

LOCAL NEIGHBOURHOOD PLANNING FOR RENEWABLE ENERGY

*An institutional
analysis to the
implementation
of renewable energy
sources through
neighbourhood
planning projects
in the Netherlands*

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Preface

The document that lies in front of you is the result of the final assignment in my Master study in European Spatial and Environmental Planning at the Nijmegen School of Management of the Radboud University. The curriculum of this Master's Programme encompasses a very broad range in spatial and environmental issues in Europe. At an early stage of this programme, I was interested in Climate Change and the way how was dealt with this issue by public authorities. Besides the fact that the issue is a "hot topic", it is a young and new challenge that spatial planners face.

As this thesis wouldn't be written by the help of many, I am grateful to announce them here. At first, I would like to thank Dr. Stefanie Dühr for her guidance and feedback. Furthermore, I would like to thank family and friends for their support in moments that progress was not as smooth as expected.

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Summary

This research contains an institutional analysis on the implementation of renewable energy sources in newly built residential areas. As a member of the European Union, the Netherlands made international agreements on lowering greenhouse gas emissions and enlarging the share of renewable energy sources. Currently the Netherlands remains to have a low share in renewable energy sources in comparison to other Western European countries. This puts the way how the targets are achieved into question. Also, the reason why this implementation is lagging behind in comparison with other countries in Western Europe remains to be a question. While every virtually every sector is capable of lowering greenhouse gas emissions, spatial planning is perceived as a sector that can play an important role in the implementation of renewable energy sources. Within the Netherlands, municipalities have a high degree of influence over their territory through spatial planning. In many cases, they also play an important role in initiating and coordinating spatial planning projects, such as newly built residential areas. The outcome is depending on the rules that institutions have set out to the implementation of renewable energy sources in newly built residential areas and the way how these rules affect decisions at the local level.

Newly built residential areas provide the possibility to build a new area “from scratch”. This makes it possible to implement renewable energy sources as a part of the newly built residential area, and contribute to achieve targets that internationally have been set out. In this respect, the following research question has been set out:

How is the current institutional framework for spatial planning supporting or hindering the implementation of renewable energy sources in new built residential areas in The Netherlands?

The institutional framework comes from a system of multilevel governance. In this respect, rules of multiple governmental levels may influence implementation of renewable energy sources. The most notable levels influencing development at the local level are the European Union, the national government, the province and the municipality itself. Besides these levels of government, also actors at the implementation level play a role in successfully achieving the implementation of renewable energy sources.

The role that the levels of government plays, depends on how the level of government can and is influencing development. As the focus is at the municipal level, the way how these rules of the multiple levels influence development plays an important role. To steer the implementation of renewable energy sources, rules have been created that directly influence decisions or can be used as an instrument. These rules, or instruments can be divided into four different types. The distinction between the types of instruments has been made according to Davoudi (2009) and are at random: (1) regulatory measures, (2) resource mobilisation, (3) plans, strategies and visions, and (4) consultation and collaboration practices. As these rules may influence development, the outcome also strongly depends on the way how these rules are used. From the theory, a distinction between formal and informal institutions is made. Formal institutions can be understood as the written rules that are set, such as laws, financial resources and transactions etc. This corresponds to the instruments described by Davoudi (2009). Informal rules are the unwritten codes of behaviour and social conventions. The outcome of a newly built residential area, depends on the formal rules and how and when these formal rules are used. This implies that informal rules also play a role.

To answer the research question, a case study has been conducted. This provided the possibility to show what is happening within current newly built residential areas. To find out in what way the institutional framework could influence the implementation of renewable energy sources, a policy document analysis has been conducted. To find out what role the institutional framework plays, interviews with local authority officials and actors involved is done.

From the policy document analysis, it becomes clear there are not so many regulative measures for municipalities to force implementation of renewable energy sources. While the land use plan plays an important role in spatial planning, and this has been used, it is limited in the process of newly built residential areas. The municipality does not have many other means that are legally binding other actors involved to implement renewable energy sources. This means that the municipality has to achieve its goals in cooperation with the other actors involved in the development, and the municipality needs to look for investors. From the case study it is shown that finding investors, depends on the type of measure. For achieving one of the measures, the central heat system, it is very hard to find investors. In this case, the province is willing to provide funds, but it demands the incorporation of market parties. For that matter, the project is not sure yet.

This is different in the case of the windmills. The location was already designated for possible implementation by the province. As this was planned in a part of the development where the local actors were not involved, the municipality could decide to build them relative quickly. Also, finding investors was easy, since the project is profitable. As currently the land use plan is waiting for approval, the project is surely going to be implemented.

As the wind turbines did not need extra financial resources, this is exceptional, as currently most measures lead to higher investments. To compensate this, the national government created financial tenders. As these are just enough for paying human resources of the municipality, they do not directly lead to the implementation of renewable energy sources. Some financial tenders are aimed at directly subsidizing measures, but these are mostly aimed at the existing housing area.

As it became clear, the municipality of Nijmegen was a bit more ambitious as regular municipalities are in the Netherlands. In this respect, it showed that achieving this higher share of renewable energy sources, demands a lot of effort, as well extra investments from the municipality itself. The implementation of extra measures is strongly depending on the political circumstances at the local level.

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1. Introduction

Climate change policy has received a lot of attention in the media, in politics and within academic literature in the last few years. Many of this attention has focused on the effects of climate change: more drought, heavier precipitation as well a rise of the sea level. The main cause why this change is happening, is very likely to be due to man made greenhouse gas emissions. Greenhouse gas emissions are gasses and substances that are released into the atmosphere and causing global temperature rise. A major cause of these greenhouse gas emissions is the combustion of fossil fuels. While the role of greenhouse gas emissions has been debated within the academic literature, these emissions are perceived as one of the main causes of current climate change (see for example Anderegg, Prall, Harold & Schneider, 2010). These greenhouse gas emissions cause a change in global temperature and climatological circumstances. This process is known as the greenhouse gas effect. The effects and impact differ in locations over the world. For the Netherlands this change will probably mean heavier precipitation, longer periods of drought, and also the rise of the sea level. Policy that has been set out, aims at adapting to these new circumstances, as well it focuses at lowering the amount of greenhouse gasses emitted into the atmosphere. The former, adapting to new circumstances, has already gained quite a sufficient policy response. The latter in contrast, lowering greenhouse gas emissions, or mitigation policy, has not yet been addressed effectively in the Netherlands. The expectation is that the effects will get worse when greenhouse gasses emissions are not reduced within a short time span. As the effects of climate change are global and emissions are made in practically every socio-economic sector, they have to be combated as such. This means that effective action needs to be incorporated in all sectors and all institutional levels, from the international to the local level. To do so, action needs to be taken within every socio-economic sector at all levels. In the Netherlands, municipalities have a considerable influence over their territory, and play a potential role in contributing to successfully mitigating greenhouse gas emissions.

1.1 Background and relevance

Scientific research shows that man made emissions strongly influence the climate: *"...it is extremely likely [i.e. with at least 95% confidence] that humans have exerted a substantial warming influence on climate."* (IPCC, 2007, p. 131). The main causes of these changes are greenhouse gasses. These greenhouse gasses influence systems in the atmosphere and cause a change in climate patterns. The biggest contributor to climate change are gasses like CO₂, Chlorofluorocarbons, Methane, Nitrous Oxides and other related gasses (Ekins, 2000, p.9). The emission of these gasses into the atmosphere is expected to strengthen the greenhouse process. From 1800 until present, CO₂, one of the most important greenhouse gasses, has grown from 280ppm to 380ppm (NEEA, 2005, p.22).

As these greenhouse gas emissions are perceived to be the main source of current global climate change, reducing these emissions has become an important goal. In this respect, institutions have started to address the issue. These institutions try to combat climate change and set rules to the emissions. At the international level, the Kyoto protocol has played an important role. The Kyoto Protocol is an agreement between countries that ratified the protocol to lower greenhouse gas emissions. The protocol introduced measures for national governments governing emissions and introduced policy for adjusting to the changing circumstances. From this document, two streams of

policy and according approaches were distinguished. The first policy stream is based on the fact that the climate is changing, and we need to prepare for the consequence that result from the change in atmospheric conditions. This policy is called adaptation policy, since it calls for adapting to these new climatic circumstances. The second policy stream is based on the fact that anthropogenic greenhouse gasses cause climate change, and that it must be prevented that these changes will become severe. This calls for mitigating greenhouse gas emissions: reducing the emissions of greenhouse gasses. Although mitigation policy had gained an earlier focus than adaptation policy, measures mitigating greenhouse gas emissions are seemingly not implemented effectively in the Netherlands (Kern & Alber, 2009). This can for example be seen from the Dutch Ministry of Infrastructure and Environment (I & E or formerly VROM). The Ministry had set multiple goals over the years, but never met its goals. In 1991 the policy document "*Note Climate Change*" was published, stating that in 2000 the emission of greenhouse gas emissions should be lowered with 3% with 1990 as a reference year. In 1995 a new document was created: the follow-up Note Climate Change. This document stated that the ministry strived to be emission neutral in 2000. But the documentation shows that in the year 2000, emissions had grown with 2% in respect to 1990 (VROM, 2002). The same tendency is seen in the production of renewable energy sources. In 2007 only 7,6% of the total energy capacity was produced by renewable energy sources, as the mean share of renewable energy sources in the EU 27 is now 15,5%. This places the Netherlands at number fifteen on the list of the 27 European countries in respect to the share in renewable energy sources (European Commission, 2010). This shows that the share of renewable energy sources in the Netherlands considerably lower in comparison with other EU countries. The fact that the share is approximately the half of the European mean, puts the way how the Netherlands is trying to achieve a larger share of renewable energy sources into question.

To make an effort in climate change targets, in 2007, The Ministry of VROM published the National Climate Strategy (VROM, 2007). The strategy is the basis for climate change policy in the Netherlands. The shows that action needs to be taken by multiple different sectors. In this respect, new financial tenders are available to individuals, businesses and other levels of government. As municipalities have considerable effect over their territory, they are expected to contribute a large share in reducing greenhouse gas emissions. This expectation can be seen from the Climate Covenant (Staat der Nederlanden & VNG, 2007) that has been agreed between the national government and municipalities. Besides making such agreements with municipalities, the national government also made similar agreements with the provinces. This puts to question in what role these levels of government contribute to the implementation of renewable energy sources.

1.2 Summary of the research problem

Man made greenhouse gas emissions are to be the cause of the enhanced climate change. As seen from International (IPCC, 2007), European (for example, EEA, 2007) and national research documents (NEEA, 2005), these emissions are produced by almost every kind of development. Even though the Netherlands has proclaimed to lower its emissions and increase the share of renewable energy sources, it is still half-way the Western European mean of 15,5%. Since emissions are made in every sector, it should be counteracted by them as well. In spatial planning, influence on energy supply and demand can be exercised by local authorities in their spatial planning projects. While almost all sectors in spatial planning processes have a long term effect, also housing and the implementation of renewable energy sources are of significant influence. As the municipality may play an important role

in implementing renewable energy sources. The possibilities are also depending on the rules that other levels of governing set, as well it depends on the actors involved. In this respect, the rules from multiple levels of governing determines the outcome of the local level. As currently the Netherlands is lacking behind with the implementation of renewable energy sources, the way how these levels of government influence

1.3 Aim of the research and research questions

Acknowledging the fact that municipalities have considerable influence over spatial development, and spatial development plays an important role for achieving climate change targets, the objective of this research focuses at how climate change targets can be achieved in local spatial planning projects. As the municipality is not the only actor in mitigating climate change, also the role of other levels of governing play a role. So, the aim of this research is not to provide a single applicable solution for implementing renewable energy sources in new built residential areas in the Netherlands, but it is at first to understand the planning process at the local level and the way how local development is influenced by rules from other levels. So, for this research, one research objective has been set out, with two aims. The research objective is:

To understand how the existing institutional framework is supporting or hindering the implementation of renewable energy sources in new built residential areas in The Netherlands

Respectively to the objective, two aims are set out:

- to investigate how renewable energy sources are currently implemented in new built residential areas in The Netherlands in order to meet international and national climate change targets, and
- to analyse in what way the current institutional framework supports or hinders implementation of renewable energy sources in new built residential areas according to local authority officials in the Netherlands

To achieve the research objective and aims, the following research question is developed. To answer this main research question, three sub questions support answering the main question.

How is the current institutional framework for spatial planning supporting or hindering the implementation of renewable energy sources in new built residential areas in The Netherlands?

To answer this question the following sub questions have been aligned:

1. *What is the current institutional framework that enables the implementation of renewable energy sources in new built residential areas in the Netherlands?*
2. *How can climate change be governed to achieve climate change mitigation through local spatial planning projects?*
3. *In how far is the institutional framework appropriate for municipalities, or in which areas is it hindering municipalities to achieve climate change mitigation targets?*

1.4 Theoretical approach

The research question focuses on the way how institutions influence the implementation of renewable energy sources in newly built residential areas at the local level. In this respect, theory on the way how other levels of government may influence implementation are used to analyze their role. This theory derives from Bulkeley and Kern (2006), who have distinguished different ways of governing. The instruments and tools that may be used subsequently derive Davoudi (2009) and will be used for analyzing the instruments and ways of governing in the case study. The theoretical context has been described in detail in Chapter 3.

1.5 Research strategy and methods

For answering the research question, the research strategy exists out of two methods. First a policy document analysis will be conducted, followed by interviews. The policy document analysis should show the rules that the multiple levels of government have for influencing the implementation of climate change, according to the theoretical framework that derives from Davoudi (2009). The interviews will then show how these rules actually are used within local development. These are held with local authority officials and actors involved, such as developers and housing corporations.

1.6 Societal relevance

Greenhouse gas emissions have a great effect on climatological circumstances. The consequences of the changing climate depends on the location. Eventually the whole world will be influenced by the changing climate. While developed countries are currently the main cause of greenhouse gas emissions, developing countries will undergo large changes that may have significant effect on the natural resources and consequently on society (Paavola & Adger, 2002). But also the Netherlands itself is expected to become the victim of climate change. In the case of the Netherlands, the expectation is that more precipitation and the rise of the sea level will cause a threat (VROM et al., 2007).. This increase of precipitation and the sea level will cause danger for people living in river basin areas or in parts under sea level (NEEA, 2005, p.37). For the Netherlands, this plays an important roles, since 25% of the country lies under sea level and 60% of the population lives in these low lying parts (van Bommel & Kuindersma, 2008).

Since the Netherlands is part of a low lying river delta, these expected changes impose a high concern for the safety of people living in these areas. Besides safety issues, changing climatic circumstances may have a great impact at the society: "*Climate change can cause severe damage to the Netherlands in such a way that society will be disrupted*" (VROM & VenW, 2006, p.5). While policy responses might combat climate change consequences as described, deciding on responses are not easy, since climate change and current knowledge on the changing climate system still incorporates a lot of uncertainty. While consequences may have a long term impact and are potential catastrophic, the uncertainty about future climatic circumstances makes the development of responses difficult (Goulder & Pizer, 2008). While as a reaction, both adaptation and mitigation policy arose for combating climate change, both may be presented as two separated policy domains, while being closely related with each other. The essence remains to be that, the more severe the situation will get, the more this will cause danger to people living in low lying areas. Besides the security aspects, also adapting to new circumstances will become more difficult and costs will rise as climatic change gets more severe (NEEA, 2005). This consequently will lead to higher costs for battling these

consequences and may eventually make adaptation policy unaffordable. This is what derives from the Stern Review (Stern, 2007). The Stern Review is a research towards the cost and benefits of climate change policy in the UK. In essence the document concludes that action in lowering greenhouse gas emissions on the short term will eventually cause greater economic benefit on the long term, compared with no action. Also the Dutch Ministry of VROM came to this conclusion: *“If mitigation policy fails, there will be no affordable adaptation options left after 2100”* (VROM & VenW, 2006, p.6). This legitimizes the investments in greenhouse gas mitigation policy: preventing that climatic problems caused by the current generation will be the problem of future generations. This is why countries like the Netherlands should adapt to the changes that are coming, but also need to mitigate greenhouse gas emissions, since they are necessary to prevent worse (van Bommel & Kuindersma, 2008). The consequences of not mitigating greenhouse gas emissions, may be severe influencing multiple fields of the physical and social environment. Mitigating these greenhouse gas emissions, is expected to benefit social, economic and environmental causes (see also: Stern, 2007).

