency (Planbureau voor de Leefomgeving, PBL) has done a 'quickscan' on Energy and Space in 2010. In the study they tried to find the answer to the question: "to what extent does spatial planning provide opportunities to realize climate and energy goals, and which additional measures within spatial planning could speed up the process of realizing these goals" (Hoorn & Spek, 2010). In short their conclusions were that the energy transition does have spatial consequences; and that further research on energy landscapes and changes in energy infrastructure, amongst other research, could provide insight in possible measures. Moreover, they propose to include energy in regional strategic plans, to avoid/overcome public resistance (Hoorn & Spek, 2010, pp. 19, 20). This research contributes to the answering of those questions.

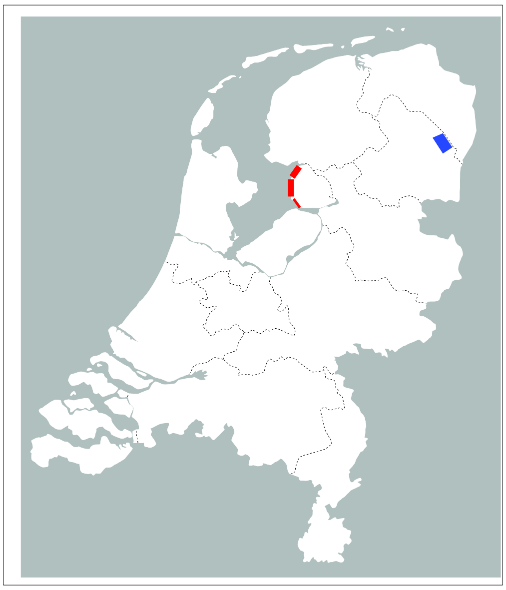
On a societal level the research is relevant too; One of the reasons for the energy transition is shown by the IPCC; Climate change should not be underestimated and mitigation and adaptation measures should both be taken (IPCC, 2007). Furthermore the articles on windmills mentioned in the introduction show that society does not accept every change related to the energy transition without a struggle. Apparently, there are negative sides too. One of the tasks planners face, is to try and make conflicting spatial claims compatible with each other. This research looks at the implementation of wind power in two Dutch projects that it may make policy makers as well as citizens more aware of the vested interests, and challenges that lie in front of us.

Also, because energy part of the economic and international policy domain (EL&I, 2011), spatial impacts are not directly taken into account when formulating policy ambitions. Space is however, affected, to such an extent that it causes considerable delays, which in turn affect the economic and international (political) situation. Therefore it is interesting to look at the way spatial policy could lessen its negative effects, or indeed be of positive influence. One of the action-points indicated in the Energy Report 2011 is the improvement of the conditions in order to quicken the energy transition (EL&I, 2011, p. 61). Part of these conditions is the policy making involved. This research may provide insight in whether the steps taken since (RCR used for energy projects, SVWOL), are seen as a success factor. This could lead to a more realistic approach and perhaps to determining some success and failure factors for the energy transition. Moreover, through interviewing a broad range of people, perhaps some policy recommendations could be given.

Section 1.5 Case studies

Two Dutch case studies are looked at in this research. They are two wind farms in different stages of the decision making process. Both of the study cases fall under the RCR which was applied for energy projects from 2009 onwards (EL&I, 2011). The choice for wind energy projects was made because of two reasons; firstly, the Dutch government sees on-shore wind energy as the most viable form of renewable energy at this moment and focuses quite some effort on the implementation of it. Secondly, because of the height of wind turbines, which has only been increasing over the last decades, their spatial impact is significant. Both of the projects are in an area where the landscape can be characterised as 'open', one is mainly a large scale agriculture area, the other on the border of the IJsselmeer (a big lake) and an agricultural area. Because of these characteristics the two Dutch projects are relevant to look at, and comparable to an extent.

Figure 1.1 Location of the case study projects



DM in blue, NOP in red

§ 1.5.1 Case Study: Drentse Monden

The first case study is the 'Drentse Monden' wind farm (DM). It is a joint initiative by local farmers and off site investors. The location of the project is indicated on the map in figure 1.1 in blue. The project is located in former peat colonies, large scale open landscape. The initiators have formulated plans to develop 275 MW to 450 MW of installed capacity. This would mean 60 to 110 large wind turbines in an area up till then not familiar with wind energy (the exact numbers depend on the type of turbine chosen (Pondera, 2011)). The municipality and province feel that this is too much and have now settled on far less, 280 MW for the entire province, as upper limit (Provincie Drenthe et al., 2012). Also the local inhabitants feel threatened by the images of vast numbers of huge and noisy turbines in their up until now quiet and empty landscape. As of yet, no permits have been granted and decisions about the exact number and location of the wind turbines still need to be taken. The case study is described in more detail in § 5.1.

§ 1.5.2 Case Study: Noordoostpolder

The second case study is the Noordoostpolder wind farm (NOP). It too was initiated by local farmers in cooperation with investors. The NOP project is situated along the dikes on the west side of the Noordoostpolder, as indicated on the map in figure 1.1. The location of the wind farm was chosen in collaboration with the municipality which preferred a big project at the edge of the polder over lots of small initiatives in the polder. People living in the neighbourhood of the project however did not feel the same, as they felt they would be surrounded by wind turbines effectively destroying their views. Despite their efforts, the decision making process involving the NOP has been finished in 2013. The construction of 86 wind turbines adding up to a total of 400 MW can begin. A more detailed description is given in § 5.2.

Section 1.6 Structure of thesis

This thesis can be divided into two parts, a first theoretical part, based on literature review and a second, empirical part, based on policy documents analysis, and interviews for DM and a questionnaire for NOP.

In the first part I will discuss energy, landscape, and energy transitions. Together, this will form the theoretical background against which the policy documents and interviews can be analysed.

The second part is used to introduce the actual research. Also, policy documents are reviewed here, with relevance to energy. Furthermore the research results will be presented.

The concluding chapter takes the conclusions from both the theoretical and empirical parts to answer the research questions formulated.

Chapter 2 Theoretical framework

In this chapter the theoretical background to the research questions is given. The current energy transition and the spatial consequences thereof are discussed. In the first section energy transitions will be described and a definition for the current energy transition is given. The second deals with energy, the relation between energy and space, and landscape quality.

Section 2.1 The current energy transition

§ 2.1.1 Energy transitions

As described in section 1.2 the composition of the energy system is a constantly changing one. Currently there is a shift that can be witnessed in the direction of a more decentralized energy production system, that increasingly makes use of renewable sources.

In 2001 the Dutch ministry for Housing, Planning and the Environment (Ministerie van Volksgezondheid, Ruimtelijke Ordening en Milieu, VROM) stated in their 4th Environmental Policy Plan (4e Nationaal Milieu Plan, NMP4), that government interference in transitions has existed for quite some time already (examples are: improving health care through the construction of drinking and sewage water networks, scale increase in agriculture and the introduction of natural gas in the Dutch households) (VROM, 2001, p. 126). Herewith 'transition' and its supervision by the government was introduced as a policy concept in the Netherlands (Agterbosch & Breukers, 2008; VROM, 2001). In 2002 the Dutch Ministry of Economic Affairs (Ministerie van Economische Zaken, EZ) introduced 'transition management' into the Dutch energy policy realm. In the 2002 'energy report' it was recognized that market parties themselves would not be able to take on the transition to a more sustainable energy system themselves and that the Dutch government should create the right circumstances for the transition to happen (EZ, 2002).

Transitions are shifts in practices, ambitions or other things. As through time ideas evolve, and with them practices, one could argue that there are no separate transitions, but that they in fact are all part of one continuous process. However, during this process there are several relatively stable periods that can be identified. An example of an energy transition that went well as far as swift implementation is concerned is the 1960s transition to natural gas in The Netherlands; it is described in section 2.1.3. The next section first details the current energy transition.

§ 2.1.2 Reasons for the current energy transition

The current energy transition can be described as the transition from an energy production system revolving around centrally produced energy using fossil fuels towards a more decentralized system in which renewable energy has a significant share (see § 1.2).

In the introduction three reasons for the current energy transition were given: climate change, decrease in fuel stock and decreasing energy dependency. These three reasons will be elaborated here.

The **first** reason, climate change, has been on the scientific agenda for a couple of decades now. With the conclusions of the Intergovernmental Panel on Climate Change (IPCC) in 2007 that human activities contribute to global warming a long debated subject was scientifically settled: the effect of human activities causes global warming (IPCC, 2007). This conclusion implies that human action actually makes a difference, so changing the course of action is part of the solution.

Therefore, in the same report a chapter on how to respond to climate change is included. Besides dealing with the consequences (adapting to the change) reducing greenhouse gas (GHG) emissions (mitigating the change) is seen as a solution.

A switch to renewable energy sources can both be seen as adaptation and mitigation strategy, therefore being one of the most implemented policy changes (IPCC, 2007, pp. 106-107).

Climate change adaptation through changing to renewable energy sources can for example be achieved by providing access to multiple viable alternatives, reducing dependence on a single energy source (IPCC 2007, p. 57). Climate change mitigation can be achieved through the switch from fossil to renewable energy sources, minimising the output of GHG emissions, or reducing the output of current technologies, for example through carbon dioxide capture and storage (IPCC, 2007, p. 59).

Verbong and Geels (2007) note that the current energy transition can be understood in a broader sense: it the result of a liberalisation process, not the least through European regulations: "Environmental problems are receiving more attention […] but in terms of guiding principles, they rank below the issue of low cost […], reliability, and diversification" (p.1036). Arguably, from a societal point of view, the environment or climate change is the most important. However as a driver for policy adaptation the cheap and reliable availability of energy are more important, these considerations are part of the second and third reasons outlined below.

The **second** reason is neither a new one. In the 1987 World Economic Commission for Development 'our common future'-report Brundtland already identified that supplies would not last forever. After 5 years of research and debate, one of the conclusions of the Brundtland commission was that there were limits to the natural resources. However they also noted that: "in general, renewable resources […] need not be depleted provided the rate of use is within the limits of regeneration and natural growth" (WCED, 1987, p. 45). This would require collective global technological efforts.

Not only switching to alternative energy sources, but thinking about our living standards was a message of the Brundtland commission:

> "Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability. Yet many of us live beyond the world's ecological means, for instance in our patterns of energy use" (WCED, 1987, p. 44).

The message that resources will run out when used at an unsustainable rate was clear. And although experts do not agree on when we will run out of fossil fuel, for example oil, the growing demand, and the gradual decline in discovering new amounts leads to higher prices already. The higher the oil prices, the more viable other alternatives like the exploitation of tar-sands get. However, the rising prices combined with the growing demand ask for a transition to cheaper and renewable resources (Noorman & De Roo, 2011).

The **third** reason, in the introduction 'the being self-supportive ideal' or: decreasing energy dependency, has also been an issue for quite a while; The oil crisis during the 1970s made clear that fuel supply is a geopolitical instrument (Noorman & De Roo, 2011). Shortly after the oil crisis, in 1974, EZ published its first white paper on energy in which renewables were mentioned as a way of diversifying energy sources, and decreasing dependency (Breukers & Wolsink, 2007; Verbong & Geels, 2007). The European Union (EU), while being politically relatively stable as well as geographically more extensive than the densely populated Netherlands, still is dependent on external supplies (EC, 2001). In 2001 about half of the energy the EU used came from outside the EU, and this percentage is estimated to rise significantly to about 70% in 2030. The European energy dependence has been an issue within European politics since the very beginning, in fact: "two of the three treaties establishing the European Communities are about energy" (EC, 2001, p.10).

The three reasons are presented here as clearly separated, however they are intertwined and are facetted themselves. The third workgroup within the IPCC acknowledges this; they state that the energy transition may not only contribute to both adaptation and mitigation to climate change. The policy measures that are taken, do not "necessarily [have to] be targeted at GHG emission mitigation" (Rogner et al., 2007, pp. 106-107). And indeed, the EU's motives for the energy transition are threefold; climate change, decreasing energy dependency and the future running out of fossil fuel sources (Gordijn et al., 2003).

Here three of the main reasons for the energy transition were presented, besides the envisioned effects of adapting and mitigating climate change, increasing security of energy supply, there are spatial consequences. These may or may not be desirable.

§ 2.1.3 The 1960s gas transition

As noted above, this energy transition is not the first, and probably will not be the last either. During 2010 the Dutch Advisory Council for Research on Spatial Planning, Nature and the Environment (Raad voor Ruimtelijk, Milieu- en Natuuronderzoek, RMNO) conducted a research in four processes relating to energy transitions. The Dutch transition of the 1960s that introduced the usage of natural gas in households nationwide serves as a benchmark for the other three (the developments in the fields of carbon capture and storage, off-shore wind and the use of waste heat are the other three processes). This transition is chosen, because it can be seen as a success from various viewpoints; i.e. policy making, decision making and policy realisation (RMNO, 2010).

In 1959 a huge amount of natural gas was discovered in the north of The Netherlands, the technology to extract natural gas was already known, and the only thing that had to be done was to access it and distribute it, resulting in a huge financial profit for both the government and the existing energy companies (RMNO, 2010).

Furthermore, in the 1960s nuclear power was seen as the technology for the future, therefore the policy was to exploit and sell the gas as quickly as possible, before it became worthless (Kemp, 2010; Correljé & Verbong, 2004; Verbong & Geels, 2007).

