

Universiteit Utrecht

# A REStless transition Towards a Regional Energy Strategy

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# Colophon

# A REStless transition Towards a Regional Energy Strategy

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# Prologue

At first, I was not particularly interested in the topic energy transition. While writing this thesis I slowly but surely got more interested and involved into this subject. I also began to understand the importance and urgency and therefore the difficulty of the task that governments (on all levels) and we as citizens have to fulfil. An energy transition raises many questions and probably even more complications when considering the implementation of necessary policies and projects.

During my internship at the municipality of Utrecht I got the opportunity to experience the process up close. In this way it became clear to me how different sorts of difficulties arise and how these can or can't be tackled.

I would like to thank everyone who helped me during the writing of this thesis. I also want to thank everyone at the municipality of Utrecht for making my internship possible and for everything I have learned there.

Pleun Verheijden,

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# Summary

All over the world concerns about the current status of the environment are increasing. In 2015 the Paris Climate agreement was signed by many countries to prevent a global temperature rise of two degrees Celsius higher than at the beginning of the industrial revolution. It was even decided preferable to stay below one and a half degrees. Following the agreement, regions formed by several municipalities in the Netherlands have participated in a pilot program to develop a regional energy strategy (RES). This strategy would allow regions to plan their way towards an energy neutral region by 2050.

The goal of this study is to get new insights into how municipalities can improve their cooperation within a region, by the means of an RES and transition management. To answer this, the following research question has been formulated: *"To what extent does inter-municipal cooperation contribute to the energy transition?"* To provide an answer to this research question two different regions were selected to evaluate: Middle-Holland and Utrecht 10. The Middle-Holland region is one of the pilot regions and therefore one of the first to have worked on an RES. Hence, it has made an inventory of the potentials of energy generation as well as energy savings within the region. The U10 is one of those other regions, and although the region was formed several years ago, the RES development process is still in its infancy and has only just completed the potentials analysis. This makes for a comparison between two distinctive cases in different phases. Additionally, a policy document analysis on all the documents that are published by both regions. This policy document analysis was supplemented with semi-structured in-depth interviews that have been conducted with several experts on this subject. A topic list was used to structure the questions. The questions were based on literature and documents published by both regions.

When studying the Middle-Holland region it quickly becomes apparent how much the region has achieved in only two years. As mentioned the completed energy potentials study was the basis for most of the following actions by the region towards an energy neutral region. Three transition scenarios have been worked out based on this inventory, for the short, middle and long term. The region's lead is due to their involvement in the national pilot program. However, it seems that as they were led by several government institutions, the induced strategic behaviour overshadows the autonomous strategic behaviour. Initiatives seem to be less prevalent when compared to the U10 region. Several system failures compromised the functioning of the region, but due to a good reflective policy the municipalities of Middle-Holland were able to improve over time.

Each of the U10 municipalities has set their environmental goals individually. Besides this the U10 also focuses on the improvement of the inter-municipal cooperation within the region. The potential study for the region has only just finished at the time of writing. Hence, there are no transition paths yet. There are however several sustainable programs running throughout the region, of which the gas-free neighbourhoods are most notable. Additionally, there is more autonomous strategic behaviour as opposed to Middle-Holland. The smart grid LomboXnet is a project in Lombok, Utrecht that is revolutionary in Europe. There is even a fund that financially supports small initiatives with a sustainable nature, providing a breeding ground for all sorts of initiatives and actor behaviour.

Inter-municipal cooperation on the regional level is needed for the energy transition in the Netherlands as a country. The transition is managed in separate smaller parts and in this way a national transition can be realized. Transition management can be used as the policy framework to serve as a basis for the development of an RES in multiple ways during many stages in the process. First and foremost, it is important to overcome the two shortcomings of transition management, namely: long term orientation and wrong use of political power. If a proper transition agenda has been drawn up an appropriate co-operational structure has to be found to comply with the institutional configuration of the region so that it can function properly as a whole. A vital aspect is that the municipalities within a region can openly share their ideas and concerns so that a proper allocation of energy generation can be achieved. Additionally, they should consider their possibilities and prevent hindrance as a result of their limitations.

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# 1. Introduction and motivation

Climate change: is there a more controversial and heavily debated topic these days? Recently, the EU commissioner for Climate action and Energy Miguel Arias Cañete criticized the current production of green energy in the Netherlands as it is way behind schedule. In 2017 the production was on 6,6%, while it should be on 20% by 2020 (NRC.nl, 2019; European Commission 2018). Following the agreement, regions formed by several municipalities in the Netherlands have started a pilot study to develop a regional energy strategy (RES). This strategy would allow the regions plan their way towards an energy neutral region by 2050. Although a sense of urgency seems to be apparent, governmental bodies struggle to address environmental issues effectively. Worldwide measures might be difficult because of differences in political views. Perhaps there might be something that can be done on a smaller scale, that is closer to citizens, and would make a change and collectively decrease our burden on the environment?

The goal of the Dutch government is to create a nationwide coverage with a total of 31 regions developing regional energy strategies through cooperation between all three levels of governments (national government, provinces and municipalities) (Rijksoverheid, 2018, pp. 214-217). The energy transition in the Netherlands will be mostly decentralized, which means that most decisions will be taken at the municipal level (Rijksoverheid, 2016, p. 90). As each municipality has its own strengths and weaknesses, they can work together to create a Regional Energy Strategy (RES). A RES, as the word suggests, comprises the energy task of a region. It aims to provide a strategy for more sustainable modes of energy generation, saving, and bringing demand and supply together more effectively. Moreover, an RES summarises the currently running projects that can be accelerated, the achieved results and the implementation plans for the short term, with directions for those plans (Rijksoverheid, 2018, p. 216). Regional energy strategies are developed bottom-up, from a regional point of view via local developments. These regional strategies also contribute to energy goals of higher government levels, including provinces and the Dutch national government. These goals mostly came from national and international agreements such as the National Energy Agreement and the Paris Agreement (VNG, 2018).

For a pilot was started in 2016, five regions developed the above mentioned RES, and came to an end in late 2017. Present-day, other regions are being formed and are also working together to create an RES, each in its own way with varying numbers of participating municipalities. Each region has to present a concept version of its RES by 2021 (U10, 2018b, p. 7). One of them is the Utrecht 10 (also known as U10), which was formed by the municipality of Utrecht and nine adjacent municipalities in the Utrecht province. This region has grown to 12 municipalities at the time of writing (Gemeente Utrecht, 2018b).

The fact that pilot regions such as Middle-Holland were established, does imply that some form of experimentation in this field was desired and required. One can imagine how regions can encounter all sorts of complications while working on an RES. A good example here is the placement of wind turbines: it is likely that people do not necessarily want to live next to a wind turbine. Within regional context, a highly urbanized municipality can lack the space to generate enough 'green' energy. Less urbanized municipalities in the region can place additional wind turbines, so that the regional ambitions can be met. However, this is probably with resistance from its inhabitants (Schönberger, 2013). Should the municipality in question redirect the problem to yet another municipality or strive for realisation of the collective goal? Financing projects like this can also give rise to all sorts of conflicts. It is tensions and dilemma's like these that guide towards the question of how to create a stable environment for cooperation wherein such complications can be overcome. In this thesis, the U10 region and Middle-Holland, one of the pilot regions, will both be analysed. A part of the analysis will be on the cooperation on the inter-municipal level in the Netherlands concerning the energy transition. In this regard, transition management theory (which has Dutch origins) is used to analyse both regions (Rotmans & Loorbach, 2009; Loorbach, 2010). The challenge with transition management is to translate the relatively abstract management rules into a practical management framework which still comprises most of its complexity but will not become too prescriptive (Rotmans & Loorbach, 2009, p. 7). Not all municipalities will have the means, funds and/or space to achieve energy neutrality within their own municipal borders. Hence, interregional or inter-municipal cooperation is the best solution in some or most cases, according to the Dutch national government (Rijksoverheid, 2016, p. 90). Larger, more resourceful municipalities can support their smaller counterparts. Initially, this can slow down the large cities, but in the end all municipalities and therefore the Netherlands can achieve the goals set in the Paris Agreement (Rijksoverheid, 2016, p. 11). In addition to this, the roles of actors should be analysed and defined. Along these lines, this study aims to find how transition management and the development of an RES can improve the inter-municipal cooperation.

#### 1.1 Problem statement

As mentioned in the introduction, the goal of this study is to gain insight into how municipalities can improve their cooperation within a region by the means of an RES and transition management. This will be done mainly by considering possible causes of conflicts and tensions that can become present in such a development process. These could involve for example differences in resources like available land and financial recourses. Results provided by this study may be useful to other municipalities and regions involved in similar processes and possibly even in a wider context, with regard to cooperation processes that are not energy transition related. These reasons lead to the following central research question, that will be answered at the end of this thesis:

### "To what extent does inter-municipal cooperation contribute to the energy transition?"

Many variables can influence the way and quality of cooperation between municipalities within a region. Furthermore, different approaches can be chosen regarding the development of an RES. It is most likely that during the development of an RES, participating regions will encounter obstacles and setbacks, which are ought to be overcome or bypassed. To clarify obstacles, influences and types of cooperation that relate to the research question, additional sub-questions are formulated to help answer the central research question. These sub questions are as follows:

- 1. How does transition management theory enhance the development of the energy transition the regional level?
- 2. How is the inter-municipal cooperation structured in Middle-Holland and the Utrecht 10?
- 3. What are opportunities with regard to developing a regional energy strategy?
- 4. What are limitations with regard to developing a regional energy strategy?

# 1.2 Societal relevance

It stands to reason that the energy transition will not happen overnight (Sociaal en Cultureel Planbureau, 2016; Vereniging Deltametropool, 2017; POSAD Spatial Strategies, 2018; United Nations, 2018). Besides changes in the production of energy, an evenly important task is to change governmental and business policies. These policies can make people more aware of the environmental problems and encourage or dictate citizens to make better choices when it comes to energy use and habits. The Netherlands, for example, is actually one of the worst performing countries in the energy transition in Europe due to their natural gas resources, for which they never had incentives to be overly prudent or efficient were not prevalent (Rotmans, 2011, pp. 1-4; Sociaal en Cultureel Planbureau, 2016; Vereniging Deltametropool, 2017, p. 7).

A substantial part of the two percent of the Dutch population that is familiar and involved with the energy transition, has the conviction that the Netherlands is doing quite well with regard to the energy transition (Sociaal en Cultureel Planbureau, 2016; POSAD Spatial Strategies, 2017b, p. 39; Vereniging Deltametropool, 2017, p. 7). Herein lies a great potential, as 98% of the population can still be mobilized and still has to realize that Dutch policy regarding the energy transition needs an

immediate change. For this very reason, it is important to make more people aware of the energy transition and its importance and how they can contribute to it themselves (POSAD Spatial Strategies, 2017b, p. 39; Vereniging Deltametropool, 2017, p. 7).

Policymakers can apply lessons learned in this study to smoothen the process in other regions (Urgenda, 2017; Rijksoverheid, 2017). Although every process is different and no blueprint for the energy transition is at hand, when assessed and implemented properly, this can only be seen as an advantage for the regions working on an RES (Nooteboom & Ybema, 2015, p. 130). Utrecht seems to be on the frontline of the Dutch energy transition when it comes to municipalities (Harmelink Consulting, 2017, p. 6). However, this claim is in many cases mostly based on the pursued policy. Indeed, Utrecht has had quite an ambitious policy. Instead of being energy neutral in 2050, like the national government has planned, the municipality tried to achieve the same by the year 2030. To make this even more challenging, Utrecht wants to be as much self sufficient as possible. As in within their municipal borders, which is almost impossible (U10, 2018a). Recently their ambition was changed from 2030 to 'as fast as possible' (Gemeente Utrecht, 2018b). This example shows how interesting and complex the process of setting and realizing goals and ambitions is. Results provided by this study may be useful to other municipalities and regions involved in similar processes and possibly even in a wider context, with regard to cooperation processes that are not energy transition related.

#### 1.3 Scientific relevance

In scientific literature the emphasis lies mostly on international and national policy or the role of local initiatives at the local level (Olsson & Cars, 2011, p. 156; Tavares & Feiock, 2014, p. 1 & 2; Faller, 2014, p. 890; Lintz, 2016, p. 956; Lidstöm, 2016, p. 403 & 407). Lintz (2016, p. 956) made the following statement in this regard: *"While there is a wealth of literature on cooperation between cities, local environmental policy-making and regional sustainable development, voluntary inter-municipal collaboration between neighbouring municipalities on environmental issues seems to have been neglected"*. Olsson and Cars (2011, p. 156) add: *Few studies, however, discuss the challenges of linking sub centres or cores themselves, particularly in cases where cores are designated or planned (based on normative goals) rather than identified (based on functional character and expected growth patterns)". Each region should present an RES proposal by 2021 (U10, 2018b), since a study on the interregional cooperation level in the Netherlands concerning energy transition can help to enrich information on this fairly unexplored topic in scientific literature. This, in combination with the fact that this kind of regional cooperation is fairly new in the Netherlands, may lead to new insights into how transition management on the interregional level can or should be implemented and what positive and negative consequences this has or may have.* 

It is important to note that although transition management is increasingly empirically tested, this is not often done with regard to the development of regional energy strategies (Weber & Rohracher, 2012; Jhagroe & Loorbach, 2015; Porter et al., 2015; Loorbach et al., 2015). As mentioned previously, pilots only started in early 2016 (VNG, 2017). Studying the processes that comprise the development and implementation of regional energy strategies, can contribute to literature in multiple ways. Think for example of an assessment of the applicability of transition management in such a situation in practice. Transitions cross multiple domains and scales and are the result of the congregation of economic, cultural, technological, ecological and institutional developments at different scale levels (Rotmans & Loorbach, 2009, p. 7).

#### 1.4 Reading guide

This thesis is organized in six paragraphs. The first paragraph concerns this introduction with a societal and a scientific relevance, the problem statement and the research question and sub questions. In the second chapter, a theoretical framework will provide insight into the existing literature on the energy transition and several governance structures. Additional theories that are

applicable to these topics will also be discussed. Chapter three deals with the methodology used in this study. Issues such as the structure and course of the research and the interviews will be explained in this chapter. After elaborating on theory and methodology, the fourth chapter will provide an overview of the outcomes of the conducted interviews and the policy document analysis. In the results chapter, statements of the interviewees will be compared to each other as well as to the policy documents. Differences and similarities between the literature and the results will be highlighted and explained. The fifth chapter provides answers to the sub-questions and the central research question in this study. The findings of this study will be discussed in relation to the earlier provided literature in this sixth and last chapter: the discussion. Possible recommendations will be given based on the findings in this thesis. Next, the limitations of the applied method and the results are objectively reflected. Concluding this thesis, possibilities for follow-up research are discussed, such as unanswered questions or new questions that arose during this research.

# 2. Theoretical framework

As discussed in the introduction, the existing literature does not completely cover the current Dutch energy transition, particularly at municipal and regional level. This theoretical framework is intended to provide an overview of the published literature on energy transition, transition management and the cooperation of municipalities on a regional level. The concepts of transition management and multi-level governance will be explained and placed into context. The characteristics of these components are described in the following paragraphs. First of all, an explanation dealing with what an energy transition exactly comprises, will be given. This will be followed by with clarifications of the concepts of governance and transition management. In addition, this chapter also briefly discusses the impact of technological innovations on the energy transition process. Moreover, various factors that can hamper policy or progress in the transition process, along with how they originate, are discussed. Finally, a short analysis is made of the situation of the energy transition in the Netherlands during the past years, as well as the plans for the future with regard to policy.

# 2.1 Energy transition

An energy transition is the irreversible transformation from one energy system into a completely new stable energy system (Hekkert & Ossebaard, 2010, p. 10). The current energy transition is not the first energy transition in history. The first energy transition is the industrial revolution, which started in England in the second half of the eighteenth century as the result of the invention of the steam engine. More recently, there have been requests to alter practices with regard to generation and use of energy as well, mostly in times of oil shortage and periods of war like those in the seventies (Auruájo, 2014, p. 113; Suurs, 2009, pp. 15-17). Until now a transition in energy was from fuels with a low energy density towards fuels with a higher energy density: from biomass to fossil fuels during the industrial revolution, and after the second world war partially from fossil fuels to nuclear power. In addition to this, many socio-economical concerns influenc such a transition, such as who will pay (consumers, taxpayers, industries, etc.), who decides on what, etcetera. The current energy transition is structured according to the principles of sustainability and climate neutrality. Therefore, societies will have to change their production and consumption patterns in such a way that they will have significantly less impact on the climate and environment (Hekkert & Ossebaard, 2010, p. 10). The term for this emerging social movement is called "energy democracy" (Burke & Stephens, 2017, p. 35). An energy transition, such as the one that we go through nowadays, from fossil fuels like gas, oil and coal, towards renewable energy such as solar and wind energy, will not happen overnight. Such a transformation process requires groundbreaking innovations: entirely new technologies, materials, products and services that lead to new ways of producing and consuming. Instead of energy-consuming and consequently high greenhouse gas emissions, these innovations are energy-efficient and climate-friendly. However, besides these new innovations on technological level, changes in social-economical context are necessary as well. This includes changes in habits of energy consumption and waste disposal, as well as in governmental policies and practices (Hekkert & Ossebaard, 2010, p. 10 & 11). Rotmans et al. (2001, p. 17) define a transition as "large-scale transformations within society of important subsystems, during the structure of the societal system fundamentally changes".

According to several authors, transitions can be split up into four distinct stages, as is the case for the energy transition (Rotmans et al., 2001, p. 17; Loorbach, van der Brugge & Taanman, 2008, p. 3):

- 1. *Pre-development phase:* this is the point from where a transition starts, a dynamic equilibrium with no visible changes in the status quo. Most of the time there is an increase in innovations from bottom-up initiatives.
- 2. *Take-off phase:* due to a beginning shift in the state of the system, the transition process and corresponding changes start to occur.

- **3.** *Breakthrough phase:* at this point, structural changes take place through an accumulation of socio-cultural, economic, ecological and institutional changes that react to each other. Within the breakthrough phase, there is an acceleration phase where collective learning processes, diffusion and embedding processes occur. Sometimes the breakthrough phase is referred to as acceleration phase.
- **4.** *Stabilization phase:* here a new dynamic equilibrium is reached as the speed of the societal changes decreases.



Figure 2.1 The different stages of transitions

Source: Van der Brugge and Rotmans (2007)

The four stages of a transition mentioned above are a description of each of the phases. In practice the stages are not so strictly framed and go fluently from the one to the other, just like the line in the graph (Genus & Coles, 2008, p. 1440). Transitions entail generic patterns that indicate the direction of a future pathway. However, they are not very predictable. Transitions cross multiple domains and scales and are the result of the congregation of economic, cultural, technological, ecological and institutional developments at different scale levels (Rotmans & Loorbach, 2009, p. 7). The challenge with transition management is to translate these relatively abstract management rules into a practical management framework which still comprises most of its complexity but will not become too prescriptive (Rotmans & Loorbach, 2009, p. 7). Nevertheless, this does not imply a one-size fits-all-solution to this problem. A type of blueprint with a given number of steps to follow during a transition management approach does not exist. As every country or region is different, they all need their own specific approach (Loorbach & Rotmans, 2010, p. 244).

Considering that energy is a persistent problem, the roots of this problem are in the anthropogenic change of the climate. Anthropogenic changes are changes that are caused by human activity, mainly concerning environmental pollution. As Rotmans and Loorbach (2009, p. 2) state, like Einstein once did: *"Persistent problems cannot be solved through* only *current policies"*. Because of their anthropogenic nature, transition policies need to be both aimed at the future and able to be changed easily and accordingly when necessary. However, this is not always as easy as one might expect, due to policies, interests, choices and investments that have already been made. This has to do with path dependency. It may seem obvious, but such past decisions made by nations, regions or municipalities dictate their future possibilities and thereby their future choices and policies. Path dependency *"refers to inertia of prior choices constraining future pathways, based on self-reinforcing limits like sunk investment costs; increasing returns; inter-relatedness of technologies; and network effects"* (Araújo, 2014, p. 118). Path dependency can clarify why some nations or regions make certain

decisions. In some occasions the same principle is referred to as a 'lock-in' situation. When a path is chosen, you are 'locked' in this path which makes it difficult to change to other ways of operating, all as a result of decisions made in the past (Meadowcroft, 2009, pp. 329-333; Suurs, 2009, pp. 16-21). As discussed in paragraph 1.2, the Netherlands are fortunate with great quantities of natural gas readily available in the north of the country. Because of this, there is no heavy dependency on other countries. The same goes for the fact that no shortages of natural gas have been encountered during the past several years. Therefore, incentives that were overly prudent or efficient were not prevalent (Rotmans, 2011, pp. 1-4; Sociaal en Cultureel Planbureau, 2016; Vereniging Deltametropool, 2017, p. 7).