1.7 Scientific relevance

Over the years, emissions in many sectors have grown enormous. According to the Intergovernmental Panel on Climate Change (IPCC), since 1970, greenhouse gas emissions in the energy sector has for example grown over 145% till 2004. For the same period, emissions of the transport sector have grown for over 120% and the residential/commercial sectors has seen its emissions grown over 26% (IPCC, 2007, p.104). All these sectors have spatial relevance, and the amount of emissions that derives from these sectors can be co-determined by spatial planning processes.

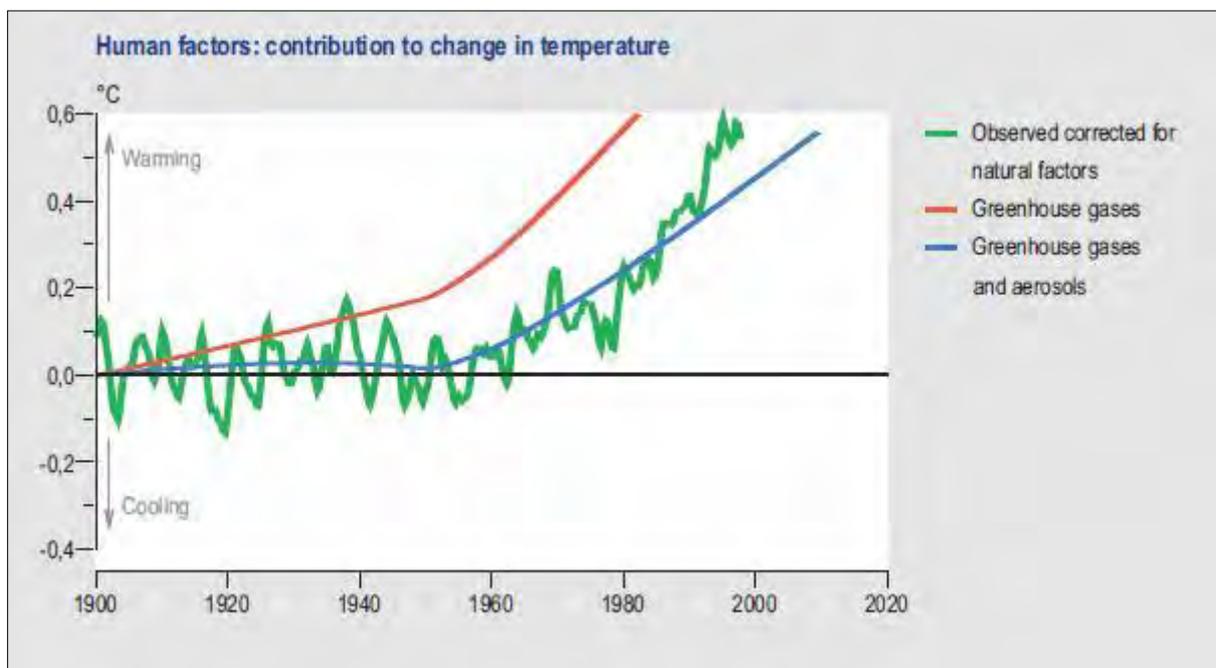


Figure 2. Perceived causality between greenhouse gas emissions and the global rise of temperature. (Source: NEEA, 2005, p.24)

A main concern is the fact that the Netherlands has made international agreements in lowering greenhouse gas emissions. To achieve these goals, sufficient policy is needed. Two important

agreements are the Kyoto Protocol and the European 20-20-20 targets (more on these agreements in chapter 2). The Kyoto Protocol introduces instruments for mitigating climate change internationally. One aspect is that for the period 2008-2012 countries set their targets for lowering emissions in respect to 1990. For the Netherlands this is 8%. But besides the national level, also the supranational level plays an important role. Since the Netherlands is part of the The European Union (EU), also their targets play a role. The EU has set its targets to lower emissions in 2008 with at least 20% in 2020 and when possible, with 30% in respect to 1990 (European Commission, 2010). That it is possible to achieve international targets is clear: *“In the EU-15, Germany and the United Kingdom are the only countries projecting emission reductions by 2010 compared to base-year emissions, with existing domestic measures”* (EEA, 2007, p.8).

As almost all socio-economic sectors influence greenhouse gas emissions, for sufficient mitigating greenhouse gas emissions, action needs to be taken in all these sectors. Municipalities play an important role in mitigating greenhouse gasses through some of these sectors: *“Municipal governments have considerable authority over land-use planning and waste management and can play an important role on transportation issues and energy consumption, all of which have implications for greenhouse gas (GHG) emissions”* Betsill, 2001, p.394). Even as Betsill (2001) focuses at cities in the United States, the statement also accounts for Dutch municipalities, as they have a considerable influence over these sectors and may thus play a key role in achieving climate change targets through these sectors. As the municipal level is not the only level of government concerning about mitigating greenhouse gas emissions, they are perceived as the level that has a lot of influence over these sectors, apart from the national government: *“local authorities have a degree of influence over these emissions, through energy supply and management, transport, planning and waste management, in ways which are more or less independent of central government”* (Bulkeley & Betsill, 2005, p.45). The existing academic literature has mainly focused at identifying the sectors that municipalities have influence over. So have Bulkeley and Kern (2004) identified four different sectors where local municipalities have significant influence over. These are energy, waste, transport and planning and land use planning. As Bulkeley and Kern (2004) have identified their sectors in the United Kingdom and Germany, also literature that focused at the Netherlands identified similar sectors. Menkveld, Burger and Coenen (2001) have identified and combined the sectors where mitigating greenhouse gas emissions by municipalities in The Netherlands is possible, with task fields of the municipalities. In this respect, they have identified the possible instruments and ways how municipalities can influence feasible development in respect to greenhouse gas emissions. As this literature provides an understanding of the instruments that municipalities have in these fields, it lacks to do two things that are important in understanding why renewable energy sources are implemented through spatial planning projects. At first, it does not describe why in certain projects more is done than in others, as the possible instruments are the same. Also, it does not take the role of other levels of government into account, and the way how these levels influence implementation of renewable energy sources. The focus, thus remains to be at one level of administrations, as more levels play a role in the implementation of renewable energy sources. The possibilities that countries have, has been explored on national implementation programs, but attention to the local level in this multilevel governance framework is still not very high: *“Few articles have examined the implementation of policy in domestic contexts, given the different political and administrative structures and the trend towards decentralization of powers to provincial and local authorities”* (Gupta, 2007). Also Kern and Alber (2009) recognize that local authorities are not taken into the research very often: *“there are very few studies that take national programmes into account and*

analyze national multi-level systems and the conversion of national policy goals into local politics” (Kern & Alber, 2009, p.2). In this respect, understanding the implementation of renewable energy sources through local spatial planning processes, can provide the knowledge on how the broader institutional architecture is supporting or hindering the implementation of renewable energy sources in these local planning projects. Within this multilevel governance system, especially local authorities need attention, since it remains to be the level of implementation. As the level of implementation, it is also expected that local governments more and more contribute to certain levels of policy, since authority is shifting in the European governance system. In this governance system the supranational level gets more authority, as well local governments do (Kern&Bulkeley, 2009). This questions what possibilities and instruments municipalities have for achieving goals in reducing greenhouse gasses through spatial planning projects.

As effects of the changing climate are location specific, for the Netherlands these effects are expected to be a growing amount of extreme warm days, growing drought and more extreme precipitation (NEAA, 2005). As a reaction on these growing emissions and the concerns about the consequences of these emissions, initiatives and policy has been carried out. On several scales and levels different kinds of policy is set up, from international targets, to local initiatives. Since climate change is a global problem, international institutions have set a framework, where countries try to lower there emissions. Internationally, an important step was the creation of the United Nations Framework Convention on Climate Change (UNFCCC). As an international institution, the United Nations are concerned about world peace and socio-economic development. In this respect, besides economic and social development, also environmental became a concern of the UN. Due the fact that environmental (and climate change) threaten the way of living for many people all over the world. An important accomplishment is the ratification of the Kyoto protocol in 1997.

As shown in former paragraphs of the introduction, in respect to other European Countries, the Netherlands keep lagging behind in their attempts to mitigate greenhouse gas emissions and increase the share of renewable energy sources. As seen from the IPCC (2007), greenhouse gas emissions from the energy and residential sectors have risen greatly. Since countries themselves are responsible the type of response, as well as the fact that almost all sectors are responsible for greenhouse gas emissions, it is feasible to understand how the different sectors is deal with the implementation of renewable energy sources and greenhouse gas mitigating measures. Where the role of the national government might be to make agreements, the local level should be regarded as the place where implementation happens.

Both energy and climate change play an important role in achieving climate change targets through spatial planning. As energy is a theme that has gained an earlier attention within the academic literature on spatial planning as climate change has. While the role of spatial planning in achieving targets in energy policy has been debated from the 1980ies in the academic literature (for example Owens, 1986) the role of spatial planning in achieving climate change targets has come to play within the past 10-15 years. The literature that focuses on achieving climate change targets through spatial planning, has for example adressed the sectors where local authorities have influence over, such as Bulkeley and Kern (2004).

1.8 Climate Change research and related policy fields

Seen from the former paragraphs, spatial planning and the implementation of renewable energy sources is very closely linked with other policy fields. As the focus within this research lies at the implementation of renewable energy sources, also policy that derives from the energy sector may influence development. This means there is a thin line between the multiple policy fields in achieving a larger share of renewable energy sources. As, spatial planning focuses on the way how people are using or going to use their surroundings. These development also influence other policy fields.

When achieving targets in lowering greenhouse gasses, causes of these emissions are framed in sectors that are responsible for big amounts of emissions. In the report by the IPCC (2007) the options for action on mitigating greenhouse gas emissions are framed in several “societal sectors”. According to the report these are energy supply, transport, buildings, industry, agriculture, forestry and waste management. Also the National Climate Change action program of the Netherlands “*Clean and Economical*” has addressed 5 major sectors in which action needs to be taken. These are: built environment, energy, industry, traffic & transport and agricultural businesses and as well there are some other minor causes of emissions (VROM, 2007). The Dutch Climate Strategy “*Clean and Economical*” has addressed five major sectors where action can be undertaken for lowering energy use and mitigating greenhouse gas emissions. These are built environment, energy, industry, traffic and transport and agricultural businesses. Besides, some emissions remain to be uncategorized (VROM, 2007).

1.9 Structure and content

The following table shows how the research has been structured and what is the content of every chapter. As the table shows, the first chapter will elaborate on the context of the subject. This should provide an understanding in what context this research is done. Following, there are two chapters on theory. Both will provide a theoretical approach that will be used when analysing in the case study, which happens in chapter 6. Chapter 5 provides an understanding on what research methodology and research strategy is used, as well why this has been chosen. Finally, in chapter 7, conclusions and remarks on the theory are drawn.

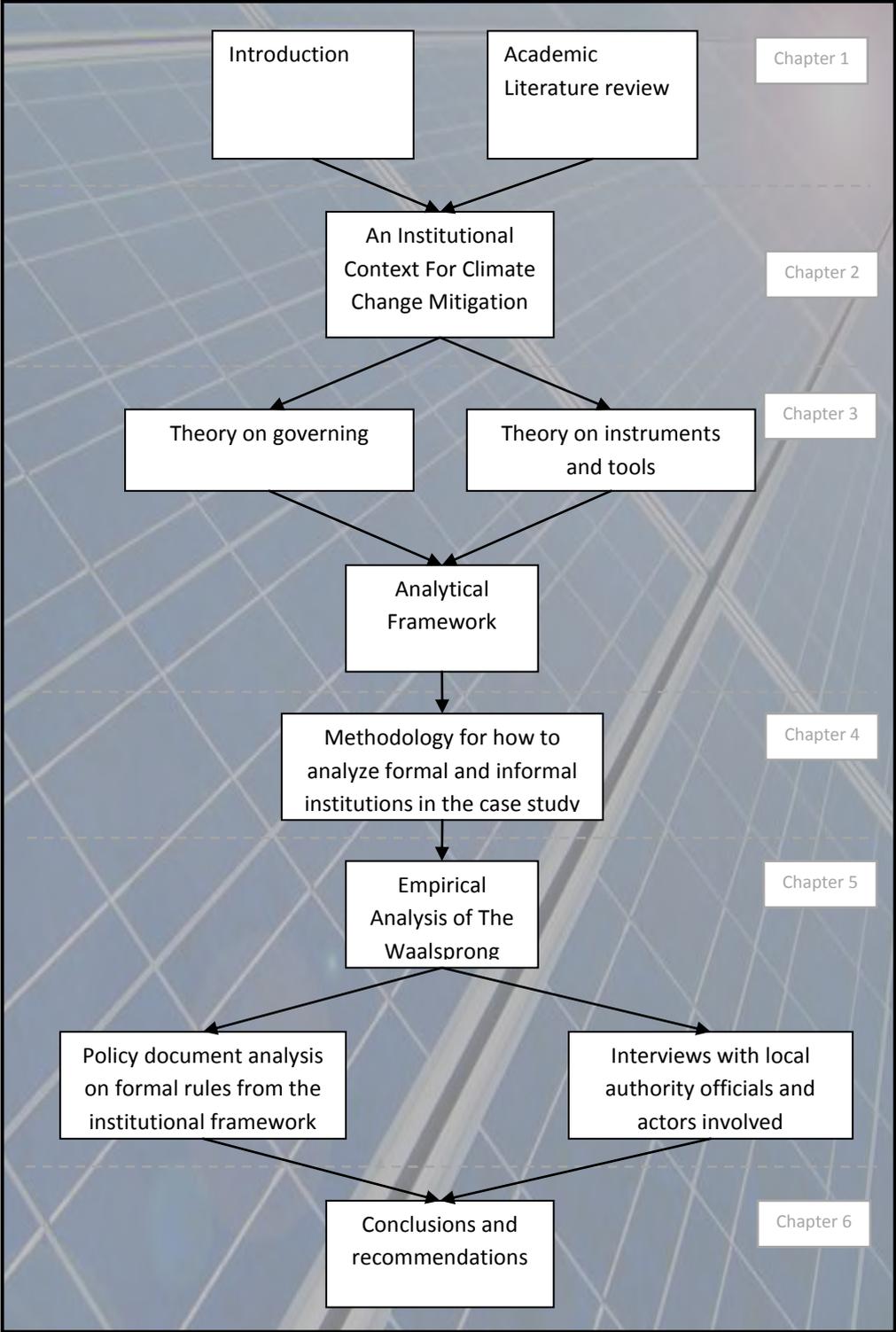


Figure 3. Structure of the research document (Source: Author's)

2. An institutional framework for climate mitigation policy through spatial planning in the Netherlands

Past few decades, climate change received more attention. Greenhouse gas emissions, such as CO₂ and methane are perceived to be the main cause of climate change. The Netherlands has signed the Kyoto Protocol, which is an international agreement on mitigating greenhouse gas emissions. Due to the fact that the Protocol is obligatory, the Netherlands is bound to the targets laid down in the Protocol. Consequently, also the European Union set out emission targets. As a member of the European Union, the Netherlands is also obliged to contribute to EU wide targets. It is the competence for the Netherlands itself to decide what measures will be implemented to achieve these targets. Since municipalities have considerable influence over spatial development within their territory, they can play an important role in mitigating greenhouse gases through spatial development. While municipalities have influence over their territory, spatial development is bound by the policy set out on the national and provincial level, and in respect to climate change, more and more on the European and International level. A description of this institutional framework for mitigating climate change, will provide an understanding in what institutional framework municipalities make spatial planning decisions, in respect to spatial planning and climate change. This correspondingly also provides an understanding why climate change targets are not being met in the Netherlands. Within this chapter, that institutional framework is described.