While it is true that the transition happened swiftly, within a decade 80% of Dutch households was connected to the national gas grid, Correljé and Verbong mention that it is too easy to give "all pointers simply stood in the right direction" (2004, p.116) as an explanation. The transition required the involvement of dedicated actors, both public and private that were willing to negotiate and put effort in the process. Correljé and Verbong give a clear account of the circumstances and developments during the transition. Three key dimensions are identified: infrastructure, institutional framework and the energy market. "The transition to a new system required a process of interrelated changes in these three dimensions" (Correljé & Verbong, 2004, p. 116).

The RMNO (2010) uses the same three dimensions to describe the transition (as Verbong was the only person interviewed by the RMNO on the subject of the natural gas transition, this is not surprising).

The following paragraphs give a short overview of the 1960s transition to illustrate the importance of the three dimensions, using Correljé and Verbong (2004) as the main source.

Before the time of the Slochteren discovery in 1959, gas had already been used from the 19th century on for (street) lighting. The gas that was used for this had to be made from coal and this was generally done by municipalities who produced and distributed the gas locally. After the introduction of electricity in the beginning of the 20th century, gas started to be used for cooking and warm water supply in households. Coal was the main source of energy, it was used to produce gas and electricity and for heating homes.

The production processes of the steel works, refineries and coal mines provided gas as a by-product and during the 1950s there were already some regional networks in place that distributed this gas. Despite efforts from the government the local and regional networks were not connected to each other: the quality of the gas varied too much for this and the producers of the gas were not interested either, as they each just wanted to sell their own gas.

Apart from this gas produced from coal there were also a couple of small natural gas resources that were exploited. This was done by the Nederlandse Aardolie Maatschappij (NAM), a joint venture between Shell and Exxon. NAM had acquired a permit to explore the Dutch soil for oil and gas. Natural gas was not a priority for NAM, as this was competing with their main business: oil.

NAM had a contract with the state gas company, Staatsgasbedrijf (SGB) stating that SGB buys and distributes all the gas the NAM produced "under the condition that NAM would run all gas fields and that it would sell the gas on a 'cost-plus'basis to the SGB" (Correljé & Verbong, 2004, p. 118). The enormous amount of gas discovered in Slochteren was too much for SGB to be distributed with use of the existing infrastructure; On top of that it theoretically meant that the NAM could bankrupt the Dutch government through this contract (Madsen and Stewart, 2007, p.65 in: De Jong, 2009).

It was clear that in order to distribute the gas in a viable way, the infrastructure and institutional arrangements had to be altered. Also the energy market would be influenced heavily, the already declining coal sales would be affected as well as the domestic oil market, as oil was used to heat homes.

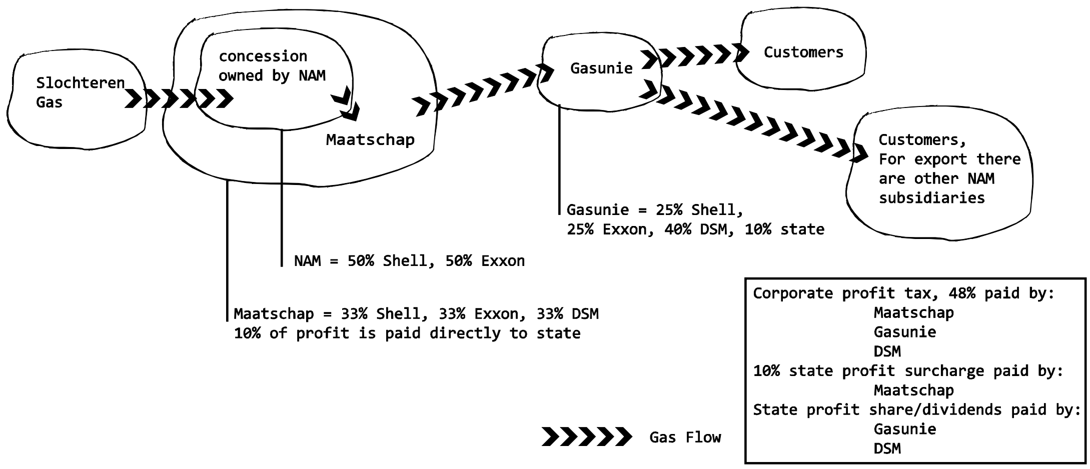
For each of the three dimensions, infrastructure, institutional, and energy market, suitable solutions were designed involving the most important public and private parties. The Dutch state was involved through the SGB, the private parties were involved through the NAM.

Regarding the energy market different models were proposed. Because of the experience of the people from Exxon in the United States a model was chosen in which the consumption of gas would be made possible and attractive to all the households. The gas was sold to 'small, but high-value' users that had to invest in the adaptation of their equipment themselves. Once they would be adapted to gas, they would have no alternative, ensuring a long term consumption of the gas. Prices were such that with an increase of the usage of gas the price per unit would go down. This meant that using gas only for warm water or cooking or heating was not as attractive as using gas for all these activities, this in turn meant that more of the gas was sold.

The institutional framework was adapted to a rather complicated one, see figure 2.1. In the process new companies were constructed and existing ones got new roles.

The Dutch state has the exclusive right to exploit resources in its soil; a concession is needed for companies to extract resources from the subsoil. Shell and Exxon, two large oil companies together formed the NAM, which produced the gas; the NAM included the concession in a society: 'maatschap', this would pay for the extraction and distribution costs, as well as Gasunie was founded in turn to distribute and sell the gas to distribution companies and paid for the construction and running of the infrastructure. In the end the state could collect circa 70% of the total revenues (Correljé & Verbong, 2004; RMNO, 2010)

Figure 2.1 Institutional framework Slochteren gas



The box outlines state income mechanisms. Source: based on info in Correljé & Verbong, 2004; RMNO, 2010.

The new institutional framework meant a big shift in the roles of public and private parties. Local public utilities ceased to play an important role while the national government became a huge player. Also, the role of private parties in the supply of gas was new.

And finally, for the infrastructure, Gasunie would pay for the infrastructure, first connecting the more densely populated areas and then using the profit from those areas to connect the less densely populated areas. The municipalities were asked to prepare their existing networks to the standards of the new gas. A lot of the people who used to work with the municipal gas service now refitted homes with new pipes, boilers, stoves and heaters. In 1968 the last municipality was connected, while work had only begun in 1962.

Although not much attention is paid to the spatial impact and/or consequences, insight can be gained in some success or fail factors as to how Dutch government dealt with the transition (RMNO, 2010). The impact from the gas transition on the landscape has been negligible in any case. Visible elements are compact and can be fitted in the existing landscape. The most notable effect has been subsidence above the natural gas pockets in some areas (Gordijn et al., 2003).

The RMNO concluded that the current energy transition process is not going as it should. The most pressing issues are thought to be the lack of a consistent governmental climate, and its main policy recommendation thus is: a coherent long-term vision that can be the basis of a regulatory framework.

The aspect that, compared to today's energy transition, worked out extremely well was the top down approach. In 1960 a strictly government led top down approach was still possible and the amount of stakeholders that were allowed to participate was deliberately kept small. The RMNO continues to conclude that the current situation is much more insecure and complex. However, 5 lessons from the 1960s transition are still deemed valid: 1) There is a need for a long term vision (institutional), 2) Stakeholders were able to agree on the way forward, 3) A strict control of radical policy change is a precondition (institutional), 4) For 'system innovation' small steps are not enough, and 5) The government (preferably in conjunction with private stakeholders) has got a special responsibility in creating a coherent approach (RMNO, 2010, p. 23).

§ 2.1.4 The problem with the current energy transition / policy stagnation as compared to the 1960s gas transition

With clear reasons for the energy transition, policies are put in place to achieve ambitious goals. Due to various reasons however, these goals are not easily met. The Dutch policy stating the ambitions is dealt with in detail in chapter 4, but from the introduction it is clear that there are some problems, there seems to be what the RMNO has labelled a 'policy stagnation' (RMNO, 2010). The characteristics of this stagnation are that the ambitions are time and again not realized, and when they are, it takes a considerable amount more time than initially planned for.

Comparing the current energy transition to the 1960s natural gas transition, some differences can be identified that favour the situation in the 1960s: the advantages of electricity from a renewable source over electricity from fossil fuels are not very apparent to the consumer: it is more expensive and the supply is not constant (Noorman & De Roo, 2011). Furthermore it does not involve a big improvement in comfort as did the switch from coal or oil fired stoves to central heating during the 1960s gas transition, which meant rooms could be heated quicker, without the need for a coal storage (and related dust and dirt) or oil tank.

The role of the government has changed too: in the 1960s the project could be led top down through a limited number of public-private-partnerships. Nowadays there is more unrest on the more volatile international energy markets and this is no longer an option (Noorman & De Roo, 2011).

There is resistance to the energy transition in general, and to the implementation of specific projects specifically. Part of the resistance stems from the questioning of the necessity for the transition in general, in turn tied to the question whether climate change should be dealt with by policy makers.

Furthermore the situation is (more) complex in the three dimensions identified by Correljé and Verbong (2004) and RMNO (2010): 1. Physical network, 2. Institutional framework, and 3. Energy market. The physical electricity network is probably not the biggest challenge; however the production facilities will have impact in the landscapes. In the 1960s there seems to have been a lack of attention for spatial consequences for a simple reason: there were few.

The institutional framework, aimed at liberalisation of the energy market is not geared towards effectively facilitating energy transition and/or renewable energy initiatives (Kemp, 2010; Verbong & Geels, 2006; Kern & Howlett, 2009). This thesis focuses on the spatial consequences and the resistance against them that may cause delays. These are mainly factors within the second dimension, the institutional framework. The policies looked at in chapter 4 present an overview of the current policies and ambitions and the institutional framework.

Section 2.2 Energy and Space

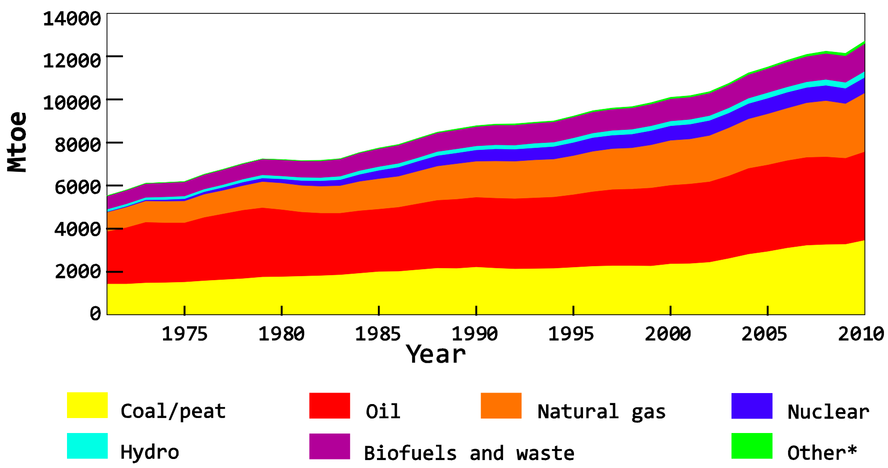
§ 2.2.1 The relation between energy and space

In the introduction it was stated that there was a relationship. There the argument was based on four articles dealing with windmills that were greeted with little enthusiasm by local inhabitants (Agterbosch & Breukers, 2008; Barry & Chapman, 2009; Warren & Birnie, 2009; Firestone & Kempton, 2006). Here I will go on to argue that the spatial impact of energy is both significant and diverse. In this subsection an overview of the relation between energy and space will be given.

Energy itself is a somewhat difficult concept. For this thesis general notion of energy is used: the usage of electricity or fuel is meant, also the production systems that are tied to this usage are in the scope of this thesis. The Netherlands Environmental Assessment Agency (PBL) in their quickscan (mentioned in chapter 1, Hoorn & Spek, 2010), automatically assumes the same, implying that this is a generally accepted way.

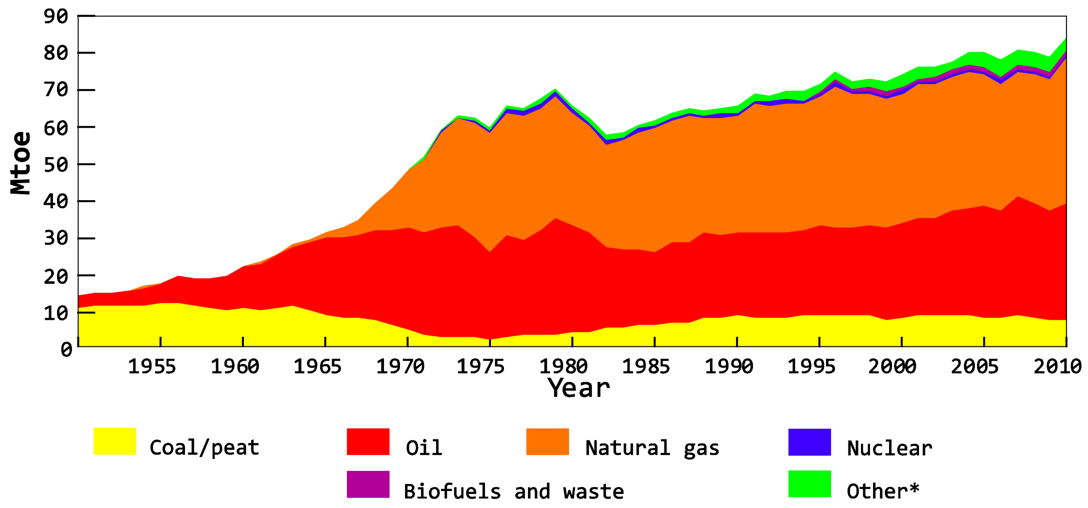
Mankind uses a lot of energy and on a global scale shows a trend that it is rising. In fact, as figure 2.2 shows in 2010 total global energy usage was more than double than that in 1973. The world's primary energy supply in 2010 consisted for ca. 80% of fossil fuels: oil 32%, coal/peat 27%, natural gas 21%. The remaining 20% is divided between nuclear 6%, hydro 2%, biofuels/waste 10%, renewables like geothermal, solar and wind make up less than 1% of the total primary energy supply (IEA, 2012). From these figures it becomes clear that there is a lot to gain for renewable energy sources. The figures for the Netherlands presents a similar picture; see figure 2.3. A similar division has been made using figures from Statistics Netherlands (Centraal Bureau voor de Statisitiek, CBS) (2013), 'Hydro' and 'Biofuels and waste' are not available as separate numbers in the historical series and are included in 'other' and separately as 'waste'. In 2011 the fossil fuels make up a little over 92%, Nuclear accounts for a little over 1 % while the 'other' category (including renewables) takes up a little over 5% 'waste' accounts for circa 1,5%).