# 2.2 Transition management and governance

Transition management comprises ways on how to accelerate a change towards sustainability, by influencing governance activities and thereby bring together and coordinate actors so that they can become competitive with other actors while reinforcing each other (Loorbach & Rotmans, 2010, p. 239). Transition management tries to give insight into the processes of a complex adaptive system. A transition process is faced with many uncertainties. To overcome these uncertainties governments must be able to adapt to such situations. Gaining knowledge through research may help to address the challenging nature of a transition process. However, not all possible obstacles will be known in advance, for example how a system responds when a threshold is crossed (Weber & Rohracher, 2012, p. 1044). When the energy transition is approached as a problem-solving process, possible setbacks and difficulties can be expected. Another important aspect in this regard is the involvement of multiple actors. The energy transition is not only a governmental or corporative process, but a multi-actor process as well (Loorbach, van der Brugge & Taanman, 2008, pp. 10 & 11). It is therefore important that new combinations of stakeholders, policy instruments and accompanying knowledge are developed. This can lead to new dynamics in actor cooperation or in society. To be fully effective, reflecting on management of both past and present is essential in the process of a transition. Present issues can be the result of a decision in the past. This then causes a lock-in situation which can be difficult to get out of. In other words: politicians and transition managers should always be critical with regard to management decisions and to adaptations in policy. The transition process is very complicated due to path dependency uncertainties. However, the government has to react to them while also maintaining good relations and cooperation with all the involved actors (Rotmans, 2001, p. 24 & 25; Loorbach, van der Brugge & Taanman, 2008, pp. 9-12; Weber & Rohracher, 2012, p. 1044). As Araújo (2014, p. 114 & 119) states shifts in practices, perceptions, knowledge and financing related to energy transitions should be studied in-depth. While doing so, it is important to make a clear distinction between evaluating energy trends or short and middle term plans as the latter can get overlooked due to the increasing pace within transitions (Rauschmayer et al., 2015, p. 213 & 214; Berenschot, 2017).

A transition is complex, because it involves several governmental levels and there are possibilities that a lock-in situation will occur. Loorbach, van der Brugge and Taanman (2008, p. 12) developed a framework that helps to analyze and guide transition processes. The authors have converted the concepts of actors, governments, policies and possible setbacks and difficulties into a multi-level framework for transition management. Within this framework, the authors define three different levels: a strategic, a tactical and an operational level. The first level consists of activities guiding cultural and social developments that are oriented on the long-term, with a top-down approach regarding decision making such as: long-term goal formulations and vision development processes. According to Loorbach, van der Brugge and Taanman (2008), regime structures are adapted to facilitate the sustainable system in future times in the second level. Most of the time this is done through co evolution between the strategies, interests and agenda's of actors. The operational level comprises executive themes such as: project building, implementation, experimenting processes and new practices. This three level framework for transition management is presented by Loorbach, van

der Brugge and Taanman (2008, p. 12) with the addition of a repetitive model consisting of four activity clusters. The four activity components of the model (figure 2.2) are presented in sequential order:

- **Problem articulation**: Innovative pioneers and trendsetters have to be identified. Likewise, problems will be defined as well as the formulation of alternative visions.
- **Building a transition agenda and networks**: After negotiation, intermediate goals and related strategies and regulations are exchanged and co-produced by actors and representatives from networks.
- **Experimenting and diffusing**: On the operational level, executing actors such as project managers, entrepreneurs and governments implement operations and actions.
- *Monitoring, evaluating, learning and adapting:* This activity section aims at optimizing reflexivity on the processes so one can learn from processes at all levels and all phases.



Figure 2.2 The transition management cycle

Source: Authors adaptation of Loorbach, van der Brugge & Taanman (2008)

This circular model is a repetitive and ongoing process. For example when a new action or policy has been implemented after going through the four phases of this cycle, it is possible that a new problem arises. To solve that new problem, another walk through the transition management cycle is needed, and so on. Every walk through the cycle is supposed to increase the support from both the public and private sector, thereby increasing the likelihood to move up along the transition curve shown in figure 2.1 (Loorbach, van der Brugge & Taanman, 2008, pp. 9-12). Transition management could thus supposedly help to better coordinate public policy and legitimize policies and therefore also mobilize problem solving capabilities in society (Rotmans et al. 2001). Leitbilder (guiding visions) play an essential role when it comes to intentionally shaping a socio-technical change in processes with multiple scales and actors. Actors translate national and international discourses into regional contexts by binding themselves to these national and international discourses. Furthermore, actors align actors throughout different levels of governance to increase authority and resources for promoting their own visions (Spath & Rohracher, 2010, p. 454). The aim of using Leitbilder does not only have to be at a shift in policy and changes in regulation that are necessary to bring about an energy transition. Technological developments and innovations also fulfil an important role in this complex process (Cherp, Jewell & Goldthau, 2011; Kern & Smith, 2008; p. 4093; Suurs, 2009; Hekkert & Ossebaard, 2010, pp. 9-11; p. 13 & 14; Weber & Rohracher, 2012, pp. 1037-1040). As the transition management theory focuses mostly on the policy-based aspects, the sole use of such types of theory does not quite cut the mustard. As Weber and Hohracher (2012, p. 1038) mention: "Many important arguments in support of transition-oriented policies remain unheard due to their incompatibility with the prevailing innovation policy framework". It is the positive expectations (the leitbilder) surrounding the technology that makes people decide to get involved with the innovation process. The number of parties that is interested in a specific technology grows as the expectations for this specific technology becomes more favourable (Hekkert & Ossebaard, 2010, p. 29). For this very reason, an innovation system develops much faster around promising technologies. In other words: expectations surrounding an innovation influence how favourable an innovation system is (Hekkert & Ossebaard, 2010, p. 12 & 29). In addition, governments should simultaneously stimulate and exert pressure on the business sector that needs to change. Only in this way the optimal circumstances will be created for groundbreaking innovations, as expectancies on technology are very important (Hekkert & Ossebaard, 2010, p. 125).

Since the introduction of transition management in 2001, transition management principles are being increasingly used in transition processes by the Dutch national government and municipalities. During this same time period, from 2001 until today, there has been an increase in criticism towards transition management theory. For example: transition management is found to be normative by several authors (Shove & Walker, 2007; Genus & Coles, 2008; Weber & Rohracher, 2012; Rauschmayer et al., 2015). This normativity discerns itself as transition management handles sustainable development as a long-term goal. Instead transition management falls short of proposing assessment methods for pathways and visions against science regarding sustainability (Rauschmayer et al., 2015, p. 213 & 214). This becomes clear when taking into account that there are many external factors that cannot be controlled or influenced by the coalition of actors. Under ideal conditions, Spath and Rohracher (2010, p. 457) think that there is even the possibility of a positive feedback loop. When the government recognizes what the importance of niches is, when it comes to translating radical visions into reality, this will provide essential support for these niches. Subsequently, resources can be used, and conditions can be improved. In turn, this can lead to even more and ambitious initiatives and cooperations on a local level (Spath & Rohracher, 2010, p. 457). Dutch consultancy firm Berenschot has made an analysis of the RES pilot regions and other similar transition plans by municipalities. They found that in many energy strategies there is a lack of incorporation between the discussed themes and the parties involved. This is partly due to the fact that formations of visions and cooperation do not always involve all affected actors and niches. In addition to this, many regions express long-term ambitions, that turn out to be considered shortterm when implemented. This leads to situations in which action is taken in the short-run and mostly over-ambitious goals are set for the long-run, but where the mid-term seems to be forgotten. However, the mid-term is essential for linking the actions taken today to the achievement of the goals in the long-run. A field of solar panels, which is called a solar farm, build today will not last longer than 2050, and neither will a wind turbine that is build next year (Berenschot, 2017, pp. 23-28).

In addition to the lack of short and middle term orientated plans, Shove and Walker (2007) have concerns whether interventions of 'transition managers' bring about the desired changes. According to these authors this has not necessarily to be the case. In fact, it may even worsen the situation, because of the naive use of political power of these transition managers who will then not account for the implications their interventions have. This political power refers to when and how to decide and when and how to intervene, which can be steered by political or common interest (Rauschmayer et al., 2015, p. 214 & 215; Shove and Walker, 2007). Transition policies are aimed at tackling specific transition problem areas. Most of the time this is done through interactive development and incorporating different societal visions in the process, by consensus. As mentioned before, a concrete operationalisation and an effective implementation is still disputable (Weber & Rohracher, 2012, p. 1040). According to Meadowcroft (2009, p. 335; Genus & Coles, 2008, pp. 1439-1442) it is likely that this has to do with the policy instruments used in the process of transition management, which differ significantly from conventional instruments: visioning and experiments are now being used, opposed to the previous regulatory, planning, tax and other financial based approaches (Meadowcroft, 2009, pp. 333-338).

#### 2.3 Inter-municipal cooperation

Since this thesis is focused on inter-municipal cooperation, an overview of the relevant literature and case studies on this subject are indispensible. According to Nelles (2013, p. 1354), inter-municipal cooperation can be split into two dimensions: a horizontal and a vertical dimension. The horizontal dimension is internally oriented and concerns the regions capability to effectively develop and implement agendas for the region. The vertical dimension is externally oriented and focuses on how a region can associate with other regions and how much the region can influence the other regions to achieve its objectives. Both of these dimensions can influence each other (Nelles, 2013, p. 1354).

When it comes to solving collective problems in metropolitan areas, Savitch and Adhikari (2017) discuss the importance of public authorities. The authors define inter-municipal cooperation in regions not so much as a regional government. In their eyes, regions are closer to a corporate entity formed by public authorities. Anders Lidström (2017) discusses this topic in a European context. The author explains how inter-municipal or regional cooperation emerged due to the lack of an overarching metropolitan government. As a region, municipalities can now solve collective problems while also integrating the metropolis and possible reductions for costs and risks due to scale benefits (Lidström, 2017, p. 404; Olsson & Cars, 2011, p. 159). In 1999, the European Commission already addressed that "polycentric urban systems are more equitable, efficient and sustainable than mono-centric or dispersed urban systems, and should therefore be actively encouraged by national and regional planning" (Olsson & Cars, 2011, p. 155). Ever since, national planning systems throughout the European Union implemented the polycentric principle. Nonetheless, there are also negative aspects to a regional cooperation. For example, a region is not directly elected, which potentially causes accountability limitations as the decision making process is less public (Lidström, 2017, p. 405). Inter-municipal cooperation typically occurs when a certain issue is beyond the capacity of the municipalities individually, but can also create a win-win situation for all of these involved municipalities. However, this is not a guarantee, as municipalities also compete with each other for attracting tax revenue generating households and firms. Hence, the municipalities and other involved parties will have to agree on essential investments and restrictions related to transportation and planning of land use when aiming to achieve a functional cooperating region. Herein, contributions of each of the parties reflect the estimations of individual risks and payoffs (Olsson & Cars, 2011, pp. 156-159).

#### 2.4 Policy instruments and strategies for municipalities

Burke and Stephens (2017) have compared 22 policy instruments to 26 outcomes for socio-technical transitions like the energy transition. To better understand this, we first have to look at energy democracy. In the first section of this chapter we learned that energy democracy is the social movement striving for renewable energy and for political, economic and social change to realize this (Burke & Stephens, 2017, p. 35). This emerging movement has a vision incorporating multiple policy instruments: resist-reclaim-restructure. This vision is based on three goals: to resist the dominant energy systems, to reclaim the energy sector both socially and publicly, and to restructure the energy sector to better support environmental sustainability, democratic processes and social justice (Burke & Stephens, 2017, p. 43). Based on these three goals at least 22 policy instruments are currently implemented worldwide, aspiring to fulfil 26 intended outcomes. The analysis showed that: "*No single policy instrument can advance the energy democracy agenda in isolation; rather, a combination of policy instruments is required*" (Burke & Stephens, 2017, p. 45).

Most of these policy instruments are aimed to reclaim and to restructure goals and primarily target corporations and policies. However, they do not target the residents individually (Burke & Stephens, 2017, p. 45). As mentioned several times before, creating awareness among citizens is very important (POSAD Spatial Strategies, 2017b, p. 39; Vereniging Deltametropool, 2017, p. 7). Besides the fact that awareness for the energy transition in general is needed, awareness on energy usage is also an important goal as households are accountable for around a fifth of the total usage of energy (Ecofys, 2015; Linden et al., 2006, p. 1918).

Linden et al. (2006, p. 1919-1922) distinguish four types of top down policy instruments to realise lower energy usage in households: information, economic instruments, administrative instruments, and physical instruments. The study found that mostly economic measures such as taxing are currently used. On the contrary, the authors found that residents experience a need for better information provision on the relation between energy use and behaviour (Linden et al., 2006, p. 1926). Lifestyle also is an important factor in changing behaviour that goes hand in hand with energy efficient technology. In such cases, behaviour seems to change almost automatically. Policy measures need to be improved, possibly also incorporating and responding to such behaviours to improve their efficiency (Linden et al., 2006, p. 1926 & 1927).

Besides the use of policy instruments and tools, municipalities can be influential in other ways as well. According to Shönberger (2013, p. 8), municipalities can be considered key actors if their role is more important compared to private actors, or if they function in higher political levels in processes such as RES development, but especially in renewable energy governance. The interest of municipalities to deal with the environmental problems can be expected to vary considerably according to their characteristics (Lintz, 2016, p. 964). When a region is working on its sustainability, it is not always limited to its internal resources such as monetary funding. There may be funds available from, for example, the national government or the EU (European Commission, 2018c). There is yet another, more creative way, for a region to get external funding. This method is very dependent on personal skills like relations and building networks, this does not imply that this method will work for every mayor or city councillor. It happens to be the case that mayors can play a very important and dominant role in large projects, also environmental related. An example comes from Kortrijk in Flanders Belgium. De Clerck, mayor of the city of Kortrijk made smart use of his relations within his own political party. By investing in relation with council members outside of his own political party, he created access to their relations with ministers and therefore their recourses and capabilities. Additionally, he maintained relations with construction companies and project boards (Block & Paredis, 2013, p. 185). As a result of his 'mayoral entrepreneurialism', De Clerck was able to get funds for projects in the city of Kortrijk which would otherwise have been unthinkable. This case demonstrates how intertwining one's own power recourses and channels with those of others can form powerful coalitions. If done where and when deemed necessary, mayors can often take the role as leader in decision making processes. This results not only in an increase of recourses, but also provides control over the destination of these newly acquired recourses (Block & Paredis, 2013, pp. 185-187).

A second example of how a municipality can take a role as key actor, when it comes to renewable energy, is when a municipality has its own energy company. In Germany municipalities can establish energy companies and provide energy from renewable sources on a local scale. When these municipal energy companies comply to economic and ecological targets set by the German government, they are legible for a cost covering compensation (Schönberger, 2013, p. 22 & 23). The municipality of Haarlemmermeer in the Netherlands has also established its own renewable energy company: Tegenstroom BV. (Binnenlands Bestuur, 2014). In this framework the emphasis does not lie on profits. Moreover, there are regular energy companies that form general market competition, which lowers prices until a breakeven point (Schönberger, 2013, p. 27). This implies that the municipal energy company joins the local energy market and behaves as any other company within an economic market. Municipal energy companies are more so used to push the frontiers of technological innovation in the renewable energy sector (Schönberger, 2013, pp. 23-26). Residents can purchase green energy at a higher price point opposed to regular energy. Profits are invested in wind parks, solar plants or thermal energy generation (Schönberger, 2013, p. 31). In some occasions these companies perform so well that they invest in renewable energy projects abroad. Such a municipal or regional energy company can offer great perspectives in situations like the development of a RES. These energy companies can be pioneering projects both scale-wise and technology-wise, as they are in Germany. This way a region can induce great changes in line with the RES themselves, instead of waiting for prevalent energy companies to rearrange their plans (Schönberger, 2013, p.

25). This shows how mayors can play an important role in the energy transition, or even how municipalities can be a pioneering actor in the production of renewable energy.

#### 2.5 RES process model

To analyse inter-municipal cooperation within a region, a research framework is desirable to guide the analysis. An analysis of the development of an RES has been done regarding the metropolitan area Greater Manchester in England (Faller, 2014). A methodological approach consisting of two elements was found to be essential to this analysis. It's applicability will be discussed later in chapter 3 on page 23. These two elements consist of a thorough document analysis of official articles, which complemented by expert interviews that provided further insight into the strategic side of the processes and actors (Faller, 2014, p. 894 & 895). It was concluded that the development of regional energy strategies is helpful for future decision making because it increases the flexibility of regions while also increasing eagerness for implementation of specific targeted measures. This opposes the belief that the development of an RES is only achievable by developing renewable energy generation capabilities and is found to be more effective (Faller, 2014, p. 890). The increase in flexibility and willingness for specific measures of the regions relate to the third and fourth activity components of the transition management model mentioned in the previous paragraph. This is most likely due to the process model Faller uses for analysing energy strategy development.

Faller's process model, shown in figure 2.3, is composed of five components. At the center the strategic concept is located which delineates objectives for the region and hence serves as a reference framework for involved actors. The courses of action within the region that are structured by the regulatory system are reflected by the *institutional context*. A multi-level dimension has to be added for the energy processes. It is supposed to reflect the outlined co-evolution and embeddedness of these energy processes. Next, the strategic discourse determines informal exchanges regarding the strategy's contents and interactions among actors in the region. The autonomous strategic behaviour encompasses all activities and interactions by all of the involved people that are not affected in any way by the regional strategy. This implies that this activity would take place even if there was no such thing as an RES. Finally, and opposed to the previous component, induced strategic behaviour comprises all of the actions that are intended and caused by



Figure 2.3 Process model for analysing energy strategy development

Source: Faller (2014, p. 894)

the regional strategy (Faller, 2014, p. 894). It was found that all of the five different components of this process model interrelate to and affect each other. The model is also influenced by external factors that are not incorporated. Nonetheless, Faller concluded this is not of any harm to the analysis of the RES development process. This way the model was kept as clear/understandable as possible (Faller, 2014, p. 894 & 895).

# 2.6 System failures framework

An additional analytical tool is found in the system failures framework. This framework can be applied to explain failures of transformative policies, such as those implemented as part of an RES (Weber & Rohracher, 2012, p. 1038). Rosalinde Woolthuis et al. (2005), created a framework distinguishing four different types of failures that can occur with transformative policies. Infrastructural failures encompass shortcomings within existing physical infrastructures such as ICT, knowledge and transport infrastructures. Institutional failures come in two forms: hard and soft, the hard being laws and regulations or in other words the formal institutions. The soft institutional failures involve institutions in a broader context, like political cultures and social values. Interaction or network failures come in the form of strong and weak network failures. Respectively, an actor can either have a too tight network or a lack of connections, both leading to a lock-in situation. The fourth and last is the *capabilities failure*. As the name does suggest, the actor in question lacks the resources, competences or capacity which causes the failure (Woolthuis et al., 2005, pp. 612-614; Weber & Rohracher, 2012, p. 1042). The mentioned types of failures are not only applicable to technological innovation systems, but also usable in a transition perspective. Concerning transitions, these four system failures are mostly used to justify policy interventions and are referred to as structural system failures (Weber & Rohracher, 2012, p. 1042 & 1045).

According to Matthias Weber and Harald Rohracher (2012) these four system failures do not quite cover all occurrences of failures. On the grounds of this belief, the authors proposed four additional failure indicators, also valid for transition policies. Referred to as transformational system failures, the four new indicators in question are the: directionality failure, demand articulation failure, policy coordination failure and the reflexivity failure. The fifth transformational system failures concerns not the efficiency and effectivity of a policy, but its orientation towards the desired end result. Inadequate market uptake, by for example transition managers, can hamper a transition and therefore *demand articulation* is the sixth failure that justifies (sectorial) policy interventions. This failure emphasises the need for more learning and anticipation about user needs. In contrast to the former two failures, a policy coordination failure solely focuses on coordination problems on a policy level, disregarding coordination problems of R&D actors. Finally, reflexivity failures are concerned with the constant monitoring of the progress en route to set goals and the corresponding development of adaptive policies and strategies, which gives it a long term character (Weber & Rohracher, 2012, pp. 1041-1045). What becomes immediately apparent is the significant overlap between all of these eight types of system failures. For example: the eighth system failure, reflexivity, is relevant to the other three transformational system failures (Weber and Rohracher, 2012, p. 1044). This implies that, when analysing the two case studies, multiple or possibly all of the eight types of system failures may apply to a particular situation. Notwithstanding the foregoing, these eight types of failures can indicate the problems and difficulties encountered, they can be very useful when analysing the two case studies regarding regional energy strategies in the Netherlands. The use of these system failures can be used to help to indicate and clarify why and how the different stages of the aforementioned transition curve can or cannot be reached.

Type of failure	Failure mechanism
1 Infrastructural failure	Lack of physical and knowledge infrastructures due to large scale, long time horizon of operation and ultimately too low return on investment for private
	investors.