2.1 The United Nations and the Kyoto Protocol

As climate change is a global problem, global action is feasible. To successfully tackle climate change problems, all countries worldwide need to take action. The fact that most countries felt need to take action became clear in 1997, when the Kyoto Protocol was ratified. *“The need for global action is operationalized through the international legal agreements, namely the UN Framework Convention on Climate Change”* (Adger, 2001, p. 922). Within this protocol, countries have agreed on achieving targets in cutting or restricting greenhouse gas emissions. The institution bringing together all these countries is the United Nations. Concerning world peace and equal development, the United Nations (UN) came to exist in 1945. After this, the UN started to focus at other policy fields as well, such as environment and climate change. For addressing climate change issues, the United Nations Framework Convention on Climate Change (UNFCCC) was initiated. The ratification under the convention, led to the creation of three principles: joint implementation, clean development mechanism and the carbon market. These mechanisms set extra rules to the targets that countries have agreed on. In essence, countries have to achieve the largest part of cut in emissions in their own territory (UN, 1998).

The Netherlands have agreed to cut emissions with 8 per cent from the base year (1990). This cut in emissions has to be achieved in the period from 2008 till 2012 (EEA, 2007). The way how the Netherlands achieve this cut in emissions, is the decisions of the country itself, as long it complies with the agreements in the Kyoto Protocol. As the Kyoto Protocol has been a great step in international climate change policy, it has still been discussed. As the biggest emitter of the world, the United States, has not ratified the Protocol, its effects Also agreements and targets after 2012 remain to be absent. While it was expected that the Copenhagen conference in 2009 was going to

lead to new targets, this was not the case. New agreements on lowering emissions after 2012 is perceived necessary for mitigating greenhouse gasses worldwide.

The targets provide pressure for countries to achieve these targets. While these targets are not directly applying for local governments, it provides the a stimulus for taking on active climate policy by the national government. This subsequently, can lead to agreements between the national government and other levels of governing in how to achieve these targets. In the Netherlands, this has been done by making intentional agreements on cutting greenhouse gas emissions with lower levels of governing, such as the municipalities and the provinces.

2.2 The role of the European Union in mitigating greenhouse gasses

The European Union has officially been established in 1993, by the ratification of the Maastricht Treaty. Since this ratification, the competences of the EU have gradually grown. Where the EU mainly used to be an economic cooperation of countries, these days, the active policy sectors where the EU intervenes is much broader. At first, the intervention of the EU in environmental issues was justified as protecting unequal outcomes from the market: since environmental standards can influence production processes and a difference within these standards leads to unequal competition. Later on, this action of the EU was further institutionalised and developed. The competences of the EU are laid down in Treaties, these Treaties are the legal basis of EU policy. In the Single European Act (SEA), which was ratified in 1987, for the first time a chapter "Environment" appeared. Within this chapter, the European Community agreed that environmental issues are a task of the European Community. Revisions and further ratifications of Treaties, led to further integration of environmental policy as a competence of the European Union (Knill&Lieberink, 2007). Responsible for climate change policy is the Directorate General (DG) Climate Action, which takes up mitigation and adaptation policy. For mitigation policy, the main focus lies on setting targets, which is closely combined with energy policy (Boeters & Koornneef, 2010).

The effect that policy has that is introduced by the EU, depends strongly The effect of implementing policy that comes out of the EU depends strongly on what level it has been addressed. One footnote should be placed here, and that is the fact that many actions within the EU have an effect that crosses multiple borders. Within allocating what level is the appropriate one to address some problem to, an essential part of EU Environmental policy is laid down. Most of the times, this is done by the subsidiarity principle, which says that everything that can be done on the lowest level of governing, should be done at the lowest level. But the fact that many EU policy functions over borders asks also for environmental policy that accounts for everyone operating in that system. For example the market has been liberalized, with as consequence the free movement of people and goods. This means that also environmental standards should be the same across borders. The nature of the EU itself in this sense as an institution stimulating liberalized markets across borders, leads to environmental policy that also should account for all countries, and thus gets addressed to the EU level as well (Knill & Liefferink, 2007).

2.3 European Union climate policy and tools

So how can the EU play a role in mitigating greenhouse gas emissions through spatial planning processes? The EU has multiple tools to engage on climate change. The first important aspect is that the EU is able to create legislation. This legislation might not be focused at climate change directly, but this can be an outcome of environmental policy that focuses at health. In this way it can be an outcome of environmental policy focusing at an better living environment and not directly at climate change. Also does the EU produce visions on what development it finds feasible and it is a agenda setter in climate policy.

When the EU wants to show its ambitions in a field where it is not active yet, the EU creates a Green paper. Green Papers are papers without a legal basis, but they aim at introducing a discussion on the policy field. For climate change, a green paper on energy was adopted in 2006. This paper takes the shape of a strategy and pleads for a stimulating role of the EU in lowering energy use and pleading for less use of fossil fuels (European Commission, 2006). Besides green papers on particular issues, the EU also produces Environmental Action Programmes on broad environmental issues. These papers, also do not have a legal basis, but they ventilate the ambitions of the EU. The most recent one, the Sixth Environmental Programme, was produced in 2001. On Climate Change Policy it stated that the aim is to *“stabilise concentrations of greenhouse gasses in the atmosphere at a level that will not cause unnatural variations in the Earth’s climate”* (EC, 2001, p.5). The way how to do this is according to the document to set emission targets lower than 20-40 per cent of the level of 1990. This should be achieved by lowering energy use, as well as the use of green energy should be supported.

These visions and strategies can become the basis of further implementation of measures and policy. For example, the Green Paper on Energy and the Sixth Environmental Action Program have introduced some ambitions that are more or less led adopted in following policy, which were called the CARE package. In 2007 leaders and heads of states of the member states have agreed with the CARE package, that states that member states will cut greenhouse gas emissions with at least 20 per cent by 2020, with 1990 as a base year. Also energy consumption should be lowered with 20 per cent in 2020 and the share of renewable energy should increase to 20 per cent. These targets also came to known as the 20/20/20 targets, or as the EU climate and energy package (European Commission, 2010). To achieve these targets, the EU uses two main principles. The first instrument that plays a key role, are the emissions trading as introduced in the Kyoto agreement, the Emissions Trading System (ETS). This is actually the core instrument of EU mitigation policy (Boeters & Koornneef, 2010, p.2). The second is that the EU has used its competence to make this agreement a legal commitment, which obliges the member states by law to commit to these targets.

2.4 Dutch National Climate Policy

As described before, national governments make agreements internationally, mainly focusing at targets to reduce greenhouse gas emissions. At the same time, the national level is responsible for policy decisions to tackle emissions such as described under the subsidiarity principle. The Netherlands is a constitutional monarchy, with a three tier administrative structure: the national government, the provinces and the municipalities. Within this structure, the local level have a high degree of autonomy. Higher bodies supervise lower bodies. In this respect, municipalities are supervised by the national government and the provinces. For the latter, the main task is to supervise and coordinate (van Bommel & Kuindersma, 2008). The ministry concerning environmental

issues in the Netherlands is the Ministry of Housing, Spatial Planning and the Environment (VROM). The ministry is also responsible for Environmental tasks, thus also Climate Change. Since the national elections in 2010, the Ministry has been changed into the Ministry of Infrastructure and Environment. When referring to VROM, this will be what is the Ministry of Infrastructure and Environment is nowadays, regarding climate change policy.

As written in the introduction, The Netherlands is not the best example in Europe in respect to the share of renewable energy sources, nor as the achievement of emission targets. This is remarkable, since The Netherlands have been one of the earliest countries to make policy statements about climate change and emissions (van Bommel & Kuindersma, 2008, p.32). Unfortunately many of these targets and ambitions were not achieved. For environmental problems in broad sense, the Dutch governments has produced so called Environmental Policy Plans (Milieubeleidsplan). Within the Fourth Environmental Policy Plan of the Dutch Ministry (VROM, 2001), the Ministry sums up seven mayor environmental problems for the upcoming 20 to 30 years. It is a discussion paper, where it lays down the problems and possible solutions for environmental issues. One of them is climate change. Within the document, the Ministry acknowledges that urgent action is needed, since it can have a catastrophic impact on several sectors in the whole world. The document has been followed up by the national climate strategy "*Clean and Efficient*". Within this strategy a program to combat emissions is presented for the years 2007-2011(VROM, 2007). The Dutch National government has taken over the targets set in the European Union, but instead of 20 percent, the government aspires a greenhouse gas reduction of 30%. Within this strategy, the government shows by which sectors and which means it wants to lower the emissions. Equal as the ambitions of the EU, the main focus lies on energy conservation, a larger share of renewable energy and innovation (VROM 2007). To achieve targets as stated in the national strategy, the government has multiple ways for achieving their goals. One of this, is collaborating with lower governments. The Dutch State made an agreement with the Association of Dutch Municipalities. The latter functions as the body speaking for the municipalities of the Netherlands. This '*Climate Accord*' has been made in 2007. In this document, which is not legally binding, the municipalities agree to cut carbon emissions and lower energy use, as stated in the "*Clean and Efficient*" program. The agreement focuses on six points: sustainable government, sustainable energy production, clean and economical mobility, energy efficient build environment, sustainable (agricultural) businesses and climate proof environments (adaptation) (Staat der Nederlanden & VNG, 2007). This is the basis for climate policy in the Netherland, from this financial tenders are provided, but remain to be voluntary.

2.5 Spatial planning in the Netherlands

In the Netherlands, multiple levels of the government concern spatial development. In the case of new built residential areas, especially municipalities play an important role. Municipalities can influence spatial development by multiple planning instruments. These instruments will be explained later in this paragraph. While they may influence spatial development, the locations and choices that municipalities make, have match with national policy and programs. In the Netherlands, the national government creates a national spatial plan, which is the basis for spatial planning policy in the Netherlands. Furthermore, all levels are obliged to create some policy documents that match with national policy.

From the 1990ies the way how local area development takes place, has been changed. From then on, municipalities had to cooperate more with other parties, such as developers: *“New is the ambition to let the market and market parties play a more significant role”* (Needham, et al., 2000, p.1) (translated by the author). This change in policy comes from the Vinex, which stands for *“Vierde Nota Extra”* (Fourth Note Extra). This was the National Planning Strategy and was presented in 1993 (Needham et al., 2000). The main goal was to achieve a higher production of housing. The perspective that it presented, as said, focused at the incorporation of market parties. This is also understood from the evaluation of the Vinex, which says that an important change in the Vinex is *“the sharing of advantages and burdens of urbanisation between government and market”* (VROM, 2005, p.45) (Author’s translation). Due the fact that these market parties started to play a major role in local area development, the way how the development of the Vinex is typologized as a negotiation model (VROM, 2005: Needham et al., 2000).

Spatial Plan

The first tool is the Spatial Plan (Structural Visions). These Spatial Plans are documents where the authority states what it sees as feasible development. For all levels of authority (National, Provincial and Municipalities) it is obliged to create a Spatial Plan. At none of the levels this Spatial Plan is National Government is obliged to create and adopt one or more Spatial Plans (structural visions). Such Spatial Plans should contain a vision of what the authority sees as feasible development and how it sees the development being achieved. Everything that is stated within this Spatial Plan has an indicative meaning and no legal status, since it can not contain any acts (Van Buuren et al., 2009, p. 24-25). Even though it has no legal status, the Spatial Plan is the basis for spatial development for every level of authority: from the national to provincial and local. It is thus also a key instrument to steer spatial development. Spatial Plans will be in function for 10 years, then they need to be updated. Any Spatial Plan that is from before 1 July 2008, when the new spatial act came into force, will remain to have its status as it had (van Buuren et al. 2009, p.385). This means that some Spatial Plans still are legally binding.

Integration Plan and Land Use Plan

The far most important instrument for influencing spatial development is the land Use Plan. The land use Plan is mainly used by the municipality. Within this plan, municipalities can apply different zoning and regulations to the use of land. The land use plan has three main functions. The first one is the planning function. What the municipality sees as feasible development should be in the land use plan. It should be an idea of development into the future, without realizing an end state plan. It should embody the position of the municipality according to certain development. The second is the development function. In this idea, the development function should show how municipalities actively are engaging in spatial development and how they are doing this. In this respect, the land use plan should display what tools the municipality is willing to use to achieve certain development for projects in which the municipality plays a role. The third and final aspect of the land use plan is the standardizing function. Within a land use plan, certain restrictions can be applied to the use of land and buildings. These restriction account for the government as well other users. This contains the most legally binding decisions of the plan (Van Buuren et al. 2009, p.30-31).

Regarding other aspects then spatial planning in the Land Use Plan is a different story. Environmental aspects, as which mitigating greenhouse gas emissions could be considered, are not to be taken up in the Land Use Plan. According to the jurisprudence and the fact that there is an Environmental Act,

Emissions are part of Environmental Policy. Because there are certain emission standards and specific environmental policy, these aspects do not belong in the land-use plan (van Buuren et al. 2009, p.51). But, in reality, the land use plan can include some environmental standards. Due the fact that there are some environmental norms set out (many as part of EU environmental policy) for water quality, air quality (including smell) and sound issues, these aspects can be taken up in the land use plan. The reason for this, is that this can have effects for granting permits and exemptions (van Buuren et al, 2009, p.54-55). So it is necessary to link the environmental standards and aspects to spatial development. This can also be shaped into zoning regulation, for example with (agricultural) businesses that have an extensive odor.

For the National and Provincial level, also land use plans can be made, which are to be named Integration Plans. Since this is a new instrument since the new Spatial Planning Act, it is not yet very clear how the instrument will be used. But these plans can only be used, when a clear National or Provincial interest is involved and made clear (van Buuren et al, 2009, p.435).

Project decision

A project decision can be used for spatial plans that are aberrant of the land use plan. In this way, a start can be made with a project that exist out of one or more buildings, where the land use plan can be changed later. The local Council can make the decision for a project decision. The decision should be strongly spatially motivated and the land use plan should be adapted to it over time (van Buuren et al., 2009). Still, also this instrument s to be used for spatial planning goals solely.

From this paragraph, it can be understood that municipalities have considerable influence over their territories, by applying zoning ordinances as well as setting rules to specific development. While there are more ways how municipalities may influence spatial development, the former are the most important instruments that have to be considered.

2.6 Concluding paragraph

This chapter shows that multiple levels are involved in mitigating greenhouse gas emissions. While binding targets are set at the international levels, national governments create their own program for achieving these targets. Depending on the national program and the way how they approach the problem, possibilities are provided to particular institutions and levels of governance. The way how the local government frames the issue, will determine the possibilities that local governments and other actors involved in the process have. Besides this important role of the National Government, also rules can derive from the European Union. While this kind of rules may take a while, they will ensure implementation over the whole EU. Due the fact of sovereignty, National governments remain to have the most influential position. The Netherlands tries to achieve this goals through the local governments by making covenants, where municipalities voluntary agree to cut greenhouse gas emissions. From this, financial programs derive. This questions what possibilities local governments have in achieving these goals at the local level.

3. Institutions, rules and instruments

Former chapters show that, at multiple levels, responses have been created over time to combat greenhouse gas emission. At the international level, institutionalisation has led to setting targets for mitigating greenhouse gas emissions: *“An institutional architecture has been created of formal rules, instruments and negotiating structures for achieving mitigating targets”* (Klosterman, Gupta & Biesbroek, 2009, p.18). In this way, at the international level, actors try to achieve these goals. But as seen from the multilevel governance perspective, achieving goals such as mitigating greenhouse gas emissions, also demands local action. At the sub national level, in everyday development, the municipality is the governmental body that plays an important role in spatial planning projects, while other policy fields such as energy and climate change also determine the framework for local municipalities with respect to mitigating climate change. Rules that are set out from other levels can determine the outcome of these local projects. Municipalities may also have to comply to some rules, or can apply rules in spatial planning projects. The rules that come from multiple institutions influence spatial development and the implementation of renewable energy sources. These rules, such as laws or procedures, did not evolve suddenly. Nor will they remain to be the same. To understand the way institutions work, tools are required to analyze the way how the current institutional framework functions. In this chapter, the definition of institutions will be explained, as well the way they can play a role in governing climate change in spatial planning projects.

3.1 Institutions

Institutions can be understood as *“systems of established and prevalent social rules that structure social interactions”* (Hodgson, 2006, p.2). In essence, institutions are rules where people comply to when undertaking action. The process of institutionalization in this respect can be described as *“the phenomenon whereby patterns arise in people’s actions, fluid behaviour gradually solidifies into structures, and those structures in their turn structure behaviour”* (Arts, Leroy & Tatenhove, 2006, p.96). The institution is thus steering or changing behaviour. Also Buitelaar et al. (2007, p.894) recognize institutions in spatial planning in this perspective: *“Institutions provide meaning and frames of reference that help to orientate and steer behaviour”* or as Healy (2007, p.3) describes they are *“frameworks of norms, rules and practices which structure action in social contexts”*. Considering North’s definition, interactions between people also appear to be of importance in describing institutions: *“Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction”* (North, 1990, p.3).