Figure 2.2 World total primary energy supply 1971 to 2010 by fuel



Source: IEA 2012

Figure 2.3 Total energy usage The Netherlands from 1950 to 2010 by fuel



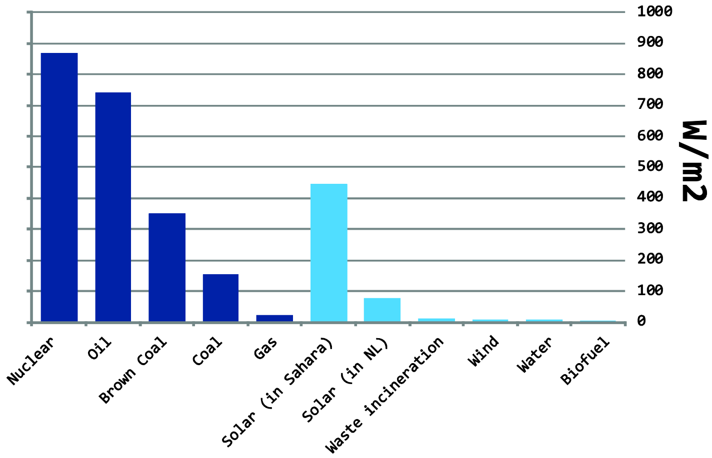
Source: CBS, 2013

The transportation of energy is spatially limited. Energy in the form of (solid, liquid or even gaseous) fuels and electricity can be transported without considerable losses over great distances. Stremke (2010) mentions a 10% loss for electricity when transported over 1000 kilometres. The transportation of heat however, is limited to 10 kilometres. Biomass, still having a low energy density should not be transported over more than ca. 50 kilometres (Stremke, 2010).

Where does all this energy come from, and how does it get to us? Our energy use manifests itself in various ways in space. Basically, somewhere an energy source is exploited from which the ‘energy carrier’ is transported to a production facility where the ‘energy carrier’ is either transformed to a different, more useful type (like the conversion of crude oil to gasoline), or converted to another type of energy (like electricity from coal). From this production facility often one or more additional steps of transportation are needed to get the energy carrier to the consumer. Al these production steps together form a set of locations which we can point to: sources, transportation routes, sinks (in the form of end-users as well as ‘conversion-points’). In some (most) areas the consumption of energy exceeds the production rate and in others, the production rate exceeds the rate of consumption. These areas can be labeled ‘sinks’ and ‘sources’ respectively (Stremke, 2010). Gaining insight in sinks and sources can be used on a regional level to identify possible connections between the two.

For different sources, different energy densities apply. In the Small Energy Atlas (Kleine Energieatlas) (H+N+S, 2008) these are presented for various types of energy, an overview is presented in figure 2.4.

Figure 2.4 Overview of power generated per area for different sources



Fossil, non-renewable sources are presented in dark blue, renewable sources are presented in light blue. Source: H+N+S, 2008.

In figure 2.4 the spatial impact of various energy production modes is presented. As can be seen, the traditional fuels, presented in dark blue, generally deliver more power per area (W/m^2). Some explanation to the figure is necessary, because the direct and indirect effects are not immediately clear from the figure. The distinction between direct and indirect effects is significant. Take for instance gas, the area used to produce/extract the gas (the directly affected area) is quite small, however because of the safety zones around transport pipes, gas still has got a significant impact (H+N+S, 2008), or as shown in figure 2.4: a low power per space ratio. A similar thing can be said about windmills and photovoltaic (PV) panels, the affected area is quite large, however, most of it can still be used (for example PV on rooftops, windmills on farmland).

Andrews et al. (2011) divide energy sources in three categories that reflect the orders of magnitude of needed land; category 1 being the least area intensive, category 3 being the most area intensive. The first category contains the non-renewables: nuclear power, coal, natural gas as well as the renewables geothermal and solar thermal. The second category, contains the fossil fuel petroleum, and the renewables

PV, hydropower and wind. The third category contains various biofuels, Andrews argues that these are "so land intensive that they can never become dominant energy sources" (Andrews et al., 2011).

Telling of the interpretative nature of the figures is the inclusion of petroleum (oil) in the second category. Andrews et al. (2011) base their categorization on the numbers given in McDonald et al. 2009, McDonald et al. estimate the 'plausible current and future levels of land-use intensity' for various energy production techniques in the year 2030, error margins are used to allow for the inclusion of the most-compact and least-compact estimates (McDonald et al., 2009), depending on how much of the error margin is incorporated, petroleum could be included in either the first or the second category. Andrews et al. base their categorization on the midpoints of these error margins.

§ 2.2.2 Spatial consequences of the energy transition

Besides the direct effects of energy production modes, there are indirect effects. One of the most important direct effects in a spatial sense is the footprint, which was shown above to vary between various modes of energy production. Indirect effects include the restrictions caused by the direct ones. For example in the case of a windmill: noise and shadow flicker. Besides the negative indirect effects, positive ones exist. Examples given by PBL are: advantages of proximity in case of a biomass plant depending on waste and 'image', the presence of a windmill gives a climate-conscious appearance (Hoorn & Spek, 2010, p. 25).

The energy densities as was shown by figure 2.4 thus differ significantly per mode of energy production, with the densities of fossil fuel systems being generally much higher. Not only the energy production densities differ, across space also the usage of energy is not evenly spread out. Urban areas are typically places with a higher energy usage density than agricultural or rural areas. The energy demand in urban areas typically ranges between 10 W/m^2 to 100 W/m^2 with high-rise buildings and some industries requiring up to 10 times that (OECD & IEA, 2009).

In this paragraph the relationship between energy and space has been shown. This paragraph thus gives some insight for answering the first research question: yes there is a relation between energy and space.

This is important to answer the question, what are the spatial consequences of the energy transition? As the energy transition primarily involves a transition towards energy sources that take up more space this will have consequences.

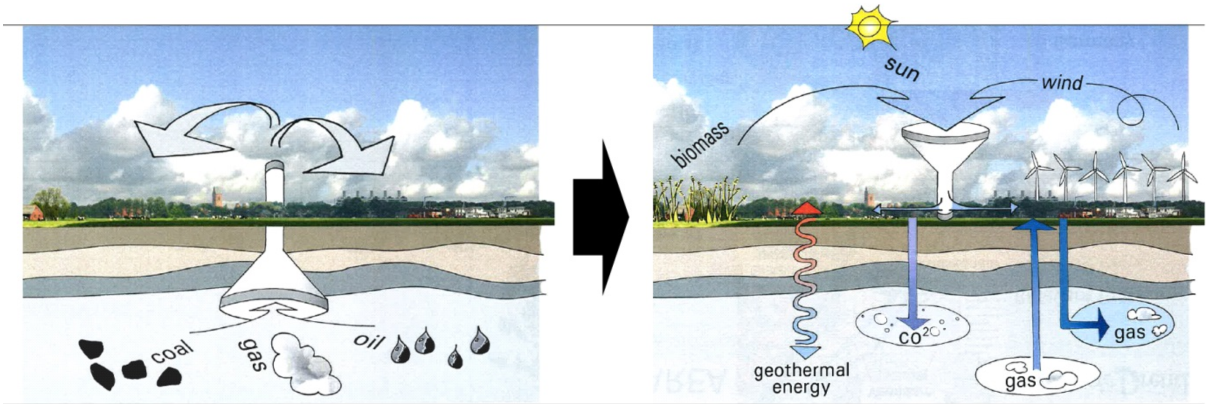
Spatial consequences of the current energy transition are described by Noorman and de Roo (2011). In their book they define a 'third generation' of energy landscapes. They argue that the first generation of landscapes tied human beings and their energy production and consumption to the available surface in a great deal. The second generation energy landscapes, the one incorporating fossil fuels had less to do with the surface. Now in the so-called third generation energy landscapes energy production will be visible on the surface/in our landscapes more and more (see figure 2.5).

In ancient history, energy production potential was directly linked to 'surface' activities. For example windmills; wood; growing crops for oil. This is what Noorman and De Roo call the first generation of energy landscapes.

With the industrialization, advancing of techniques and discovery of oil, coal and gas, our energy supplies moved out of sight of the general public. Gas and electricity come from wall sockets, invisibly transported to our homes. Petrol can be conveniently bought at gas stations. This is illustrated on the left in figure 2.5, the fuel stock lies below the surface, and only in few places it is exploited, this is what Noorman and De Roo call the 2nd generation of energy landscapes. During the first decades of the 20th century production of energy gradually moved from predominantly steam power to electricity. As innovations were made, the efficiency of generating electricity gradually went up from 15% in 1950 to over 40% in 2005 (Praetorius et al., 2009, p. 10). During this period of innovations, economies of scale caused production facilities to get larger and larger up until the 1980s. Both the technical and institutional designs of the electricity system were focused on this centralized approach of economies of scale. This lead to markets with few actors, or even state owned companies (Praetorius et al., 2009, p. 13). During the 1990s the EU asked its member states to liberalise their electricity market. This has led to a diminishing influence of states in the electricity market, and even to international takeovers and mergers resulting in the concentration of market power in a few former state companies (Breukers, 2006).

The right part of figure 2.5 shows the energy transition reconnecting the space around us with energy production. This is the 3rd generation of energy landscapes.

Figure 2.5 Change in energy supply



Source: presentation by the Province of Drenthe 2011.

Because of the lower energy densities that the renewable energy sources are able to generate (see figure 2.4), more space is needed. However because energy production can often be mixed with other usage, e.g. PV on roofs, windmills on farms or on industrial sites, the resources that are available within urban areas 'can usually be sufficient to make a significant contribution to the total energy demand' (OECD & IEA, 2009).

Together with paragraph 2.1 this subsection has answered the first research question: *Are there spatial consequences of the energy transition?* Yes, there are significant spatial consequences of the energy transition; more space is needed, more people will be confronted with energy structures.

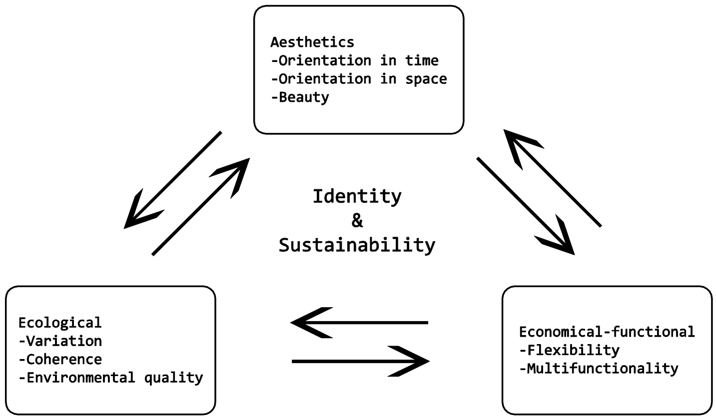
§ 2.2.3 Landscape quality

In order to answer research question 4: **In what way is 'landscape quality' taken into account in current policy making?** In this subsection a description of landscape quality is presented.

Landscape quality is relevant to look at because it is the one reason of objection against proposed wind farms that is most spatial. And it is considered to be the most important/underlying reason to objections (Agterbosch, 2006, p. 177)

Landscape quality can be described as the extent to which the landscape matches the needs of the users. The quality is higher as the match is better. By definition there cannot be too much quality (Van Zoest, 1994).

Figure 2.6 Landscape quality



Source Van Zoest 1994, p43

Three key aspects play a role in assessing landscape quality, shown in the triangle in figure 2.6: aesthetics, ecological and economical-functional. The introduction of a windmill in a landscape adds to the economic-functional aspect, and is argued to affect the aesthetics and ecological aspects in a negative way. It is in these two aspects opponents of windmill projects seek their arguments.

The ecological aspect deals with concepts like biodiversity and environmental quality. While these are important issues, also to policy makers, they are not directly related to spatial planning and therefore will not be discussed here.