2 Institutional failure	<ul> <li>Hard institutional failure: Absence, excess or shortcomings of formal institutions such as laws, regulations, and standards (in particular regarding IPR and investment) create an unfavourable environment for innovation.</li> <li>Soft institutional failure: Informal institutions (e.g. social norms and values, culture, entrepreneurial spirit, trust, risk-taking) that hinder innovation.</li> </ul>
3 Interaction or network failure	<ul> <li>Strong network failure: Intensive cooperation in closely tied networks leads to lock-in into established trajectories and a lack of infusion of new ideas, due to too inward-looking behaviour, lack of weak ties to third actors and dependence on dominant partners.</li> <li>Weak network failure: too limited interaction and knowledge exchange with other actors inhibits exploitation of complementary sources of knowledge and processes of interactive learning.</li> </ul>
4 Capabilities failure	Lack of appropriate competencies and resources at actor and firm level prevent the access to new knowledge, and lead to an inability to adapt to changing circumstances, to open up novel opportunities, and to switch from an old to a new technological trajectory.
5 Directionality failure	Lack of shared vision regarding the goal and direction of the transformation process; Inability of collective coordination of distributed agents involved in shaping systemic change; Insufficient regulation or standards to guide and consolidate the direction of change; Lack of targeted funding for research, development and demonstration projects and infrastructures to establish corridors of acceptable development paths.
6 Demand articulation failure	Insufficient spaces for anticipating and learning about user needs to enable the uptake of innovations by users. Absence of orienting and stimulating signals from public demand Lack of demand-articulating competencies.
7 Policy coordination failure	Lack of multi-level policy coordination across different systemic levels (e.g. regional-national-European or between technological and sectoral systems; Lack of horizontal coordination between research, technology and innovation policies on the one hand and sectoral policies (e.g. transport, energy, agriculture) on the other; Lack of vertical coordination between strategic intentions and operational implementation of policies; No coherence between public policies and private sector institutions; No temporal coordination resulting in mismatches related to the timing of interventions by different actors.
8 Reflexivity failure	Insufficient ability of the system to monitor, anticipate and involve actors in processes of self-governance; Lack of distributed reflexive arrangements to connect different discursive spheres, provide spaces for experimentation and learning; No adaptive policy portfolios to keep options open and deal with uncertainty.

Source: Weber & Rohracher (2012, p. 1045)

# 2.7 Conceptual framework

In this last section of this chapter, previously presented information will be summarized and distilled into a conceptual framework which will be used as the basis for the further research in this thesis. Throughout this chapter the different phases of the transition curve and how these with governance issues resulted in transition management are discussed. Hereafter, a framework for analysing RES development was explained, as well as how affiliations between mayors and city councillors can provide additional kinds of recourses. Finally, a system failures framework was presented which can be used for addressing failures and how to overcome them. To conclude this chapter, all of these insights will be summarized and incorporated into a conceptual model which will help to guide this thesis.

According to van der Brugge and Rotmans (2007), the energy transition can be divided into four different phases which it goes through during the transition. These four phases are a rough indication to determine the current status and general progress of the transition in question. Nevertheless, one

has to keep in mind that a transition is a linear process. Transition management is a theoretical framework aimed at analyzing and improving a transition process. This is ought to be achieved by repeatedly going through the four activity components of the transition management cycle. These four components are respectively: problem articulation, building a transition agenda and networks, experimenting and diffusing, and monitoring, evaluating, learning and adapting. As transition management is increasingly being integrated into policies regarding energy and transition, criticism has also increased. Mostly it is to be found normative and primarily long term oriented, disregarding the evenly important short and middle term.

Several studies (Olsson & Cars, 2011; Savitch & Adhikari, 2017; Lidström, 2017) have shown that inter-municipal cooperation can play an important role for solving collective problems in a region. Inter-municipal cooperation can be divided into a horizontal and vertical dimension. In this thesis the focus lies on the horizontal dimension as it is internally oriented, such as a regions capability to effectively develop and implement agendas for the region. This was followed by how building political networks and establishing municipal energy companies can help a region to achieve its environmental goals and how to use which policy instruments. Both fall within the analytic scope of the process model. As is the case with technological innovations and experimentation. These are also very important in an energy transition as they accelerate the implementation of sustainable alternatives to their fossil fuelled counterparts. Hence they cause an accelerated out-phasing of the use of fossil fuels. Hereafter Faller's process model for analysing an RES process is presented.

Finally, eight system failures are discussed. These system failures help to indicate and clarify why and how specific failures occur in innovative decision making processes and the implementation of policies. A total of eight system failures are distinguished in the studied literature. These eight indicators do, however, overlap each other. Hence, in most cases, multiple indicators apply to just one failure.

The conceptual framework for this thesis is shown in figure 2.4. It represents a regional energy transition process with subjects that are encountered during inter-municipal cooperation on an RES. It is based on the process model presented by Faller (2014). It has been adapted and combined with the other literature on transition management and system failures. The conceptual framework starts at the *strategic concept* in Faller's model. In this conceptual framework this is renamed to the regional environmental objectives. Incorporating short term, middle term and long term objectives. In this way it can harness the positive sides of transition management, while also focus at the otherwise overlooked short and middle term. These objectives result in a policy the region found appropriate to achieve the objectives set in the previous stage. In turn this policy leads to both induced strategic behaviour and autonomous strategic behaviour by actors in the region. Induced strategic behaviour are the actions that are intended and caused by the effects of a policy, regulation



### Figure 2.4 Conceptual model

or strategy, pushing actors in a specific direction. Autonomous strategic behaviour encompasses all the activities and interactions of actors that are not caused by policy, regulation or strategies such as: local initiatives, participation, the more creative and out of the box actions by actors within legal limits. Policy and both forms of actor behaviour are influenced by the system failures indicators. Either when a problem is encountered, or in advance when these indicators are used to indicate and prevent possible future failures. In essence this creates a sort of feedback loop for the policy and both forms of actor behaviour. Outside of this process, the induced and autonomous strategic behaviours of actors lead to achieving goals set in the first stage of this model, which in turn leads to reaching a new stage on the transition curve. From there the cycle can start again.

# 3. Methods

In this chapter, theory and practice are linked to clarify the research that has been done. The methods that have been used in this study are described in this chapter. First, the research design is discussed. The limitations of operation are also mentioned when these are apparent. Moreover, the choices that have been made, are substantiated. In the last paragraph, the topic list is presented with a brief explanation on each topic. The chosen research approach is based on the conceptual model which was presented on the previous page. The conceptual model has been used as a guideline in this research. In addition, the research follows the steps outlined by Faller (2014) and the conceptual model. Given the resemblance between Faller's research and this subject, Faller's framework is considered appropriate to study the development of an RES. This study comprises of an analysis of two case studies, nine expert interviews and a policy document analysis of documents published by both regions.

# 3.1 Research design and case selection

The goal of this research was to establish how transition management and the development of a regional energy strategy can improve inter-municipal cooperation. Due to this goal the ambitions and plans from the regions and municipalities were important. In addition to this, the experiences on the internal functioning of the regions were essential to come to a conclusion for this study. Because of both of these reasons, a qualitative research design was chosen with a document analysis and semi-structured expert interviews. An analysis of all relevant policy documents has been done and interviews with involved government officials have been conducted as well. Hereafter, the collected information was compared to each other and related to the theory which was discussed in the theoretical framework chapter. As this conceptual framework incorporated and combined the scientific literature in a comprehensive flow chart (figure 2.4). This all was done in the form of an illustrative case study with two cases. This basically means the case studies were descriptive and give in-depth examples and information about the RES programs (Baškarada, 2014, p. 5). This acquisition and processing of information from policy documents and interviews is elaborately discussed in the next paragraph.

The case study in this research was an illustrative case study (Baškarada, 2014, p. 5). Because all 30 regions in the Netherlands have the same objectives, to be energy neutral by the year 2050, the regions that are chosen are very similar (Provincie Zuid-Holland, 2018a; Rijksoverheid, 2018). Another reason for this was the recency of the need for developing an RES. There isn't a definitive plan with guidelines for the regions in the form of the Dutch Climate Agreement yet. For this study a pilot region (Middle-Holland) and a non pilot region (Utrecht 10) were selected. This was done as it can indicate how help and support from other governmental bodies at the start of the developing process lead to any differences.

Middle-Holland and the Utrecht 10 are the two regions that were selected as the two cases that were studied in this thesis. The Middle-Holland region was part of an already finished pilot project initiated by the national government of the Netherlands to develop an RES. The U10 region is a region that has just started the process of developing an RES. The comparison between a finished and starting project region was in line with the goal of this thesis; how can transition management and inter-municipal cooperation improve the development and implementation of an RES? Besides this, both regions had a different history on inter-municipal cooperation. The municipalities of Middle-Holland have always had close cooperation with each other (ODMH, 2016, p. 5). The opposite applies to the Utrecht 10 region, where inter-municipal cooperation is fairly new to the municipalities (U10, 2015b, p. 2 & 3). Another reason for choosing these specific regions was the offered internship which led to the U10 as the first case selection. The contacts available at the municipality of Utrecht lead Middle-Holland to be a logical second case choice.

The conceptual model presented in the last paragraph of the previous chapter was used when analysing both regions. As it represents a transition process, the transition processes of each of the two regions were analysed step by step. When possible, the different types of actors for each of the regions are drawn up, so one can get an idea of what parties are involved in the region and how they may relate to each other. As it is a regional challenge, the municipalities and regions try to involve executing parties from as close by as possible (VNG, 2017, p. 8 & 9). Moreover, when all the types of involved actors and their relations were distinct, this uncovered where defects occur and how these can be improved upon. The system failures framework provided description of eight different types of system failures that typically occur. Hence, they were identified and possible solutions were provided accordingly (Woolthuis et al., 2005; Weber & Rohracher, 2012). Strengths and weaknesses were mentioned throughout the analysis with reflection to literature, policy documents and respondents' statements.

#### 3.2 Three step approach: data acquisition and processing

The methodological process for acquiring information used by Faller structures the collection of information which was linked to the theory from scientific articles. Fallers methodology consists of two parts: first, official articles were examined as secondary data within a document analysis. Secondly, interviews with experts were the primary data, providing a deeper insight into actor constellations, strategic processes and strategic development (Faller, 2014, p. 894 & 895). For extra clarification of this research a third phase was added to this two step approach, which is the analysis of the gathered information during the previous two steps. As was mentioned in the previous paragraph this was done using the conceptual framework as a guideline and will be discussed below.

### 3.2.1 Policy document analysis

An analysis of all available policy documents was a very important and substantial part in the study by Faller (2014, p. 894 & 895). For the most part the document analysis comprised the documents published by the U10 municipalities and region itself, but also those of the Middle-Holland region pilot group. These policy documents, in combination with the interviews, hopefully gave an accurate overview of their processes and practices during these processes. Probably not all information was available as it might be too sensitive in some cases and wherefore not all information will be made public until it is completely reliable or really necessary. The findings of this analysis will be elaborately assessed in the next chapter in the form of two case studies, Middle-Holland and Utrecht 10 respectively. The two case study analysis are followed by another paragraph containing additional observations and including some additional subjects not discussed in the other two paragraphs, because they did not fit a specific place in the conceptual framework or, for example, span several blocks therein. A comparison between both regions was made in the last paragraph of the results chapter.

For the policy document analysis an informal approach was chosen, as these documents were not the only source of information and the study also relied on interviews and scientific articles (Peräkylä & Ruusuvuori, 2011, p. 870). Yanow (2006, p. 411) states very clearly how document analysis can substitute other types of studies: *"document reading can also be part of an observational study or an interview-based project. Documents can provide background information prior to designing the research project, for example prior to conducting interviews. They may corroborate observational and interview data, or they may refute them, in which case the researcher is 'armed' with evidence that can be used to clarify, or perhaps, to challenge what is being told, a role that the observational data may also play". This is exactly how policy documents and interviews. In the interviews elaboration and explanations for the contents of the policy documents were obtained. This was especially useful as interpretation of documents can vary from reader to reader. <i>"In many cases, qualitative researchers who use written texts as their materials do not try to follow any predefined protocol in executing their analysis. By reading and rereading their empirical materials,* 

they try to pin down their key themes and, thereby, to draw a picture of the presuppositions and meanings that constitute the cultural world of which the textual material is a specimen" (Peräkylä & Ruusuvuori, 2011, p. 870). In addition to this, not all documents always reflect reality as they can be out dated sources of information (Baškarada, 2014, p. 11). All available documents regarding the regional energy strategies of both regions were read thoroughly. During this analysis the focus was on the goals and ambitions set by both regions. What are these goals and ambitions and how are they ought to be realized? What kind of policies and regulations are used in this respect? Another important subject was cooperation. How does the inter-municipal cooperation take place? Do the regions cooperate with other regions or governmental bodies like the provinces? While these were analysed, important sections were marked and notes were made. Coding was done according to the topic list. This was made easier by the fact that the documents were already organised in similar subjects. Eventually these documents were summarized in such a manner that it is still understandable for the less initiated readers of this thesis. However, the summaries maintain all the important details of the original documents. Due to limited time and resources, policy documents of the municipalities individually were, for the most part, left out of the analysis.

### 3.2.2 Semi structured interviews

The themes used for the document analysis mentioned above, together with findings from scientific literature, were used as the basis for the second part of the methodology: the interviews. The distinct themes and topics were grouped in several overarching themes to form a topic list. Under each of these overarching themes several questions were formulated. However, the questions changed during the research process, because certain topics turned out to be less relevant and new ones arose during the interviews, further research and newly published documents. Baškarada (2014, p. 11) states that interviews should only be used to acquire information that cannot be acquired in any other way. It should also be pointed out that interviews do not always reflect reality. However, interviews are very often the most important source of case study evidence (Baškarada, 2014, p. 11). The goal of the interviews in this research was also to deepen the understanding of the development process and gain insight from different levels and perspectives. Another function of the interviews was to confirm findings from the document analysis, or to highlight contradictions.

There seems to be a (general) tension between asking short and to the point questions on the one hand, and being flexible and ask the interviewee to explain their experience in more detail on the other. A related tension is thoroughly following the line of questioning in order to make sure that data was comparable on the one hand, and to deviate from the interview in order to explore meaning and to get a better understanding, on the other.

To help answer the central research question and sub questions, the respondents for interviews were both policy makers from the municipalities of the pilot region or U10 region or project leaders from the Middle-Holland pilot region or the U10 region. They were approached preferably in person or via e-mail for an in-depth interview about either the municipal vision or the project group. The interviews were conducted as semi-structured interviews to provide enough room for additional interesting topics of discussion. The interviews were be led by questions based on a pre developed topic list. These topics will be briefly discussed below in paragraph 3.5 of this chapter. When new questions during interviews arose, these were incorporated in following interviews if necessary. The interviews were conducted both in person and via telephone, the latter was mostly due to travelling distances or because of the tight agendas of the government officials.

# 3.2.2.1 Respondent selection

The respondents were policy makers (from municipality, inter-municipal projects, province and maybe national government), initiators of environmental projects and project leaders (e.g. U10, RES pilot regions). Ultimately nine respondents were interviewed for this study. These respondents were contacted as an employee of the municipality of Utrecht during the internship, after the internship as a student from the University of Utrecht. This was either done in person, via email or by phone. All

the interviews were conducted in person or by phone and recorded so that they could be transcribed later.

The names and positions of the interviewees were not mentioned throughout this thesis. The reason to ensure anonymity is the fact that most of the respondents have specifically asked not to mention this information. Another reason for this was the possible sensitivity of the provided information or statements. Moreover, if misinterpretation of one or several statements occurs among readers, it cannot be traced to whom said what and therefore cannot be harmful for the respondents reputation.

### 3.2.2.2 Seminar and workshop

On behalf of several Dutch ministries, both design bureaus worked on the book Spatial exploration Energy and Climate (Ruimtevolk, 2018b), which gave insight into the spatial aspects of the energy transition. Attending relevant seminars and workshops on the energy transition topic, organised by design studios such as POSAD Spatial Strategies and Ruimtevolk, were helpful to expand the research scope beyond scientific literature. In the book Spatial exploration: Energy and Climate, the bureaus worked both within and beyond the political and regulatory boundaries to explore what is truly possible (Ruimtevolk, 2018b, p. 8 & 9). In doing so, it was possible to gain a better understanding of new ideas that currently exist among involved groups, ranging from government to businesses to consultancy firms to citizens. Discussions in the workshops gave insight into why people support certain believes or not. A seminar at Ruimtevolk was attended on may 17<sup>th</sup> of 2018. The subject of the seminar was: *The route towards a regional energy approach* (Ruimtevolk, 2018a). Several municipal planners and RES project leaders attended the event. Even a government official from Belgium was present, which led to a completely different perspective on several subjects as spatial practices differ between Belgium and the Netherlands.

# 3.2.2.3 Attendance of U10 meeting and We Energy Game

On may 30<sup>th</sup> 2018 a meeting of the U10 took place in Houten, one of the municipalities of the U10 region. This meeting was attended as an intern from the municipality of Utrecht. During this meeting, all attendants were divided in several smaller groups of around four to five people. These groups would then play the so called We Energy Game developed by the Hanzehogeschool Groningen (Hanzehogeschool Groningen, 2018). Each player was assigned to an unique role and score are given for several categories, for example energy generation, emissions and impact. The goal of the game was not per se to meet the required amount of energy to be generate, but most of all to create awareness. Awareness for the extend of the energy transition problem, tensions it creates and the difficulties that come along with it, but also shed light on opportunities. Attending this meeting was in itself not of unprecedented value for this thesis, but it gave some insights in how the U10 region was still exploring ways of cooperation and how to come to consensus.

#### 3.2.3 information processing

Mentioned several times beforehand, the conceptual framework was used to provide guidance while processing the results and relate them to theory. The first two blocks in the flowchart are related to transition management. Regional environmental objectives correlates to the first of the four components of transition management: problem articulation (Loorbach, van der Brugge and Taanman, 2008, p. 12). In this section the objectives and goals were discussed and when possible, connected to the transition management theory. The second block goes one step further and looks into the policy that municipalities and region implement to realize the objectives from the previous step. This, in turn, complies with the second activity component of transition management theory: building a transition agenda and networks. The last two components from the transition management model relate to reflexivity and adaptation, which applies between the first and the second block as objectives might have to be changed due to possible complications (Loorbach, van der Brugge and Taanman, 2008, p. 12). It holds a similar relation between policy and system failures, as the latter is essentially a sort of control method (Weber & Rohracher, 2012, p. 1038). System

failures were used to help indicate and clarify why and how specific failures occur in innovative decision making processes and the implementation of policies. A total of eight system failures have been used during this research (Weber & Rohracher, 2012, pp. 1041-1045). However, before the system failures were addressed and discussed, both the induced strategic behaviour and autonomous strategic behaviour have been drawn up for each region respectively. This is done on basis of the policy documents and expert interview conducted prior to the results analysis. The last two block of the conceptual framework did not apply during this research as the regions were not at these stages yet. They were, however, included into the model to complete the full process of moving along the transition curve (Rotmans et al., 2001, p. 17; Loorbach, van der Brugge & Taanman, 2008, p. 3; Faller, 2014, p. 894).

Each of the regions was discussed in their own paragraph. A third paragraph in the results section was added to compare both regions, such as their take on inter-municipal cooperation on establishing a municipal energy company or using political instruments to induce changes or accelerate processes (Block & Paredis, 2013, p. 185; Shönberger, 2013, p. 8 & 22-26; Lintz, 2016, p. 964). Based on these three paragraphes, several guidelines for developing an RES have been proposed which are discussed in the conclusion chapter.

### 3.3 Validity & Reliability

In this paragraph the precautions to ensure the highest possible validity and reliability for this study are discussed. During this study a mixed methods approach was used, as was discussed earlier. The collection of data through multiple sources and methods has increased the studies reliability, which is discussed in more detail below.

### 3.3.1 Internal validity

Internal validity is about the quality of the research design. If a study is internally valid, if one can draw the correct conclusions from the chosen research method. Interpretation by the researcher can colour the used information form documents or interviews, which weakens the internal validity: *"It is important to note that documents are always dependent on their development context; they are always a result of a complex process of coordination among different actors and institutional settings. Furthermore, their content and context is subject to interpretation by the reader"* (Prior, 2003; Faller, 2014, p. 895). Interviews were used to verify conclusions deduced from documents or other interviews to make up for this and to improve the internal validity.

# 3.3.2 External validity

The term external validity refers to the generalisability of the findings in this study beyond the two studied regions. In other words: the findings do also apply for the other 28 regions in the Netherlands. During the exploration of scientific articles prior conducting the interviews, several of them stated a blueprint approach for a energy transition is not likely to work. These papers thus imply that there is no one-fits-all solution that can be applied to all countries or all regions, due to geographical and political differences (Nooteboom & Ybema, 2015, p. 130). This might indeed be true, especially on a international scale. However, the Netherlands is a fairly small country and most regions have a similar typical characteristic: a larger city with several smaller rural municipalities. Therefore, the situation in the Netherlands, and therefore this study, does not fit the scenario's sketched in the scientific articles thus improving the external validity. In addition to this, the goals of this study was to provide several, more general guidelines which could be worked out and adapted to the regions preferences and characteristics.

#### 3.4 Bias and error

It is possible that during the writing of this thesis several errors have occurred. These errors could have been of different natures. Specifically for this study translation and interpretation errors were the most likely errors. Interpretation errors could have taken place during interviews when the interviewer unintentionally interprets the respondent in a different way than was intended by this respondent. This could also have happened when reading policy documents. This is called observer bias. Given the fact that the interviews and document analysis were done in Dutch and this thesis was written in English it might have happened that translation errors were made. This and translation in general could have resulted in that the initial connotation of the interviewee or text was altered or lost. In turn this could have lead to a different interpretation by the reader.

#### 3.5 Topic list

The topic list below was used to structure the interviews and during the policy document analysis. The topics in this list correspond to the subjects in the conceptual model, each subject is briefly explained or operationalized. The topic list was also used to ensure that all topics that are interesting and relevant were discussed during the interviews. The questions that served as a guide together with the topic list during the semi-structured interviews will not be given due to the same sensitivity of the subject discussed earlier. However, the questions were classified per topic during the interviews, unless the direction of the conversation dictated otherwise.