Within spatial planning and climate change, interactions between actors are determined by the rules that come out of the institutional framework, as well as rules that are set by local actors involved in the planning process. The way these social rules are shaped, consequently depends on how they shape behaviour.

3.2 Multilevel governance

Institutions of different levels play a role in mitigating greenhouse gasses. Both local authorities as well as authorities at the provincial, national and international level play a role in setting rules for implementation. As the government plays an important role in achieving these targets, it is questioned how this governing takes place in such a multilevel governance system. The term

“governance” does not imply “government”. Governance is a term that covers a broader understanding of achieving goals in the public interest. Healey (2003) says that “ *‘governance’ is used to convey the array of mechanisms for structuring collective action, whether by government, by business associations or by associations arising from within civil society*” (Healey, 2003, p.7). This means that there are “*established patterns of rule without an overall ruler*” (Bomberg & Stubb, 2003, p.9). With respect to this, public issues are addressed through this governance framework, where multiple levels of governing influence socioeconomic development. The degree of influence depends on the subject or issue at hand. This means that the national government is not always the only or main actor concerning public issues, nor is the municipality at the local level where implementation may take place. Even decisions on the European level may trigger local action. Multilevel governance systems are characterized by the fact that “*power is shared between the supranational, national and subnational level*” (Bomberg & Stubb, 2003, p.9). Also Kern and Bulkeley (2009) explain multilevel governance systems in such a way that different levels, local, national and supranational get involved. The government in this respect, can use their traditional ways of governing like regulation, but non-regulative instruments should be considered in this system, as this ability of governments comprises a wider range of governance and actions. With respect to these possibilities and actions for climate change mitigation, the institutional framework differs between countries. Even countries that may be in the same sort of economic development, can differ considerably in their institutional structure (Fischer et al. 2007).

From this paragraph it is understood that multiple levels of governing can influence the implementation of renewable energy sources at the local level. For that matter, the way how these levels influence implementation may be just as important, as the role of the municipality itself.

3.3 Actors and competences

Since governance implies that goals are achieved through cooperation between governments and other actors, questions may arise on what actors may be involved in local area development and what their role is. Van Tatenhove and Leroy (2003) distinguish three different type of actors: the market, state and civil society. These three actors are expected to follow their own rationalities. “*The concept of ‘early political modernisation’ reflects a relative insulation of state, market and civil society, each sphere functioning according its own rationales: bureaucracy, competition and solidarity respectively*” (Van Tatenhove and Leroy, 2003, p.160). In this respect, the government concerns public problems, such as environmental problems as climate change and market parties are expected to strive for financial gains. Although their emphasis is on political modernisation and policy arrangements, it shows how actor’s rationalities get intertwined when working in different kinds of arrangements. Seemingly, this is also a necessity for achieving environmental goals through a more governance approach, where municipalities have to cooperate with other parties, using softer instruments to achieve their goals. When government is expected to govern particular issues, the question is how the government then governs or can govern the emission of greenhouse gases.

In newly built residential areas, mainly three different types of actors are involved. These are the municipality, developers and housing corporations (Kalt, 2006). Based on theory on the different types of actors, these actors are expected to follow their own rationalities and focus on their goals. In this respect, it can be assumed that the municipality is expected to function in the public interest, achieving environmental and spatial planning goals. Developers are expected to focus on making profit and housing corporations to fulfil a social role: providing affordable housing (Kalt, 2006).

Assuming that some actors may not directly have a goal in mitigating climate change, does not mean that they are not willing to comply or put effort in achieving lower emission development. Depending on the rules that are set as well as how this could benefit actors such as market parties, implementation might be perceived feasible or not by these actors. This leads to questions regarding how institutions that are involved in spatial planning and climate change set rules for mitigating greenhouse gas emissions and the implementation of renewable energy sources.

3.4 The emergence of formal and informal institutions

As seen from the former chapter on the institutional framework, it is shown that institutions play an important role in climate change policy and spatial planning. The nature of institutions determines their role and the way how the institution influences development. As seen from the definition of institutions, an important matter is the way social rules come to exist and consequently influence behaviour again and may become formal institutions. Hall and Taylor (1996) elaborated on “New Institutionalism” which gives a good insight in three ways of how institutionalism can be understood. As Hall and Taylor (1996) describe, within the “New Institutionalism” these three different types of analytical approaches are: historical, rational choice and sociological institutionalism. To understand the nature of these three types of institutionalism, Hall and Taylor (1996) divide two different approaches that are applicable to analyze the institutionalism. Institutionalism can be understood from the calculus and the cultural approach. The calculus approach explains institutionalism from the perspective that human behaviour is instrumental and strategically calculated. Adhering to the rules will make people better off than deviating from them. From this perspective, institutions provide *“greater or lesser degrees of certainty about present and future behavior of other actors”* (Hall & Taylor, 1996, p.7). The cultural approach explains the existence and persistence of institutions based on the fact that they connect to people’s worldviews and norms. With this in mind, the three institutionalisms are explained.

The first institutionalism, historical institutionalism, understands institutions as a process that happens through time and leaves a historical path. Decisions made in the past will create a path for decisions in the future. These past decisions could be made, because of the fact that they were the most effective (calculus) or because they were perceived as the best solution (cultural). The historical paths that come to exist possibly change, when a critical juncture occurs (see paragraph 4.7). Rational choice institutionalism describes the creation and continued existence of institutions the choice that yields most will always be opted for. Behaviour is then understood from the calculus approach: the option that provides the maximum gain or fits the problem the best remains. In most cases, the remaining institutions are the ones with the lowest transaction costs (administrative, financial or effort) or the most effective ones. Somewhat opposite of the rational choice perspective is sociological institutionalism. Sociological institutionalists explain the existence of institutions from the fact that people have a certain worldview and from that worldview, make their decisions. Institutional solutions that are perceived as feasible are chosen, even when they may not be most effective. This approach is completely based on the cultural aspects of institutionalisation and does not pay any attention to the calculus approach.

The approaches as described in the New Institutionalism by Hall & Taylor (1996) show that institutionalism can be understood from cultural and calculating approaches. These institutionalisms shed light on how institutionalism takes place, while they are not mutually exclusive. Both cultural

and calculating aspects play an important role, and change over time. This also leads to questions how institutions change over time, and how this can be understood.

While institutions are social rules in essence, these rules can be of different natures. While both cultural and calculating aspects provide the possibility to understand institutionalism, it does not provide an understanding of how institutions function or play a role. Institutions can set or change rules, but these rules can be economical, regulative, unwritten etc. Also, the way these institutions function, depends on how they are implemented and at what level. From literature, the distinction between two different types of institution are made: formal and informal institutions. Formal institutions can be seen as “constitutions, laws, organizations, regulations, plans and programs of action” (Alexander, 2005, p.213). Or, as North (1990, p.47) describes: “Formal rules include political (and judicial) rules, economic rules, and contracts”. In this respect, formal rules and judicial rules include powers that are assigned to certain authorities or plans. Informal institutions are “like values, conventions, and codes of behavior”(Buitelaar et al., 2007, p.891). Informal policy involves practices that influence the process and thus the outcome, but do not have any legal power nor do they have to be a standard or written down. If this is not the case, and a rule is more or less socially expected, it is a norm or habit. Hodgson (2006) prefers to make a distinction between legal and non-legal or between public and tacit institutions. Hodgson (2006) states that a distinction between tacit and public or legal and non-legal shows a clearer deviance between what exactly is legal or non-legal and public or tacit. In his perspective, the distinction between formal and informal institutionalisation

<i>Type^a</i>	<i>Public/formal</i>	<i>Tacit/informal</i>
Performative	<u>Transactions¹</u>	Episodes <u>Events</u> <u>Customary behaviors</u>
Structural	‘Cultural’ institutions <i>Laws</i>	‘Ontological’ institutions <u>Norms</u>
[Agency, process]	<i>Rules/regulations</i> <i>Standards</i>	<u>Habits</u> <u>Practices</u>
[Structure]	<i>Governments</i> Markets: <i>‘hybrid’ markets²</i> <i>artificial/quasi-</i> <i>markets³</i> <i>Interorganizational</i> <i>networks⁴</i> <i>Organizations</i>	<u>Knowledge/world-views</u> Languages ‘Games’ Informal social networks Associational/kinship networks

Figure 4. Formal and informal agents of institutionalization. (From: Alexander, 2005, p.216)

remains vague. However, making a distinction between legal and non-legal, will categorize some legal institutions, and leave everything else in a different category, while there are many other institutions with influencing behaviour. Formal and informal institutionalisation provides the possibility to understand behaviour from a broad perspective: laws and procedures, as well worldviews and codes of behaviour. Hodgson (2006) discusses the terminology “formal” and “informal”, as he suggests that some perceived informal practices are very formal indeed. This, he

rather determines as tacit or public institutions. But the terminology of tacit and public institutions embraces the same issue. Some institutions are arguably not specific tacit or public. In this research, the terms are used as in much of the consulted literature, which remains to be the distinction between formal and informal institutionalisation.

Formal and informal institutions imply that there are different types of elements that can be classified as one of both. The table from Alexander (2005) shows what elements of institutional interactions between actors are part of institutional design and could be classified as formal or informal. While some rules may be economical and others political, there is a counteraction between both. *“Broadly speaking, political rules in place lead to economic rules, though the causality runs both ways.”* (North, 1990, p.48). In figure 2, the italic words are agents of institutional design (more on institutional design on paragraph 4.7) These are designed to deal with issues at hand. These agents interact with or impact the underlined institutions. Both formal and informal institutions can have a great effect on how certain developments, or processes take place. Both formal and informal institutions involve institutional design, although informal institutionalization may sometimes seem to evolve more spontaneous, since it does not involve written rules or codes (Alexander, 2005, p.213). But this does not say anything about the effect it has on the process and the involvement of institutional design.

The institutionalization of rules, whether they are formal or informal, may gradually evolve over time, but it also incorporates some patching and designing of shaping these rules. For example, land use policy in the Netherlands by municipality is very common. It is accepted that municipalities are involved in active land policy. Although it is the task of the municipality to manage spatial development, actively buying land is not a formal task, but an informal way of achieving a certain end: perceived feasible spatial development. Although it is not formal, the outcome of the process is strongly influenced by this informal policy (Buitelaar et al. 2007, p.902-903). These formal and informal policies can arise over time, but still need institutional design. *“The evolutionary transformation of institutions, informal though it may be and however spontaneous it may seem, also involves institutional design”*(Alexander, 2005, p.213). That fact that formal and informal institutions are closely interwoven seems clear. But the shaping of formal institutions does not occur by coincidence, it needs specific institutional design, while the cause of this need may be institutional evolution of informal institutions: *“In retrospect we can recognize that institutional design was invoked (whether consciously or not) in the creation and implementation of all formal institutions (constitutions, laws, organizations, regulations, plans and programs of action) that did not evolve (as many did) spontaneously or informally”* (Alexander, 2005, p.213). The notion that evolution also needs some kind of design, leads to question what the solution for achieving institutional change could be. This example shows that in day-to-day practice, formal rules have to be followed, but they might not always be the first rules that are followed. Or, as North says: *“Underlying these informal constraints are formal rules, but these are seldom the obvious and immediate source of choice in daily interactions.”*(North, 1990, p.36). This means that both formal and informal policy or institutions play an important role. For this research, this means that when analyzing the institutional framework, both formal institutions and their role, as well as informal institutions need to be analyzed. As seen from their definition, formal institutions are regulations, markets, governments and organizations. Analyzing the former in the field of spatial planning and climate change policy, will provide the formal institutional framework that supports or hinders implementation of renewable

energy sources. Implementation and day-to-day practices take place at the municipal level, which is where informal practices play an important role in using or implementing formal rules.

3.5 Governing climate change

The use of formal rules can differ, as due to informal practices. Within the multilevel institutional context, how can authorities influence development in such a way that it leads to a decrease in greenhouse gas emissions and the implementing of renewable energy sources? As has been discussed before in this chapter, government plays an important role in mitigating greenhouse gas emissions. The (local) government has multiple tools for mitigating greenhouse gas emissions and controlling spatial development. Depending on how the authority uses them, will classify the way of governance. Bulkeley and Kern (2006) (and later: Kern & Alber, 2009) have distinguished four modes in which local governments can be classified for governing climate change. Both have used this classification for analyzing developments in the United Kingdom and Germany. While the planning system in the Netherlands is different than both of these countries, the modes of governing focus at a type of governing that is most dominating. There is always a most dominant type of governance. The four modes are self governing, governing through enabling, governing by provision and governing by authority. Self governing means what governments can do to lower their own emissions, being consumers themselves. In newly built residential area development, it puts the way how municipalities deal with other actors involved in the process into question. This is why this type is not of any relevance for the questions addressed in this research.

Governing by provision focuses on the direct supply of services by the municipality. Since in many European countries the provision of services like water, energy and public transport has become liberalized, this is a domain where municipalities in many countries do not have much influence anymore (Kern & Alber, 2009). This means that municipalities have to achieve their goals through different ways, such as by argument and persuasion: municipalities cooperate and make agreements with liberalized parties. This leaves provision by municipalities in many cases merely involves providing the infrastructure. Governments using their influence by persuasion and argumentation, is described as governing through enabling. Governments can participate in initiatives with private actors in a public-private partnership to establish a better cooperation. This can lead to more effective or efficient development of projects. Also, strategies and plans that ventilate the municipality's ambition and vision can influence visions of actors involved. Throughout time, this governing mode has become very common: "*Most governments restrict themselves to enabling modes of governing*" (Kern & Alber, 2009, p.1). In this mode, the local government encourages other actors to take steps that are perceived as in the public interest. The municipality acts as a facilitator, that informs and tries to convince other actors.

While there may be a shift towards more enabling modes of governing, municipalities remain to have regulative or legislative measures. In the case of governing by authority, the local government used its legal power to regulate or restrict behaviour. This mode of governing is not always easy, because the implementation of some regulation requires political commitment and facing the opposition of actors within the municipality (Kern & Alber, 2009). Examples of regulation are new building or housing standards that have to be met within the municipality.

With respect to the shift of governance towards a more enabling approach, it is to be expected that many municipalities do perceive some actions that can be solved by the market, not as being one of their tasks. Also, regulative measures, that restrict behaviour or obliges other actors to

do something, is not always perceived as the best solution. While a mix of instrument will remain to exist, the preference in tools will likely not be regulative or in the area of governing by provision. This shift in governing has also been seen in The Netherlands, as seen from the Vinex policy as described in chapter 2. This is also important for understanding spatial projects that are currently being developed or have just been developed. This change in governing implies that municipalities have to work with other parties involved, when developing newly built residential areas.