The aesthetic aspect is arguably to an extent a subjective one. Landscape values are based on perceptions and only recognized by individuals. People differ in what they think is important in landscapes, part of what is important to people is culturally determined (Berry, 1975). Another difficulty in assessing landscape aesthetics is that experts look at different aspects separately as opposed to a holistic approach that inhabitants and other laymen tend to use (Rogge et al., 2007; Scott, 2002). This leads to a difference in the valuation of landscapes between groups of people.

As Craik and Faimer (1987) (as cited in Coeterier, 1996) stated: “the construct of environmental quality is multidimensional and complex”. So while experts do consider landscapes differently, through the practice of dissecting landscapes in order to value them, this is not necessarily the way ‘ordinary people’ value the landscapes surrounding them. People rather value landscapes as a whole, taking into account various aspects, combining them to these ‘multidimensional and complex’ constructs of landscape quality.

In this research the focus lies on two parts of The Netherlands where most of the landscape can be characterized as countryside. However, because of the relatively high densities in The Netherlands, this countryside too has to provide for a variety of functions other than the (often) traditional agricultural one (Coeterier, 1994). Thus a multitude of spatial claims is already present. This multiplicity of interests makes it almost impossible to garner a single perception of the landscape (Penning-Rowsell & Lowenthal, 1986).

What can be the benefits of landscapes that are positively valued? And are there any consequences to a negative valuation? In a report that serves as a basis for the Dutch landscape policy of 1992 done by Van Zoest (1994), the main reason for the conception of the policy seems to be the negative effects of the 'affluent society' that has marked the period after the Second World War. Due to developments such as urbanization, mobility increase, larger scale agriculture, etc. Landscapes across The Netherlands have significantly been affected (Van Zoest, 1994).

The perception (Van Zoest uses the Dutch word: 'beleving', which implies a somewhat more active form of perception, perhaps ‘experience’ is a better word) of landscapes had been found to strongly influence wellbeing and even health. Besides this experience, moral or ideological values (can) play a role.

Velarde et al. (2007) reviewed 31 studies that looked into the health effects of environments on people. In the study three main types of beneficial aspects that landscapes can impose on their perceivers from these studies were identified. These three categories were social, psychological and physical benefits (for a complete overview see Velarde et al., 2007). Although natural landscapes were on the whole regarded as yielding the most benefits, these were also, albeit at a considerable less extent, present in urban landscapes.

The multitude of claims mentioned earlier is nothing new to planners; one of the main challenges is to try to regulate spatial claims in such a way that the quality of places is as little affected in a negative way as possible by new interventions. As Couterier notes: “People are not opposed to change, they are opposed to a loss of quality; they seek to preserve qualities, not objects, and are not inclined to give up established qualities when new ones are not at least as good” (1996, p. 42). When dealing with infrastructure of any kind the question whether the extra noise, traffic, ‘ugliness’, etc. will weigh up to the benefits of better accessibility, more energy produced, etc. is one of the first challenges that come up.

A negative development in landscape quality can have negative effects on well-being and health. How exactly landscape quality is valued is a difficult issue and seems to differ amongst people. However because of the benefits that some environments have on people it is worth paying attention to landscape quality when new structures have to be included in the landscape.

Having illustrated the importance of landscape aesthetics as a background to the fourth research question, in chapter 4 the current policy on landscape quality is described.

Section 2.3 Conclusion

The question that has been answered (partly) in this chapter is the first question: what are the spatial consequences: the spatial consequences are a changing land use pattern, with new people being affected; more people will be affected by the presence of windmill/wind farms.

The Dutch government currently has a transition policy aimed at the implementation of the most cost-effective technologies in order to reach the European goals in 2020. One of the consequences is that the ratio between investment in research and current development is relatively low, which could be suboptimal in the longer term (Verdonk & Wetzels, 2012).

Besides the three dimensions identified in the 1960s transition to natural gas, another dimension has been identified: the impact on the landscape quality. People object to change in their environment, their objections seem to be channelled through 'landscape' arguments. Therefore in the empirical research this will be asked to the respondents to see to what extent this does affect the successful outcome of a project.

On the other hand as was shown in the first chapter, policy ambitions are pretty clear: a 16% reduction of CO_2 emissions by 2020. As concluded once more by the Netherlands Bureau for Economic Policy Analysis (Centraal planbureau, CPB) these are likely not to be met (CPB, 2013). Policy may be in a different phase than the actual transition is? To investigate two case studies of Dutch Wind farms are used. They have both been initiated under the National Coordination Regulation. One of them, the Drentse Monden windfarm, is in its early stages, the decision making process is finished for the other. In the next chapter (3) The methodology for the empirical part of this research is set out. In chapter 4 an overview of relevant energy, transition and spatial policies on different scale levels is given. Afterwards in chapter 5 the case studies are presented and a comparison is made.

Chapter 3 Methodology

In the previous chapter the theoretical framework was given from which some key conditions for a successful outcome of the energy transition have been identified. In this chapter the research methods used are outlined and motivated.

3.1 Research methods used

A set of three different qualitative research methods have been used; interviewing, questionnaires and literature analysis, in two case studies.

Initially the research was centred on wind farm the Drentse Monden (DM). During this phase of the research I conducted a total of 9 interviews with stakeholders. However, after the initial series of interviews was finished, it seemed interesting to compare this case study with another, contrasting one.

So, at a later stage, it was decided to include a similar set of respondents from the Noordoostpolder wind farm (NOP) project (see also § 3.3.1).

A slightly different approach was taken: first phone calls were made to the respondents in which they were asked if they wanted to cooperate. In case the answer was positive, a questionnaire was sent. This was done in hope of a quicker collection of responses. However, due to varying reasons per respondent I ended up doing 1 live interview and 3 telephonic ones as well as receiving 1 filled in questionnaire. Another questionnaire has been promised on multiple occasions, but to this date not received.

Interviews were chosen as a research method because from the start the important aspects are only known up to a certain level and because the personal view of the individuals is what we are after. The type of interview conducted is best described as a 'topic interview' (Baarda et al., 2005). A topic interview allows for the respondent to dwell on, or add, topics he or she thinks are important while at the same time making sure that all the topics that need to be considered during the interview are discussed, not necessarily in the order written down (Baarda et al., 2005). Topic lists (see appendix I) were made based on the information gathered from the newspaper articles gathered (see also § 3.3.1) and policy documents and scientific articles read.

Initially for the second case study the research method chosen was written questionnaires. Questionnaires can be used when the topics to be researched are somewhat clear. In theory they allow for a more structured gathering of data, lessening the amount of time needed to prepare and analyse data. Moreover respondents can fill in (parts of) the questionnaire when it suits them best. And lastly, the travel time otherwise needed for either interviewer or respondent (in the DM phase, I went to all the respondents) would be eliminated.

A possible downside of using a written questionnaire is that respondents are given a bigger responsibility. Not only do they need to sit down and put down their thoughts on paper, while it is often easier to talk about them (Baarda et al., 2005), the flexibility of a topic interview is gone.

Multiple case studies are suited for comparison when one wants to research a certain aspect that is present to a more or lesser extent in all the case studies, while the circumstances vary. Cases should be comparable (Baarda et al., 2005). My two cases are comparable in scale and type of intervention. Both are orchestrated under the RCR. And the type of landscape that is affected is comparable too. The differences between the cases are the local actors involved and the stage in which the decision making process is. So the things that are compared to each other are the success/fail factors in local policy and success/fail factors that might be learned from an earlier process conducted under the National Coordination Regulation (RCR). All of these can be useful input for other local authorities and the actors involved in future projects.

When interested in personal experiences the researcher can best ask them directly, either face-to-face or in written form (Baarda et al., 2005).

3.2 Qualitative nature of research

According to Bryman (2008) there are three distinctive features set qualitative research apart from quantitative research: an inductive view of the relationship between theory and research, an interpretivist epistemological position and a constructionist ontological position (Bryman, 2008, p. 366). This research recognizes these features, and therefore the qualitative approach is consistent with these features. Qualitative research is research that is not focused on exact figures, but more on "qualities, perspectives, experiences, perception and interpretation" (Baarda et al., translated from Dutch, 2005, p. 12).

Data gathering in qualitative research adapts itself as much as possible to the situation of the respondent, this involves flexibility i.e. not a rigid structure, and this improves the quality of the data (Baarda et al., 2005). Using semi structured interviews allows for respondents to give their own opinion and go off the point on matters they think are important, this allows for two opposing views by two respondents; a constructionist ontological position. An interpretivist epistemological position is also taken, in processes with various actors, such as the case studies, the 'truth' researched is the 'truth' constructed by the individual actors. Lastly, an inductive view is partly adopted; trying to come up with answers through analysis of case studies, theory building is not the goal of this research, giving a little more insight in how the spatial policies could facilitate the energy transition is.

3.3 Respondents

To gain insight in what stakeholders play a role in the DM project a basic stakeholder analysis was done.

A stakeholder analysis is used to get 'an estimate of the "population" of key stakeholders who are affected by and affect the policy' (Dunn, 2004, p. 121).

Using LexisNexis articles containing 'drentse monden' were sought in all the Dutch newspapers. This yielded a total of 386 articles. Narrowing the query with 'wind!' ('!' is the wildcard character used by LexisNexis to include also words like 'windpark, windmolen en windmolens'), diminished this to 207 articles. Through the option in LexisNexis to filter duplicates out, a more manageable 100 articles was achieved. The first relevant article was dated at 4 Januari 2011, making the timespan a little under two years: from 4 Januari 2011 to 6 December 2012, the date of the query in LexisNexis.

All of the documents were read and actors and their statements were highlighted and put into an excel sheet. A list with all the actors mentioned in the 100 newspaper articles resulted. The ones that were mentioned most frequently were the first actors to be contacted; they were given a short explanation of the research and asked for a one hour appointment. Some of them agreed to this, others referred to colleagues who they thought were more appropriate to answer my questions. During the interviews respondents were also asked if they knew of other actors that were major stakeholders. In the end a set of respondents, believed to be a representative crosscut for the DM project was selected and interviews were conducted. This set included people from municipality, province, national government, local action groups, local inhabitants and the initiators of the project (see table 3.1).

For the NOP respondents a similar set of respondents were contacted: people from municipal and provincial government levels, initiators, opponents. The national government level was left out in this instance as the person interviewed during the DM interviews was responsible for the RCR projects in a more general sense of which the DM project was one, actually the NOP project was mentioned in that interview as well. An overview of the respondents name, role and response is given in table 3.1.

Table 3.1 Overview of respondents in alphabetical order, per project.

Pro-ject	Name	Role	Name of organisation	Type of response	Date of Interview /Response
DM	Peter Bennema	Local affected foundation	Astron	Interview	19-12-2012
DM	Henk Brink	Municipality	Gemeente Borger-Odoorn	Interview	10-01-2013
DM	Almar Bruin	Ministry of EZ	RCR Coordinator Drentse Monden	Interview	21-01-2013
DM	Henk Bulder	Local affected inhabitant	Ex-Platform Storm	Interview	10-01-2013
DM	Eddy Diekema	Province	Provincie Drenthe	Interview	24-01-2013
DM	Jan Feiken	Action group	Platform Storm	Interview	23-01-2013
DM	Harbert ten Have	Initiator	Stichting Duurzame Energieproductie Exloërmond	Interview	25-01-2013
DM	Arthur Vermeulen	Initiator	Raedthuys	Interview	4-10-2012
DM	Rob Rietveld	Action group	Tegenwind Veenkoloniën	Interview	28-01-2013
NOP	Hans van Engelenburg	Municipality	Gemeente Noordoostpolder/Royal HaskoningDHV	Interview on the phone	10-7-2013
NOP	Anne de Groot	Initiator	Ventolines/NOP Agrowind	Interview on the phone	12-9-2013
NOP	Leen van Loosen	Action group	Urk Briest	Questionnaire	16-8-2013
NOP	Anno Vuuregge	Province	Provincie Flevoland	Interview	19-7-2013
NOP	Ine Margriet Westhoff	Municipality	Gemeente Urk	Interview on the phone	9-8-2013

3.4 Analysis of data

Permission to make audio recordings of the interviews was asked and given in all cases. Transcriptions of the interviews were made and these were analysed using Nvivo. In the case of telephonic interviews, a report was written up and send to the respondent in order for them to be able to check whether my notes had been correct. The reports and the answers to the filled in questionnaire were included in the same Nvivo dataset.

The coding process is an iterative one. The coding scheme that was achieved in the end can be found in appendix II

In chapter 5 the results from the research described here are presented. The next chapter presents a review of the current policies that are important for the DM and NOP projects as well as the energy transition in The Netherlands as a whole.

3.5 Limitations of the research

Each research methodology has its advantages and disadvantages. The characteristics of the research methods used here are such that because of the constructivist ontological position, each actor influences the process and is influenced by the process in turn. Therefore each process is unique and claims as to what does and does not work should not be seen as true regardless of circumstances. However, because the two case studies represent similar projects in different settings, some success and fail factors can be identified. Both in the individual wind farm projects themselves and the wind farm projects as part of the energy transition on a national scale.

Chapter 4 Current Policy

This chapter consists of 2 sections. In the first the policies that affect both the case studies and energy transition from the Dutch perspective are presented. The second part of the chapter presents the German case, which is often seen as a good example for the energy transition from a policy point of view

Section 4.1 The Netherlands

In this section the policies that are important to this research and relevant to the study cases are presented. This is done starting at the highest scale level, the global level, then zooming in through European, national, regional respectively to the local level.