#### Regional environmental goals and ambitions

From the analysis of policy documents it became apparent that on all governmental levels goals and ambitions are formulated with regard to the energy transition, which is no surprise. However, some of these goals and ambitions are more clearly defined than others. Furthermore, the achievability of some of them are in some instances questionable. The same goes for the ambitions and goals set by the project groups. In many cases the origin is not mentioned or just briefly mentioned without any further elaboration. This relates to Rauschmayers' (Rauschmayer et al., 2015, p. 213 & 214) critique. Are these goals and ambitions indeed only long term oriented? Interviews can give more insight into both their origin, how they came about and how realistic they are. Additionally, this is also the first box of the conceptual framework and relates to the process model on which it is based (Faller, 2014, p. 894).

#### Policies and regulations to realize set goals

What kind of policies and regulations are and will be likely to be implemented to achieve and realise aforementioned goals and ambitions? Policies and regulations are the instrument of municipalities to shape the course of action. Another point of interest is to what extend these policies are limited by higher governmental policies, regulations or laws. It goes without saying that municipalities, also in regional context, cannot overrule regulations and laws from higher governments. This implies there is a likelihood system failures are at play here (Weber & Rohracher, 2012, pp. 1041-1045).

#### Actor behaviour

The above mentioned policies and regulations cause induced strategic behaviour by actors. This behaviour is intended by the municipality or region (Faller, 2014, p. 894). For example: if a region sets up a programme where residents can apply for a charging pole and a personal parking spot in front of their home, this will probably stimulate the use electric vehicles (EV). Or at least convince those who where in doubt of buying an EV. The opposite of the induced strategic behaviour is autonomous strategic behaviour, which encompasses all activities and interactions by all of the involved people that are not affected in any way by the regional strategy. This implies that this activity would take place even if there was no such thing as an RES. However, if such initiatives are noticed by municipalities or the region they can adopt or support them. To determine the induced strategic behaviour were

measured by the amount both of these behaviours occurred in the policy documents and expert interviews. Induced strategic behaviour was often mentioned in the policy documents or by the experts during interviews. Information of autonomous strategic behaviour was less present in the policy documents but was obtainable during the expert interviews when asked specifically.

# Inter-municipal cooperation

In a transition, cooperation is an important aspect to collectively realize all set goals and ambitions and can either be done via a horizontal or a vertical dimension (Nelles, 2013, p. 1354). This is not solely for smoothness, quality and efficiency, but also for a pleasant experience during the process. Not everyone might prefer the same way of cooperation, but a good cooperation can also bear fruits for future projects and collaborations. It could also be the case that the cooperation is not going as was intended, which can lead to specific points for improvement. Depending on if it was caused by people or methods. Cooperation can take place on many different levels regarding an RES (Nelles, 2013, p. 1354). That is to say between:

- Region and province;
- Region and stakeholders;
- Municipality and province;
- Municipalities mutually,
- Municipality and stakeholders;
- Municipality and citizens.

### **Expectations**

This section incorporates all of the three topics above, but also sheds light on how achievable these topics are according to the interviewed persons. For example how to accomplish a shared ambition or goal. How will this path to achieving these goals and ambitions unfold according to the interviewee. How do they expect or ought cooperation to be? These expectations can also give insight into what system failures might occur, because when system failures are present in the expectations, they can perhaps still be overcome.

#### Possibilities and opportunities

Here will be explored how the municipalities and the regions explorer and value possibilities and opportunities. But also what exactly is meant with an opportunity or a possibility? What are the possibilities and opportunities within the municipalities and the region, and how are they valued? How are possibilities and opportunities explored? Think hereby of the exploration of new forms of renewable energy. Another example of this is the consideration of establishing a municipal energy company (Schönberger, 2013, pp. 23-26).

# System failures

The system failures that apply to each region were determined using the clear definitions for each system failure in table 2.1 on page 18 and 19 (Weber & Roracher, 2012, p. 1045). During the policy document analysis it became apparent that both regions already recognize some failures themselves. This was mostly due to their reflective approach to their RES development. This was not the case during the interviews, therefore the information acquired during the interviews was transcribed and then checked with table 2.1. By combining both the policy document analysis and the interviews several system failures came forward.

# 4. Results

Within this chapter both case studies will be explained and discussed into detail, but also related to the earlier presented literature discussed in the theoretical framework chapter. The course of events in both project regions will be presented as clearly as possible. This chapter is structured according to the conceptual framework which was based on Faller's process model (Faller, 2014, p. 894). At first we will have a look at the region in a broader sense in a short introduction. Each following paragraph will represent one of the separate sections depicted in the conceptual framework in chronological order. Thereafter, the regional objectives are discussed relative to the first box of the conceptual model. In the third paragraph, the second box of the conceptual framework regarding policy and the process will be looked at. After this paragraph the actors and the following three boxes induced strategic behaviour, autonomous strategic behaviour and the system failures are determined respectively in four subparagraphs. First, the Middle-Holland region will be discussed, followed by the U10 region. Both sections start with an introduction to the region. Findings will be clarified with the use of quotes and anecdotes from both the interviews and policy documents. Ultimately, in the third and last paragraph both regions will be compared to each other and differences will be briefly discussed.

# 4.1 Case study 1: Middle-Holland

# 4.1.1 Introduction to the region

As discussed in the beginning of this thesis, the Netherlands started a pilot with five regions to develop their Regional Energy Strategy (RES), as a part of the new energy policies (Rijksoverheid, 2016). "That was, of course, the whole reason that we signed the Paris agreement two to three years ago. Well, the national government. This is where they actually said: Well, now we have to develop a way to relate this to planning. That's how I always explained it. And we just don't know how or where or what. What would be logical? Well those regions then, on that scale, so let's try something. That was the idea, to do that. Very good, but also stubborn. In the end you also know that if you do this, there must also be a different approach on the European and national level to make it feasible at all. That does not diverge you from the duty to make a good plan" (Respondent 1). These pilot regions consisted of several adjacent municipalities. Ranging from six to well over twenty municipalities per region. This pilot program is a collaboration between the Ministry of Economic Affairs, the Minister of Infrastructure and the Environment, the Ministry of the Interior and Kingdom Relations, the Association of Dutch Municipalities, the Union of Water Authorities and the Interprovincial Consultation. The idea behind a program on a regional level is due to the belief that on this scale it is easiest to make actual steps. Furthermore, each of the regions was led by an independent process leader (VNG, 2017, p. 18). To be able to develop and implement an RES, a region should start to make an inventory of the current energy consumption, of both households and the different business domains. A region does also needs to know future estimates of energy use, and how much energy can be saved. Thereafter, the region can make an estimate of the scope of the transition (VNG, 2017, p. 25 & 26).

In this case study we look at the Middle-Holland pilot region in particular. Middle-Holland consisted of six municipalities. These municipalities were: Alphen aan den Rijn, Bodegraven-Reeuwijk, Gouda, Krimpenerwaard, Waddinxveen and Zuidplas. The Middle-Holland region and its participating municipalities are shown on the map in figure 4.1 on page 30. The municipality of Alphen aan den Rijn was only part of the Middle-Holland region during the pilot. Thereafter the municipality joined the Holland Rijnland region. However, the realisation of spatial and environmental tasks of Alphen aan den Rijn are still accommodated by the environmental service of Middle-Holland (ODMH). Although this might seem confusing, both parties see it as an advantage as cooperation and sharing





Source: Author (2019) with use of ESRI ArcGIS

Middle-Holland) was the program manager during this pilot. In this program the regions will be supported in realising an RES with a short term roadmap, fitting in a long term strategy (ODMH, 2017, p. 4).

The goal of the regional approach is to work, in cooperation with all relevant stakeholders, on: the realisation of the intended  $CO_2$  reduction in the short run, and the incorporation of al insights, developments and plans to form a coherent strategy to achieve the ambitions for the long term.

# 4.1.2 Regional objectives

As mentioned in the previous paragraph, the Middle-Holland region has a history in close intermunicipal cooperation. The region has emphasised this multiple times. This underlines their confidence in the constellation of municipalities comprising the region to achieve their goals. Leading to the question what the former pilot region actually expects to achieve and over what time period. When it comes to the use and generation of energy the region planned to save up to 31% in electricity and heat combined by 2050. 55% of the total energy demand in Middle-Holland in 2040 will be generated within the region. An intermediate goal has been set for 2025, with almost 8% in energy savings and around 10% renewable energy generation at that point. For both scenarios there

information between the two regions has become much easier and more effective (Respondent 4). Administratively the Middle-Holland region belongs to the province of South Holland. This region has a central position within the Randstad and has both rural and urban landscape features. Cooperation has always been an important theme in Middle-Holland. In the Dark-ages it was verv important each village maintained its dykes. In particular to protect their villages against the possibility of flooding. If this would not have been village done, every downstream would have flooded as a result. The area comprises 492 square kilometres, over 340,000 inhabitants and houses around 12,500 firms and establishments (ODMH, 2016, р. 5). Omgevingsdienst Midden-Holland (ODMH/ Environmental service

has been accounted for the increase of energy consumption (ODMH, 2017, p. 1; Provincie Zuid-Holland, 2018a, p. 53 & 55). Another interim point on the transition timeline of Middle-Holland is at the year 2040. Both this year and 2025 are chosen as making accurate calculations for 2050 is especially difficult. The foremost reason being that changes in demography, energy use and possible technological innovations are almost impossible to account for on the short term, let alone in over 35 years (POSAD Spatial Strategies, 2017b; Provincie Zuid-Holland, 2018a, p. 53).

Furthermore, based on the collective goals of the region, each of the five municipalities in the region will set its own individual goals too. These will be translated into a Regional Energy Agreement, that was signed at the end of 2018 (ODMH, 2017, p. 1). The idea behind this Regional Energy Agreement is to adapt the common, regional transition plans in such a way that they are comfortable to work with for each municipalities individually (Provincie Zuid-Holland, 2018a, p. 53). In the preliminary cooperation agenda five sub goals are drawn up (ODMH, 2017, p. 28; Provincie Zuid-Holland, 2018b, p. 55). These being: households and firms free of natural gas use and more energy efficient within thirty years, create space for renewable energy generation, optimizing a more flexible energy infrastructure including storage, sustainable mobility and transport and a more sustainable corporate environment among which agriculture. By signing this covenant, all involved parties agreed with continuing these policies. "It is valuable to work together within this system, because working on energy issues on a regional scale has a future. Because Gouda will not be able to solve the energy transition within his city limits, so the municipality needs the countryside. Then the region, especially if you look at participation, is a scale on which you can grasp it. ... So that is why the scale is nice. In order to continue to do this, everyone agreed on it as a good idea. So in the end we went to a covenant in which we say: this is the basis of our energy policy, for the governments and companies that have participated, and social organizations. Moreover, we will continue to work together and we are going to work hard and make money available. So that's where it finally ended at the end of last year, and the agreement about that. So no plan, but agreements about how we deal with it" (Respondent 1).

It is important to note that all of the goals and agreements mentioned in this paragraph are not legally, nor in any form, binding whatsoever. They are only used as guidelines, inspiration or as a basis for future research. The covenant and cooperation agenda published by Middle-Holland provided directions for mindsets and solutions for the involved parties. Within this region, "The ODMH performs the legal and specialist tasks for all municipalities throughout the region. It is a cooperative body, where a number of statutory tasks have been assigned to. In addition, a number of important non-lawful policy tasks that are recognized as being useful to cooperate on. Ambitions are then formulated on various subjects, but the ODMH is actually an implementing body and the ambitions can be found more in the municipalities themselves, in the coalition agreements" (Respondent 6). "The municipality of Alphen aan den Rijn was formally affiliated with the Holland Rijnland region, but has assigned the realisation of spatial and environmental tasks to this environmental service. Alphen thought it was useful because they are at a sort of intersection of those two regions, and that way we can work together more easily and we can see how they are doing." (Respondent 4). An exception is the Regional Energy Agreement due at the spring of 2019, which will be binding for the municipalities individually. This ensures the goals for 2025 are met. Nonetheless, at the time of writing this agreement still has to be signed (ODMH, 2017, p. 28). "It is an accumulation of ideas and directed towards a solution. The challenge has became particularly clear. Which is also important..." (Respondent 1).

#### 4.1.3 Policy and process

In order to achieve the goals and intentions discussed in the previous paragraph, an appropriate policy has to be implemented and pursued. Moreover, to develop an appropriate policy one should know all the ins and outs of the current status of the region beforehand. For this very reason the region made an inquiry of the current use of energy, both for electricity and heat. Numbers on the current situation are used as a reference point throughout the whole transition process. Additionally,

a study has been made on the future potentials of electricity and heat. "The heat analysis has actually provided a picture of costs. It has provided a map of where, which form of heat is the cheapest. So there is a map of the most advantageous form of alternative heat. But there is also a map of the second most beneficial solution of heat. Both maps provide insight into where all-electric districts and city heating networks are possible and are the most economical. If you slide those maps over one another, the entire city actually changes. So after carrying out that heat analysis, after the release of that report, we concluded that this report really just clarifies all questions. So it has become even clearer that we have to do very precise research into which forms of heat you can actually apply to your city. Now we are only talking about heat, not even about sustainable electricity generation" (Respondent 6).

Based on these figures three scenarios were developed for the short, middle and long term. In this way it could function as a guide during the process and a future aim to work towards. Some of these figures were shortly discussed in the previous paragraph. Most of the plans and the policy are based on this inventory process and the three scenario's that were developed. Both the covenant and the cooperation agenda are based on this, however, they do not form a coherent strategy as explained before. Network, planning and communication are the main drivers of the Middle-Holland region and less emphasis lies on technological breakthroughs. This may have to do with the uncertainty of technological innovations, or with the fact that the province of South-Holland only recently revisited their wind turbine policy (Provincie Zuid-Holland, 2018b). *"The provincial regulation on space and mobility states that wind turbines may not be erected here. The province is now working on the experiences from the pilots and the discussions that subsequently took place. Thanks to the pilot and the ambitions of the municipalities that have been established therein, they realize that they will not make it this way" (Respondent 4).* 

Below follows a short description of all of the three transition paths which resulted from the design workshops that were organised after the inventory of the region was complete. An elaborate and detailed roadmap and project overview can be found in the report itself (POSAD Spatial Strategies, 2017b, pp. 23-35). The perspectives used in this section are not drawing table plans or blueprints. They provide a representation of how things could be done, not how they should or ought to be done. Furthermore, for each of the phases the trias energetica is used. This strategy for energy neutrality prescribes that focus on energy reduction comes first, followed by attempting to solve the remainder in a sustainable manner. Only if there is no other solution, fossil fuels can be used, but only as efficient as possible (POSAD Spatial Strategies, 2017b, p. 23). *"From administrators to residents asking for information, we always use the trias energetica as a basis. We will start our campaign in the near future. During this campaign we will start propagating the message: first make sure you use as little energy as possible. So reduce your energy consumption in any way. So first one should isolate and save energy, and only thereafter look at what can possibly be generated" (Respondent 6).* 

Short term (2017-2025) – Maximally decentralized: substituting studies and policy full of opportunities - During this period, an inventory of initiatives should be made so that these can be facilitated and stimulated in the most appropriate way. On basis of this, there can be decided which initiatives can be scaled up and in what manner. Four different focus tracks emerged for the short term:

- 1. Develop detailed energy plans
- 2. Form regulations and accompanying policy to enable and facilitate an energy transition
- 3. Stimulate and facilitate existing initiatives
- 4. Working on awareness and sharing knowledge among both government officials as well as citizens and businesses

Gouda has limited open space within their municipal borders. Wherefore they have to mostly rely on the import of energy (POSAD Spatial Strategies, 2017b, pp. 24-26). Yet, this does not imply no action will be taken. Goals for over hundred acres of solar panels and over thirty windmills are necessary.

When realizing such plans, focus will be on how the benefits can flow back to local citizens, partially to create support and accelerate the process (POSAD Spatial Strategies, 2017b, pp. 24-27).

*Medium term* (2025-2040) – Strong network: up-scaling and building on structures - Energy savings in homes, businesses and agriculture continue. From this time period on, only electric vehicles will be used. Local initiated projects are linked together in a smart grid to make a new energetic and spatial system. Some of them are scaled-up if their location is adequate. The energy requirement is now met, only converting electricity to heat has to be further elaborated. This, in turn, will lead to a higher energy demand. Written off solar panels will be replaced with solar-thermal panels to heat households or will be used in low-temperature industrial processes. Emphasis on the renovation of buildings resulted in an average A energy label for the built environment. Residual heat will be fed into the heat network, which will be extended and become increasingly sustainable (POSAD Spatial Strategies, 2017b, pp. 28-30).

Long term (until 2050) – Integral planning: consolidation of energy landscapes combined with renewed space for nature and cultural landscapes - The transition is now in its final phase and will almost be completed as the last users of fossil fuels switch to renewable energy. The technical and economical lifespan of first generation projects are over. Energy generating systems will be replaced by new technologies or make way for other spatial uses. Because of the uncertainty when it comes to technical innovations and political decisions there are no estimates for energy generating potentials (POSAD Spatial Strategies, 2017b, p. 30).

# 4.1.4 Actors

Besides the five municipalities of the region, there are several other prominent and important actors involved in the transition process of Middle-Holland. The province of South-Holland is, as the administratively overarching government, also an important actor. The same goes for the three water authorities in the region. Alongside these governmental actors, three other groups of key actors come from the local corporate environment. These are the network operators, housing cooperation's and local firms. Administrators from the five municipalities, the province, the three water authorities and the social corporations form a leading committee. A program team representing this leading committee is the executing party and is supported by the ODMH (Provincie Zuid-Holland, 2018a, p. 56). "I myself think in three categories. So the network operators are very important. Three different layers of governments are involved: municipality, water boards and the province. The pilot was of course drawn from the VNG, so that was an important governmental body at the time during the pilot and still is today. And if you look more at the region itself, yes parties that are involved in sustainable generation. For example, the NVDE or, more specifically, a corporation such as the Windvogel. Energy corporations, housing cooperatives, healthcare education and business" (Respondent 4). Several businesses from four of six original municipalities are united in a business platform specifically aimed at sustainability. For example: Duurzaamheidsplatform bedrijven Waddinxveen (Sustainability Platform businesses Waddinxveen) or Duurzaamheidsplatform bedrijven Gouda. In short DPW and DPG respectively (Respondent 4). "They all united to form a DPX. Well, that is actually a nice result of the pilot that these sustainability platforms now work together" (Respondent 4).

Ultimately, the final say in the decision making process lies at the municipalities, as they are responsible to draw up heat transition plans and spatial plans for wind turbines and solar farms. *"That is what will also happen when you look at the participatory side, eventually it will be the different layers of governments that will decide the coming years"* (Respondent 4). The intentions are to involve as many local businesses throughout the process as possible. This is with the local economy in mind. In this way not only the regional sustainability can be improved, but also the regional economy can benefit from all the newly emerging projects. Moreover, these local businesses will most likely have the best interest for the region at heart (Provincie Zuid-Holland, 2018a, p. 56).

Block and Paredis (2013) discuss the opportunities that politicians such as mayors can provide when they use their political network. However, it seems unlikely that this would work in a similar way in the Middle-Holland region: "*The dynamics in participation processes change when you involve councillors or aldermen. They make it political, they attract attention. As a result, the actor environment will also react differently, so it is not always desirable to involve councillors or politicians in these processes*" (Respondent 1). This can be due to political and cultural differences between Belgium and the Netherlands.

#### 4.1.5 Policy leading to induced strategic behaviour

As discussed in the theoretical framework chapter, the difference between induced strategic behaviour and autonomous strategic behaviour is as follows: Induced strategic behaviour is caused by the effects of a policy or regulation, pushing actors in a specific direction. Autonomous strategic behaviour encompasses the local initiatives from both citizens and firms, participation, the more creative and out of the box actions by actors within legal limits. These initiatives can however be picked up by municipalities or regions and either be supported or adopted. The five sub goals of the cooperation agenda mentioned earlier provide an additional scope for the region to work within. In short these five sub goals are: phase out gas consumption within thirty years, create space for renewable energy generation, optimizing a more flexible energy infrastructure including storage, sustainable mobility and transport and a more sustainable corporate environment. To achieve its goals, Middle-Holland is not strictly bound to horizontal inter-municipal cooperation as described by Nelles (2013, p. 1354). Horizontal inter-municipal cooperation is essentially inter-municipal cooperation within the region. In some occasions the vertical dimension of inter-municipal cooperation (cooperation with other regions) can provide useful opportunities. It would be a waste of time and recourses to reinvent the wheel if a solution is already out there with other municipalities or regions. Take for example the first sub goal, to make households and firms free of natural gas use and more energy efficient within a thirty year time period (POSAD Spatial Strategies, 2017b, p. 38; ODMH, 2017, p. 17 & 18). Similar types of houses have been built throughout the Netherlands. This means that a standardized process for refurbishing these types of houses can be developed and applied everywhere throughout the country. For example: a refurbishing including better insulation and a conversion from gas heating and cooking to a heat pump and induction cooking. Large amounts of costs can be cut in such a manner is a standardized 'package' is developed. If a working concept can be shared, economies of scale will reduce prices, instead of every construction company having to develop a method for this process for themselves. Of course, one should be the first, but thereafter this can and should be shared (Respondent 1 & 2). Perhaps the national government should stimulate such opportunities with standardization possibilities. This would help the national energy transition tremendously, as well as the regional transitions (ODMH, 2017, pp. 16-18; Respondent 2).