3.6 Instruments in spatial planning

As governments can use multiple modes of governing, they use particular instruments. As there are formal and informal rules, what formal rules and instruments can municipalities use for governing? In this respect, what formal instruments are available to spatial planning and climate change? As Hall and Taylor (1996, p.7) point out: *“Central to any institutional analysis is the question: how do institutions affect the behavior of individuals?”*. To achieve their goals in spatial planning, municipalities have different types of instruments and tools available. How they use them, determines the way of governing (see next paragraph). For spatial planning, Davoudi (2009) distinguishes four different types of tools and instruments: strategies and plans, regulatory measures, consultation and collaborative practices, and resource mobilisation. Despite the fact that Davoudi (2009) uses this typology for the planning system in the United Kingdom, they are also applicable to the Dutch planning system. The difference may be in the strength of particular instruments, or their juridical consequences. For all of these tools, explanations of what they encompass. The first category, strategies and plans, might need to be explained in more detail, because it entails several different tools. In this distinction, Davoudi (2009) draws on Hopkins (2001). Plans can take different shapes, they can be an agenda, a policy statement, a vision, a design or a strategy. When taking the first, an agenda, this implies the creation of a “to-do” list. Moreover, it means that there is an effort in taking action, committing others to discuss these issues. Although agendas might imply the effort to do something, they are not objectives. Besides agendas, there can be policy statements. These are a way to standardize decision making. Instead of making a new decision for every similar case, a policy statement offers an equal solution to the same kind of situation. The policy does not have to be a regulatory measure, since it does not imply a change in legal or administrative rights. It only gives a standard response to the similar situation (Hopkins, 2001, p.38). A vision differs from a policy statement, in that it focuses at a particular outcome, despite the means. A vision is able to shape the mind of actors involved in a process as perceived outcomes, while designs are outcomes that are fully worked out. A design functions in such a way, that it focuses to create an end state situation and adjusting all individual interdependent actions according to it. The design is presented as the outcome of a combination of these actions but created prior to these actions and thus focuses primarily on outcomes. Designs try to solve problems before taking actions. In many cases, designs need to change throughout the process. The final type of document can be a strategy. The strategy is a combination of decisions and actions that create a path through multiple possible decisions. In this decision tree, actions and decisions are based on different situations and possible outcomes. A strategy takes on different paths, where with every path action is taken depending on the situation of that moment. These different options are considered and discussed prior to the moment of happening, anticipating possible future action. This way, strategies are in their essence very complete, taking into account possible actions, their interdependencies, outcomes, uncertainties and intentions. This is somewhat of the opposite to a design, which focuses

on the outcome and encompassing that decisions can be made in one single action, where a strategy implies a more incremental approach, i.e. sequentially making decisions and taking action. Agendas, policies and visions can be part of a design or strategy. The target asking for the need of creating a agenda, followed by creating a stray which includes policy making and a vision.

Regulatory measures in general are binding; they have a legal consequence. This means that the effect of regulatory measures is very strong. There are two types of regulatory measures that can be distinguished according to Davoudi (2009). The first type is developmental regulation. Developmental regulation entails setting higher developmental standards for achieving better quality in particular developments, which mostly goes hand in hand with a better quality of life. This type of regulation are for example includes standards to ensure minimum sizes for living areas, or the obligation to have windows in houses. The second type of regulations focus on protecting assets and environmental issues, which are protective regulations. Protective regulations try to prevent negative outcomes, which are sometimes also referred to as externalities. Protective regulations can for example be a maximum standard of emissions. Depending to given competences, levels of government are able to enforce regulations. This in respect justifies a level of government to take action and regulate within certain fields (Hopkins, 2001).

Another instrument that municipalities may use is the consultation of and collaboration with other parties. Such practices are used to create a greater understanding of issues at hand and may create partnerships. In many situations, this practice goes accompanies other practices, like resource mobilisation. These kind of tools provide the possibility to inform other actors about their functioning, without using hard tools. Collaborative practices can also involve other actors and can stimulate them to take steps into desired directions.

Resource mobilisation refers to gathering human and financial resources. Financial resources take an important role in resource mobilisation, in such a way that they can be used for investments in the physical environment or in human resources. Human resources can also be mobilised without directly using a higher amount of financial resources, for example by shifting tasks or by involving different stakeholders as described in consultation and collaborative practices. (Hopkins, 2001).

Within this research, the instruments as described, will be used for analyzing formal rules within the current institutional framework. This will show how formal rules influence the implementation of renewable energy sources in newly built residential areas. This will be linked to the multiple levels of the institutional framework and actors involved in the local area development, so a conclusion can be drawn in the way how these rules work and have effect. When combining the use of instruments with the modes of governing, a possible link can be made between the current shift to more enabling modes of governing, as described in the former paragraph, and the instruments used.

Modes (Bulkeley & Kern, 2006)	Instruments (Davoudi, 2009)
Enabling	Consultation and collaboration Strategies, plans and visions
Authority	Regulatory measures
Provision	Resource mobilisation

Tabel 1. Source: Edited by the author; based on Bulkeley and Kern, 2006; Davoudi, 2009.

Since instruments are specific tools, the modes of governing describe a more general tendency of the way particular instruments are most dominant in application for using governing goals. When

connecting the instruments to the modes of governing, the most dominant use of instruments can be linked to a more general trend. Strategies, plans and visions are a part of the enabling mode, while their legal basis may determine in how far they have effect on other levels of government or other actors involved. These strategies, visions and plans may provide the basis for further policy, such as regulations and financial programmes. It is to be seen that when combining both, the instruments that Davoudi (2009) described, are very useful for analyzing what instruments are used in day-to-day practices, achieving goals set by the municipality.

3.7 Institutional Change

As modes of governing and instrument change over time, institutions change. Instruments and institutions may not serve the issue at hand. When this is the case, institutions may undergo some pressure from inside out, or because of the societal need for change. To understand and discuss the institutions currently in place, and the rules they provide and instrument that local authorities have, these instruments and structures are put into question. Analyzing the current institutional structure, is what Buitelaar et al. (2007) call "*institutional reflection*". From literature two analytical perspectives explain changing institutions: institutional design and institutional evolution. The former is the idea that institutions are deliberately created to solve an issue. Institutional design is about "*the devising and realization of rules, procedures and organizational structures that will enable and constrain behaviour and action so as to accord with held values, achieve desired objectives or execute given tasks*" (Alexander, 2005, p.213). But even when some institutions are designed, does not explain why some will remain to exist over time, and others do not. The second approach is the idea of institutional evolution, that assumes that institutions change over time. These perspectives are closely related to the institutionalisms that derived from Hall and Taylor (1996). Both institutional design and evolution are part of explaining changing institutions. While choices in institutional design depend on the perspectives in society at the issues and the solutions at hand, also the felt need for change from society plays a role. Buitelaar et al. (2007) explain this using the work of Kingdon (1995), who explains the transformation of policy by three different streams. These three streams are "*(a) the societal problems that are conceived important, (b) the policy solutions at hand [for example, suggestions of institutional (re)design] and (c) political endorsement and action*" (Buitelaar et al., 2007, p.896). Even within the approach of institutional evolution, institutional design takes a role, as even in history choices were made and created to deal with issues at hand. Or as Buitelaar et al. (2007) state: "*Institutions thus result from a historical path that is punctuated by acts of purposeful design*" (Buitelaar et al. 2007, p.893).

Institutional design and perceived solutions for the problems at hand can be of two types: instrumental responses may be the most effective or they may be perceived as the best solution within the current institutional structure. The first is what is called logic of instrumentality, which thus focuses on the solution that deals best with the issue at hand. The latter is understood as the appropriate fit, which entails taking the current institutional structure into account and testing whether the solution at hand fits best within this structure.

For this research, institutional reflection and design play an important role. As current institutions and instruments may or may not address the issues with respect to mitigating greenhouse gasses in a feasible way, the role of the status quo is put to question. This institutional reflection then questions the design of instruments and institutions, and also may lead to possible perspectives on feasible (re-)design of the institutional framework and instruments.

3.8 Conclusions and conceptual model

From this chapter, the role of institutions in spatial planning and climate change is described. What can be concluded, that in essence, institutions influence or change behavior by creating rules. While all rules for that matter are social rules, these rules can be formal or informal. Formal rules are the written rules that influence behavior. To influence behavior by formal rules, from literature, it can be seen that there are mainly four types of instruments that institutions may adopt. Some of these rules may directly be applied for newly built housing area development, while others may be tools provided to the municipality. When the latter is the case, implementation and use of these rules, depends on how local authority officials use these rules. This again, also depends on the actors involved in the process and how these actors play a role. The way municipalities in their turn use the instruments then again, may determine the outcome of local area development.

The current institutions framework may leave room for improvement. This demands reflection on current institutions, rules and instruments involved in spatial planning processes. Whatever this improvement may be, depends on the way the rules have effect at the local level. The perception on the design, will provide perspective on possible changes for the institutional framework.

The conceptual Model

The conceptual model derives from the literature review and the theory used for this research. It presents the relation between different parts of the theory in this research. First, the institutional framework and rules that derive from multiple levels and three policy fields, are mapped out. This will show how the institutional framework plays a role in setting rules that influence mitigating greenhouse gas emissions at local newly built residential areas.

Some institutions may directly have an effect at the local level. Some rules may be implemented through other levels. When the latter is the case, implementation of rules depends on how this is done at the local level. Also the municipality itself is able to create rules, or make decisions on land use and/or climate change and energy infrastructure. The choices that are made at the local level, in turn, may depend on the provision of rules from other levels.

As the local level is the implementation level, actors that are involved in this level have an understanding what the shortcomings of the institutional framework are for implementing renewable energy sources in newly built residential areas. From this perspective, they are able to reflect on the current institutional structure and possible suggested improvements in the current institutional structure (institutional design).

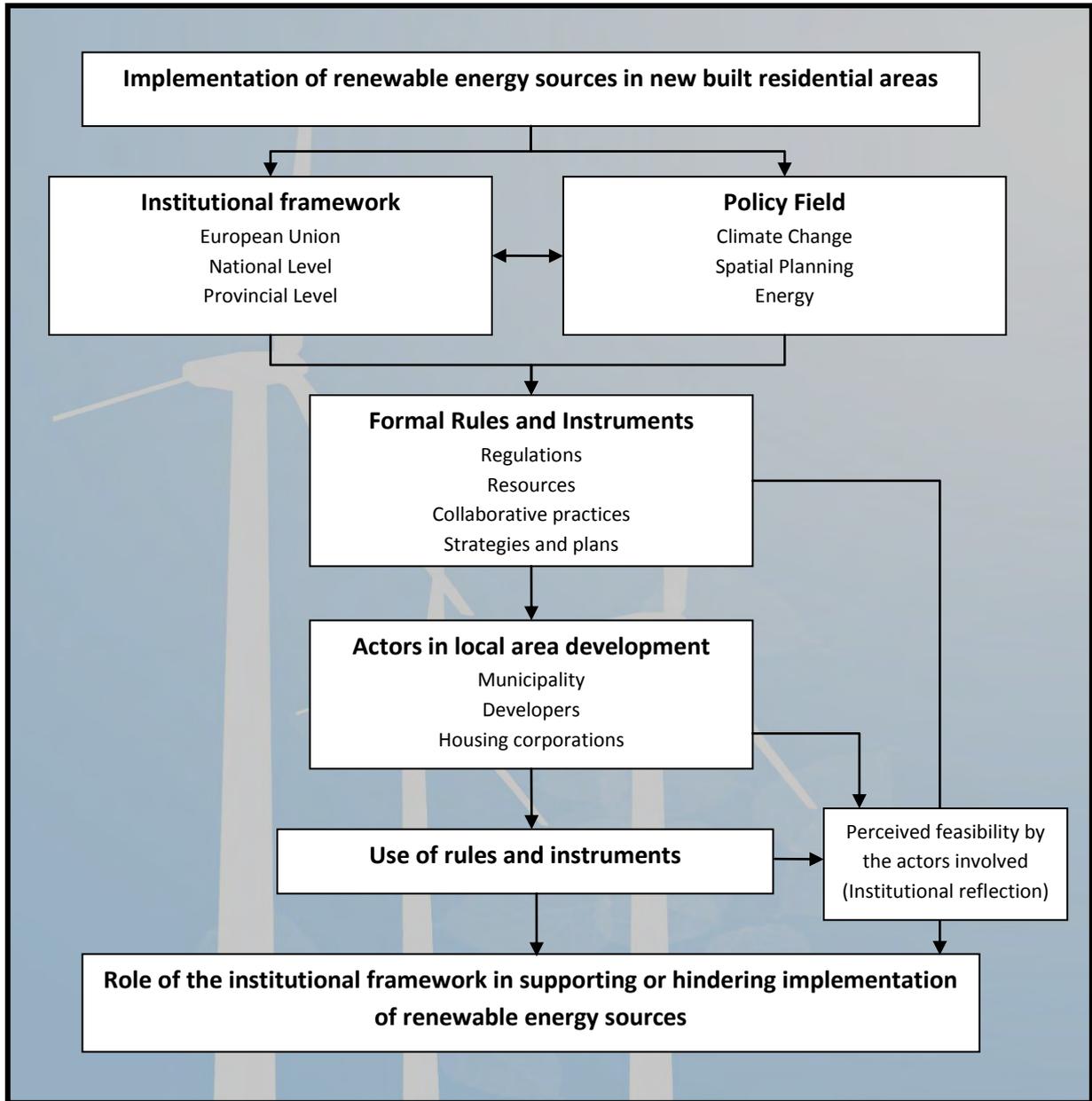


Figure 5. Conceptual Model of the research. Source: the Author's

4. Research strategy and method for analyzing the case study

As the theory provides the basis for the empirical analysis, methods and research strategies have to be aligned accordingly with the aim of the research and research questions. Within this chapter, the research strategy, as well as the research methods and explanation of choice is described. As these choices heavily depend on the research question, a repetition of the research question is given:

“How is the current institutional framework for spatial planning supporting or hindering the implementation of renewable energy sources in newly built residential areas in The Netherlands.”

As the focus lies at newly built residential areas at the local level, the choice of research strategy has to match this approach. In this respect, the considerable role of the municipality over its territory has to be taken into consideration.

4.1 Research strategies in social sciences

In social sciences, many different research strategies exist. Common used strategies are the survey, the experiment, the grounded theory approach and the case study (Verschuren en Doorewaard, 2007, p.161). Other possible strategies that could be added in social studies are: ethnography and historiography (Yin, 2003; 2009). Within this research, a case study has been chosen as the most appropriate strategy.

4.2 The application of the case study

A case study is useful for getting insight in what Verschuren and Doorewaard (2007, p.183) call *“one or some space-time bound objects or processes”*. The case study is a research strategy that provides the possibility to analyse a relatively small amount of subjects. It can be described as *“an in-depth, multifaceted investigation, using qualitative research methods, of a single social phenomenon. The study is conducted in great detail and often relies on the use of several data sources.”* (Orum, Feagin & Sjoberg, 1991, p.2). Because a case study provides the possibility to analyze a small amount of research units, it is useful for acquiring qualitative data for doing in-depth analysis of the situation (Verschuren & Doorewaard, 2007). The case-study is useful for answering questions that ask *“how”*, just like the main question in this research. The main difference between a single case study and a multiple case-study is the fact that a single case-study provides the possibility to do an analysis that is more in depth. As the aim of this research is to find out how the institutional framework is supporting or hindering the implementation of renewable energy sources in newly built residential areas, an in-depth analysis as is possible in a case study is very useful. A single case-study has the characteristic that it may be hard to distinguish the boundaries of the phenomenon from the context (Saunders et al., 2008, p.129). To distinguish the context from the phenomenon, the theoretical framework will be applied, which functions as the basis for both the policy document analysis and the interviews (later in this chapter more on the choice of these methods). The single case study can provide knowledge on a particular phenomenon or process that has not been studied in depth previously: *“a single case-study can be used because this one is characteristic or because it provides the possibility to study and analyse a phenomenon that not many people previous have paid attention to”* (Saunders et al. 2008, p.130) (translated by the author). Within the single case study there is a distinction to be made between a holistic approach or an embedded case study. While the case may be possibly split up in several sub cases to analyze, within this research the case is

approached as a whole. This makes the approach holistic. This is done due the fact that the development of renewable energy sources in this particular development may be due to case-specific circumstances. The theory in that matter provides the distinction in the context (institutional framework) that supports or hinders implementation. To show this particular phenomenon, the case selection should be selective. This means that the case should present to be an example of a particular group. To define to what specifics the case study should meet, the following paragraph will explain. As a single case study has been conducted, it is expected that source or method triangulation takes place (Verschuren & Doorewaard, 2007). In this research this is done by conducting both a policy document analysis, as well doing interviews.

4.3 Selection criteria of the case-study

For selecting the case, a couple of criteria have to be met. The case should more or less try to represent a larger amount of development. Because the focus is at newly built residential areas, the case should be part of the most common places where newly built residential areas are created, which are urban municipalities. As the Netherlands is a country with a lot of middle sized cities, the case should represent a “regular sized” urban Dutch municipality. Another reason for using this criteria is the fact that cities are responsible for a large share of greenhouse gas emissions. Also, cities have been subjected to growth past decades, due to national policy (as seen from the Vinex policy). To determine what is a regular sized city in the Netherlands, the choice is made for a classification that is used by the Ministry of Housing. In the Netherlands, there are thirty medium sized cities that are taking part in the subsidy program called Investing budget City Renewal (ISV). Without elaborating too much on the program, the program covers thirty bigger urban municipalities that will get subsidies. These subsidies are to be used broadly, from housing as well for environmental causes (Dijkstra, 2006, p. 505-506). The municipality of the selected case has got to be part of this G30, because the size of the city also determines that way how development of newly built residential areas takes place. This makes it able to compare the case study with other medium sized Dutch cities, and maybe even generalize between them.