§ 4.1.1 Supra-national Policies

On a global scale the Kyoto protocol drawn up in 1997 amongst the members of the United Nations Framework Convention on Climate Change (UNFCCC) was one of the first major agreements amongst governments worldwide—in 2006 165 countries had ratified the protocol—to reduce the impact of mankind on the climate (Rogner et al., 2007). The ultimate goal of the protocol is stated in Article 2 of the UNFCCC: "to achieve […] stabilization of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UN, 1992).

The Kyoto protocol, together with the 1987 World Commission on Environment and Development 'Our Common Future' i.e. Brundtland report as mentioned in section 2.1.2 and the findings of the Intergovernmental Panel on Climate Change over the last decade have been mostly 'agenda-setting'. Of the three, the Kyoto protocol has got the most direct influence on Dutch policy. In 1993 The Netherlands joined the UNFCCC and agreed within an European Union (EU) framework to reducing greenhouse gas emissions (UNFCCC, 2008).

Europe

On a European scale level there are policies on various aspects of this research which trickle down to The Netherlands. There are policies on all three main reasons for the energy transition, i.e. climate change, energy security and autarchy/decreasing dependencies on geopolitical relationships. The European Directive 28 of 2009 contains agreements with member states that include binding targets to be reached concerning the 'share of energy from renewable sources in gross final consumption of energy in 2020' (EC, 2009). Through this directive, The Netherlands' target is 14% (Annex 1, EC, 2009). As an illustration to the intertwinement of the reasons behind policy ambitions for renewable energy the first article of the directive serves as a good example. Not only does it contain references to energy security and environmental concerns, also opportunities are seen for technological innovation, employment and regional development:

1) "The control of European energy consumption and the increased use of energy from renewable sources, together with energy savings and increased energy efficiency, constitute important parts of the package of measures needed to reduce greenhouse gas emissions and comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and with further Community and international greenhouse gas emission reduction commitments beyond 2012. Those factors also have an important part to play in promoting the security of energy supply, promoting technological development and innovation and providing opportunities for employment and regional development, especially in rural and isolated areas" (EC, 2009).

As mentioned in chapter two, the European Union deals with energy from its very start (EC 2001), moreover, environmental policies are another of the key pillars of EU law and policy. Besides sustainable development, integrating environmental concerns in all other areas of policy are the two basic EU policy principles on environment (Massai, 2012). This includes policies on clean energy.

Lastly on an EU level, the European Landscape convention states that the landscape is important in respect to 'cultural, ecological, environmental and social fields' and it is important to protect it, not the least because it can provide jobs (CoE, 2000). Moreover, the Council of Europe recognizes the influence of landscape on the well-being of people. The European Landscape convention urges member states to identify the key qualities of their landscapes, and take care to protect these.

§ 4.1.2 National Policy

From the higher scale levels some of the ambitions, like reduction in CO_2, for the Dutch government are derived. In this section the most important Dutch policies are outlined. In the Netherlands the energy transition falls under the responsibility of different ministries. Energy is mainly the responsibility of the Dutch ministry of Economic Affairs (EZ), while the Dutch ministry of Infrastructure and Environment (IenM) is responsible for all the spatial permits.

There is already quite a track record of various policy initiatives that have lead up to the current situation. As an indication of the amount of policies: an overview of policy Dutch policy measures between 1976 and 2002 on just wind energy given by Breukers (2007, p. 100) already includes 15 of these.

Only the most important and current ones are dealt with here.

Schoon en Zuinig

Through the governmental ambitions set out in the working programme Clean and Efficient (Schoon en Zuinig), the Dutch national government is dealing with CO_2 reduction. Part of this will have to come from changing the energy mix: the sources used should change. Partly due to international and European obligations and partly due to national ambitions the Dutch government has formulated ambitions to reduce CO_2 emissions in 2020 to levels that lie 30% lower than the 1990 values. On top of that 20% of the energy production should come from renewable sources (Hoorn & Spek, 2010; VROM, 2007).

In the Fourth National Environment Plan (NMP4), transition management was first introduced as was described in chapter 2. In NMP4 ambitions were formulated in order to get to a sustainable energy system. Amongst other efforts, the usage of renewable energy had to grow to 10% in 2020. The 2002 energy report translated these ambitions to the realm of energy policy. In the energy report, the separate policy fields of economic affairs and spatial planning were identified as possibly interfering with each other. Research was to be carried out in order to identify whether or not sustainability processes were hampered by this divide and how this could be improved (EZ, 2002).

One of the improvements made is the application of the National Coordination Regulation (RCR) in renewable energy projects, which is discussed below.

In the 2011 energy report, on-shore wind energy was identified as one of the most viable options to realize a significant amount of renewable energy production by 2020. It was stated that in 2020 48 PJ (Peta Joule) could be produced. This means having an installed capacity of 6000 MW, which consequently forms the ambition for the Dutch government (EL&I, 2011).

Electricity law, RCR

Policy on electricity is made by various ministries, this is because of the multitude of interests, concerns and actors involved (Breukers, 2007, pp. 66) In the Netherlands the EZ ministry is responsible for the electricity law. Together with the ministry of IenM the minister of EZ is responsible for RCR. Through this RCR the national government has got the power to introduce projects with national importance, this includes energy producing projects that are projected to have an installed capacity of 100 MW or more. In such a situation there are 3 levels of government involved; national appointing the place for the facility, provincial to provide the permits and municipal to provide the zoning plans. This means that the national government takes a coordinating role so that permits and other documents are prepared in a coordinated manner. The local and regional governments remain responsible for these, as they are the ones still issuing the permits.

SVWOL

As of yet (December 2013) there is no national spatial framework on wind energy. However, a structure plan on on-shore wind (SVWOL) is in the making: the environmental impact assessment procedure for the plan is currently being done (Commissie mer, 2013).

In the proposed document the Dutch government acknowledges the fact that the ambitions for wind energy will take up more and more space in the near future. At the same time, it is argued, the effort is needed as European environment goals need to be reached and wind energy is one of the most cost-effective ways to increase the share of renewable energy. Because of the nature of the wind farms, a couple of policy principles are formulated: concentration, large scale, and a selection of suited sites (IENM & EZ, 2013b). The concentration in a restricted number of sites decreases the spatial impact on a national level. Through projects with substantial size, significant leaps can be made towards the national goal. Lastly, the selection of suited sites is done by the government taking into account structure of the landscape, and current rules and regulations. At the same time the government acknowledges that even though the planning should be done very careful, wind farms will always have a significant impact on landscapes and surroundings of local inhabitants (IenM & EZ, 2013b).

§ 4.1.3 Regional Policy

On a regional level, the provinces make their own structure visions which usually include bits on wind turbines (IenM & EZ, 2013). Through an interprovincial agreement in 2013, the provinces have committed themselves to making sure the goal of 6000 MW can be reached by 2020, see table 4.1 for the amount of megawatt each province has dedicated itself to.

Table 4.1 Commitment of provinces installed capacity in 2020

Province	Megawatt
Drenthe	280 MW
Flevoland	1370 MW
Fryslân	525 MW
Gelderland	210 MW
Groningen	850 MW
Limburg	60 MW
Noord-Brabant	420 MW
Noord-Holland	580 MW
Overijssel	80 MW
Utrecht	60 MW
Zeeland	550 MW
Zuid-Holland	730 MW
Total	5715 MW

Source IenM & EZ, 2013

Every province has got its own policy on wind energy, here the provinces relevant to the study cases are dealt with: Drenthe and Flevoland. Drenthe has committed itself to 280 MW whereas Flevoland with its more suitable geography has committed itself to an impressive 1370 MW.

Drenthe

The Province of Drenthe drafted their second provincial structure vision (Provinciaal Omgevings Plan, POPII) in 2004, following the first provincial structure vision, POPI, from 1998. In POPII the energy transition and Drenthe's role in it was mentioned, wind energy being one of the issues. According to POPII Drenthe would have to develop 15 MW of installed capacity, this would be done in a wind farm in Coevorden (Provincie Drenthe, 2004). It was also recognized that wind turbines with heights exceeding 80 metres would have a significant impact on the landscape. Therefore some guidelines were introduced, wind farms would only be allowed in areas where there already had been a significant disturbance of the landscape and in such a way that they would not deteriorate the quality of neighbouring landscapes insofar this was a key quality of the area (Provincie Drenthe, 2004, p. 188). In principle there would not be any cooperation with any wind farms except for the Coevorden one, unless this was necessary to reach the renewable energy target.

In the plan following the POPII, the Omgevingsvisie Drenthe from 2010 the ambitions of Drenthe had risen to 60 MW of installed capacity in 2020 (Provincie Drenthe, 2010). Besides the Coevorden area, now also the former peat-colonial-area was mentioned as a possible location for wind parks.

As shown above (see table 5.1) in 2013 the ambition of Drenthe has been heightened to 280 MW. Together with the four municipalities that are designated as a 'search-area' the province has made a regional vision on wind energy (Provincie Drenthe et al., 2012), this document will be discussed below under local policy, as it also details the local policy of the Borger-Odoorn Municipality.

Flevoland

In the 2000 provincial vision, wind energy was favoured by the province of Flevoland, there already was an installed capacity of 94 MW, and the province was prepared to allow at least 250 MW, taking into account various factors. The policy was aimed at development at as few places as possible, in order to disturb the openness the least. Already the Noordoostpolder was designated as an area in which it was not allowed to build, except for the western edge (Provincie Flevoland, 2000). Apparently in Flevoland policy in favour of wind turbines has led to a situation that called for a stop on new wind turbines in 2005 (Provincie Flevoland & Arcadis, 2011). The policy had been so successful that the landscape was perceived as overfull. In the 2006 provincial vision (Omgevingsplan 2006), the province acknowledged this, and introduced a policy called 'up scaling and sanitation' (Dutch: opschalen en saneren) (Provincie Flevoland, 2006). It would entail a reduction of 40% in the number of turbines, combined with an increase of installed capacity. This was possible through the use of more advanced turbines. In the Noordoostpolder, the proposed projects that were already on the map in 2000 were exempt from this arrangement; they were still in the preparation phase.

§ 4.1.4 Local Policy

Borger-Odoorn

As mentioned above, the province of Drenthe has drafted a regional vision together with the municipalities involved in wind energy in Drenthe. For Borger-Odoorn this was a recent development. In their vision for 2018 from 2009 (Gemeente Borger-Odoorn, 2009), there is no mention of wind energy whatsoever. The paragraph dealing with sustainability, energy and climate does mention improving the sustainability of the local energy system, but aims to do so through the use of bio-mass. The situation in the structure vision that was put in place in January 2011 was not much different; the municipality by now knew that parts of their area were designated as 'search area' by the province and the national government. However, the municipality felt that a wind farm with 80 to 200 turbines was too much for the area, pointing to a possible increase in the population decline (Gemeente Borger-Odoorn, 2010). In the above mentioned regional vision on wind energy (Provincie Drenthe et al., 2012), the position of the municipality on wind energy has not changed much, however together with the other municipalities and the province a more cooperative approach has been sought. Pragmatic constraints such as low-fly zones are included and a vision on how wind parks could be designed is included. In total the four municipalities and province are prepared to allow 280 MW installed capacity in the designated areas (Provincie Drenthe et al., 2012).

Noordoostpolder

The municipality in their structural vision acknowledges that the national government is realising wind park projects on the west side of the polder. Because of the size of these developments, wind turbines are not needed elsewhere in the municipality (Gemeente Noordoostpolder, 2013). The municipality is willing to allow small turbines (height max 15m) on properties of farmers, but under the current up scaling and sanitation policy of the province, this is not allowed (Gemeente Noordoostpolder, 2013). In 1999 the Noordoostpolder municipality already had fixed the location for the current developments in their ‘Nota integraal beleid windenergie’ from februari 1999 (EL&I & I&M, 2010).

Section 4.2 Germany

The policies used in Germany to address the energy transition have arguably resulted in a more successful approach (see for example Bruns et al., 2011; RMNO, 2010; Breukers & Wolsink, 2007; Toke et al., 2008 and Praetorius, 2009). As lessons could perhaps be learned, Germany’s approach is described here, the next few paragraphs will address the major differences between the German and Dutch current transitions.

In their book 'renewable energies in Germany's Electricity Market' (2011) Bruns et al. describe the 'innovation' process through a 'constellation analysis'. From the introduction their opinion of the German energy transition immediately becomes clear: “Germany […] has been an influential forerunner in the deployment of renewable energies on a national scale, […] The applied research project […] tracked and analyzed this widely noted success story" (Bruns et al., 2011, p. 1).

Breukers (2007) and Toke et al. (2008) have made comparisons including both (parts of) Germany and The Netherlands.

Breukers (2007) has made a comparison between the German land 'North Rhine Westphalia', England and The Netherlands and in this comparison shares Bruns' view that the German case is successful:

> "In the early nineties, the Netherlands was the third wind power country (behind the US and Denmark). However, […g]rowth stagnated and the turbine manufacturing industry withered away. In contrast, Germany's growth in installed capacity increased rapidly after 1991. Within a few years, several German states had surpassed the Netherlands" (Breukers, 2007, pp. 71-72).

Toke et al. (2008) have made a comparison between 6 country cases including Germany and The Netherlands. One of the determining factors in the more successful deployment of wind energy is the presence of a reliable and consistent procurement system. In the Netherlands the rules and regulations have changed a couple of times and this does not help investors in their decision making. The German system has of guaranteed feed-inn tariffs has been in place for almost two decades now and has been actively defended, even in court, by the German government (Toke et al., 2008).