Another essential for a good transition process is, without a doubt, the generation of renewable energy, both electricity and heat. "*This, however, requires space. A lot of space*" (Respondent 4). The generation of energy with fossil fuels also requires space, but generally renewable energy requires more space. Nonetheless, the generation of energy can be done in unconventional places when compared to fossil fuels. Instead of a large coal, gas or nuclear plant, energy can also be generated on roofs with thermal and solar panels or beside highways with wind turbines. Although this gives more and creative locations for energy generation, it still requires a lot of space. The situation is complicated even more due to the fact that some municipalities are almost completely urbanized, so that there is barely space left for the generation of renewable energy. Even if there is good problem articulation and there is a Leitbilder, it becomes very difficult to realize your plans when there is no space available. This is where the horizontal dimension of the inter-municipal cooperation of the Middle-Holland region is really being tested: the ability to develop and implement a regional agenda. With the upcoming Environmental Act, the region has made several proposals for locations for wind turbines, solar farms, geothermal installations and biomass production. Especially the latter is a space-intensive resource as it takes time to grow and is used up quite quickly (ODMH, 2017, p. 18).

A study of Ruimtevolk (2018a; 2018b, p. 15 & 28) showed that a reduction of one part of consumed energy leads to reduction of three parts of energy generation required. This 1:3 ratio is a result of the energy losses due to the transport between the energy source and the place of consumption. An additional amount of energy can be saved in altering the way of energy consumption. For example: not all houses are optimally insulated and many households use older, more inefficient electronic devices or don't always turn them off, which of course results in wasted energy (Ruimtevolk, 2018a; Ruimtevolk 2018b, p. 15 & 28). This relates to the trias energetica concept that the Middle-Holland regions uses as their basis for reducing energy consumption (Respondent 6). It can also be related to the fact that only around two percent of the Dutch population is familiar with the concept of the energy transition. Research has shown that there is a significant lack of understanding the urgency of the energy transition and what the energy transition comprises in general (POSAD Spatial Strategies, 2017b, p. 39; Vereniging Deltametropool, 2017, p. 7). The region of Middle-Holland want to spread news and knowledge on this matter among its population. Hoping that this will accelerate the process as inhabitants of the region will take measures of their own. For example by the placement of solar panels on houses and being more thoughtful with the consumption of energy. Pioneers have to attract, a second, less involved group into the implementation to create the necessary system shift. "We have an energy team here in the organization. We sometimes notice in our team that we are in a kind of bubble in which we know a lot more than perhaps the average resident" (Respondent 6). An important part of this, with great potential is via education on renewable energy in elementary school (POSAD Spatial Strategies, 2017b, p. 39 & 40). If awareness is created at a young age and therefore is self-evident, their children will adopt this knowledge as well. When knowledge about the energy transition is spread among government officials, the transition will be integrated faster in all policy fields. For example: many citizens argue that the placement of several solar panels on their roof will be sufficient. However, this is not the case: "There is always someone who says: shouldn't we do all those roofs first? I see all those roofs of business parks. Before you put that windmill in my backyard, get those roofs done first. Indeed, we need those roofs as well! Have a look with me: roofs provide one petajoule of the 18 we need. So we certainly need those roofs, but even then wind turbines will also be placed in your backyard, we also need geothermal energy etcetera. That is a nice aspect of this study. For once just the facts on the table" (Respondent 1).

The municipalities of the Middle-Holland region are starting to realize smart grids. A smart grid manages the electricity in a neighbourhood or city and stores it in times of overproduction in batteries or other devices. It does what is required for the new energy infrastructure as described above to succeed. Yet, the realization of a smart grid is not the only measure that has to be taken. The power grid has to be extended and adapted for the future connection of wind turbines, solar farms and the like, to the network. In close cooperation with the two network operators, an energy-infrastructure-plan is being developed. In order to realize the best possible and adaptable smart grid for the municipalities in the region (ODMH, 2017, p. 19).

Alongside the refurbishing of houses, office buildings and updating the power grid, the mobility sector needs to become more sustainable as well. Responsible for around twenty percent of the energy consumption within the region, here is room to gain on improvements as well. The emergence of the electric vehicle has mostly been in the realm of personal transportation such as electric versions of cars, bikes and scooters. This has been accompanied by an increase of electric charging points for these vehicles in the region. However, there are lots of vehicles left that rely on fossil fuels. Sustainable transport is also gaining ground within the distribution sector in Middle-Holland. Besides several local initiatives to improve the sustainability in the regional distribution sector, the fuels that are used are also subject to a critical eye. Especially electric and hydrogen vehicles experience interest and preference. At the time of writing the ODMH is investigating the possibilities of a pilot for hydrogen vehicles with several local entrepreneurs. The advantage of
hydrogen over battery powered vehicles is that hydrogen's properties are similar to that of diesel and petrol vehicles. A hydrogen tank can be filled in a matter of minutes and the range is considerably longer compared to battery powered vehicles (ODMH, 2017, p. 20).

The region's intentions to improve the sustainability of firms in the region has already shortly been discussed. The agricultural sector is evaluated separately by the region as it is quite prominent throughout the region. Its contribution to the consumed energy is therefore quite large. Totalling a quarter, it's energy consumption is almost the same as all the households in the region combined, (ODMH, 2017, p. 21; Provincie Zuid-Holland, 2018a, p. 52; Respondent 4). A large part of the reason here for is the illumination and heating of the greenhouse horticulture. The heating aspect is subject to the heat transition plan discussed above, aiming to out phase natural gas use within thirty years. The large amounts of energy consumed is not the only threat to the environment by the agricultural sector. Dewatering of soil in the region causes the peat in the subsoil emits a substantial amount of greenhouse gasses. Several measures are being studied as to prevent this phenomenon from taking place. In the municipalities of Bodegraven-Reeuwijk and Krimpenerwaard the Topsurf project was started to experiment with reversed drainage. At the same time the region joined the national and provincial green programs to share knowledge and experience on this subject with hopes to improve on this situation (ODMH, 2017, p. 21). The Middle-Holland region is closely working together with adjacent regions to lower the energy use of the greenhouse horticulture. "For example: if it has been established that the port of Rotterdam has residual heat for years to come, we will use it. But we will also have to decide on what is the most convenient way in which we can use it" (Respondent 4).

#### 4.1.6 Autonomous strategic behaviour

The conducted expert interviews and the evaluation report on the energy analysis and the design workshops published by POSAD Spatial Strategies (2017b) gave some insight into the autonomous activity of actors.

Following from the report published by POSAD (2017b, p. 21) the business sector was in some instances ahead of the municipalities and the region. The business sector in the Middle-Holland region was in some instances much more progressively minded and ahead of the local governments, as becomes clear from the following quote of a businessman: "Governments make a plan! There is a need for clarity about what will be happening: how are we going to arrange the heating of buildings at various locations: with heating networks, via full electricity or something completely different? If we, as companies know this, we can continue with sustainable approaches that have already been started" (POSAD Spatial Strategies, 2017b, p. 21). This shows how some corporations have already made plans to improve their sustainability, but because of certain policies and regulations they were actually held back instead of encouraged and therefore have to postpone their innovations.

However, all of the five current municipalities of the Middle-Holland region say to embrace local initiatives, both from citizens, as well as from businesses. As far as the latter is concerned, one case in Gouda actually provides an example of when an municipality embraced an initiative. One firm in Gouda voluntarily placed solar panels on the facility's roof and made it available to an adjacent neighbourhood. This could be done as this company did not need this additional energy. For the distribution of this newly available energy the municipality of Gouda employed a company with experience on such projects throughout the Netherlands: Greenspread. One of their assignments was to find more companies to form an energy cooperative, which they did successfully. In conjunction with the ODMH Greenspread tries to involve as many local businesses for this project. It is now named Goudse Panelen (Gouda's Panels). The goal of this new energy corporation is to place solar panels on as many roofs of companies and businesses that are technically suited as possible (Respondent 4 & 6). *"There are companies that simply say: I am too occupied with my core business so I don't really care about that roof. We then take care of it by employ a company like Greenspread to handle it for them"* (Respondent 6). At the time of writing Goudse Panelen consists of three companies, with several more joining in the near future. In addition, there is great interest and there

are many registrations for the project. The municipality of Gouda has developed a support structure for energy transition related initiatives. One for facilitating starting initiatives in, for example: organizing meetings. Another for providing technical advice for already longer running initiatives (Respondent 6).

The autonomous strategic behaviour seems to be mostly restricted to corporate actors and not so much for the residents of the region. This may have to do with the fact that the concept of an energy transition is fairly unknown to the masses. Hence there are no innovative initiatives to discuss (Respondent 1). However, the region is determined to bring the energy transition under the attention of its residents, as was discussed beforehand (POSAD Spatial Strategies, 2017b, p. 39 & 40). "We started a participation trajectory, because it must above all serve as a piece of consciousness, and create some movement. We have formed a common picture. We have an overview of the assignment, we have parties that can work on it. We have possible solutions" (Respondent 1).

#### 4.1.7 System failures and their effects on policy and actor behaviour

From the total of eight system failures, three failures are most prominent in the case study of Middle-Holland. These are: infrastructural failures, institutional failures and policy coordination failures. Infrastructural failures predominantly apply to the anonymity of the energy transition among residents, but also among government officials. Clearly policymakers, like the aldermen from the Middle-Holland municipalities, where presently surprised of how enormous the challenge is that the energy transition represents (POSAD Spatial Strategies, 2017b, p. 21; Respondent 1 & 4). "What I like is that serious planning is finally taking place. With a thorough analysis of what the challenge is. For a number of years I have been working for municipalities with energy programs. The energy program is all too often just a stockpile of five or ten projects and these are usually the hobbies of the officials or the responsible alderman: staple them together and they have an energy program! And add an ambition! So climate neutral in 2030 and five projects stapled together. Everything in between, whether one leads to the other. No clue. This is the first time that people look at it, how do we get it together?" (Respondent 1). This hints to poorly knowledgeable government officials, or at least a part of them. However, this quote makes clear that the situation is improving: "In one year, I have seen an entire council turn around, from an alderman who was previously the portfolio holder, to at least three. They fought for that wallet. And now we have three aldermen who manage the energy transition portfolio, the three of them. So that is also guite unique. That is just something that happened within a year because it is considered so important" (Respondent 6). This is a perfect example of an infrastructural or a soft institutional failure.

Concluding the design workshops and final presentation, it became apparent that governmental supervision and coordination for cooperation is needed (POSAD Spatial Strategies, 2017b, p. 21). When the situation is changed, both the induced strategic behaviour and autonomous strategic behaviour will increase. Autonomous strategic behaviour will develop as residents see the urge and necessity of the energy transition and that they can contribute to it themselves. The induced strategic behaviour will develop because of an increase of knowledge within the municipalities of the region will change policies and regulations. The latter overlaps with a soft institutional failure, but also somewhat with policy coordination failures as it is a problem that is caused by a coordination problem on the policy level. "Everyone runs into problems: do I have to pay? When do I have to pay? The choices about what to do have not yet been made and that must be done together with the population. So it's very complicated" (Respondent 4). However, efforts are made to make this policy coordination failure soon obsolete. This brings us to the next failure, the reflexivity failure. Only now in a positive way. Middle-Holland is very reflective on its policy and practices, making the occurrence of a reflexivity failure very unlike to take place (POSAD Spatial Strategies, 2017b, p. 40 & 41). From the statement of the business sector quoted in the previous paragraph (POSAD Spatial Strategies, 2017b, p. 21), we learned that a hard institutional failure is also present. The region is willing to change policy and regulations to give corporations room to implement their sustainable measures. Nevertheless, this is not always possible as municipalities or regions cannot change policies and regulations from higher governmental tiers. In the case of this region this is the wind turbine policy of the province of South-Holland. It is going to change, but before that is done the municipalities are incapable to cause any change in this field (Provincie Zuid-Holland, 2018b; Respondent 1; 3 & 4). *"It means that you have to put your shovel in the ground now to build a windmill, or you won't make it. Not one windmill but several. It takes almost seven years to build one. Don't sit back, do something!"* (Respondent 4).

## 4.2 Case study 2: U10

#### 4.2.1 Introduction to the region

The municipality of Utrecht is very ambitious when it comes to ambitions applicable to sustainability and energy according to themselves and several news sources (Energie Overheid, 2015; Ecofys, 2015; U10 & Gemeente Houten, 2015a; Gemeente Utrecht, 2018b). As mentioned before, Utrecht is leading in the energy transition as a municipality (Harmelink Consulting, 2017, p. 6). The ambition of this municipality was, until very recently, to be energy neutral in 2030 (Gemeente Utrecht, 2018b). In 2011 they started with the program Utrecht Energy (Utrechtse Energie). The aim of this program is to reduce  $CO_2$  emissions in 2020 by 30% opposed to those in 2010. In addition, 20% of the produced energy has to be renewable energy and ten percent of the roofs in the municipality must be equipped with solar panels (Ecofys, 2015, p. 3).

In autumn 2015, Utrecht and 9 other municipalities (Bunnik, De Bilt, Houten, IJsselstein, Nieuwegein, Stichtse Vecht, Vianen, Woerden and Zeist) agreed to work together in regional context concerning the energy transition, when signing the management covenant U10 (U10, 2016b, p. 1). The Utrecht 10 is established by the ten municipalities, which fund the organisation as well. A map of the participating municipalities is shown in figure 4.2. At that time, almost 738.000 Dutch citizens resided within the ten founding municipalities, which is more than double that of Middle-Holland, on a patch of land that is only 100 square kilometres larger (Twynstra Gudde, 2015, p. 37; U10 Buurtmonitor, 2018). The aim of the U10, as an organisation, is to provide a platform where the participating municipalities can cooperate. Another function of the U10 is to bring alderman from the different municipalities in contact with each other. They organize these board tables, so that policy



Figure 4.2 Map of U10 municipalities

Source: Author (2019) with use of ESRI ArcGIS

can be coordinated with one another. Agreements made at these board tables will be discussed in the municipal councils and implemented in other organizations. The Utrecht 10 stimulates the whole process of decision-making and implementation, guiding, organizing, in such a way that it remains from the municipalities themselves (Respondent 2 & 3). "The U10 is not a big institution that does and arranges all sorts of things, so that municipalities can sit back and wait until we are ready with something. No, we organize that they themselves go to work. Well, that sometimes works well and sometimes it does not work out very well at all. Actually, the core task in short is: the U10 always looks for the added value of regional cooperation" (Respondent 2). During the past few years, the U10 grew from ten participating municipalities to twelve, with the accession of the two municipalities Utrechtse Heuvelrug and Wijk bij Duurstede in 2017 (Respondent 2; U10, 2018c, p. 5). There are five more municipalities attending the energy transition board table that are not officially part of the U10. These municipalities are Oudewater, Lopik, Montfoort, Zeederik and Leerdam. Of which the last two municipalities, Zeederik and Leerdam, will be fused with Vianen in 2019 to form the new municipality Vijfheerenlanden. If Oudewater, Lopik and Montfoort join the region, the U10 will most likely be renamed to U16 (U10, 2018a, p. 4 & 9; Respondent 5). This also gives a good indication of the openness the U10 provides to municipalities in terms of participating and dropping out. Municipalities are unfettered to join the U10 or to drop out. However, if an agreement is signed, there is no way back considering there is a contractual obligation to fulfil a made decision (U10, 2015b, p. 7; Respondent 2).

Historically, there are no specific regions within the province of Utrecht when it comes to cooperation. This is in contrast to many other regions, for example those of the pilot groups. There is regional cooperation, but this can vary on the subject. For example: a municipality can cooperate with certain municipalities when it comes to the safety region, but with completely different municipalities for the police region (Respondent 3; U10, 2015b, p. 2 & 3).

The province of Utrecht has, as an overarching governmental body of all municipalities in the province, is a few years prior to ambition of most of the U10 municipalities. This was to be energy neutral by the year 2040. *"Preferably, a reasonable part of renewable energy has been generated and cut back by 2030 already"* (Respondent 3; Provincie Utrecht, 2017). Utrecht is the largest city in the U10 region, as is visible on the map in figure 4.2 on page 39. Available land is reasonably scarce as the city is growing very quickly, and will be in the following years. It is estimated Utrecht has grown with around 44,000 homes and about 100,000 citizens by the year 2040, compared to the time of writing. As a consequence of this, Utrecht has to cooperate with the adjacent municipalities to fulfil its energy demands, which have more rural area that could be turned into energy generating landscapes with for example wind turbines and solar farms (Gemeente Utrecht, 2018a).

#### 4.2.2 Regional objectives

Opposed to Middle-Holland, the Utrecht 10 does not have a history of inter-municipal cooperation. However, the region has the same confidence in succeeding as far as realizing their goals go. It is important to note that the U10 has five different domains of focus. These domains are: economy, spatial planning, housing, sustainability and energy transition, and the social domain. For the purpose of this thesis we will only be looking at the sustainability and energy transition domain. For the purpose of this thesis we will only be looking at the sustainability and energy transition domain. Yet there is another important difference with the Middle-Holland region. Whereas Middle-Holland has a regional goal as far as the environmental objectives go, the Utrecht 10 does not have a joint goal. Apart from the national goal to have a fossil free energy supply by 2050, and goal of the province of Utrecht to be energy neutral by 2040 (Provincie Utrecht, 2017; U10, 2018b, p. 2; Respondent 3). Instead all municipalities set their own goals and objectives and the year by which they are ought to be achieved, though be it by 2050 at the latest. *"As a region you have to make a bid. This might imply that some municipalities have to do more than is currently stated in their roadmap. All 30 regions together must generate large-scale energy, being 35 terawatt hours. Therefore we have to do roughly 1/30^{th} part. Well, then you discuss with the other municipalities in the region how we are going to divide this over the region. This can imply that municipalities with a lot of rural areas are allocated* 

relatively more large-scale generation. So we will have to figure that out and agree on that together. Municipalities with a lot of rural areas have much more space than for example Utrecht. These municipalities will have generate much more energy relatively. More than their original ambition was. That is what it will come down to" (Respondent 7).

The U10 region does not want a decision making body to be more subtle and transparent. In other words: the U10 as a region does not have decision making authorizations as it relies on the autonomous decision making capabilities of each municipality individually. Besides the fact that the U10 acknowledges the great importance of achieving their environmental goals, the region sees the inter-municipal cooperation as equally important. This is also a difficult assignment since this is not common practice within the region as is the case with Middle-Holland. The fact that the U10 still has to work on its inter-municipal cooperation also has a negative impact: "I am also very honest that I also occasionally think: I am getting tired of it. It demands a lot from the people, because we are still talking a lot about each other, going left or right. Or: it goes like this in my municipality so it has to be *like that*" (Respondent 8). To reach the maximum potential of cooperation, the U10 accentuates the organization of the meetings between the municipalities: "the close bonds of the network and the number of contacts that municipalities maintain with each other, are an important success factor" (U10, 2015b, p. 8). Also the acknowledgement of the importance of the joint responsibility of this organisation is essential for improving the inter-municipal cooperation (U10, 2015b, p. 11). The U10 region is building on this horizontal inter-municipal cooperation, but still lacks in some aspects. This is primarily the development and implementation of a regional agenda. This is due to the fact that each municipality can set its goals and ambitions on their own timeline (U10, 2018b, p. 2; Respondent 2).

As mentioned in the previous paragraph, municipalities within the province of Utrecht cooperate on subjects that are relevant or convenient. Therefore, an 'ideal' scale of cooperation does not exist in the region of Utrecht (U10, 2014, p. 3). For this same reason municipalities are autonomous in dropping out or joining the U10. Even within the Utrecht 10, not all municipalities have to cooperate on a specific subject. Such a level of openness asks for a high level of flexible cooperation as well. Especially to be able to "know, think and work together" as the U10 municipalities put it. The Utrecht 10 always strives for cooperation on a scale that fits the problem in question. This also involves other levels of governments, educational institutions and corporate businesses. The aim here is to establish networks from which different specific forms of cooperation can arise. Such networks are built up within the municipalities by the process team that is employed by the participating U10 municipalities. The process team supports cooperating municipalities at the management tables, leads projects, runs the program secretariat, organizes meetings and provides process support in a general sense (U10, 2014, p. 3). In contrast to the Middle-Holland pilot region, the made agreements will be binding. These agreements will be contractually arranged, so that they are contractually binding (Respondent 2). In the absence of a regional goal the Utrecht 10 formulated five types of intended results in the 'We started yesterday' document from early 2015, to further guide the process (U10, 2015b):

- *Network development* This encompasses the integration and familiarity of the municipalities with each other for efficient and smooth communication among themselves.
- *Specific intended results* With this the municipalities' aim at results that are noticeable for citizens, which would not have been without the U10 cooperation.
- *Lobby and presentation* what is meant with joint lobby and presentation, is the recognition of the region by citizens, businesses and governments throughout the Netherlands.
- *More efficient government* Cooperation among the municipalities has to be an added value, resulting in a more efficient government.
- Goal exploring research The document ends with the supplementary benefits of goal exploring research, which proposes the sharing of knowledge and information. Mostly from research done by a municipality individually, which can sometimes be more efficient opposed to research done in regional context (U10, 2017a, p. 3).