Within every research reliability and validity of data has to be ensured. Validity can be obtained in two manners: internal and external. *“internal validity is mainly a concern for explanatory case studies, when an investigator is trying to explain how and why event x led to event y.”* (Yin, 2009, p.42). In the case of this research, the outcome of the area development, including the implementation of renewable energy sources (y) depends on the formal rules that derive from the institutional framework (x). In this way, a causal relationship is perceived between the case study and the context (institutional framework). More on the internal validity will follow under the paragraph “Interviews”.

The fact that information is context dependent, is an important aspect within social sciences. *“Social science has not succeeded in producing general, context-independent theory and, thus, has in the final instance nothing else to offer than concrete, context-dependent knowledge”* (Flyvbjerg, 2006, p.223). The fact that information and theory is context dependent, makes “hard” evidences hard to find, and makes theory only applicable within a certain context. This perspective makes a case study is very useful for showing what happened within the context, providing a possibility for learning from this development. The fact that the information is context-dependent does not mean that there is no generalization possible. This is what is meant with the external validity: external validity questions the research results and whether or not they can be reproduced if the research is

repeated. This requires a theoretical framework that frames the phenomenon under investigation and shows what is researched. Also Yin (2009, p.43) acknowledges this as a critic on the case-study, especially the single case study: *“Critics typically state that single cases offer a poor basis for generalizing.”* The counterargument Yin (2009) gives to such reasoning is the fact that in many situations, the generalization is compared with that of surveys, which provide a statistical generalization, while case studies provide analytical generalization. Within this analytical generalization, the results of the research are generalized by the theoretical background.

4.4 Research methods used in this research

The data that can be collected within a case study may be of six different sources. Yin (2009, p.98-99) describes these sources as: documents, archival records, interviews, direct observation, participant-observation and physical artifacts. There are two research methods used in this research. The first is a desk study, in the shape of a policy document analysis. The second are interviews. As the research focuses at formal rules that are influencing local development, the analysis of the policy document should provide the formal policy that is exerted by the multiple levels of governing. A policy document analyses is somehow closely related to literature research. The written documents provide a possibility to be analyzed on qualitative content. It makes it possible to find background information on the current situation in a relative short period (Verschuren & Doorewaard, 2007). The choice for doing a policy document analysis, is due the fact that it provides the possibility to analyze the current situation. Besides, as Yin (2008) stated: *“Except for studies of preliterate societies, documentary information is likely to be relevant to every study topic”* (Yin, 2008, p.101). An advantage of the policy document analysis is that the policy documentation can provide exact, broad coverage of the subject, which is a stable source of information due the fact its not a result of the empirical analysis of the case study (Yin, 2009, p.102). This allows the documents to show a stable perspective on the current institutions and policy, as well in what some levels of the institutional framework provide to the local development.

The policy document analyses has as a purpose that it should show the policy that comes from the multiple levels of governance. For analysing what policy comes from other levels of governance, the types will be classified in the types of policy as described by Davoudi (2009) and Hopkins (2001). The outcomes of the document analysis are the basis for the interviews as to describe the effect of the measures found in the documents as well the interviews should answer how this happens.

The interviews with local actors, should provide an understanding how these formal rules are used and have effect in local new built residential area development. As there are different types of interviews, they can be categorized in three different types: structured, semi-structured and non-structured interviews. Semi-structured interviews provide the possibility to be explanatory. Semi-structured interviews are not standardized. This means that not every same question is asked to all respondents. Instead, certain issues and topics are discussed (Saunders et al., 2008). This is the approach used for this research, because this research tries to answer “how” certain development takes place. This assumes an explanatory approach. In respect to the reliability of the data that is collected, some steps need to be taken. Because the interviews are semi-structured, it is plausible that the answers that are given by respondents are not always the same as well as they are interpretable, which makes it less reliable. Also whether or not the data is valid remains to be questioned. This could cause an interview bias, which means that misinterpretation of answers by

the interviewer due to non-verbal communication or intonation of the respondent, occurs. Also, a respondent bias is possible. In such a case, the respondent is not willingly to give full information about the subject due to specific reasons. This may be because certain information is sensitive or because the respondent does not dare to take on certain information into a certain depth, as may be feasible for the researcher (Saunders et al., 2008). To guarantee this internal validity and reliability, respondents are asked whether or not used quotes are placed within the right context and interpreted as meant.

4.5 Research material

In academic research, it is always important to gather valid and reliable data. But especially with having a case-study as a research strategy, it is important to be aware of this, due the thin line between the phenomenon under investigation and the context. As reliability and validity depends on the sources that are used and the way how triangulation of methods are applied, within this research the two research methods should provide a higher degree of reliability and validity. A mix of multiple sources for a case study may be feasible to guarantee quality of the research. *“The incorporation of these principles into a case study will increase its quality substantially”* (Yin, 2009, p.98). This is also emphasized by Saunders et al. (2008, p.129) who states that *“When you follow a case-study strategy, you probably have to use different types of data sources and triangulate* (translated by the author).

As the reason for doing a policy document analysis is given, this still leaves the question how to (a.) select the documents that shall be analyzed and (b.) what should be the parameters that the documents will be analyzed on. Since there are many documents available on good practice of energy in new built residential areas, this specific selection of documents.

As it is impossible to interview all people involved and affected by the phenomenon that is under investigation, as well due to restrains in time and resources, the interviews can only represent a sample of the actors involved. To ensure the reliability of the research, the choice of respondents is broad within the project. While some respondents work in one policy field, and other work in another policy field. As multiple policy fields play a role in implementing renewable energy sources in new built residential areas (like environment or planning) a broad selection of respondents is chosen. Even though they will have some links in their day to day work, their perspectives may differ due to specific perspectives on the issues. When some answers do coincide, this strengthens the answers given by the respondents.

The interviews are held with experts on the local level. These people are involved within the case and thus know what is happening at the local level and can clarify what made implementation of renewable energy sources happen in this particular case. In this respect, 5 involved actors of the municipality have been interviewed, 2 of housing corporations and 1 developer. As many developers do not see renewable energy as a part of their tasks, most of them did not want to spent time on such an interview. From the municipality, officials that are close involved with the project are interviewed. To find out who to interview, the spatial planning department in the municipality was consulted. From the first interview, the respondent was asked whether or not he/she could introduce another person involved in the process that might could play an important role within this research. Also, the respondents are asked whether or not the researcher has overseen an important measure, or instrument, that played an important role in this development.

As for developers and housing corporations, in most cases, there is only one person closely involved in the process, who is responsible for development in the project. As developers and housing

corporations focus at building houses, they will only be able to say something about implemented measures in houses as well they can describe how the process has led to the current outcome. They should be able to describe what made the implementation possible and what hindered the implementation of renewable energy sources as well which parties or agencies played what role. Besides describing what currently happens (within the status quo) they are also expected to elaborate on feasible institutional design (see chapter 3). For the interviews a distinction is made between the current situation and the perceived changes that should be made. In this respect the model at the next page will show how this distinction is made. The basis for this approach is the institutional approach of Buitelaar et al. (2007). In this approach, within the interview, the current situation is highlighted and discussed (Institutional reflection), that focuses at the formal and informal rules of the status quo. Secondly, perceived solutions and options are discussed (Institutional design). This will probably not provide the best technological solution that is at hand, but the perceived solution that is best within the understood context.

As the interviews are taken in Dutch, all interviews are translated by the author. The length of the interviews is approximately between 30 and 60 minutes. The interviews will presented following the multiple types of instruments. Every type of instrument subsequently is subdivided by the actors involved and what is their opinion about the current instruments.

4.6 The selected case

But before further take up the analysis of the content, a description of the project will be given. The case under investigation is called “The Waalsprong”. The Waalsprong is a new built residential area at the north of the city of Nijmegen. The city has approximately 160.000 inhabitants (CBS, 2011) and meets with that number the requirements of the group of bigger urban municipalities in The Netherlands. Furthermore, the development stands as an example for the kind of new built residential areas that were initiated in the 1990s under the national Vinex policy. This shows a type of development where many of the current new built residential areas were developed.

Actors involved

The selection of the case is also made due the fact it needs to be part of current development, that is part of the national spatial planning strategy Vinex. A reason for this, is the fact that this was

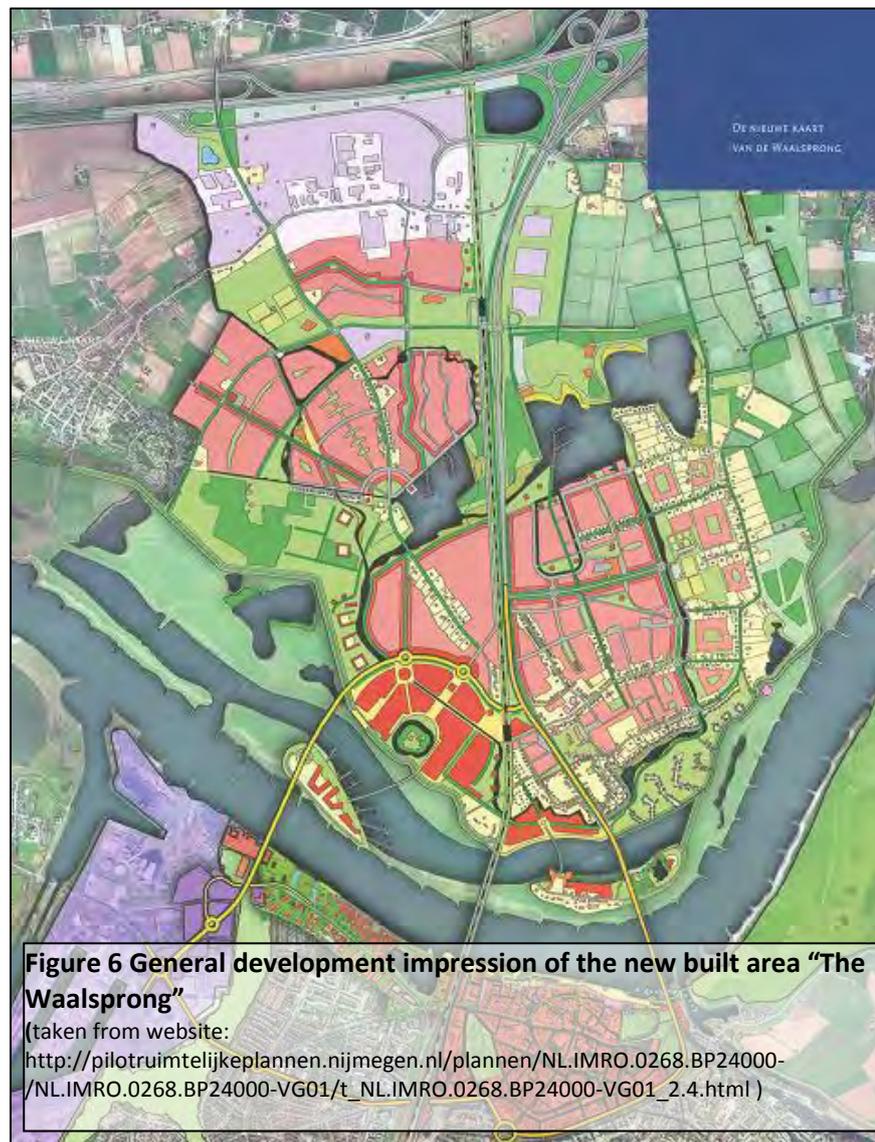


Figure 6 General development impression of the new built area “The Waalsprong”

(taken from website:
http://pilotruimtelijkeplannen.nijmegen.nl/plannen/NL.IMRO.0268.BP24000- /NL.IMRO.0268.BP24000-VG01/t_NL.IMRO.0268.BP24000-VG01_2.4.html)

one of the first times that municipalities needed to involve other parties in developing new built residential areas. It is expected that involving other actors plays a role in the development, and also influences decisions due to the nature of the actors. As seen from the theory there may be 3 types of actors: the municipality, developers and housing corporations. Within the Waalsprong, there are eight actors involved in developing the area. As in many spatial planning projects initiated through the nineties, the actors are united in a public-private partnership, called the GEM.

Rules that come from the institutional framework may affect actors differently. This may be due to their goals, but also because some rules are aimed to affect only some of the actors involved. As they all play a role in the development of the area, all actors need to be taken into account. The role that they play, and how the rules influence their behaviour takes an important place in understanding what happens at the local level.

5. Case study Analysis

Within this chapter, the analysis of the policy documents and the interviews is presented. At first, the policy document analysis will provide the formal rules that are available in the institutional framework. Subsequently, the role and use of these formal rules are discussed in the interviews.

5.1 Progressive municipality

Before presenting the data from the policy document analysis and the interviews, some other interesting findings are presented. While conducting the interviews, it became clear relative quickly that this particular case study is not exactly an “ordinary development”. Respondents made clear that the municipality of Nijmegen makes a bigger effort in climate change issues than is regularly the case in Dutch municipalities. This is due the fact that current parties in power consider climate change as an important topic.

“Nijmegen has always been a progressive municipality, left wing oriented..... So we have always said, we want to develop as environmentally as possible” – Local authority official

“Nijmegen is more of a left wing municipality” - Developer

“For the current climate policy, we have made an extra reservation in 2010, of one million euro within this municipality” – Local authority official

5.2 The role of the economic crises

Besides the fact that the municipality seems to invest more in climate change policy than other municipalities do, also the economic situation seemed to influence the development. To implement extra measures, one of the main problems is financing those, as is understood from a local authority official: *“In most cases, it is about money”*. Financial conditions may differ per type of measure, but in general, the overall economic situation seemed to play an important role in the development. *“The margins on housing are currently so small, that this is a big point in the negotiations”* a local authority official says. This is also acknowledged by another local authority official: *“(...) especially in this economic crisis, because there are no big margins on housing anymore. (...) So currently it is not an opportune moment for alternative energy sources, because everybody is busy lowering costs. Where you can do it for a penny, you won't do it for a dime. Despite all beautiful ambitions”*. The challenge that the economic crises imposes is also perceived by employees of housing corporations: *“It is difficult to sell anyhow, but it is especially difficult when your houses are more expensive in comparison with other houses because of environmental saving measures”*. And also developers perceive the economic situation to be of big influence over the current lack of implementation of renewable energy sources: *“because of the fact that housing prices rose, extra ambitions could be paid. Now it works the other way around. The housing prices declined and then there is no money anymore for such ambitions”*.

As the economic downturn causes a lack of financial resources, on the other hand it also provided an opportunity, as a local authority official explains: *“the demand for business parks has collapsed, so the need for such a big business park has gotten smaller. In the former term, the decision has been made to develop the wind turbines at this location, so it would at least fetch something”*.

5.3 Implemented measures

Before analyzing the way how the institutional framework has supported or hindered the implementation of renewable energy sources in newly built residential areas, a brief description is given of the measures that derived from the policy document analysis and interviews and are very likely going to be implemented. The first measure that is definitely going to be implemented are 5 windmills at the north of the Waalsprong, and also 4 will be build on the territory of the ascending municipality. The municipality also tries to achieve a central heat system. This heat system should eventually have to use residual heat from the waste incinerator for heating the houses in the Waalsprong.

Thirdly, also a project of approximately 131 houses has been implemented by one of the housing corporations involved. This project incorporates photovoltaic solar panels for generating renewable energy. As these measures still have to be built, till then not much has been done in respect to renewable energy sources or sustainability, is what a local authority official makes clear: *“Probably there will be a central heat system, wind turbines and there is this national regulation on how houses are to be built, the EPC. And yes, the central heat system is fundamental when we talk about heat distribution for the houses in the Waalsprong and the wind turbines are relevant for the energy proficiency of the Waalsprong. If both are realized, then we finally did something on sustainability”*. Also another local authority employee acknowledges that currently not so many measures to lower greenhouse gas emissions are sure to be implemented: *“When we have the central heat system, the Waalsprong will be a lot more sustainable. But for now, we can’t say that the Waalsprong is a sustainable neighborhood, definitely not. So the heat system needs to be part of it”*.