This feed-inn tariff system has been a great success from a policy point of view, together with other subidies it resulted in a lot of investment capital. The projects realised with this money caused the "electricity generation from renewable energies [to] more than double […] between 1999 and 2006 (from 30.5 to 70.4 TWh)" (Praetorius et al., 2009, pp.15-16)

Another difference between the German and Dutch case which could be one of the reasons of the comparative success could be the planning system. Toke et al. (2008) state that on a general level the high rate of wind power deployment could be because of support from the planning system. They show that in the Dutch system 80% of the initiatives for wind power do not get planning approval by governments, it must be noted that "most of these failures occur […] at an informal level" (Toke et al., 2008, p. 1134);

whereas the German planning system dictates local councils to designate suitable areas for wind development, in addition to that, when local councils fail to do so, developers can build wind farms where they want outside build-up and designated areas (Toke et al., 2008).

Finally, one could argue that The Netherlands is densely populated, this is also the case for some German states. North Rhine-Westphalia for example is also densely populated and it is 'one of the three forerunner states in wind energy in Germany' while it also has less favourable wind-conditions, the installed capacity is still considerably higher than in The Netherlands (Breukers, 2007, pp. 72).

So it appears that the institutional setting in Germany is more favourable to renewable energy deployment than in The Netherlands. The planning system requires designation of suitable or preferred areas on a regional level and the subsidy system in place has been stable and reliable in Germany unlike in The Netherlands. Economic incentives are definitely important, Toke et al. even state that without them, there will be no wind power development, and have been in place both in Germany and in The Netherlands since the 1990's (Toke et al., 2008). However they are not sufficient (Jobert et al., 2007) planning regulations have also been vital to the large-scale deployment of windmills in Germany. Not only through allowing wind-farm developers to build, but also through giving local authorities a way to appoint places that suit them well. In interviews done by Jobert et al. this was seen as having "reduced [the] fear of uncontrolled growth and increased acceptance" of wind parks (Jobert et al., 2007 p. 2753).

In a study that compared approaches commissioned by the Dutch government it one of the conclusions is that 'a government that actively conveys its policies, like Germany, can count on more cooperation from regional or local governments' (B4-Werkgroep, 2004, p. 126).

The German story has been successful so far, but even there the project slowly gets more and more criticism: "wind power gave rise to public debate as acceptance of wind turbines decreased during the expansion phase. These challenges were countered by policies from state actors at the regional and local level" (Bruns et al., 2011, p. 261).

In Germany the local inhabitants that are directly affected by the wind turbines have become more critical. The debate on new projects is increasingly emotional and focusses more and more on hinder and possible impacts on health. Other arguments now used against wind turbine developments include "impacts on the overall appearance of the locality and landscape (looking "out of proportion"), high land usage, bird strikes and the disturbance or displacement of bird species and bats […, and] possible losses in value of real estates neighboring wind turbines" (Bruns et al., 2011, p 285).

The German feed-in tariffs in have also lost support over the last couple of years (Toke et al., 2008).

Bruns et al. (2011) do come to the conclusion that there have been several key factors to the actions of the government during the transition so far. The main ones are 'phase-specific adjustment of policies', 'recognizing and limiting unintended outcomes in a timely manner', 'integrating levels of action and actors', 'synchronization-based policy' and 'coherent policies in complex constellations'.

At the same time however, Bruns et al. (2011, p. 389) warn that 'policy cannot 'breed' innovation'. Government can, and should, set up a framework in which innovation can take place. This includes making it possible for small firms in 'niches' to develop.

The German energy transition has seen more success so far than the Dutch one when it comes to installed wind power capacity. The developments have gone more quickly, mainly due to policies and the national government actively presenting and defending its policies.

Chapter 5 Case studies

In this chapter the two case studies are presented using the data gathered in my research, as well as some background information. First the Drentse Monden (DM) case study is introduced and then the research questions 2–5 are discussed for DM using the interviews as the source. The chapter ends with a comparison between the two case studies amongst each other, and a comparison of the Dutch and German situation. This is the basis for answering some of the research questions in chapter 6.

Section 5.1 DM

§ 5.1.2 Drentse Monden description

The Drentse Monden wind farm is actually a combination of two initiatives, one by Raedthuys Windenergie BV and the other by 'Stichting Duurzame Energieproductie Exloërmond' (DEE). Raedthuys is an electricity producer that focuses on the exploitation of renewable sources like wind and photovoltaics. Raedthuys has been developing wind farms since 1995 (Raedthuys, 2008). DEE is a corporation founded by local farmers that together will develop and exploit wind turbines on their own land.

Figure 5.1 The current landscape in the Drentse Monden area

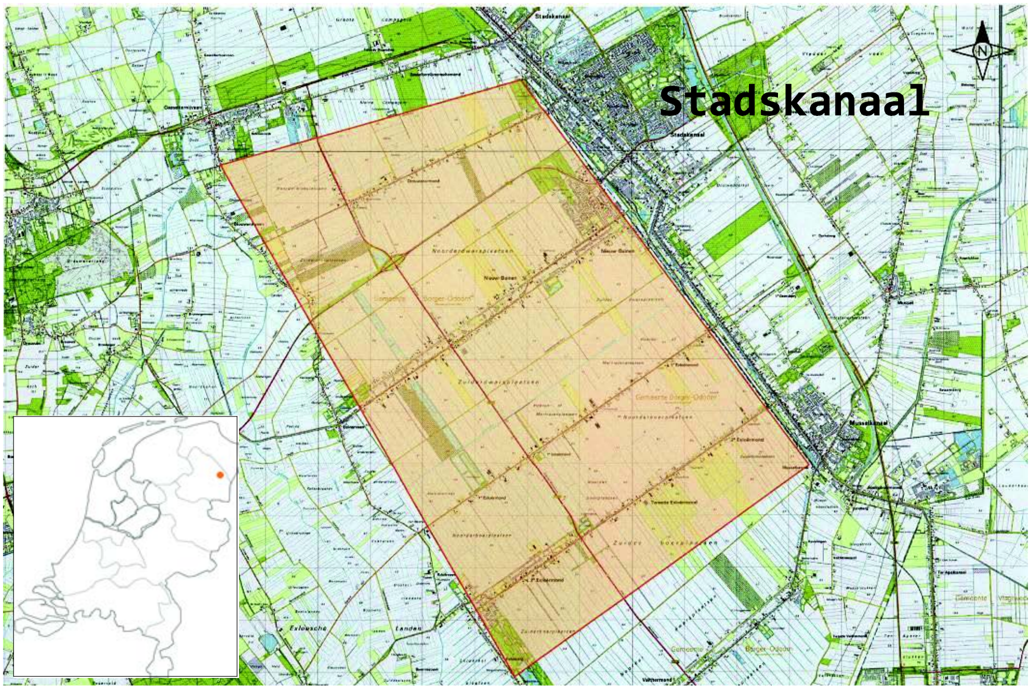
The two initiators both develop their own wind farm, Raedthuys in the north part of the area and DEE in the south part. Together they will look like one from an environmental and landscape perspective and thus are considered one under the name ‘De Drentse Monden’ (DM) (Pondera, 2011) the combined wind farm aims to be of considerable size: between 300 MW and 450 MW is what is aimed for (Pondera, 2012). Because of their proximity, the farms will look like a single one, also from an environmental point of view. The initiators have chosen to combine their efforts in the required legal procedures like the environmental impact assessment (EIA). Eventually both wind farms should get their own permits and will be exploited by the two initiators separately (Pondera, 2011).

The project is located in the east of the Province of Drenthe is the former peat colonies area. At the end of the nineteenth century, most of the peat had been extracted and the area developed into an agricultural area (Eggens, 2005). When looking at the map the characteristic shape of the built-up areas is noticeable: due to the former peat extraction activities, narrow, stretched villages have developed along the roads. These long villages can stretch out over a couple of kilometres while having only one or two parallel streets for the entire length of them (see also figure 5.3). The area can be characterized as agricultural, having vast open spaces as illustrated by the photos in figure 5.1 and 5.2.

Figure 5.2 Large scale agricultural landscape in the Drentse Monden area

A couple of initiatives have been started by local farmers to develop wind farms in the area. In the whole area a total of ca. 700 MW installed capacity has been drawn up in various plans. DM is one of the bigger initiatives with 300 MW to 450 MW.

Figure 5.3 Location of wind farm De Drentse Monden



The shaded area is the global search area. Source: Pondera, 2011.

For wind farms of this size an EIA has to be done. Before such an EIA can be done, a 'start document' stating what should be analysed and to what detail. In turn, this document can then be commented on by people who have interest in the project. In the case of DM 1080 unique official comments were submitted by local governments, inhabitants and other organizations (BEP, 2011). The high number of comments shows that there are a lot of doubts about a wind farm of this size in this particular area.

At a later stage, other wind farms were proposed in the proximity of the DM wind farm, another one in the province of Drenthe, Oostermoer (OM), and one just across the border in Groningen, N33. Because OM is in the same province, and they together affect the former peat colonial landscape, it is located directly to the north-west of the DM project, it has later been decided that the EIA is done for DM and OM combined (Pondera, 2012). For this new EIA a new start document was made, and new comments could be given. Comments already given for DM separately did not have to be made again. In this case

2052 views were presented, of which 645 unique comments (BEP, 2012); this might indicate the local action groups having gained momentum in the meantime.

The project has been met with quite some resistance is clear from above comment figures, in addition to that however, each farm has seen one or more protest groups against it come into existence.

Because of the intended scale of the wind farm, the National Coordination Regulation (RCR) is applicable.

This case, with the RCR applied and having private initiators as well as a lot of comments opposing the project matches the situation sketched in the theoretical chapter. Below the key findings are presented. Respondents are not mentioned here in conjunction with statements, due to request of anonymity by some.

§ 5.1.2 Responses

For the Drentse Monden project a total of 9 interviews were done (see also § 3.3). During these interviews the topics listed in appendix I were used as a guide during the interview.

Opponents views

The opponents of the wind farm, the residents, local governments, action groups and affected organisations have a lot of arguments against the proposed project.

One of the main arguments of opponents in the area is that they question the sustainability of the wind turbines, stating that their return on investment is negative after the 15 to 20 year lifespan is over. Other arguments against the wind farm are a inconstant energy production; "when all wind turbines are producing full power we have to sell the surplus power."

In general the need for wind turbines in the reduction of CO_2 is questioned. Opponents claim that there are alternatives which are not given a proper look.

Local inhabitants and action groups say that the discussion is now an economic one, which they feel it should not be while it is affecting people's area of residence so heavily.

Other negative consequences mentioned are:

- Reduced liveability of area (and attached to that fear of depreciation of dwellings, an increasingly declining population with all the related consequences for the local businesses, and tourism).
- Impact on health, due to low frequency noise. The safety and hinder zones should be much larger. Also the noise levels allowed under new legislation are deemed too high.
- It also affects birds and bats in a negative sense.

Perhaps the most important consequence of the proposed wind farm is the social impact. Socially, tensions are created. Part of the population (farmers) are actively involved and have their role as initiators, while other inhabitants are opposed and feel these farmers, who are also their neighbours, do not care enough for them. This is a concern to all and also mentioned by policy makers and initiators. These social tensions have already led to small acts of vandalism and threats. Local inhabitants fear that this might get worse.

The initiators acknowledge that stress causes health problems and that some people are stressed by the whole process. According to the initiators, scientific studies however do not find a causal relation between health effects and wind turbines. And that the rules and regulations set out by the government should take care of a safe environment for people. If there are clues that the low frequencies are indeed bad for health, this should be reflected in the hinder zones required by law, research should be done and the norms should be adjusted. Opponents claim they do have access to research from the US, Australia and New-Zealand that indicates that there is a relation. Shadow flicker and noise are also mentioned by initiators; they feel that these are covered adequately by the EIA studies.

Another consequence is that due to windmill projects, other projects are hindered, for example the Astron Low Frequency Array for radio astronomy (LOFAR). At the moment research is being done to find out to what extent the electromagnetic radiation caused by the wind turbines will affect LOFAR. If this is to an unacceptable extent, wind turbines will not be placed in those areas.

Another aspect that is questioned by opponents is the choice for the DM area; in contrast with a proposed highway or railroad going from A to B there is no perceived need to put the windmills in a specific area. Local government and opponents of the park argue that offshore is the place to put the windmills. The local initiators feel that they have a good site and argue that the national government has designated their area as search area for wind farm developments. The argument of the national government for the development of wind on land is that it is easier and cheaper in the short run.

Initiators, and it is felt that this is also the fault of the province that did not put a maximum in their policy, have gone for a project on a scale level that does not fit in with the area. Local governments acknowledge the need for wind power, and that their area is suited for it, but feel that the scale of the development is too large.

From a national (government) perspective the concentration policy means the fewest people are affected, the windmills that are not build in one area will have to be put in another area. When the total impact in the separated areas otherwise needed is added up, it amounts to a higher impact than with the concentration policy.

At the same time, the Initiators argue that they do not want to maximize installed capacity because they feel searching for the maximum possibilities within noise/hinder contours puts their turbines too close to dwellings.