#### 4.2.3 Policy and process

Besides the absence of a shared regional objective, the Utrecht 10 region has just completed an inventory of the region's energy consumption and potential energy savings and renewable energy generation at the time of writing. Along with the more facilitating function that the U10 has for its municipalities, this has several consequences for future practices. First, now that the region has its energy analysis the current energy consumption, estimates for future energy use and the regions potential for renewable energy are now worked out for all municipalities individually and the region as a whole (U10, 2018a). An overview of the region's energy potentials is provided in appendix 2 on page 70. Without this information they were only able to make long term plans and some middle term plans, which relates to one of the imperfections of transition management (Shove & Walker, 2007; Genus & Coles, 2008; Weber & Rohracher, 2012; Rauschmayer et al., 2015). The completion of the energy analysis opens the way for the municipalities and the region to move on and make substantial plans, based on these findings. If the transition management method is used correctly and the recommendations of the Berenschot report (2017) are incorporated, the region can make favorable progress. Transition management should therefore be adapted so that it specifically states a three stage transition agenda is required. Including short, middle and long term goals and objectives, ensuring a gradual but all encompassing and successful path to the desired goals and objectives. The method therefore becomes more normative, but perhaps this is needed for it to function properly every time (Rauschmayer et al., 2015, p. 213 & 214). If the Climate Agreement of the Dutch national government is finished in the near future, it can provide guidelines for realizing three stage transition agenda's and therefore a better execution of the transition management method. The Dutch Climate Agreement can also strive to inhibit improper use of political power by the regions and municipalities through the use of policy instruments (Burke & Stephens, 2017, p. 35; Respondent 2 & 8).

The second implication comes in the form of the diversity of environmental goals and different deadlines set by the municipalities individually. To date there are no concrete plans to uniform these goals and objectives into a completely regional plan (U10, 2015b, p. 8 & 11; Respondent 2). *"It is a very difficult playing field anyway. The differences between the different municipalities are quite large. There are a number of municipalities that are in a quite prosperous situation, but are not willing to show solidarity, for example, to realize more social housing"* (Respondent 9).

As mentioned in the annual report of 2016 the energy transition and sustainability board from the U10 has two main subjects of focus. Them being: energy saving in existing constructions and stimulation of a circular economy. Municipalities of the Utrecht 10 can contribute to the stimulation of circular economy themselves. Three different ways can be distinguished: choose circular variants when purchasing new goods, when collecting and processing domestic waste, and by stimulating corporations and businesses to form production chains (U10, 2016c, p. 10). The Utrecht 10 region does not have three elaborate transition paths like Middle-Holland has. However, this does not imply that the energy transition process has come to a standstill. Currently the region has several running projects that will be discussed as part of the induced strategic behaviour in paragraph 4.2.5 on page 43 below.

#### 4.2.4 Actors

Apart from the twelve municipalities currently affiliated with the region, there are a few other important actors involved in the development of the RES of the Utrecht 10 region. The U10 is an actor itself, as it is not only the name of the region, but also the facilitating and fraternizing platform employed by the municipalities themselves. Important to mention is that for all actions the U10 undertakes, it tries to collaborate in the vertical dimension of inter-municipal cooperation. This (vertical) type of inter-municipal cooperation focuses on adjacent municipalities or other governmental levels like the province of Utrecht, water authorities, local businesses and societal organisations such as the Natuur en Mileufederatie Utrecht (NMU, Nature and Environmental

federation Utrecht) (U10, 2016c, p. 10 & 11; Respondent 5 & 8). As the U10 states: "The U10 network is and remains goal-exploratory: the question is always whether there is added value in cooperation on a specific subject. If there is one, boards can decide whether or not to step in there. If it is not there, the item will be removed from the agenda without delay" (U10, 2016c, p. 1). Additionally, the region takes advantage of the knowledge institutions in and around the region. In the field of public administration cooperation, energy transition, and development of the energy plan, there is close cooperation with Utrecht University, TNO and the University of applied sciences Nyenrode. Energy company Eneco and network manager Stedin are also involved in this field (U10, 2016b, p. 10). Via the Economic Board Utrecht, a circular economy and waste-free offices are being studied in cooperation with local corporations (U10, 2016b, p. 10). However, choosing actors to cooperate with and how to communicate this to citizens can be difficult as Respondent 8 explains: "Which parties do you invite to think along or cooperate with? If you involve them or work with them, will they also have an impact on the outcome? For example, if you allow Eneco to think along actively about the heat vision, yes it is like a carpenter: he solves everything with a hammer. The involvement of Eneco will probably lead to a lot of large-scale heat networks, because they are good at it. I don't mind if we come to the conclusion that it would be the best solution. What would bother me is that the RES will be determined later and when we will switch to the implementation that people will say: You have always been subject to Eneco, we don't want anything to do with this" (Respondent 8). The same goes for the involvement of councillors, alderman and mayors: "The moment something happens in a city and that alderman is under fire. Then you notice that this has administrative repercussions: now they have to keep their alderman out of the wind" (Respondent 8). Like it was the case with the Middle-Holland region, this contradicts the findings of Block and Paredis (2013).

When attending the U10 meeting it became obvious there was a difference in appreciation in such an awareness creating tool like the We Energy Game. Observation showed that the municipality of Utrecht seemed more reluctant than others when free 'playing hours' of the game were offered to the municipalities, and deemed the game not that useful. This might have to do with the fact that this municipality already was quite ambitious and was aware of the extend of the energy transition.

#### 4.2.5 Policy leading to induced strategic behaviour

As discussed in the theoretical framework chapter, the difference between induced strategic behaviour and autonomous strategic behaviour is as follows: Induced strategic behaviour is caused by the effects of a policy or regulation, pushing actors in a specific direction. Autonomous strategic behaviour encompasses the local initiatives from both citizens and firms, participation, the more creative and out of the box actions by actors within legal limits. These initiatives can however be picked up by municipalities or regions and either be supported or adopted. There are running sustainability projects throughout the U10 region, of which four are discussed below. Regarding gas-free neighbourhoods and house insulation, energy generation, and circulair economy. The possibilities regarding a municipal or regional energy company are also discussed.

Like the Middle-Holland region, the U10 expanded their agenda in 2017 with the goal to realize natural gas-free neighbourhoods. The municipalities of Utrecht and Woerden are currently performing pilots regarding this new goal (U10, 2017b, p. 1 & 2; U10, 2018c, p. 9). In Utrecht for example, the neighbourhood Overvecht-Noord has to be gas-free before the year 2030. Overvecht-Noord was chosen as a pilot neighbourhood, because the gas pipelines will have to be replaced in the near future. It would have been wasteful to place new pipelines and to discontinue the use of natural gas within a few years of their placement. An additional reason was the scheduled refurbishing of the homes in the neighbourhood. As this was planned anyway, these households can now be adapted to make use of a gas-free energy system. Another reason is the possibility of standardized refurbishing packages for similar housing types, as was mentioned in the context of Middle-Holland (U10, 2017b, p. 1 & 2; Respondent 1; 2; 8 & 9).

In the same category there is the U-Thuis (U-Home) program. Purpose of this program is the saving of energy in owner-occupied dwellings. The aim here is to bring homeowners, contractors and construction companies into contact with one another (U10, 2018c, p. 9). Although the amount of dwellings is still particularly small with mostly local businesses involved. The goal is to let these numbers grow along the years. This is ought to be done by focussing on the supply and demand side. More specifically by stimulating the energy saving measures by spreading information. Also, the U10 will facilitate initiatives in a societal context, such as energy cooperatives and energy ambassadors. To facilitate businesses, the process team aims at collection of information before spreading it again. It is hoped that an increasing number of businesses will be acquired that will apply knowledge on how to cost effectively refurbish a dwelling to an energy efficient, or even an energy neutral one. An increasingly number of homeowners are investing into their homes themselves, to take advantage of the increase in benefits and comfort of an energy efficient home. Subsidies are only expended temporarily for pilots. This is done so to help getting the necessary innovations on the market going (U10, 2016c, p. 10). In line with this, the council of the municipality of Nieuwegein is currently developing a 'ladder' which helps residents to identify bottlenecks and determine appropriate measures to overcome these with a short return on investment (Respondent 9). "They have to know which way to go. Yes, the big obstacle in the current phase of policy development is that we get a bit of an idea of which direction it should go and where it should take place, but we still have far too little idea of how it will actually will be realized" (Respondent 9).

Dwellings owned by housing corporations are subordinate to performance agreements made with the concerned municipalities. Such agreements encompass quality, quantity and affordability of social housing. Utrecht 10, as joint municipalities, want to stimulate housing corporations to implement zero-on-the-meter for newly constructed buildings on a much larger scale. The same desired up scaling also applies for energy efficient refurbishing of the current housing stock, and where possible, to refurbish to zero-on-the-meter efficiency for homes (U10, 2016c, p. 10).

Besides improving the sustainability of houses such as by isolating them or make them gas-free there is a second type of induced strategic behaviour: locally generated energy. Locally generated energy is another subject which is seen as very important by the U10 region, just as by Middle-Holland. In 2015 the U10 management board ordered the NMU to find an effective approach for the placement of solar panels on large rooftops of societal real estate, without the use of governmental allowances. The province of Utrecht provides assistance here, but only concerning roof of agricultural real estate. This jointly gathered and developed knowledge will be diffused thereafter. Besides this, compliances regarding the energy agreement, signed by the Dutch national government, are explored. After all, the placement of wind turbines is not a sinecure in Utrecht. Utrecht 10 hopes to give this a suitable fit within their plans through cooperation (U10, 2016c, p. 10 & 11).

Another project to encourage the purchases of solar panels is the SamenZonneEnergie (SolarEnergyTogether), wherein the collective acquisition of solar panels resulted in a record discount for those whom were enrolled (U10, 2016a). As the results had a positive effect on citizens, and thus noticeable, the U10 reached also this second target (U10, 2017a, p. 5 & 6). Regardless of this fact, this is of course no reason not to prolong this target and strive for more similar results. After all, 2050 is still many years ahead, which will most likely offer many opportunities to exceeds previous results. Some respondents state that they see changes in society when it comes to the energy transition and sustainability. *"If you watched the television three years ago and saw the commercials, then you would hear sustainability being mentioned only a few times. Nowadays sustainability is mentioned in almost every advertisement. You can even buy solar panels at IKEA. That of course says something if you can already buy solar panels at IKEA. Then it really is becoming a common good, I think. It is more than just sustainability are becoming more 'mainstream'. And that is a good thing. As we have learned from the studies on policy instruments in the theoretical framework chapter, lifestyle can induce changes. When lifestyle and energy efficient technology go* 

hand in hand, behaviour seems to change almost automatically as a result of that (Linden et al., 2006, p. 1926 & 1927).

A third type of induced strategic actor behaviour is with regard to a circular economy. The Utrecht 10 municipalities lead by example. Where possible, they collectively purchase circular products. Eventually, procurement officers of the municipalities will form a network to share experiences and knowledge regarding circular purchases (U10, 2018c, p. 10). Furthermore, waste processors will be obliged to recycle as much residential waste as possible through newly closed contracts. Additionally, the U10 municipalities have signed a covenant that encourages the circular use of concrete. A minimum of 30% of concrete should be reused in 2020. Real estate that is not viable to be repurposed and therefore unusable, will be disassembled and the salvaged raw materials will be reused as much as possible throughout the region. Utrecht 10 really wants to make a point and sent out a signal towards construction companies with signing this covenant. Where possible, concrete projects are encouraged and for building contracts by the municipalities it is required that recycled building materials are used (Staat van Utrecht, 2017; U10, 2017b, p. 2; U10, 2018c, p. 10).

This fourth point is not yet put in practice, but the establishment of a municipal or regional energy company is certainly considered by at least two municipalities of the Utrecht 10. However, this is quite a new idea with not much support and therefore in most occasions not considered by municipalities or regions. In some cases this was substantiated, but most of the time is was just not considered or not seen as a viable option. Establishing a municipal energy company does not come without resistance, which is objectively explained by respondent 8: "If you choose your own energy company, you will also have to explain what you think is the added value of one energy company compared to the other. That can of course be capital and that can be reliability, perhaps a piece of income policy with regard to rates and such. Everything is conceivable. You also have to deal with 16 municipalities and a lot of political colours". This respondent from the U10 region has clearly put some work and thought in the possibilities of municipal energy companies, opposed to the other respondents. This respondent also explores the question if governments would be willing to take the risks of such an project. Governments usually look for parties to bare that risk, but respondent 8 states that if a municipality would take the risk, she should do it 'for better and for worse'. Additionally, the respondent prefers a regional energy company instead of just a municipal one. Not only because risks can be spread across multiple municipalities, but also for the larger scale. This improves the chances for a successful energy company (Respondent 8). "At the moment that you succeed in reducing the grid costs of wind parks and solar farms, you could make sure that the profits don't disappear in the pockets of the developer, or at least not completely. But instead partially flows back to energy transition purposes in the region" (Respondent 8). This is exactly in line with the course of events in Germany, where profits are invested in wind parks, solar plants or thermal energy generating projects (Schönberger, 2013, pp. 23-26). Another respondent agrees with the fact that an municipal or regional energy company should always be an option: "So there is still a lot to think of to develop, but the real assignment to do that is not there yet. And so the option of an own energy production company, yes, it will have to be part of that" (Respondent 9). These two respondents agree on the fact that there should be looked beyond the everyday options, or at least consider them. "There are a lot of catches though. But I think if we keep doing what we always did, we will get what we've always got" (Respondent 8).

In contrast to the Middle-Holland, the Utrecht 10 region is quite technologically oriented. To get the induced strategic behaviour by actors, the region has to explore the vertical dimension of cooperation. In this case the national government of the Netherlands is needed, both to stimulate technological innovation and experimentation, and to share the necessity and importance of the energy transition. *"The national government must also communicate more, even if the solutions are going to be bottom-up. That is excellent within those regions. The urgency can certainly be accentuated by the Dutch government through communication. I notice the following: if the national* 

government does not say: this has to happen, these are the goals, that is useful to do, we are not on the track of where we should be. That makes it easier for us to say the same to stimulate the municipalities and the region" (Respondent 3). Experts also agree on the fact that national governments can steer and accelerate technological innovations, which is in line with Hekkert and Ossebaard (2010): "There are, of course, technologies and developments on their way, and therefore you need decisions and a government. So this gets going, that is happening right now, but do not wait until they are done with the solutions. We have to get rid of gas right away, the temperature rise that is happening is also an issue. We have to make sure that we do it right now, with current technology that is available right now. Coming technological developments will probably develop rapidly, but whether they come soon enough to become climate neutral in 2030, we cannot wait for that to happen. One will have to work with the current technology of solar panels and wind turbines. One has also to realise that what we are doing now, in the present day, are temporary measures to get rid of that gas and oil. Wind turbines we are building today, we can hopefully can break down again in the future. Because there are, and will be, better ways, and less in the open, to generate that electricity" (Respondent 2).

#### 4.2.6 Autonomous strategic behaviour

As was briefly stated in the Middle-Holland paragraph, the autonomous activity of actors has not directly been studied during the writing of this thesis. Nonetheless, the conducted expert interviews and evaluation reports published by the region give some insight into the autonomous strategic actor behaviour within the Utrecht 10 region. As discussed in the theoretical framework chapter and briefly in the Middle-Holland case study, the difference between the induced strategic behaviour and autonomous strategic behaviour is as follows: induced strategic behaviour is caused by the effects of a policy or regulation, pushing actors in a specific direction. Autonomous strategic behaviour encompasses the local initiatives from both citizens and firms, participation, the more creative and out of the box actions by actors within legal limits. These initiatives can however be picked up by municipalities or regions and either be supported or adopted to help these initiatives and projects grow.

In the case of Middle-Holland only a few businesses where progressive and innovative. In the U10 region there is an energy foundation that facilitates innovative pioneers and trendsetters. This foundation is a non-profit organization that is completely autonomous and independent. Small loans can be provided for those who are looking to close their budget on a environmental friendly initiative, mostly CO<sub>2</sub> reduction. Such a loan is only provided if a solid business case is provided by the initiator. This foundation is financed by the municipality of Utrecht and the province of Utrecht (Energiefonds Utrecht, 2018). In a way one can argue that this is a type of indented behaviour, as the energy fund can select which initiatives can receive monetary funds to realize their plans. However, these initiatives are completely autonomously worked out. Initiators have to apply for the funding themselves with a good business case, as mentioned before. This provides the possibility for plans to be realized. Assuming that these initiatives would have emerged anyway, this therefore will be handled as autonomous strategic behaviour. This may be the reason that initiatives in the Utrecht 10 region are more prevalent than in the Middle-Holland region as it provides a breeding ground for all sorts of initiatives and actor behaviour.

Initiatives in the U10 region are not limited to small businesses that want to reduce their greenhouse gas emissions. Take for example Energie-U, which represents 'Utrecht residents who drive, organize and monitor sustainable energy at home, in their neighbourhood and in their city' (Energie-U.nl, 2018). Another, very ambitious initiative comes from the neighbourhood Lunetten. Whereas the plan to make Overvecht-Noord gas-free, was initiated by the municipality of Utrecht, no one would have thought that residents would make such an initiative on their own. However, this is exactly what happened in Lunetten: citizens initiated a similar initiative all by themselves. Support for a gas-free Lunetten is slowly growing (Gemeente Utrecht, 2018c). This is in line with the seventh

'lesson' for governments provided by Hekkert and Ossebaard, stating that governments should stimulate and be susceptible for new technologies and initiatives by civilians (2010, p. 125). *"In our municipality we use the concept of invitation planning: we have offered space and then we leave it to the market to come up with an initiative. The challenge we face here is: is it a huge challenge, but where do we want it realized and how are we going to phase it over time?* (Respondent 8).

An example of a new technology and a truly revolutionary initiative in Utrecht is LomboXnet. Entrepreneur Robin Berg engineered a small smart grid for the neighbourhood Lombok called LomboXnet. It is revolutionary in that it uses 'smart' car chargers in this smart grid. This implies that these chargers do not only provide electricity to the cars in time of overproduction, but also supplies the grid with electricity at times of low supply. This electricity is taken back from the car batteries that were charged at day time by a large network of solar panels. In this way the cars act as an energy storage for the neighbourhood, so that solar generated electricity can be used as efficient as possible. Such a system is a novelty in Europe. The electric cars that are part of the smart grid are rental cars as well. In addition to the smart grid an optical fibre internet network provides the residents of Lombok with a high speed internet connection (Game Changers Utrecht, 2018).

#### 4.2.7 System failures and their effects on policy and actor behaviour

What becomes immediately apparent when analysing the Utrecht 10 region is that to a certain extend there are interaction or network failures. In this case weak network failures as the involved municipalities are not familiar with each other. Notwithstanding the foregoing, part of the U10's function is to change this and improve on the current situation. After all, a more efficient government was the fourth out of five intended results published in 2015 (U10, 2015b; U10, 2017a, p. 3). Particularly through increasing cooperation, duties of the involved municipalities are ought to be performed better and more efficient. A regional traineeship program has been developed to further increase the level of cooperation between the government officials of the participating municipalities. In addition to this program, labour capacity has already been exchanged several times between different municipalities. Both measures also lead to the fact that municipalities develop a better understanding of each other's way of operation and their structuring (U10, 2017a, p. 7). It also seems that sometimes the U10 municipalities are somewhat wary to do concessions or to fully engage in the process for reasons we could not get exactly clear during this study (Respondent 5; 8 & 9). It is most likely to have to do with interests that are not clearly stated, at least not to the world outside the U10 meetings. According to Lintz (2016, p. 964) the interest of municipalities to deal with the environmental problems can be expected to vary considerably according to their characteristics. "All those interests will be on the table soon and yes, then you really have to make decisions based on all those interests. There still is the fact that there is too little land and there are many wishes. I think that how we, as 16 municipalities, will come out of that discussion together and what that final offer will be. Whether that will also be supported by everyone, I think that is really possible? But we have to go there. It can go really well, then you will have a time of cooperation with each other. But I can also imagine that something has to be done and that there will still be some lively discussions and perhaps a little more than that" (Respondent 5).

The soft institutional failure and the infrastructural failure with respect to the anonymity of the energy transition apply the same way as they did for the Middle-Holland region. Additionally, for the U10 region there is another infrastructural failure that also has to do with knowledge. This is the lack of information on the regional energy potentials. At the time of writing the inventory has just been completed. Due to this reason the results of this inventory now used to develop the RES. It has a significant effect on policy and therefore on induced strategic actor behaviour as well. As policies and regulations can yet not be adapted or aimed towards realizing the regional potentials, actors can't either. This subject can also partially be seen as a policy coordination failure. Whether there is a directionally failure is hard to tell as the inventory is only just finished. It is now hard to tell to what respect the energy inventory will increase the shared vision regarding the goal and direction of the energy transition process. Finally reflexivity failures are for the Utrecht 10 region also few to non-

existent as they are currently resolving the failures mentioned above, which testifies of a reflective structure.