5.4 Formal rules that derive from the policy document analysis

To present the findings of the document analysis in a orderly way, they have been presented in a table. From this table, the level to which the instrument or policy document is applicable as well the relation it has with the policy documents and instruments is presented.

Type of instrument	Title of document or instrument	Date of taking effect	Geographical scope	Implementation: actors, structure etc	Cross-ref
<i>Regulative</i>	BAEI (Decision on energy infrastructure)	2003	National	Regulative tool that municipalities may use for excluding fossil fuel energy infrastructure.	-
	EPC (and EPL)	2006	European	Through national legislation, laid down in the building code.	National Climate Strategy
	Land Use Plan (zoning ordinances)	-	Municipal	Through the land use plan	
	Integration Plan	-	Province		
<i>Strategies, plans and visions</i>	Nota Ruimte National Spatial Plan	2004	National	The basis for spatial policy in the Netherlands. Is implemented through hierarchy of spatial plans in the Netherlands	-
	Gelders Streekplan Provincial Structural vision	2005	Provincial	Projects on the provincial level, or in cooperation with municipalities.	-
	National Climate Change Strategy	2007	National	Through multiple policy fields and the hierarchy of governing.	EPC Climate Covenants SLOK
	Structural Vision	2010	Municipal	The municipality uses the vision as the basis for spatial development	-
<i>Financial</i>	BANS (Administration Agreement New Style)	2002	National	Funds for municipalities to take on climate change policy	Preliminary financial tenders of the SLOK
	SLOK (Stimulation Local Climate Initiatives)	2007	National	Financial tender for municipalities and provinces climate projects	National Climate Strategy Climate covenant
<i>Collaboration</i>	PPS GEM Waalsprong (public private partnership)	1997	Municipal	Actors involved in the local development: developers and housing corporations.	-
	BLOW Covenant	2001	Provinces	Agreement between provinces and the national government for indicating best locations for wind turbines	BANS (for achieving targets, provinces have to consult with municipalities)
	Climate covenant	2007	National Provincial Municipal	Intentional agreement between the national government, municipalities and provinces	SLOK financial program National Climate Strategy

Table 2 Policy documents, instruments and their relation. Source: Author's.

5.5 Results plans, strategies and visions

Plans, strategies and visions are the basis for policy for many levels of governing. As most plans (except for provincial or municipal land use plans) do not have legal consequences, they are the basis for further policy and action. This can be seen for example by the National Climate Change Strategy, one of the most notable strategies playing a role in climate change policy. Within this strategy, the national government laid out how it was going to tackle climate change issues the next few years. From this strategy, other instruments arose for achieving climate change targets, such as the climate covenants with provinces and municipalities. These covenants subsequently included subsidy schemes for achieving local climate ambitions (the role of these tenders will be discussed later in this chapter).

The municipality is able to create structural visions for achieving, which is the base for spatial policy of the municipality, where decisions are based on. As is seen from the municipal structural vision for example, the municipality had already planned to incorporate wind turbines (see: Gemeente Nijmegen, 2003). The municipality has created plans, visions and strategies as the basis for further policy. The plans, strategies and visions can incorporate measures and perceptions of the municipality on these measures.

Some measures that would be feasible have not been taken up in current plans yet. One aspect that has not been taken into account for example is the positioning of houses so they are feasible for implementing solar panels afterwards. A local authority official states that there is still some space for implementing *“can we design houses in such a way that solar panels can fit on them afterwards. In that respect I do not have to invest right now, I will just prepare them. Currently, we have not laid this down in policy”*

5.6 Results consultation and collaboration

As can be seen from the table, the municipality is collaborating with other parties in a public private partnership (PPS). In here, the way how this consultations and collaborations takes place and the role that these partnerships play is described. Three main actors in the development of the Waalsprong are the municipality, the developers and housing corporations. As not the whole area is developed in cooperation with these partners, the Depending on what the type of energy source the municipality wants to implement, the municipality collaborates with actors involved according to that measure.

Collaboration with local actors involved

The actors involved in the Waalsprong, all have their own goals to achieve. There is a difference between the role of the housing corporation and the role of the developer. This means that it differs what municipalities can achieve in corporation with these other actors, as a local authority official makes clear: *“Developers sell houses to the consumer and then they are gone, their task is done. For housing corporations this is different, they are a partner to us for a longer term”*. This difference has consequences for the implementation of measures in the project. Even if implementing renewable energy sources is not the goal of housing corporations, they do see a role in implementing energy sources that are more durable than current systems are. This is because of the fact that their goal is to keep rental prices low: *“And what you see, is that within the housing costs, the part of rental fee gets smaller than for example the price of energy”* – (Housing corporation employee). This statement gets strengthened by the same respondent later in the interview: *“(…)you may strive for, and that is*

a theme, that is that the housing costs will become smaller than the energy price. At least, that will be the future trend, is the expectation. So the basic rent of the house is one component. But subsequently, your rent, your variable housing costs will rise. This is where lies a task for us". This also means, that the housing corporations try to keep the energy use as low as possible. *"To build as much energy efficient houses as possible, what we are doing, we built standard A-plus"* – Olof Olthoff
But besides the energy efficiency of the houses, the housing corporations do not see all types of renewable energy sources as feasible. Due the nature of housing corporations, they prefers a a stable system, with a structural price and certainty for many years: *"We will be present on the location for a long period, let's say 50 years. So it is also in our interest that the distribution of heat is constant and sustainable"* – (Housing corporation employee).

As for developers, the situation is different. When developers have sold their houses, they are not involved anymore in the project. This means that if developers want to make profit, extra investments have to be earned with the sale of the houses. This remains to be the issue, seemingly buyers do not want to pay extra for these investments: *"it will cost us directly extra money, but the consumer is not willing to pay for it"* – (Developer). This perspective gets acknowledged by a local authority employee, that points out that the benefits will come to the consumer: *"the advantage of lower expenses every year, comes to the customer, but the developer does not have that as he sells the house"*.

As the public private partnership exists out of multiple actors, changes need approval of all shareholders. This has been the reason why the public private partnership has not been used for implementing renewable energy sources: *"The public private partnership is also able to organize the implementation of renewable energy sources, but we deliberately did not chose to do so, since this demands approval of all shareholders"* – (Local authority official). The municipality contracted the parties in 1997. Within these contracts, also agreements were made on the energy standards of the houses. This contract was the basis for public private partnership and their collaboration in developing a large share in the Waalsprong. Because this contract was signed, it was difficult to change situations afterwards. The municipality also did not have regulative measures to force other actors, as will become clear from the regulative paragraph.

Even when it is difficult to implement measures through the public private partnership, the partnership is perceived as feasible way of developing: *"I think it is a prudent decision, where a distance is kept between the daily political hectic and the multi-year development of the Waalsprong. Because you're talking about a development that takes twenty to thirty year. (...) But, the drawback of such a construction is of course, that if you would like to add some more ambitions and policy goals afterwards, this always will cost extra money"* – (Local authority official). Besides this role, an employee of the housing corporation states that the public private partnership also supported the implementation of the central heat system: *"(...)the public private partnership has especially been facilitating the process. They hired advisors, did research and eventually signed the agreement with the energy company on behalf of all the shareholders. Despite the fact that the public private partnership is not responsible for the delivery of the heat, they do cooperate in finding a solution"*. The public private partnership is also perceived as feasible, because market parties are perceived to be the parties with expertise and the need for development *"market parties have a tremendous drive to develop the houses. Besides, they have a lot of knowledge of the current housing situation and the demands of consumers. I'm not sure if we would have been as far as we are now, if we as a municipality would have developed it by ourselves"* – (Local authority official).

An important measure in the area where the municipality is working on, cooperates with the other parties, is the central heating system. To get the project financed, the municipality needs to incorporate other actors who are willing to invest. Bringing together these actors is perceived the major role of the municipality, is understood from the answer to the question what role the municipality plays: *“Control function. For example, the central heating system. We take the lead. We do research and we bring parties together that will have to invest. Probably, we also need to put in public funds together with the province and by subsidy”* – (Local authority official). But bringing together these parties was not an easy task. Especially due the financial risks that the project imposes: *“(…) thus you need somebody who is willing to invest dozens of millions of euro’s (….) That is difficult, it is a financial risk, where you need to find somebody for”* – (Local authority official). This also gets acknowledged by another local authority official: *“Since it requires a lot of investments, no market parties wanted to get in, no energy company or whatsoever. Also the market parties that would build the houses, were reluctant. So that process was a dead end”*.

Also, parties involved did not always have the same perceptions: *“The parties involved in the public private partnership, were at first very much against a collective system. They say that such a system will give them less flexibility”* – (Local authority official). This difference in perceptions had led to the fact that the process had stalled for a long time and the developers were given a chance to come up with other solutions: *“They could not get along with each other anymore, the electricity company, the director of the PPS and my predecessor (..) Then we will try to achieve the energy performance by individual solutions. But also this did not work, the actors did not achieve extralegal standards, they just stuck to the EPC”* – (Local authority official). So the individual solutions did not provide the cut in emissions as much as the collective system would do. This cut in emissions was perceived as important by the municipality, as gets confirmed by one of the respondents: *“In the past, there have been multiple steering groups, project groups and advisors that advised the municipality, but never led to the result that the municipality wanted”* – (Developer). As this already made the option inferior, individual solutions were also not perceived feasible because they would disrupt the underground ecology too much: *“(…) what we don’t want to have is individual combined heat and power solutions or storage, because this implies a disruption of the ground balance. So we said, puncturing the soil for individual combined heat and power solutions is unwanted”*. – (Local authority official). Not only the municipality perceived a central heat system as the best solution, also the housing corporations preferred a collective system prior to individual solutions: *“At one moment, there were market initiatives. And those were, in the way I see it, heat pumps or other systems that may be interesting, but also still have teething problems. These do not provide the continuity we would like to have”* – (Housing corporation employee).

So, as the municipality had decided to implement the central heat system, as stated earlier, this also had to be achieved in corporation with other actors. As finding investors remained to be a problem, the plan of the system changed to a cheaper, less sustainable system. This was needed, to get other actors to invest in the project. Or as a local authority official says: *“It will provide a smaller cut in emissions, but it is much less risky. Especial financially”*. But even at the moment of writing, the implementation is not completely agreed by all parties. *“Currently these are intentional agreements, without having completely agreed on the financial conditions.”* – (Local authority official)

Collaboration played a much different role in achieving the wind turbines. The wind turbines are planned on a part of the area that is not developed in corporation with the public private partnership. This makes achieving agreements much easier: *“The energy company invests and is going to deliver that energy to the grid. We do not need the partners involved in the public private partnership, so the decision structure is much more easy: the municipality of Nijmegen, the ascending municipality and the company that is going to invest in the wind turbines. In this way, the distribution of risk is much clearer, so the process is easier”* – (Local authority official). To do so, the municipality used its organizational and spatial planning capacities to achieve the implementation. For collaborating with other parties, this meant finding energy companies who were willing to invest.

Another aspect that the municipality tries to achieve in collaboration, is designing houses in such a way, that their positioning is feasible for implementing photovoltaic panels later on. This has not been the case so far, but respondents indicate that they are trying to get developers to do so, as respondents say: *“we try to make agreements, that the houses will be developed in such a way, that other energy systems can be implemented, even after ten years”* – (Local authority official) Another local authority official confirms this, but states that currently this has not been used yet: *“(..)That is something we have not laid down in policy yet, but in the upcoming note on sustainable development this will be a subject that are to be addressed”* – (Local authority official).

Collaboration with other levels of governing

Not all of the respondents seem to have the same perspective on the role that other levels might play. One respondent says that the province played a key role in developing the central heat system: *“without the province as a public stakeholder, it would have failed in advance. In that sense, the province may have played a decisive role if something like this is going to happen. But, the province had indicated, around 2009, that they did not want to be involved in developing the central heat system as a public stakeholder if no market parties were involved. They absolutely wanted involvement of market parties”* – (Local authority official). For achieving the wind turbines, the province played a role in finding the best location for implementing the wind turbines, as was their role from the BLOW covenants *“the province has done research to appropriate locations for wind turbines at the beginning of the process. But as a municipality you have to change the land use plan to get this done eventually. In principle, this is a public task. But if the municipality lacks to do so, because they do not want to, the province is able to intervene with an integration plan”* – (Local authority official). So the province might helped by allocating the windmills, action still depends on the willingness of the municipality to take action. Another local authority employee stated that in fact the province did not provide that much of support: *“Honestly, I did not have a lot of support from the province”*.

5.7 Results regulative measures

From the policy document analysis it becomes clear that the main regulative instruments available to municipalities are the land use plan, the EPC and the BAEI. To enforce measures to be implemented, a local authority official answers *“As the municipality, we have little authority in enforcing implementation of renewable energy sources”*. This gets confirmed by another local authority official: *“Instruments to enforce implementation, that remains to be difficult. Such as the EPC, which is currently 0,6 and is expected to go down in the future, that is very strict.”* Even if the EPC is very strict,

the municipality is not able to increase this, if they would like to. The EPC is a national standard on the energy use and generation of a house, which has been laid down in the building code. This standard has to be met when applying for a building permit. In this respect, municipalities are not able to set higher standards as the ones that have to be met in the building code. This means that the municipality functions as an executive institution, to enforce this legislative measure. At the moment of initiating the Waalsprong in 1997, the municipality agreed with the other stakeholders to achieve a higher degree of energy efficiency at the location (the EPC/EPL) as was legally obliged. Since these agreements date from 1997, they do not fit with the current state of technology and thus are dated: *"(...) the agreed level is a farce. When actors involved in the process follow the building code, they will achieve this with ease."* – (Local authority official). Whether these stakeholders can be convinced to develop according to extralegal standards, a local authority official answers: *"No, not simply. Market parties perceive it in such a way, they say: we have a contract that originates from 1997 for the Waalsprong, so our contract is different as what you want now"* – (Local authority official). This position that developers take, as an increase of the EPC will lead to higher investments made by the developer: *"at the moment this is paid by the developer, and for years this went well, because housing prices increased, for that matter the extra ambition could be paid"*.

As was made clear in the subparagraph on collaboration, reaching consensus on particular measures such as the central heat system was difficult. As the municipality wanted eventually to achieve a cut in greenhouse gas emissions, it decided to use a regulatory instrument, which is called the *Decision on constructing energy infrastructure*, or in short BAEI. By this measure, the construction of infrastructure for fossil fuels such as gas, can be prohibited. The municipality can only do so, if an alternative for supplying heat to the residential area is available. In Nijmegen this took shape in the central heat system. Even while the instrument has eventually been used, it was not given preference: *"Experience shows that the procedure is difficult and has been little used in the Netherlands, so it does not have our preference"* – (Local authority official).

The use of the BAEI to implement the central heat system is also justified by the fact that the EPC will get stricter in the future, which could threaten future development of the neighborhood: *"The expectation is that from 1 January 2015, the EPC will go one step lower and in 2020 the coefficient will go to zero. As a couple groups of houses in the project will probably be built after 2020, we need measures like this (central heating system) to achieve that EPC"* – (Local authority official). In the perspective of a housing corporation employee, the implementation of the central heat system is perceived as feasible: *"When you build houses at this moment, these will be less energy efficient in respect to houses that are built in 2020. For that matter, it makes sense to think about building houses with a lower EPC than is needed, so that the houses can compete with other houses in the future. So that is what we do"*. By developers, this was not perceived the best solution. The implementation of the central heat distribution system means they have to pay a connection fee for every house. To meet developers, they were given a discount on their EPC: *"eventually the municipality decided to give us a discount on the EPC of the houses, so we need to invest less to achieve the 0,6 that we need as the Building Code demands"* – (Developer).

This is the public task of the municipality to do so: *"we have the public task to change the land use plan, and there are partners who are willing to invest"*. So when partners are available that are willing to invest in the measures, the municipality can use its ability to change the land use plan. Till now, this especially played a role in implementing the wind turbines. But before doing so, the municipality had to buy the land. Only then the municipality was able to change the land use plan.

Other levels of governing

The province has the possibility to intervene with an integration plan, as also became clear from the paragraph in consultation and collaboration, but this has not been done in the Waalsprong. While this may be possible, it does not seem to happen, as is showed by an example that a local authority official gives on an adjacent municipality: *“The province can show a bit more courage. In an adjacent municipality, a windmill park is aborted. Then the province has to say, sorry but here are higher interests involved”*.