Landscape

Initiators acknowledge that the wind turbines will be visible from a great distance. They also admit that implementing projects on a scale such as the proposed DM's will always entail a significant impact on landscape, however as the values of this particular area are defined as: large scale agricultural production, this would fit with a wind park according to the initiators.

Within the region there is also a more hilly, forested area: de Hondsrug. Initiators state that they do not want to build wind turbines there because of a couple of reasons: 'de Hondsrug' has got significant landscape quality (also formal), there is less wind, and dwellings are dispersed through the area. And because of the landscape quality there is virtually no support for windmills in that area.

A spokesman of one of the action groups actually does not think landscape quality is an important issue with large projects like this. As long as the need for wind as a new energy source is satisfactorily motivated. A negative impact on the quality of the landscape is one of the things people are willing to accept once the need for them is clear. This is not yet the case according to the action groups, and because of this they question if it can be properly motivated at all. Once the need is clear and accepted, local inhabitants will try to make sure that noise and shadow flicker are properly taken care of and care less about more distant things as the landscape.

Suggestions for improvement

One of the initiators notes, one must realise that it will probably stay difficult: we are working against the established order. Everything we do involves adapting existing structures, this is not easily accepted by everyone.

Both pro- and opponents make a similar observation: there is no concerted action in The Netherlands, and they feel that is the problem. According to one of the initiators: "The Dutch always have an opinion on everything, we talk too much and above all believe that the future (we) will solve all our problems. In the meantime there is too little action, with the result that we are losing as a country. We used to have excellent entrepreneurs in the wind turbine industry, they have mostly gone bankrupt. This is due to the fact that rules and regulations change too often."

Connected to that is that there are multiple tracks going on at the same time, at different government levels: there is the RCR, the structure vision from the municipalities and province, the national SVWOL, EIA procedures, as a participating citizen it is pretty difficult to find out who to go to for information and when and where to present your views.

And not only for citizens, but also for local governments: the local authority had already stated that they did not want wind in their municipality, however now they were confronted with multiple actors, both public and private who did want to implement wind, and a lot of it in their municipality.

It may sound familiar, but communication is one way to ease the process. According to the action groups: "the initiators could have been more accurate when they presented their plans, this would have saved a lot of stress under inhabitants who still do not know where the windmills exactly will be build." This is not only true for the initiators, but also for governments at various scale levels: "On the bright side: municipality and province did not really know how to consult the public have now gotten better at it."

Conclusion

Pro- and opponents seem to agree that the transition should not have a negative impact on health.

A spokesman of one of the action groups mentions that landscape is not a big issue once the usefulness and necessity of wind turbines in general and on the site more specifically is clear.

The opponents and inhabitants realise that wind turbines are coming, and their biggest concern is the social divide that the project induces. They feel that acknowledgement of the impact by initiators, but more importantly, by the national government (which designates the areas through their policy documents and has formulated the ambition of 6000 MW onshore wind in 2020) is one of the most important (if not the most important) aspects in gaining support. Once the necessity is clear and the acknowledgement that their habitats are affected it is thought that people will be more inclined to at least join the discussion around these projects.

Section 5.2 NOP

§ 5.2.1 Noordoostpolder description

The Noordoostpolder (NOP) project is located at the shores of the Noordoostpolder, see figure 5.5. The Noordoostpolder was drained in 1942 and plans for the polder were drawn on the drawing board.

The polder was planned to such an extent that even the new inhabitants were selected. The ten villages are situated around a central town, such that every farmer would live a maximum of 5 kilometres from a settlement. The ring of villages and accompanying subdivision of agricultural plots combined with The openness of the landscape are the main quailities of the Noordoostpolder (Renes & Piastra, 2011 & Boeve & Hospers, 2010)

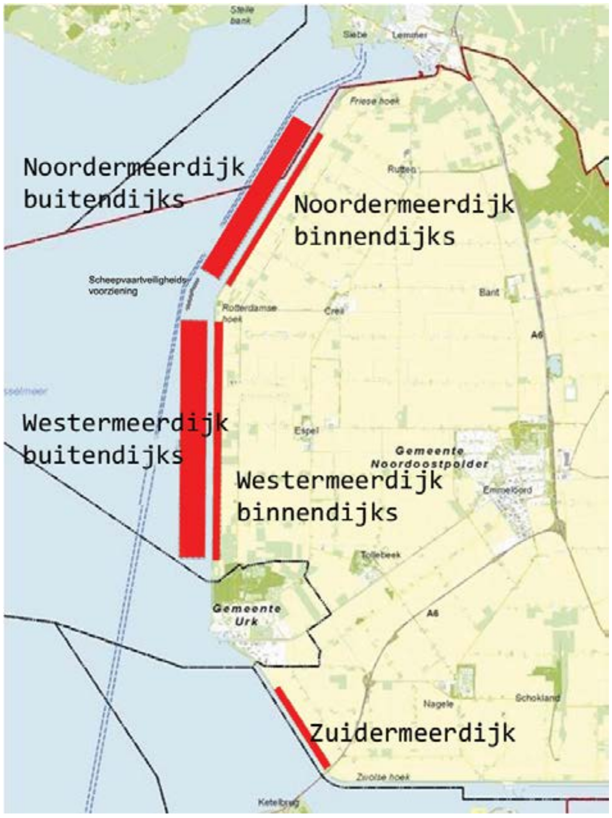
Where the decision making process of DM (& OM) is still in its early stages, there has been another project in The Netherlands under the RCR where the decision making process is in later stages (in total there are now 8 wind farms under the RCR, of which NOP and Zuidlob are finished with the decision making process). The decision making process for the Wind farm Noordoostpolder (NOP) in the province of Flevoland is finished. The various permits needed have been granted. For some of the permits needed for the implementation of the wind farm appeal has been sought at the Council of State.

Figure 5.4 Construction has started in the Noordoostpolder

Photo taken December 2013

As DM is a combination of projects, the NOP is a combination of projects. In the NOP a total of 5 projects is combined (see figure 5.5). The total installed capacity is aimed to be 450 MW (BEP, 2010). 4 of the projects will be realised north of Urk, two on water (buitendijks), and two on shore (binnendijks). The project to the south of Urk will be developed along the dike on shore.

Figure 5.5 Overview of the 5 separate projects in the NOP



Source: Pondera, 2009

The start documents for the EIA procedure have been separately presented to the public. A general EIA has been made including for each separate project an elaboration in the form of a separate document.

Here too comments by local stakeholders have been contributed; during the presentation of the final decisions a total of 109 unique comments were presented (BEP, 2010), again in total the number was much higher: 693, this might be because of the presence of a local action group providing people with a standard format.

The initiators have grouped themselves under the umbrella organization 'Koepel Windenergie Noordoostpolder' which effectively consists of 5 stakeholders, each representing their own, a shared or two wind farm(s), see table 5.1 for an overview. The respondent in this research worked for NOP Agrowind, involved in the 2 on-shore developments north of Urk, Noordermeer Binnendijks and Westermeer Binnendijks.

Figure 5.6 Current Westermeerdijk wind farm view of the 5 separate projects in the NOP

View from Urk to the north

Currently there is a wind farm at the Westermeer Binnendijks location, it consists of 50 smaller turbines with a combined capacity of 15 MW. The wind turbines in the current situation have a height of approximately 40 m to 50 m. In the new situation there will be fewer turbines which will be significantly higher with a total height of 198 m.

Table 5.1 Stakeholders in the NOP project.

Wind farm	Partner
Noordermeerdijk Binnendijks	Windpark Kreil BV
Noordermeerdijk Buitendijks	Westermeerwind BV
Westermeerdijk Buitendijks	Westermeerwind BV
Westermeerdijk Binnendijks	Acousticon Windpark BV
	VWW Windpark BV
Zuidermeerdijk	RWE

Source: Koepel Windenergie Noordoostpolder 2012

Because of the similarities between the cases, both under RCR, both being met with local resistance, both having multiple private initiators, it is interesting to look at the Noordoostpolder wind farm project (NOP) and compare it to DM. As the decision making process is still at an early stage in the DM case, perhaps some of the experiences from the NOP project could be used as input for the DM process. Possibly some success factors could be identified in the NOP case. This could be of benefit for the energy transition on a national scale, as the decision making process is effectively finished and one of the first examples of how these projects work under the RCR.

§ 5.2.2 Responses

General

In general the involved actors feel that the RCR has had a positive influence. The opponents feel that "Urks' Wind park" (Urk will be enveloped to the north and south by wind farms, although non of the turbines will be built on Urks' territory) is developed top down, without consulting and hence the support of the local population.

Consequences

According to the opponents, the spatial influence of such parks is huge and will bring a lot of hindrance: noise, shadow flicker Opponents feel that the wellbeing of people living nearby is not taken into account.

Unique to the NOP is the openness of the area. The proposed windmills along the dikes can be seen from 40 kilometres, keeping in mind the scale of the IJsselmeer this means they will be visible from all over the IJsselmeer, it is stated that 'this supports the spatial character'. Opponents feel that this is a way with which you can get away with a lot of things.

Figure 5.7 Current Westermeer binnendijk wind farm

View from the East, at approximately 4,5 km, the current wind turbines almost disappear in the treeline, the new ones will be 4 to 5 times higher and significantly more visible

Policies

This project was started before the RCR was put in place. Initiators, municipalities (both for and against) and province do feel that the RCR has had a positive influence: 'especially the fact that there is now one body that has got an overview of everything that is done and what has to be done'. For municipalities it is now easier to cooperate in a wind project according to some: sometimes they have got conflicting interests regarding wind, on the one hand they are willing to cooperate, on the other they are not willing to take the risks, the RCR eases the decision to start a wind project decision making procedure.

A negative consequence of the RCR is that 'lower' governmental bodies have no longer got any interest in cooperating; under the 'crisis and recovery law' (crisis- en herstelwet) of 2010 they have lost the possibility to go against a decision made by another governmental body. This became clear in this project through the municipalities of Urk and Lemsterland; they had no possibilities in participating or opposing when the decision had already been taken. According to one government employee, should they have continued to be present in the discussion, perhaps some concessions could have been made resulting in a more agreeable outcome for the affected parties.

Both the province of Flevoland and the municipality of Noordoostpolder have a policy framework regarding wind energy, which has worked rather well in the Noordoostpolder. The policy in the Noordoostpolder did no longer allow solitary wind turbines to be placed, in fear of cluttering the landscape.

At the same time however, it is felt that on a national level the national structure plan on on-shore wind (SVWOL) is a good document, now projects presented to the minister are tested against this document instead of being looked at separately for every case.

With the 'Regioplan' the province tries to prevent the national government to use the RCR without consideration for the local situation, this is of course always possible, but a lot of political lobbying has gone into this process; although in the NOP project the RCR was seen as having a positive influence, apparently the province has its reserves too.

Now that the SVWOL is being proposed there is a policy on a national level in which ´search areas´ are indicated. The provinces jointly have made a deal with the minster on how much each of them would develop. As one respondent mentions: "With those agreements, the struggle between national government and the provinces seems over, now the struggle is between provinces and municipalities."

The Noordoostpolder municipality has now got a policy to gain benefit from the fact that the wind farm will be build; it is a fivefold approach dealing with (1) the creation of jobs, (2) education for mechanics, (3)'social return'; getting those without a job back to work again, (4) public participation, allowing local inhabitants to join in the investment and therefore have the local population benefit from the earnings of the windmills and (5) tourism and recreation.

And in the neighbouring municipality of Urk, a firm opponent of the project, positive developments are taking shape too. An example mentioned is an information market for local entrepreneurs which was attended by a lot of people interested in possible business opportunities.

Public participation and consulting processes are good according to the initiator: the initiator and governmental bodies need to have their act together, and then the public should be able to have their say.

Landscape

Depending on who is asked landscape quality has had a significant, or very little impact in the decision making process. There can be arguments found for both of the opinions.

From the start of the process, landscape quality was the single most important reason for the Noordoostpolder municipality to come up with their policy of bundled development. So in a way, as mentioned by initiators and municipality, landscape quality is the actual instigator of the project.

However other local government employees argued that landscape quality did not play a role; because of the location of the wind farm, the typical structure of the Noordoostpolder landscape was not affected by any of the plans and therefore was not an issue.

Opponents argue that there has been no consideration for landscape quality at all; there has not been looked at alternatives like photovoltaics, which would arguably have less impact. The NOP policy of bundled development is understood, but the scale it has resulted in because of the national government interfering is not acceptable for opponents.

Suggestions

As to the question how spatial policy could in the future better facilitate the energy transition one respondent answered: this is a policy making related issue: the role of energy does not seem to be clearly defined from a policy point of view. According to the respondent this is the case at the national government level as well as the provincial level. Because it is not laid down in policy documents it is difficult to be pro-active in the energy field; another current example is the shale gas discussion in the NOP: when there is not a long term vision on energy, policy often is about creating obstacles or blocking the new developments. The fact that new energy-initiatives are usually met with reluctance due to a lack of policies on energy can to an extent be mitigated through incorporating 'sustainability' in structural visions on a provincial level according to a respondent. Municipalities are sensitive to what is stated in the provincial structural vision and are willing to think in a creative, cooperative way during the making of such visions. This is because when making visions participants in the discussion are not yet tied to rules and procedures and can push each other gently in desirable directions refraining from being repressive.