#### 4.3 Comparison Middle-Holland and Utrecht 10

When comparing both regions, we can conclude that Inter-municipal cooperation differs per region, mostly because of historical matters. Some municipalities in some regions have been working together for decades or even centuries, which is the case with Middle-Holland when it comes to water management. Within the province of Utrecht there was not always felt the need for such important and compulsory cooperation (Respondent 3). So in the U10 region there was less of a tradition in the field of cooperation. Indeed, there was cooperation in the region, but mostly as a result of influence form higher governmental levels. Hence, the Middle-Holland municipalities had more experience in working together with each other, which will most likely have a positive effect on the cooperation within the region during the energy transition (ODMH, 2016, p. 8). Where the Utrecht 10 municipalities have a portion of their plans dedicated to facilitate the opportunity to get to know the other municipalities. The region also invests in research that looks into which forms of cooperation are most effective for each topic (U10, 2015b; U10, 2017a, p. 3 & 8). The essence of the pilot regions does become apparent to anyone who shows interest in the regional energy strategies: "If you delve deeper into these pilots, you will understand that it is really necessary to work together, because you will not get there on your own. You will probably not have the resources, nor the space, nor the knowledge, nor the manpower, nor the network, nor the money. There is a lot you won't have. This proves that if you do work together within a region, with other parties, it has a much greater chance of success. Well, something like that has to be communicated much more" (Respondent 3). It is interesting to see how reasonably different these two regions can be when they are so close together. Middle-Holland and Utrecht 10 actually share borders at the municipalities of Bodegraven-Reeuwijk and Woerden.

Utrecht 10 seems to be approaching the Middle-Holland region in terms of achievements regarding the energy transition, especially with regard to technology and its implementations. Take for example the gas-free neighbourhood pilots currently running in the U10, or the revolutionary smart grid LomboXnet. The Middle-Holland region also has a disadvantage in the wind turbine policy of the province of South-Holland. This region has, however, achieved more in a shorter timeframe. Notwithstanding the foregoing, as a pilot region Middle-Holland was provided with extra possibilities and help from the VNG and other involved governmental institutions.

From the theory it can be concluded that a blueprint approach is not likely to work, as all regions are different on all sorts of aspects (Loorbach & Rotmans, 2010, p. 244). This holds true in reality as well. Each region seems to prefer its own, specifically fitting approach to inter-municipal cooperation. Middle-Holland with a very close form of inter-municipal cooperation and the U10 with a much more loose and individual form of inter-municipal. Drechtsteden, for example, is another pilot region also located in the province of South-Holland and has the authority to make political choices for the region as a whole: *"There they said: we are a big institution. A lot of municipal officials have also been transferred to the region. There they put money, jurisdiction and decisions together. So they really have a common arrangement, administratively, and do it that way. Well, that is possible, but that is just another way"* (Respondent 2, Ruimtevolk, 2018a).

Besides these differences in inter-municipal cooperation chosen by both regions, yet another noticeable difference lies in their approach towards the future. For the Utrecht 10 plans are contractually binding, this is not the case in the Middle-Holland region. The pilot region Middle-Holland has developed three transitions paths, for the short, middle and long term. These three paths are to be followed and explored by the municipalities of the region. In addition, they share common goals and ambitions, as opposed to the Utrecht 10 municipalities, which are allowed and expected to set their goals and ambitions individually. Furthermore, the decision to cooperate on certain subjects also lies at the municipalities of the U10. Although they share many similarities, this approach is considerably different. For this reason, different groups of municipalities can cooperate on different aspects of the energy transition at the same time. This is in line with the current ways of

cooperation throughout the province of Utrecht, where a similar structure exists for cooperation that is non energy transition related. The same conservative structure can be found in Middle-Holland, which clings to its roots of all-out, joint cooperation. Again, there is no right or wrong way in the pursuit of a certain approach, as long as the region is confident it will provide the desired results. For now, the chosen approaches do not seem to be faulty in any way, wherefore only the future can tell if the right decisions were made. *"I do think that if one would do this again, you will have a better idea of what to look for in an approach. As a starting point, I would not work towards a plan, but instead draw up something that will serve as input to shape your local planning. So, for example, for your environmental vision which you expand with an additional energy paragraph. The fact that participation just works, can also be of additional value, to do things together with everyone is a good way. Because it also serves mainly as a piece of consciousness, and creates some movement" (Respondent 1).* 

A similarity is found in that both regions put emphasis on creating awareness for the energy transition and not on participation. This is done because according to their point of view, people will take action themselves when they realize the urgency. This relates back to Linden et al. (2006, p. 1926 & 1927), who state that if sustainability becomes mainstream, behaviour changes almost automatically.

What could give both regions a great advantage is establishing a regional or municipal energy company (Schönberger, 2013). In this way the region or the municipalities individually can improve technological innovation and experimentation and be on the frontier of the renewable energy sector. Practice has shown that it comes at an affordable price and encourages the energy sector to innovate (Block & Paredis, 2013, pp. 185-187; Schönberger, 2013, pp. 23-26; Binnenlands Bestuur, 2014). Especially the Middle-Holland municipalities can hopefully take advantages in the future to the recently changed regulations on wind turbines in the province (Provincie Zuid-Holland, 2018b; Respondent 4). In the Utrecht 10 two government officials have stated that a regional energy company is an option that should be considered during the energy transition process and the development of the RES (Respondent 8 & 9). The approaches in the Middle-Holland region are, instead, more aimed at supporting energy generating initiatives from businesses and residents. The Goudse Panelen project, which was discussed earlier is a good indication for this. An energy corporation, what this is, is essentially a civilian version of a municipal energy company. But now energy is generated by residents or sometimes businesses and slowly expanding its energy generating capacity. The municipality or region does not have to supervise certain projects by themselves: like in this example where the municipality of Gouda outsourced the project (Respondent 6).

This leads us to the allocation energy generation. Both regions will likely have issues when addressing the allocation for generating renewable or sustainable energy in the near future. Where the Middle-Holland region is hoping for the province of South Holland to loosen the regulations regarding the placement of wind turbines, the Utrecht 10 is most likely to end up with municipalities that have to generate more energy than their initial quota based on the energy potential analysis (U10, 2018a). It is expected that the rural municipalities will have to generate more energy than their original calculations have predicted. This has to do with the fact that urbanized municipalities like Utrecht, Gouda and Nieuwegein have less undeveloped land to provide their own energy requirements (Respondent 1, 5 & 8). As mentioned before, the U10 region seems to be the most reluctant on open communication on this subject and therefore needs to improve their cooperation on this energy allocation issue.

Many, if not all respondents from both regions have indicated in some way or form that some guidance from the national government would be very much appreciated. Being it in the form of a detailed Climate Agreement or by clearly stated tasks or steps that have to be performed. Either way, if this ends up to become reality, the misuse of political power in relation to transition management can be significantly reduced. Maybe even so far as to only the national government. A possible

downside to this is that if the national government does not properly caries out it's guiding role, all regions will be guided in the wrong direction. Respondent 8 summarizes this as follows: *"We trust politics with climate decisions. Politics must decide. At the same time, we believe locally that society must decide. So this creates a field of tension about what role to give to who"*. This is a normative solution, which leads us to the other shortcoming of transition management.

### **5.** Conclusion

In the previous chapters, the methodology and the results of this research were discussed. As well as the literature published prior to this research on the energy transition and what this brings about around the world and therefore also the Netherlands. In this chapter all this will be combined and the sub-questions are answered, after which the central question will be answered which concludes this chapter. First, the following sub-questions of this study will be answered:

- 1. How does transition management theory enhance the development of the energy transition the regional level?
- 2. How is the inter-municipal cooperation structured in Middle-Holland and the Utrecht 10?
- 3. What are opportunities with regard to developing a regional energy strategy?
- 4. What are limitations with regard to developing a regional energy strategy?

## 5.1 How transition management theory enhances the development of the energy transition at the regional level

In the theoretical framework chapter it was discussed that transition management is a set of tools for influencing governance to accelerate sustainability (Loorbach & Rotmans, 2010, p. 239). Transition management can enhance the development of the energy transition provided that it is used in an improved form as a policy framework. This implies that at least the two main critiques regarding transition management are improved upon. The most heard critique regarding transition management is that is very normative as transition management handles sustainable development as a long term goal, also called Leitbilder (guiding visions) (Shove & Walker, 2007; Genus & Coles, 2008; Weber & Rohracher, 2012; Rauschmayer et al., 2015). The other criticism on behalf of the theory is that the so called transition managers may in fact impair the process trough the wrong use of political power, only targeting very specific problems (Shove & Walker, 2007). If a three stage agenda is used instead of only a long term oriented agenda, incorporating the short, middle and long term, this critique is easily overcome. The other shortcoming of transition management can be prevented with guidance from the Dutch national government.

Transition management is self controlling due to the transition management cycle, which makes it well suited as a policy framework that can be used as a basis for energy transition oriented policies at the regional level. In this way there is no solely reliance on the policy makers to reflect on their decisions, but there is a repetitive component that ensures moments of reflection and adaptation. The concerned governmental body should go repeatedly through the four activity components of the transition management cycle. These four components are respectively: problem articulation, building a transition agenda and networks, experimenting and diffusing, and monitoring, evaluating, learning and adapting. It has been pointed out several times that reflection and adaptation are very important in a transition process. Especially to prevent path depended lock-in situations. This quality of using transition management as a policy framework is consolidated by the use of a three stage transition agenda. When short, middle and long term are incorporated the transition can be gradually improved and developed. The reflection and adaptation can now be applied to every stage and change future plans based on current observations. If only a long term oriented agenda is used, adaptations will most likely be too late as the scope is in a too distant timeframe.

Guidance in the form of frameworks and guidelines from the Dutch national government for the regions and municipalities to work within also contribute to a better functioning of transition management. That is because regions and municipalities can now focus better on the implementation of their plans as crude paths have already been chosen. In addition to this the municipalities do not have to devote so much assets to clarifying their plans to citizens, because it is essentially commissioned by the national government (Shove & Walker, 2007). Technological innovations can develop faster if there are positive expectations surrounding a certain technology. Because transition management is primarily policy based, governments can stimulate and exert pressure on business sectors that need to change. For example in the form of induced strategic behaviour. In both regions induced strategic behaviour has resulted in several successful initiatives. In this way preferred circumstances can be created for innovations. The large scale conversions of dwellings from gas to gas-free can induce incentives to the market to create cheaper and more efficient heat pumps for example. This is yet another way in how transition management can improve the transition on a regional, and likely a national level.

#### 5.2 Inter-municipal cooperation in Middle-Holland and Utrecht 10

Municipalities of the Middle-Holland region have cooperated for centuries with regard to water management. Water has always posed a tread of flooding due to the fact that the region is situated below sea level. These municipalities had to take flood preventing measures as a region, as a whole (ODMH, 2016, p. 8). This jointly bound structure is also visible in the structure of Middle-Holland when developing its RES. Even though the municipality Alphen aan den Rijn has joint another region, they still closely cooperate, which is in favour of both regions (Respondent 4). Without such a history of close cooperation, municipalities within the Utrecht 10 region are now getting to know each other. This is actually one of the main priorities of the region so that the cooperation can improve (U10, 2014, p. 3).

What does this imply for the approaches in cooperation in theoretical context? As far as the dimensions of inter-municipal cooperation go, Middle-Holland was present in both. The horizontal dimension seems to be as it should be: three worked out scenarios forming some sort of agenda. Nonetheless, it is not a very detailed agenda, lacking specific dates and chronically structured objectives, but is a good basis to start from. The vertical dimension is somewhat more complicated to reflect upon. This vertical dimension is externally oriented and focuses on how a region can associate with other regions (Nelles, 2013, p. 1354), which Middle-Holland did well with the other pilot regions. However, this was obligatory as it was part of the pilot program (Respondent 4). Another aspect of the vertical dimension is that the region is also able to influence other regions to achieve its objectives. This is rather hard to tell as all five pilot regions shared their information on all fronts between each other and the governmental institutions and ministries that were involved in this pilot project. This is worlds apart from the example of Kortrijk in which case the mayor used his political network to channel national funds to his municipality (Block & Paredis, 2013, p. 185).

Utrecht 10 convinces less than Middle-Holland in the horizontal dimension as there is no common agenda in the region in the way the Middle-Holland region has, at least not yet. Several projects are scattered throughout the region and a real sense of coherent policy seems to be absent, apart from the fact that the municipalities need each other to realize their individual objectives. Presumably this will change now that the regional energy analysis has been completed. The analysis is mostly from a regional perspective, wherefore a more regional approach is induced (U10, 2018a). With this information the region and its municipalities can now set more substantiated goals and ambitions. Notwithstanding the foregoing, it still seems that the U10 municipalities are somewhat wary to do concessions or to fully engage in the process for reasons we may not exactly know. This is without a doubt an issue that needs to be overcome in the near future to prevent friction and possible escalation of disputes. Decisions on the allocation of energygeneration have to be made and several smaller, more rural municipalities will presumably have to generate more than their initial targets to fulfil the energy requirements of the cities with limited developable land like Utrecht and Nieuwegein (Respondent 5; 8 & 9). What applies to the vertical dimension is that the intentions of the region are to cooperate as much as possible with other surrounding municipalities and regions. To what extend this is actually the case and how much the U10 influences other regions to achieve its own goals and objectives cannot be concluded from the conducted research.

Concluding, there seem to be multiple ways to develop an RES. How this is actually done, appears to be partially guided by the internal structure of a region. This, in turn, can be influenced by the historical structure of cooperation within that region. Nevertheless, an RES will most likely comprise short, middle and long term goals along a transition path to guide the region. Herein, constant monitoring and reflecting on the process is ought to be done. In this way the process can be adaptive, which is crucial to avoid and overcome possible lock-in situations in the future.

#### 5.3 Opportunities when developing a regional energy strategy

Now different interpretations of energy transition among different governmental tiers and the different strategies that can be implemented are discussed, the third sub-question will be answered. The opportunities when developing an RES will be discussed in this paragraph. In short, the opportunities which may be encountered when developing and implementing an RES are: a growing support from society when informed on the energy transition, establishing a municipal or regional energy company, working as a region offers more perspective opposed to a municipality on its own, local sustainable initiatives and projects, and a sufficient midterm policy to bridge the gap from now to long term goals and ambitions.

The first opportunity focuses on awareness among the Dutch population: When the respondents' desires are fulfilled, and most of the Dutch population is informed on the energy transition, this may help to accelerate said transition. One possibility is when a growing group of supporters emerges, large and impactful projects and policies experience less resistance. In addition, pressure from society on the government might induce advancements and expansion of such developments. A study by Linden et al. (2006, p. 1926 & 1927), shows that when something becomes part of a lifestyle it almost automatically changes behaviour. According to respondent 6 this is starting to happen as solar panels are now available at IKEA and sustainability becomes an increasingly discussed topic in society.

The second opportunity is often mentioned throughout this thesis establishing a municipal or regional energy company is another possibility for municipalities and regions to consider. It is a possibility that can lead to great influence into the energy sector and therefore also control over the adoption of new renewable energy generation technologies. This approach has proven itself in practice in multiple occasions, further proving its potential (Schönberger, 2013, pp. 22-27; Binnenlands Bestuur, 2014). So far two respondents (8 & 9) from the Utrecht 10 region see this as an option that should be further explored.

Thirdly, working together in a regional context can open doors to opportunities which might be out of reach for a municipality on its own. While analysing the two case studies, it came to light how Utrecht and Gouda have very limited space within their municipal boarders. This hardly enables them to realize energy generating related projects on municipal ground. Within the regions of both cities, there are several municipalities with large un-build areas, which offers opportunities for said projects (Respondent 2, 5, 6 & 8). An underestimated possibility for municipalities lies in the smart use of networks of politicians within the region. This can be especially beneficial as it is used in the vertical dimension of inter-municipal cooperation

Fourth, autonomous strategic behaviour can lead to initiatives and projects that can be revolutionary. Think of LomboXnet in the U10 region and Goudse Panelen in the Middle-Holland region. Initiatives like these can be supported by regions or municipalities financially or by expanding their networks. In doing so small projects can become pioneering like LomboXnet and Goudse Panelen. There are several more initiatives an projects throughout the region. However the municipalities or regions might not be aware of them, as not all of them will contact the municipalities or regions.

Finally, middle term scenario's with related plans and projects are very important. Berenschot (2017) concluded how such visions lacked in Dutch policies, which accounted for an insurmountable gap between executing short term projects and the way towards realising long term goals and ambitions. As this middle term section is missing in most policies, this simultaneously poses a very useful opportunity for regions as well. This gap can be filled by a middle term vision with corresponding measures and plans. In this way it can provide a consistent and smooth bridge from the short to long term. Adaptive policy is key here, because the future is unclear.

#### 5.4 Limitations when developing a regional energy strategy

This last sub-question is as follows: What are limitations and possibilities with regard to developing a regional energy strategy? Looking at the conducted research and studied literature, especially the system failures framework developed by Woolthuis et al. (2005) which was later expanded by Weber and Rohracher (2012) and already provides eight reasons for failures that might occur. These eight reasons, however, do not specifically apply to the development of an RES. Hence we turn to results of the conducted research. This enables us to provide a better and more relevant answer to this sub-question. In short, the limitations which may be encountered when developing and implementing an RES are: finding a fitting manner of cooperation, the necessity of a energy analysis for detailed plans, laws and regulations by the national government, and the unawareness among the population among the population.

First, from the second case study which focuses on the U10 region, it became apparent that a fitting form of cooperation is not always easily found. A form of cooperation that does not fit the political culture of the municipalities within a region can lead to unwanted problems, which can be related to several system failures (Woolthuis et al., 2005; Weber & Rohracher, 2012). It is not without reason the Utrecht 10 devotes significant financial assets to research which is aimed at how their cooperation can really provide additional value. This goal exploratory research is even marked as a core responsibility of the region, further accentuating the importance to overcome this limitation. In addition to this, a sense of unity and solidarity has to arise among the municipalities of a region to exploit the its maximum potential.

A second limitation is found in the value of an energy potential analysis. Where Middle-Holland had based all of its plans towards their goals and ambitions on the analysis of the regions potentials for energy savings and production. The U10 region has only just finished their analysis and have not yet made such plans as result of the findings. Several projects were already in progress or planned, but when comparing the two cases it becomes apparent very quickly how much difference this makes. A region, or municipality for that matter, can only do so much in the absence of such valuable information. This limitation can, of course, be surmounted by commissioning a similar inventory for the region. As it takes time before the inventory is finalised, a region is restricted to endorsing and executing projects that do not rely on certain specific information.

Legal frameworks, regulations and policies drawn up by the national government of the Netherlands form the third limitation for regions while developing and implementing their regional energy strategies (Lintz, 2016, p. 964). These types of limitations and their consequences have already been elaborately discussed in the results chapter of this thesis. Furthermore, the gas-free neighbourhood pilots in Woerden and Utrecht seem to point out opportunities when it comes to bypassing or changing these types of limitations. This proves the point that municipalities can be key actors in such processes, if they want to as Schönberger (2013, p. 8) suggested (Lintz, 2016, p. 964). This a way how induced strategic behaviour in actors can be achieved Faller (2014, 894).

Likewise, the fourth and last limitation that will be addressed, has been broadly defined throughout this thesis. First mentioned in the introduction of this thesis, the unawareness among Dutch citizens regarding the urgency and the energy transition itself, turned out to be a widely acknowledged problem. All interviewees underlined the fact that only 98% of the population is familiar with the phenomenon that is the energy transition. Followed by the message that this group has be informed and mobilized (Sociaal en Cultureel Planbureau, 2016; POSAD Spatial Strategies, 2017b, p. 39; Vereniging Deltametropool, 2017, p. 7).

#### 5.5 Conclusion

After examining the results and their relation to the discussed literature, the sub-questions have now been answered. Hereafter, an answer to the central research question can now also be provided. The central research question in this study is as follows:

"To what extent does inter-municipal cooperation contribute to the energy transition?" First, we found that transition management can be beneficial in several ways when it is used as a policy framework. A three stage transition agenda should be incorporated to ensure the effectivity. As well as that the national government specifically states demands and somewhat guides regions and municipalities during the transition process. Next, it was established that each region has its own preferred approach to developing an RES. Both regions excel and lack in certain aspects of this process, which shows that there is not 'one way'. Finally, multiple possibilities and limitations in the process of developing and implementing an RES were discussed to answer the third and fourth subquestions.

Inter-municipal cooperation can contribute significantly to the energy transition. This is because when every region successfully develops and implements its RES, the national goals of the Netherlands will be met as well. In achieving this, inter-municipal cooperation can be positively influenced by transition management theory when used as a policy framework. For example by creating incentives to stimulate induced strategic behaviour among actors. It can be concluded that, transition management seems to be a good method of accelerating the energy transition. However, it has its shortcomings and accelerating the energy transition is easier said than done. These can be overcome with the incorporation of short and middle term goals and guidance from the national government. The development of a middle term scenario is especially important as it bridges the gap from the short to long term while providing a more consistent and smoother process (Berenschot, 2017). With these solutions in mind, transition management theory is a helpful tool to improve both inter-municipal cooperation and the development of an RES. But only if it is used in the appropriate way and how it is intended to be used.

A good cooperation structure will certainly benefit difficult processes like the allocation of renewable energy locations within the region or spreading initiatives that developed through autonomous strategic actor behaviour. An inventory of the regions potentials provides structure and gives insight into what is truly a realistic and achievable goal and what is not. Transition paths and short, middle and long term scenario's can be based on such an inventory. With these criteria met, the repetition of the four activity components in the transition management cycle should be self correcting if the monitoring and self reflection is properly carried out. Regional governance structures like an RES can embed transition management and inter-municipal cooperation in a structured plan to realize a regional energy transition. Hence can inter-municipal cooperation result in regions mutually achieving a national energy transition.