5.8 Results resources

From the former paragraphs, it became clear that the financial circumstances play an important role in achieving the implementation of renewable energy sources. The policy document analysis shows that a couple of financial programs are currently available. Within this subparagraph, the role of these resources is explained.

The municipality has set out specific targets in mitigating greenhouse gasses and achieving a share in renewable energy sources. By the perspective of a local authority official, the municipality itself is responsible for achieving the targets it sets and thus should also take care of the (financial) consequences: *“We want to achieve the reduction in greenhouse gas emissions. We want to achieve our climate change targets, so from the perspective of the municipality it is logical, but then you’d have to be tough enough to arrange it and take the risk”* Another local authority employee reinforces this perspective and explains that this subsequently means that the municipality has to use more financial resources: *“If you want more measures to be implemented, this is possible, but you will need to complete the financial gap”*. Also in perspective of the developer, the municipality is responsible for taking the financial consequences of its own ambition: *“When the municipality wants to achieve a higher cut in emissions, they will need to pay for it, as it is their ambition”*.

To support municipalities in achieving climate change targets, the national government has created financial tenders. The most notable financial programs focusing at renewable energy sources are the SLOK, the BANS and the SDE. Programs like the SLOK and the SDE have been a consequence of the Climate Covenant that the municipalities made with the national government. The BANS used to be the precursor of the SLOK. The SDE aims at individuals and businesses who are willing to invest in renewable energy sources and are compensated for supplying energy to the energy grid. In this respect it does not play a role in achieving renewable energy sources in the Waalsprong. Since the subsidy will benefit future owners, investments are done by developers. In this respect, the tenders have not been used.

The BANS has been an older financial program that ran until 2005. The financial program was just enough for financing human resources, communication and other process costs. *“The BANS and SLOK resources, those are more a type of process financing: the only thing that can be paid with them, are human resources and some communication, that’s it!”* – (Local authority official). These resources can be used within a certain time limit, which also means that they possibly get used before the program officially is ended *“we have made extensive use of the BANS subsidy scheme. The SLOK scheme is still available till 2012. But as it is possible to use the resources earlier, which means we will use them for the last time this year. We do this because we can cover investments with it, and we also already have done this”* - (Local authority official).

The SLOK program was initiated as part of the National Climate Change Strategy, introduced

in 2007. This strategy led to the Climate Covenants, where municipalities and provinces agreed to establish a cut in greenhouse gas emissions and enlarge the share of renewable energy sources. These measures have been used by the municipality, but as states before, these resources are just enough to finance the process costs: *“Yes, there is also the SLOK, which we use of course. But they remain to be motivational funds that do not even cover our investments, no way at all. What you can do with it is to create a foundation for the sustainability policy of your municipality”* – Local authority official. The financial tenders could not be used for the energy infrastructure itself, which means that the municipality still needed to find investors to get the projects implemented. As comes out of the chapter on collaboration this remains to be a big issues according to a employee of the housing corporation *“The biggest problem I think there is, will be the investments in and exploitation of the infrastructure.”* And this gets confirmed by a local authority employee: *“(…)and what the parties involved look at, are the substantial investments that are involved”*.

Financial resources that are available for the implementation of renewable energy sources are not used for new built residential areas. The aim of the municipality is to achieve the biggest cut in greenhouse gas emissions with the financial resources available. In this respect, the resources available from the financial programs are mainly used for the existing built-up area: *“The subsidy schemes, in my perspective, I’d rather use them for the existing buildings, than for new built areas as the latter already have a higher degree of energy efficiency”* – Local authority official. The local authority official strengthens his statement by saying that *“You can only spent your euro once, and the biggest cut in emissions is currently to be made within the existing housing area”*. This shows that the financial resources that are used by the municipality, first focus at the existing built up area. The financing of other measures still remains to be an issue. Even if the municipality would like to, financing these measures remains to be a big problem: *“these could be solar panels. And we really want to use those, but financing remains to be a big problem”* – Local authority official.

Other levels of governing

Besides financial tenders that come from the national government, also the province has provided financial support. Most financial resources that are available to the province, are also part of the resources that the national government made available from the climate program. But a higher ambition of municipalities is not paid from the provincial funds, according to a respondent: *“Eventually, the province will never give more funds to Nijmegen as to another big city in the province. It is possible, that we in Nijmegen have higher climate change ambitions as in another city. So if we have this higher ambitions than in other cities, and we will get the same amount of funds, we need to fill the financial gap our self. So what you will see is that in Nijmegen, we invest more in climate change, because we have higher ambitions”* – Authority official. This gets acknowledged by another local authority official *“the province will never spent more money on Nijmegen then it will on another big city in the province, so you will have to finance it yourself. So what you see, is that we invest more, because we have higher ambitions in climate change targets.”* Although the province may not support Nijmegen more than it does other cities, the province plays an important role for achieving the central heat system. To make other market parties to invest in the central heat system, the province and may play an important role: *“They have been given a large amount of subsidy in prospect by the province and national government”* (Local authority official). The province is perceived to have played an important role in achieving he central heat system financially: *“the province may be the decisive stakeholder to make this project happen”* (Local authority official).

Another role that provincial resources played, was the implementation of a sustainable neighborhood of 131 houses. Within this neighborhood, solar panels are being implemented. The project is developed to set an example, and will be developed by one of the housing corporations. But even the project of approximately 131 houses will incorporate solar panels, at first this was not directly the intention of the housing corporation. A lack of communication led to the fact that other actors involved knew about the possibilities of these funds: *“the project ‘Woonpark Gelderland’, that I talked about, has been a process that took place without us and the developers knowing it initially. So when we heard of it, we did not know what it was about and it became clear fairly late that we were able to implement solar panels. By that time, developers were already in such a stage that they could not turn it around, they already sold houses. At that stage, you will not start about solar panels anymore. So a lack of coordination has been the major problem.”* – (Housing corporation employee) The fact that this subsidy scheme was essential for the implementation of renewable energy sources is made clear by the housing corporation employee: *“Without subsidy, we would not decide to implement solar panels very quickly”*.

But there are a lot of critiques on current financial tenders and subsidy schemes available. One critique is that none of them focused at developers. As the provincial subsidy scheme was available for creating a sustainable neighborhood, due to the communication issues, developers were not able to use these. Otherwise that would have been the only one. This in frustration of the developer *“Current programs are only aimed at individuals and housing corporations. While it is strange to implement measures after development has taken place, since this is much more expensive. We can implement it directly, for a lower price”* – Developer.

Another critique that a local authority official has, is that financial tenders are always changing. The fact that they are temporal, means that they do not provide a basis where people or businesses can build on *“what you will see in the Netherlands is that a subsidy scheme is implemented, this triggers a run on the companies that supply these measures. Subsequently, these companies need to hire extra people, make quotations and thereafter they have nothing to do. The companies have to get rid of their employees, and do not have many applications. And then again, there is a subsidy scheme, which again triggers a run on the measures and it starts all over again.”*

The way how financial tenders are shaped now, is also not always feasible for getting more measures implemented. They can eventually also frustrate developments in the long term according to local authority officials: *“For now, this will be the last time we will do this, because the cost of solar panels is going down pretty fast, with twenty to thirty per cent a year. When you keep working with subsidies, companies do not feel the need to lower the price and people will start anticipating to the subsidies. When the subsidies are spent, they will wait for the next year. While if they know that there is no more, they will invest themselves. It can be working obstructive, so we are looking for other ways to boost investments. For example by lease constructions.”* In this respect it is expected that subsidy schemes that just fill the financial gap, will disappear. Local authorities expect that these will take the shape in funds that eventually need to be paid back: *“(…)there is a tendency that as well on the national, as on the European and provincial level, they want to get rid of the grants to fill the financial gap”*. The same local authority official follows the statement with: *“we expect a change in grants towards, what is the term, refolding funds. That is a way of funding programs that need to yield dividend or eventually needs to be paid back”*.

A possible solution is given by another respondent, who aims at better ways of financing *“Still, there is no real green mortgage. There is no way that sustainability is given an impulse, and also current administration is not going to take care of that.”* – (Local authority official) The respondent refers to a mortgage that takes the energy production and use into account. In his perspective this would be a great solution, because this makes it able for people to buy houses that have more expensive measures implemented and will save monthly expenses on energy.

5.9 The supportive and hindering aspects of the institutional framework

As the different types of measures have been discussed within this chapter, these are presented in the table on the next page. This provides an clear overview what role particular instruments and tools have played in the Waalsprong. In short, a small description is given of the supportive and hindering aspects.

	Supportive aspects	Hindering aspects
Regulative European (EPC)	Strong measure to force a standard of energy efficiency. May lead to the implementation of renewable energy sources to achieve the standard.	Municipalities are not able to make agreements on higher standards if they want to.
<i>EPC (EPL)</i>	Ensures a minimum standard of energy efficiency of houses	No higher demands can be set or agreed, only voluntary non binding
	Renewable energy sources may be used to achieve the standard	Changes over time, insecurity about future height remains to be.
Municipal <i>BAEI</i>	Makes exclusion of fossil fuel infrastructure possible.	Other infrastructure to provide heat must be available.
		In practice, only used for central heating systems
Resources National (<i>BANS/SLOK/SDE</i>)	Resources cover cost human resources municipality	No resources for implementation of measures in new built residential areas.
	Resources for implementing renewable energy sources	Programs are only used for the existing housing areas, not for new built residential areas.
		Very low budget to make a difference
		Programs are temporal, so actors cannot anticipate to these programs when making plans for projects
		A lack of possible support or stimulation for developers to implement measures, as they are important actors in area development.
Provincial	Co-financing central heat system	
Collaborative practices <i>Municipal PPS</i>	Provides the possibility to make binding agreements with actors involved at the beginning of the project.	Due the nature of spatial planning processes in the Netherlands, commitments made in the past may not be so ambitions at moment of implementation.
		Difference in perspectives of actors involved in perceived feasible measures
<i>Other</i>	Collaborating with energy companies provides the possibility to finance big investments in renewable energy sources.	Only market-profitable solutions are implemented.
Strategies, visions and plans	Ambitions of the municipality is laid down and form the basis for further policy	Spatial plans lack the ability to incorporate energy goals and measures.

Table 3 Supportive and hindering aspects of tools and instruments. Source: Author's.

6. Conclusions

The former chapters have built up from the literature discussion, to the theoretical approach, which was the base for the conceptual mode. This conceptual model was the base for analyzing the case study, as explained in the methodology chapter. On the basis of these former chapters, an answer will be given to the main question that is central to this research:

How is the current institutional framework for spatial planning supporting or hindering the implementation of renewable energy sources in new built residential areas in The Netherlands?

To answer this question, a case study has been done that encompassed a policy document analysis and the conducting of interviews with local authority officials and actors close involved in the process. To analyze the role of the institutional framework, a distinction was made between the four types of instruments and tools that were presented by the theory. From the interviews, according to these tools and instruments, the main question will be answered.

6.1 The role of the European Union in implementing renewable energy sources

The role of the European Union directly on the local development, is not much, but has a great impact. The main influence that comes from the European Union, directly affecting the situation at the local level, is the EPC of individual houses. The EPC creates an incentive for developers and housing corporations to build more energy efficient. To achieve a higher level of EPC, also renewable energy sources can be implemented. Even if this has only happened within the case study with support of financial resources of the province, the EPC is possible to supports the use of renewable energy sources. Municipalities are not able not to make use of the EPC, this is a legal standard for the whole country. This subsequently also means that no higher level can be forced. As the municipality wants to achieve a higher EPC, it has to do this by using other instruments.

6.2 The role of The National Government in implementing renewable energy sources

From the national government a mix of instruments have been presented. Most of them are connected to the Climate Change Strategy from 2007. The financial tenders deriving from the climate covenants are only sufficient for paying human resources, they are not enough for financing the projects itself. As this may enough to provide a base for climate change policy at the local level, it does not directly support the implementation of a large share of renewable energy sources. This means that municipalities are expected to take on action themselves and find investors to achieve these projects, or pay shortages in the budget themselves. According to some local authority employees, these financial tenders provide too much uncertainties and should be more structural.

6.3 The role of the Province in implementing renewable energy sources

The role of the province remains to be doubted, especially in the case of the central heat system. The province will finance the project partially, but investments of other actors is still needed. On the one hand, the province may have triggered other investors to get in, but this is hard to say, as the project is not implemented yet. The municipality financed the project for creating a sustainable neighborhood. This will lead to 131 houses that will contain solar panels. This remains to be an example project, as these are 131 houses in an area of 12.000 newly built houses.

In achieving the windmills, the province had done research to the best locations to be

implemented. This was a consequence of the BLOW agreement between the province and the national government. In this way the location had been allocated, and was also given preference by the municipality in its plans. This was only the start, because actual action needed to be taken by the municipality, such as acquiring land and creating land use plans.

6.4 The Municipality in implementing renewable energy sources

The municipality plays a key role in achieving the implementation of renewable energy sources. As derives from the interviews, the reason for this is highly political. Local endorsement to climate change policy makes or breaks implementation of renewable energy sources. The municipality decided to implement both the central heat system and the wind turbines. As eventual implementation of the central heat system is partially made possible by the province, the municipality played a big role in getting actors together. In newly built residential areas, many other actors are involved. These actors all have their own preferences. This makes it hard for that municipality, to come with a measure that everybody perceives best.

Getting other measures implemented in collaboration with the parties involved seems to be hard, since this demands investments. These finances are not available. If they are, they are used for the existing housing area, because a bigger cut in emissions is to be achieved there.

6.5 Modes of governing

As it is hard to make strong statements on the role of informal institutions in the process, some remarks can be made according to it in relation to the theoretical framework. As seen from the interviews, municipalities will not directly use their legal tools, even if they are available. This can for example be seen from the implementation of the central heat system. This corresponds with the statement Kern and Alber made (2009, p.1) *“Most governments restrict themselves to enabling modes of governing”*. Only if this does not lead to the perceived development, municipalities may use regulative instrument, such as the BAEI for achieving implementation. The municipality is not directly willing to use formal rules such as legislative measures. This corresponds with the statements from North: *“Underlying these informal constraints are formal rules, but these are seldom the obvious and immediate source of choice in daily interactions.”*(North, 1990, p.36). Eventually the municipality had to use legislative measures, because there was no other way for achieving the goals that the municipality had in mind.

What is more or less the case, is that other levels of government want municipalities to take action, but the institutional framework does not determine the outcome. The outcome is determined by the effort of the municipality. As can be seen from the case study, the municipality of Nijmegen is putting more effort in climate change policy as is regular the case. This means two things. At first, it is very likely that the municipality of Nijmegen, is not a regular example of new built residential area development. And secondly, it shows that when municipalities are willing to put more effort in climate change, municipalities have very little tools and instruments to do so. The most influential instrument remains to be the land use plan, or th BAEI. As the latter can only be used in specific circumstances, when heat can be delivered

Support that derives from the provincial level includes some support in the shape of financial resources. This has led to a sustainable neighbourhood. As it is not very clear, some local authority officials perceive the province to have played a key role, while others perceived the province to have

6.6 Considerations in respect to the research

A consideration that has to be taken with this research is the fact that it might be hard to generalize from it. The situation in Nijmegen, may not be the same in other municipalities. At the same time, this shows that the role of the institutional framework does not have a steady outcome.

As seen from the interviews, the current financial situation plays an important role. Currently, there is an economic crises that has a big influence on the sales of houses. If this contextual circumstances would have been different, the outcome of the development of the Waalsprong could have been different as well.

In the short term future prices of measures like solar panels are expected to decrease. As actors in local area development do not have any influence over such developments, these are aspects that are taken into account by actors, in their willingness to invest in these measures.

6.7 Further research

Within this research the role of multiple levels of government in implementing climate change has been researched. As this research shows how the implementation of renewable energy sources takes place at the local level, and what instruments have been used, further research in these what measures would be most effective would be feasible. As this research only covers a small area in a particular moment, further research on the possible role of the province (a bigger area) or doing research for a longer time at one particular place. Also, the role that particular changes in the market could bring would be feasible. As becomes clear from the interviews, it is a big problem for developers to sell houses that are more expensive because of the extra measures that have been implemented.

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Appendix I

Interviews:

Municipality

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