The RCR has worked positively in the NOP case; in this case there had already been a good amount of debate between initiators and local government and inhabitants which produced a shared vision. The RCR then facilitated the process of permits and consultation procedures. The SVWOL and provincial agreement on the implementation of on-shore wind is seen as positive too; it is now up to the provinces to realize their bids.

Also one proponent feels that the government must come with a clear vision in which makes clear choices regarding ambitions, (not choosing everything; and wind, and coal, and shale gas, and…) and ways to achieve them, a clear integral vision could help this.

One of the lessons from the early projects under the RCR like the NOP project is that the current electricity law must be repaired, but this is currently being done. During the NOP process it became clear that not all the required permits are incorporated in the RCR procedures; for example the water-law permit was not yet part of it. Also the 'flora-and-fauna' permit posed a problem during the NOP process; an additional exempt was needed, which was never done before. The question was whether this could be possible at all, the Council of State (Raad van State, RVS) eventually decided that it 'was not unlikely that it was possible' and the exempt was afterwards granted. The RVS' statement has generated a jurisdiction in which the exemption can be granted, making future onshore-wind projects possible.

Because of the long duration of the project, every now and then new issues, due to new rules and regulations, arose.

More specific for this project; the initiators could have presented the opportunities for the public to participate in the project in an earlier stage. Initiators state that this is due to financial rules and regulations, they are not allowed to make ungrounded claims, either way, this could be improved.

All parties feel that communication to the general public could have gone better; even though the wind farm is not on Urks area they should have been included in the process from early on. This could have been done by not only the initiators, but also province and national government. The initiators being organised themselves from the start would have helped too.

The opponents reacted in a similar way: “we should have lobbied in an earlier stage”, they also mention that in a proper discussion, the windmills to the north of Urk perhaps could have been placed 5 km away, which would have significantly increased public support in Urk. In a discussion alternatives that are acceptable for everyone could probably have been chosen.

Conclusions

Flevoland seems to have accepted its fate as a province hosting wind turbines. In the province and the Noordoostpolder municipality there is an active policy on how and where to develop wind farms. The policy currently underway of changing the 600 odd smaller windmills to fewer but more powerful versions and using this process to come to a better spatial framework is illustrative of this.

In relation to the Noordoostpolder project itself, in general the RCR is felt to have played a positive role, but only because it was used after a consensus was more or less reached. Also the fact that the municipality itself had a clear vision on where and how to develop windmills is seen as one of the success factors. All of the parties feel that communication and active involvement are important and could be improved in future projects.

Figure 5.8 Not everyone agreed to the new wind farms

'One billion of subsidies = one million per person per year net!!!"
Sign in a front yard in the Noordoostpolder

Section 5.3 Comparison

What are the main similarities and differences between the NOP and DM projects? Where the NOP project can be seen as a successful example, the DM project still is in a difficult start-up phase.

In general the reactions concerning the DM project are more negative. The project is still in the starting phase, a lot of decisions have to be made. The opposition has organised itself and is well aware that this is phase of decision making is where their influence is largest.

The starting phase has been very difficult in the NOP project too. A complicating factor was a multitude of initiators. The fact that the municipality had a clear stance on where and how to develop wind turbines in the area has been a positive factor in the process. In Flevoland they already had experience with the 600-odd windmills that were already built; the Noordoostpolder municipality had chosen not to follow the same path. From the start there was a different framework: local government clearly stated that they were in favour of larger projects as opposed to individual turbines dispersed through the landscape.

When the RCR was introduced in the process, lots of discussions had already been held and the decision to develop wind turbines was effectively taken. After this difficult initial phase, under the RCR everything was far more coordinated and this proved to be beneficial to the process.

The things DM could improve on are the communication to and involvement of local inhabitants, and local governments. The fact that the project has started under the RCR, so as a responsibility of the ministry, as opposed to the province and municipality as was the case with NOP, may not be the best way. At the moment the province and municipality are trying to diminish the amount of wind turbines that will be built. They have an active oppressive policy and themselves were not really happy about the wind turbines in the first place. However one or two things could be learned from the situation in Flevoland; In Flevoland the policy is now to go to parks instead of solitary turbines, this is a difficult process. In Drenthe they have got the opportunity to do it right straight away. The province, together with four municipalities now has got a policy on wind, this can be seen as win for both the inhabitants and initiators who both have more clarity now.

In both case studies opponents argued that the discussion for the need of wind energy has not been held yet (properly). Some of the initiators agree, as they feel that this causes a lot of unrest and uncertainty amongst local inhabitants. This is something the national government has tried to address with the SVWOL.

When looking at the overall reactions of the respondents, the reactions from the NOP respondents are more positive from a municipal/provincial point of view and initiator point of view. The municipality is actively trying to reap any potential spin-off activity.

In general the RCR is viewed as a positive policy instrument by most of the respondents, opponents and proponents alike. One respondent in the NOP case believes that the RCR is used by the initiators in the DM in a wrong way, it seems to be that the RCR is there used to force policy decisions.

Chapter 6 Conclusion

Section 6.1 Answering the research questions

In this section each of the four research questions is treated and answered separately. The next section will integrate the five of them in order to answer the main research question.

§ 6.6.1 Research question 1

1. What is the current energy transition?

The current energy transition has been described in chapter 2. It entails the switch from the current energy production system into a next one. The current one can be characterized as a centralized system based on fossil fuels as a main source. The new system is a more decentralized system, making use of renewable energy sources such as wind, solar and biomass.

§ 6.6.2 Research question 2

2. What are the spatial consequences of the current energy transition?

The spatial consequences of the energy transition lie in both the decentralized approach of the new system as well as the characteristics of the energy sources used in the new system. As shown in chapter 2 renewable energy sources in general have a lower energy density. This means that in general, more space is needed. This in itself does not have to be a problem, e.g. off-shore wind is proposed by some, as this would not impact people's habitat. However, cost concerns and a decentralized nature of the renewable energy production facilities will have the effect that a lot of people will be affected with a changing situation.

§ 6.6.3 Research question 3

3. In what way does spatial policy deal with the energy transition now?

In the fourth chapter policies dealing with the energy transition have been outlined. Currently the national government is implementing the most cost-effective (wind) renewable energy with priority. The ambitions are fuelled through supra-national agreements. Policy makers do realise that developing wind farms has got a significant impact, therefore a policy of concentrated bundling is used: this affects as few people as possible.

§ 6.6.4 Research question 4

4. In what way is 'landscape quality' taken into account in current policy making?

Landscape quality is considered at all levels in the policy making process. However at a lower scale it becomes harder for those involved to see the bigger picture. The national concentrated bundling approach leads to fewer landscapes being affected, but the landscapes that are affected have to deal with a huge change. From a local government perspective this is not always easy to accept.

§ 6.6.5 Research question 5

5. How could this (the way spatial policy deals with the energy transition now) be improved?

'How could this be improved' needs a direction in to where the improvement should go. When we keep in mind that this is a sub question to: 'What are the spatial consequences of the current energy transition, in what way can the Dutch spatial policy deal better with these? It still depends on a political choice. A good spatial policy takes into account interests in different scale levels, these can conflict as is shown through the case studies.

In the introduction this question was labelled the most interesting and at the same time hardest question to be answered. The difficulty in answering this question is that it is a normative one, this will be elaborated in the following section.

In order to answer this question, the two Dutch case studies in the current energy transition have been compared to two other cases; The present energy transition in Germany, and the Dutch 1960 transition to natural gas.

The German transition was shown to be more successful, and main success factors identified were the institutional setting in the planning system, the feed-inn tariff system and the stability of those. While subsidies are present in The Netherlands, schemes have changed quite a few times over the years, making it difficult for initiators to attract investors.

From the 1960s transition to natural gas it became clear that the current energy transition is more complicated in two ways: 1) a lot more players because of liberalization policies and the nature of electricity production and 2) the population is now more active in giving their opinion. Another disadvantage in the current energy transition is the fact that the advantages of the 'new' energy sources are not as clear and substantial as with the shift from coal to gas.

Section 6.2 Conclusions and discussion

The main research question: *What are the spatial consequences of the current energy transition, in what way can the Dutch spatial policy deal better with these?* consists of two parts.

The first part, 'what are the spatial consequences of the current energy transition' is answered through research question 2, and although research question 5 aims to answer the second part, it also became clear that there was a normative aspect to this part of the question.

In what way can the Dutch spatial policy deal better with these? There are several ways to answer this question, it depends on how 'better' is defined, i.e.: In order to realise national governments' ambitions? In order to implement as much renewables as possible? In order to hinder as few individuals as possible? Etc.

The respondents too questioned the need for wind-energy in their areas, and even questioned the need for an energy transition in general. In general though, the energy transition was seen as the way forward, both by opponents and proponents of the projects. As the question requires a political choice as to which of the above defines 'better' and the original question is about 'Dutch spatial policy', all of the above options should be considered.

In 2050 the (political) ambition is to have a climate neutral energy supply system, the question should perhaps be answered with this as goal. *In what way can the Dutch spatial policy better accommodate the goal of a climate neutral energy system, while keeping in mind people and landscape?*

Currently the energy production system takes up a lot of space and affects people and landscapes. The spatial consequences of the current energy transition will affect more and different people. In general this is acknowledged by everyone, however, because there is discussion on the usefulness and necessity of wind energy, these spatial consequences are not acceptable to everyone. National government should clearly state the usefulness and/or necessity of wind energy, in such a way this does not have to be repeated each and every time in provinces, municipalities and by local opponents. The national structure plan on on-shore wind (SVWOL) is a good step, however an integral policy framework (not only for wind, like Drenthe and The Netherlands have) on energy should be considered if the ambitions for 2050 to be 100% climate neutral are to be realised. It may also point out that the effects are not only negative, but in the long run provide a cleaner environment and a more sustainable energy supply.

The concentrated bundling policy now in the SVWOL affects the people, local governments and landscapes in an area with developments to a large extent, while trying to minimise the total number of people, local governments and landscapes affected. It is understandable that this is experienced as unfair, as through the National Coordination Regulation (RCR), local opponents cannot use this as an argument. The most important thing to inhabitants as mentioned by respondents though, is recognition by the government that their landscapes are affected. Once this is achieved, compensation may be thought of.

The more complicated institutional and social situation calls for a coordinated approach, which the RCR aims to do so. The RCR is seen as a good instruments by all parties involved, everyone acknowledges the multitude of actors and rules and regulations, is not helping in realising projects. However, as seen in the Noordoostpolder wind farm (NOP) case, and illustrated by the lack in the Drentse Monden wind farm (DM) case, consensus on a local level is a success factor. It is also clear that this 'low-level' consensus costs a lot of time and effort to reach. When the RCR is applied special attention should be paid to local stakeholders, this is done today, but should be kept in mind. The RCR itself does not pay attention to landscape.

The application of the RCR to energy projects combined with the SVWOL makes for a step forward towards the realisation of a climate neutral energy system. However, local level stakeholders do not always get the time to adjust to new proposed projects and projects under the SVWOL are quite large. The principle of subsidiarity otherwise found in spatial planning is not helped by both the SVWOL and RCR as they are instruments on a national scale level. One with a clear goal in mind (SVWOL, teleocratic) and one instrument (RCR, nomothetic). These roles leave local stakeholders little room for own initiatives other than following what is in the two documents. They dictate what should be done and to an extent how it should be done. Perhaps the earlier mentioned integral policy framework on energy supply should just state what it is that needs to be achieved, i.e. a climate neutral energy supply system in 2050, with sub-goals in between now and then. If indeed wind energy is the most viable option this can still be developed. If however there are other initiatives that may not be as efficient, but have better support, in the end adding up to the same amount or more of installed capacity, there is no reason why these should not be supported by the national government.

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Appendices

Appendix I Topic list

DM

This is the general topic list used during the nine DM interviews:

-Person, Organisation, Aims

-Opinion on Renewable energy in General

-The process in this project

-Landscape quality, public support

-Collaboration with other governmental bodies/stakeholders

-Role of policies (RCR, Own structural vision documents)

NOP

The questionnaire sent to the NOP respondents contained these 7 questions:

1/7 What was your role in the NOP project? What were your ambitions, how did you try to achieve those, did you manage to do so?

3/7 How do you judge the roles of other governmental bodies (municipalities, provinces, national government), other stakeholders and local inhabitants?

3/7 How do you judge the role of the RCR in the project process, what was the level of influence? Did it have a positive or a negative influence?

4/7 The absence of a spatial framework to base policy decisions on was seen as a big omission. Permit requests were difficult to deal with because of the absence of this framework. Do you agree? Do you feel that the recent SVWOL fulfills this need?

5/7 In what way could the spatial policies better accommodate the energy transition (the transition from fossil fuels to renewable energy sources)?

6/7 How important was 'landscape quality' in the project according to you in the decision making process, could you motivate your answer?

7/7 In hindsight, do you feel that there are aspects of the project (e.g. policy, consultation process,…?), had they been dealt with differently would have improved the succession of the process?

Appendix II Coding scheme

Nodes

Name	Sources	References
consequences	7	12
Negative	8	30
Depreciation of dwelling	2	2
Noise	4	5
Positive	3	4
Spatial	3	7
Fail factors	8	19
Germany	1	3
Landscape quality	12	39
Role of policies	12	49
Role of RCR	14	37
subsidies	1	1
Role of various actors	14	90
Governmental	2	4
Initiators	4	13
Opponents	5	8
Political	6	16
Success factors	7	14
Usefulness and necessity	8	20