As becomes apparent from the above, inter-municipal cooperation on the regional level is needed for the energy transition in the Netherlands as a country. The transition is managed in separate smaller parts and in this way a national transition can be realized. Transition management can be used as the policy framework to serve as a basis for the development of an RES in multiple ways during many stages in the process. First and foremost, it is important to overcome the two shortcomings of transition management, namely: long term orientation and potential wrong use of political power. If a proper transition agenda has been drawn up, an appropriate co-operational structure has to be found to comply with the institutional configuration of the region so that it can function properly as a whole. A vital aspect is that the municipalities within a region can openly share their ideas and concerns so that a proper allocation of energy generation can be achieved. Additionally, they should consider their possibilities and prevent hindrance as a result of their limitations.

#### 6. Discussion

In this chapter reflections on this thesis is given. This reflection encompasses both the discussed literature as well as the whole process of the conducted study. First, recommendations for other regions will be discussed. These recommendations are based on the results and answers on the sub and research questions from the previous chapter. Next, the literature used throughout this thesis will be assessed. Wherefore the same order of treatment from the theoretical framework chapter is used. Finally, a reflection on the conducted research for this thesis will be provided. Finally, this chapter will be concluded with opportunities for future research.

#### 6.1 Recommendations for practice

Based on the answers to the sub-questions and central research question in the previous chapter, seven recommendations for other regions that are developing an RES can be presented. The first recommendation is that regions must start right now with the development of their RES. Not only because they have to present their bid to the national government this year, but also because a transition takes time. In this study it is stated that municipalities and the pilot regions do not always take into account that solar panels and wind turbines will not last until 2050, but Middle-Holland specifically mentions the replacement of these energy generating devices (Berenschot, 2017, pp. 23-28; POSAD Spatial Strategies, 2017b, pp. 24-30). In addition the insulation of houses to improve their energy label. In the Utrecht 10 region, energy savings also have a high priority as well as making neighbourhoods gas free (U10, 2015b, p. 8 & 11).

Second, a often heard comment during both the interviews and the analysis of the policy documents and literature, is that the urge and necessity of the energy transition has to be spread throughout society. Both among citizens and government officials. As was mentioned in paragraph 4.3, creating this awareness causes residents to take action individually, or collectively by starting initiatives. This is induced strategic behaviour. When related to the literature from the theoretical framework we learn that this approach is most effective when saving energy, the energy transition, sustainability and the like become somehow a mainstream 'trend' or 'lifestyle'. When this is the case, changes in behaviour will occur without the need of much further pressure of guidance Lifestyle (Linden et al., 2006, p. 1926 & 1927). Based on this we can conclude that regions and municipalities working on an RES have to devote significant assets to communication, actively spreading the essence of the energy transition, in a similar fashion to the case study regions do (ODMH, 2017, p. 6 & 24). In addition to this, this particular recommendation might also be useful to the national government. They will have to set up and coordinate a program aimed at communicating anything related to the energy transition to create awareness among the Dutch population. Awareness ca result into the benefits stated above. It also obsoletes discussions revolving around where to establish energy landscapes, as it is then common knowledge and known that all possible locations should be considered for development. As respondent 3 stated, the urgency can certainly be accentuated by the Dutch government through communication. It should be noted that information regarding to the plans of a region should be communicated by the governmental body closest to its residents, being the municipality. Not the region itself, as the region is too 'distant' from the citizens (Respondent 2 & 9).

The third recommendation is that policies should be constituted along the principles of the trias energetica. This strategy for energy neutrality prescribes that focus on energy reduction comes first, followed by attempting to solve the remainder in a sustainable manner. Only if there is no other solution, fossil fuels can be used, but as efficient as possible (Respondent 6). As mentioned before, a study of Ruimtevolk (Ruimtevolk, 2018a; Ruimtevolk 2018b, p. 15 & 28) showed that a reduction of one part of consumed energy leads to reduction of three parts of energy generation required. This 1:3 ratio is a result of the energy losses due to the transport between the energy source and the place of consumption, but also due to the way of consumption. Pursuing this reasoning can help to

make the energy transition faster, less expensive and more achievable. Despite the fact literature (Nooteboom & Ybema, 2015) and the respondents assume that developing a blueprint for regions on how to develop and implement an RES will be very difficult to achieve, this does not deny the fact that regions can learn from each other. For example: regions can hire the same research agencies to conduct an inventory of its potentials, if done to satisfaction in another region. Or consult the association of Dutch municipalities for specific information and knowledge gathered during the pilot period.

Fourth is establishing a regional energy company is a possibility that has to be looked at. This claim is supported by several authors (Block & Paredis, 2013; Schönberger, 2013) and respondents (8 & 9). Especially as practice has shown that it comes at an affordable price and encourages the energy sector to innovate (Block & Paredis, 2013, pp. 185-187; Schönberger, 2013, pp. 23-26; Binnenlands Bestuur, 2014). A regional energy company is mentioned specifically. In this way the risk can be spread and the scale upon which the energy company can operate is significantly larger than only one municipality. Profits from this regional energy company are supposed to be reinvested to increase the energy generating capacity or into the isolation of houses. The latter would be exceptionally helpful as the financing for certain projects it is still one of the greatest challenges of the energy transition. In this way cost can be lowered, helping out home owners tremendously. To consider if the establishment of a regional energy company is a viable option, regions should have completed the energy potential analysis of their region. It is most likely that a regional energy company is only a legitimate option when there is a particular large gap between the current renewable energy production and the necessary future demand. Because in such a situation they can make an better entrance to the energy market than if the future demand is almost achieved. Although the establishment of regional and municipal energy companies is not a common solution, it works really well in Germany and Haarlemmermeer is the first municipality to take this rout in the Netherlands (Schönberger, 2013, p. 22-31; Binnenlands Bestuur, 2014).

Fifth is not so much a recommendation for municipalities or regions developing an RES, but one that might benefit them is more guidance from the national government. As has been mentioned several times throughout this document, many of those who are involved in the development of an RES would like some guidance from the national government in some shape or form. Especially now that the Climate Agreement is not yet finished and the outlines for the RES are still unclear (Burke & Stephens, 2017; Respondents 1, 2, 3, 4, 5, 6, 8 & 9).

The sixth recommendation concerns actor behaviour. With induced strategic behaviour actors are steered in certain direction by the regions. Autonomous strategic behaviour by actors, however, occurs regardless of policies and regulations by governments (Faller, 2014, p. 894). This results in all sorts of sustainable initiatives and projects like Goudse Panelen and LomboXnet. Nevertheless, these are not always noticed by regions or their municipalities. It is therefore advisable that a government official is assigned to keep an inventory of such projects and initiatives. If they have the potential to grow a system, as was done for Goudse Panelen, can be implemented to develop the initiative further. In this way the potentials of these initiatives can be used to their full extend. Perhaps they can even grow region-wide.

The seventh and last recommendation focuses on inter-municipal cooperation and interregional cooperation. From the comparison between the regions of U10 and Middle-Holland it followed that a good internal structure for a region is a necessity. A region should function as if it was just one municipality with regard to its inter-municipal cooperation. That the municipalities are familiar with how the other municipalities operate, so that misunderstandings can be prevented. This is what the U10 is still working on, but Middle-Holland already has established over time. Next the municipalities must be able to effectively develop agendas for the region. Again, this is where the Utrecht 10 falls behind in comparison to the Middle-Holland region. A good internal structure and the region's capability to develop and implement regional agenda's are the cornerstones of the horizontal dimension of inter-municipal cooperation. It is also desirable for regions to invest in their relation and cooperation with adjacent regions. If a region not fully meets its demands, there is perhaps a region nearby that has a energy surplus that can be sold or traded with the other region. This is in line with the requirements for the vertical dimension of inter-municipal cooperation. As discussed beforehand, the vertical dimension of inter-municipal cooperation is externally oriented an focuses on how a region can associate with other regions and how much it can influence them.

#### 6.2 Literature

In this section the literature and its relevance to this study will be discussed, starting with theory on transitions. The four phases on the transition curve can be helpful to provide a general idea of how a transition enfolds. As has been mentioned beforehand, in some occasions it is difficult to determine the current situation along those four phases. This has to do with the fact that a transition is a fluent process over a prolonged period of time, wherein such hard lines do not always seem appropriate. Yet, these points of criticism have been acknowledged in published literature (Rotmans & Loorbach, 2009, p. 7; Loorbach, van der Brugge & Taanman, 2008).

Transition management is aimed at providing a structure for a transition process. In the theoretical framework chapter a few critiques on behalf of transition management have already been discussed. But how do practical approaches towards developing an RES, compare to transition management theory? At first glance the three levels (strategic, tactical and operational) as defined by Loorbach, van der Brugge and Taanman (2008, p. 12) seem to be relevant and useful, which they are, but only to a certain point. Especially the differentiating line between the strategic and tactical level seems to be blurred. When looking at the description of both levels (Loorbach, van der Brugge & Taanman, 2008, p. 12), differences appear to be minimal. In addition, the names can be confusing and therefore, as a result of these similarities, get mixed up relatively easy. However, the four activity clusters were present in both regions' agenda's and ambitions, indicating the importance of reflexivity (Loorbach, van der Brugge & Taanman, 2008, p. 12).

Transition management should be revisited with a three stage transition agenda. Including short, middle and long term goals, ensuring a gradual but all encompassing and successful path to the desired goals and objectives. This would overcome the main critique regarding transition management when used as a policy framework (Shove & Walker, 2007; Genus & Coles, 2008). Mainly because when there is a lack of short term and middle term goals, there is also no adequate 'run-up' towards the preparation and thus realization of the long term goals (Berenschot, 2017).

The second critique concerns the wrong use of political power. A little, though specific, governmental guidance in conjunction with creating awareness among Dutch citizens can make a very much needed and noticeable difference in the eyes of the respondents (Respondents 1, 2, 3, 4, 5, 6, 8 & 9). It is for these reasons that lower governments can use their political powers in the appropriate way if the national government uses theirs to guide them in the desirable directions (Shove and Walker, 2007). This is in assumption that the national government has now realised it laxity in the previous years and now starts using their political instruments in ways fitting the energy transition.

With hindsight the theory on municipal cooperation and in what dimensions that is possible was not really relevant to this study (Olsson & Cars, 2011, p. 159; Nelles, 2013, p. 1354; Lidström, 2017, p. 404). What was relevant was the framework presented by Faller (2014, p. 894), which ended up as the basis for the conceptual framework during this study. However, the author does not go in depth into his used methods. For this reason, only the outline of conducting interviews and analysing policy documents was provided. Each region should present a proposal RES by 2021 (U10, 2018b), hence a study on the cooperation on the inter-regional level in the Netherlands concerning energy transition can help to enrich information on this fairly unexplored topic in scientific literature. This, in combination with the fact that this kind of regional corporation is fairly new in the Netherlands, may lead to new insights into how transition management on the interregional level can or should be implemented and what positive and negative consequences this has or may have.

The operationalisation of the induced strategic behaviour and autonomous strategic behaviour introduced by Faller (2014, p. 894) was inconvenient in that both types of actor behaviour are relatively difficult to measure. Induced strategic behaviour is for example most noticeable as the purchase of solar panels or by the results of programs like the U-Thuis program in the U10. However, autonomous strategic actor behaviour is not always noticed which makes it very difficult to study in some occasions. There are very successful initiatives that have become substantial through the years like LomboXnet. In such a case it will be noticed by the municipality and region. Less, prevalent initiatives can go under the radar of municipalities and regions. Especially because they focus on their own plans and projects (Respondent 2, 3, 4 & 5). For this reason, initiatives will not be noticed unless they present themselves to a municipality or region. Therefore the image of autonomous strategic behaviour might not comply to the actual circumstances. The same applies to induced strategic behaviour, but to a lesser extent. Because of the abovementioned reasons, the only way how this could have been done was to get into the networks of pioneers and initiators of each municipality. However, this would have been beyond the goal of the research goals of this thesis.

Whereas the article from Schönberger (2013) on municipal energy companies was an eye opener, the opposite goes for the use of mayors and their political networks to induce sustainable changes (Block & Paredis, 2013). At first glance it seems to be an interesting theory, but during the conduction of this stsudy it became quickly apparent this would not work in the two case regions. The tensions are, in some occasions, so high that is does not seem possible for a mayor to get away with forcing his or her needs.

The system failures framework was somewhat confusing while analysing the two regions. This may be due to the fact that all of the eight failures are relatively broadly defined, resulting in the aforementioned overlap between them. Whenever a point of concern or failure is addressed and related to the framework, in almost every instance multiple failures apply. Despite the fact that improvements, such as the addition of new types of failures have been made (Woolthuis et al., 2005; Weber & Rohracher, 2012), said problem is still persistent. The additional failures may actually have made matters worse. Another revision of this framework in the form of a reduction and reordering of these eight system failures, might be of added value for future studies. Notwithstanding the foregoing, this could also narrow or specify the system failures too much so that some failures encountered would not fit any of the descriptions anymore.

In the end most of the literature discussed in the theoretical framework could be related to each other in such a way so that the conceptual framework could be drawn up. It was done in a manner so that it could provide a useful basis for the continuation of the study. Relying on Faller (2014) as the basis for important steps, but in the form of a timeline. Along this transition process the other literature added more depth and improvements and to this basis.

#### 6.3 Reflection on this study

The secrecy surrounding the development of regional energy strategies is presumably the greatest limitation of this study. For example: it was difficult to get usable interviews due to the sensitive nature of this topic and its related policies and implementations. Respondents were cautious when sharing their opinion, or explained that they were not to be used in this thesis or made public in any other manner. This made using the information, acquired in the interviews, extremely difficult to implement in this study. The use of a complete interview was allowed, but only when solely politically correct and cautious answers were given by the respondent. What is the additional value of such an interview, if all of the provided information can also be found in a few policy documents. This will presumably, again, result in the supply of very dull information. Although this does not apply to all respondents, it would have helped if they would have been more open on some parts of the subject. Or at least confront their colleagues with what bothers them, to get obstacles out of the way

of cooperation. Because at one point in time the RES bid to the national government has to be done anyway. In their defence, it has to be said that giving all their inside information on a very sensitive topic to a student would be somewhat unrealistic.

The issue with sensitive opinionated information will most likely not be overcome as, even in the future, politicians will be cautious with answers in many situations for aforementioned reasons. Those involved will most likely not disclose their opinions towards the public due to reasons mentioned earlier, like in the methodological chapter of this thesis. Perhaps an independent progression analysis commissioned by the national government of the Netherlands could be the answer here. Or at least a step in the direction of the desired results. It might after all be possible in a certain situation for barriers to be eradicated, because there is pressure from the Dutch national government.

An additional limitation can be pointed out as the names and functions of the experts are omitted from this study. These omissions slightly devalue the arguments and quotes presented in this study. On the ground that the function and names of the respondents cannot be mentioned, the context by the offered perspective of the quotations disappears as they are now only relatable to a region.

Another limitation related to interviews was the difficulty to plan a meeting for an interview. The first and foremost reason was the overly full agenda's of the potential respondents. In some occasions there was only one government official for two municipalities. Not only contact via email was troublesome, the same applied to contact by phone in multiple instances. This can significantly reduce the time and willingness to participate in an interview, resulting in shorter interviews in some occasions. Given that there is only a fixed amount of possible respondents this limits the possibilities of finding substitutes for the missed out interviews.

When contacting the respondents, one thing in particular was important and requires some reflection. This is whether to approach the respondents as a student from the Utrecht University or as an employee from the municipality of Utrecht, which was possible as an intern. When interviewing as a student the experts will probably elaborate more on certain topics to make them clear and understandable. However, they may be less transparent as when they would be approached as an employee from the municipality of Utrecht with regard to sensitive information. This seems, however, unlikely as the municipalities work together in a region. Moreover, in the latter situation they may see someone from the municipality more as an equal than they might think of a student. For this reason, the respondents were approached as from an employee from the municipality of Utrecht.

However, after the internship came to an end, approaching possible respondents could not be contacted as if an employee from the municipality of Utrecht any longer. Therefore, they were from then on approached as an Utrecht University student. It became apparent fairly quickly this method of approach had its downsides of which the three major downsides we will discus. First, there are no shared agenda's so that appointments could be planned or respondents could be phoned when they were available. Second, due to overly full agenda's respondents were less likely to make an appointment for an interview. Third, respondents were in most cases very hesitant to share information due to its sensitive nature to a student writing a thesis, which, after completion, will be openly accessible to anyone. In turn this resulted in some occasions in very dull interviews with answers mostly similar to published documents by the region. For these reasons the time during the internship should have been used more to this studies advantage.

Yet another option was to interview someone from a design bureau such as POSAD Spatial Strategies or Ruimtevolk. These organisations make design studies, studies without the current and future limitations. In this way they can calculate and visualize how the future could be. This can of course serve as inspiration for governments and project groups as different ways of thinking are allowed and can be exploited. Ultimately, no interviews with either of these design bureaus have been conducted due to difficulties in communication and schedules. Instead a seminar at Ruimtevolk has been attended, which will be discussed below.

The comparison between two regions may not have been as interesting and useful as to provide an useful template for other regions. As became apparent from literature (Nooteboom & Ybema, 2015, p. 131 & 132; Vereniging Deltametropool, 2017, p. 7), even when in the same country, regions are difficult to compare for mostly geographical reasons. Even though the Middle-Holland and Utrecht 10 regions share borders, similarities are in some instances hard to find due to, for example, historical reasons.

Further depth could have been acquired if an additional analysis of all documents published by each one of the involved municipalities is done. Such an analysis could have been supplemented with interviews conducted with a representative government official responsible for the RES from each involved municipality. For example why a municipality has decided to join its current region. Notwithstanding the foregoing, for the purpose of this thesis and with regard for the time available, this study in its conducted form, was probably the most obvious and logical way of executing this research. Perhaps it would have been more interesting if the Rotterdam region with a industrial character would have been compared to a very rural region. This can provide insight in how totally different regions handle the same task of developing an RES, but in a different context.

Instead of providing a template or blueprint, the accumulated insights can certainly be of assistance to other regions and municipalities as guidelines or improvements on existing practices and models used. Focus groups with government officials, politicians, involved firms and maybe even citizens, could have been organised and would probably have given very interesting results such as discussions that give a good reflection of each of the parties motives and underlying motivations. Nevertheless, this will most likely be incredibly difficult to arrange given the busy schedules of the involved government officials.

The actor network diagrams of both regions were left out as they are too complex and not necessarily easy to simplify without losing important information and make them therefore inadequate. Using the complete actor network diagrams would have resulted in a situation were too much explanation was required that would not have been in proportion to the information that is actually needed. After all, the focus of this thesis is on the inter-municipal cooperation in a region, not the complete functioning of the region as a whole, with all four governmental layers and governmental institutions involved.

#### 6.4 Questions for future research

On account of the aforementioned limitations, future research on the subject of regional energy strategies could be improved when taking these limitations into account. A future study might both be desirable and interesting due to the fact that the Utrecht 10 region only just started their cooperation in its current form. In contrast to this thesis, a study conducted with a time interval is probably most relevant, for instance from 2020 to 2025. When measured at (at least) two points in time, one can analyse how much progress, if any, is made during this time period. Thereby answering the questions like: How well did the regions perform during this time period? What is the progress the two regions have made over the last five years? Moreover, changes in regime, policy, approach and such can be observed and analysed. The 2020 study can, of course, be published when finished. Later this can be supplemented by the study performed in 2025. In addition to this, a comparison could provide insight in how different regions are adequate enough to realize their goals? To what extend did the regions deviate from their initial plans, goals and ambitions?

Aside from all the possible ways of carrying out the research mentioned above, the Drechtsteden region might be a particularly interesting one for a future study. The fact that a separate governmental institution was created specifically devoted to the development and implementation of an RES, is interesting enough to study in itself to say the least. A comparison between this region and Utrecht 10, Middle-Holland or both, can provide insight into yet another

form of a regional cooperation structure. Giving insight into: How does a separate governmental body affect its outcomes over the years compared to the 'ordinary' approach of the other regions?

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# **IPAK EN SCENA**

gazat Het nautbort van de ateliars is een scenario det in die traesloot zien welwe stoppen er in de tijd medig en voorstelboor zijn om de doelstelingen van 2050'te huien. voor de energietransitie. In het eerste ateier lag de nodruk op de verre toekomst en het ontwikkelen van (van onder meer agrariërs, vastgoedeigenaren, energieaarporaties, inwoners en overheden) gebrainstormd over ideeen, kansen en belemmeringen perspectieven. In het tweede ateier lag de nodruk op de korte termijn en welke stoppen nu mosten worden In twee ateliens is met ean diverse groep stakeholders

Middellange termijn (~2025-2040); Sterk Network Kertetermijn (~2017-2025): Maximool Decentraat Belangrijk is het stimuleren van bestoande initiatieven an het werken oon bewustwording

Opechalen van de decentrale initiatieven en bouwen Lange termijn (tot 2050): Integrale Planning; De economische en technische levereduur von de eerste ganaratia projecten is voorbij. Dit biedt kansen voorde ooneolidatie van energielandschappen geoombineerd oon structuren. Een nieuw energienetwerk ontstoot

De projectanlijst en de routekoart geven aan welke projectenzijn genoemd tijdens de ateiers en op welke tijdschoolze speien. Daamaast wordt duidelijk welke stappen in de tijd genomen zouden moeten worden.

met hemieuwde wimte voor natuur- en outruntendechop





No: Immo

## **Appendix 1: Middle-Holland energy analysis summary**



## Appendix 2: U10 energy analysis summary

Source: U10 (2018a, p. 92)