REWARDING THE ENERGY TRANSITION

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Reward Planning as Policy Instrument to Achieve a Sustainable Built Environment in Nijmegen

Colophon

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SUMMARY

At the start of 2019, the Dutch Environmental Assessment Agency concluded that the concept Climate Agreement of the Dutch government and subsequent municipal heat visions lack effective policy instruments to stimulate housing corporations and residents in improving the sustainability levels of their property. Therefore, the national ambition to transform seven million houses and one million buildings into sustainable structures before 2050 will not be achieved.

In this research, the applicability of reward planning as a new policy instrument within the sustainability debate is studied. Reward planning is a form of spatial planning whereby room for development is offered by a public authority in exchange for the willingness of private parties to meet extra-legal requirements or choose for innovative techniques. This instrument has not been applied within the context of achieving a sustainable built environment, but is proven to be a suitable instrument to achieve public goals with private means. To study the applicability of reward planning, a specific case is chosen: the municipality of Nijmegen. Nijmegen is one of the first municipalities within the Netherlands to have drafted a heat vision with a clear approach on how to achieve a sustainable built environment before 2050. To this background, the main research question within this thesis is as follows:

'How suitable is reward planning as a policy instrument to achieve a sustainable built environment in Nijmegen?'

To formulate an answer to this question, two sub-questions have been drafted. The first sub-question studies the current policy domain on achieving a sustainable built environment within Nijmegen. This sub-question is formulated as follows:

'What are the opportunities and barriers within the current policy domain on achieving a sustainable built environment in Nijmegen?'

The opportunities and barriers are explored using the policy arrangement approach. This approach consists of four, mutually intertwined variables: actors and coalitions, the discourse, resources and rules. The actors and coalitions dimension is hereby upgraded to a multi-actor network, placing actors within and across state, market and civil society spheres. From the analysis, numerous opportunities and barriers came forth.

A big opportunity is the interest and active involvement from multiple actors and professions into improving the sustainability of the built environment in Nijmegen. There is consensus among actors that achieving a sustainable built environment is necessary and will actively contribute to the energy transition. Another opportunity is advanced plans regarding the expansion of the city heat network. It will offer a (more) sustainable energy source for approximately half of the 80.000 houses in Nijmegen. But, some barriers are present as well. In contrast to active involvement from various professions within the state and market sphere, individual residents often do not feel the urgency to participate in the energy transition. Other barriers are related to the availability of (financial) resources. Public authorities cannot offer stable financial support for sustainability measures to property owners and housing corporations mention that without financial security, large-scale investments could financially jeopardise their tenants. Furthermore, there is no certainty about the proposed expansion of the city heat network, so actors do not know whether they should invest in this energy source or not. Thus, at this moment, the city heat network is more of a barrier than an op-

portunity. The last barriers can be found within the legal domain. Market and civil society actors miss a strict, legally enforceable deadline that sets hard targets for every actor to cooperate in achieving a sustainable built environment in Nijmegen. And, in conclusion, members of civil energy cooperatives are constrained by long and complicated permit procedures for simple sustainable renovations.

The second sub-question refers to the applicability of reward planning to reinforce opportunities and overcome barriers present within the policy domain on achieving a sustainable built environment in Nijmegen. This sub-question is formulated as follows:

'To what extent can reward planning be a suitable policy instrument to strengthen opportunities and overcome encountered barriers within the policy domain on achieving a sustainable built environment in Nijmegen?'

Reward planning can be unravelled into five underlying assumptions: accomplishing public goals with private means, receiving a spatial reward in return for these private efforts, the spatial reward should be the stimulus to act, the proportionality of the reward and enforcement of noncompliance.

Only for citizens in an energy collective and housing corporations a spatial reward can be a suitable stimulus to implement sustainable measures in their property. Members of an energy cooperative would benefit from an easier permit procedure when wanting to implement sustainable measures in their homes. The unnecessary time and costs that are involved with applying for permits is rather spent on the actual implementation of sustainable techniques. Housing corporations' willingness to invest in the energy transition largely depends on rent affordability for their tenants. If housing corporations are legally allowed to have extra exploitation possibilities, a higher building density or a wider variety in functions, it enables them to have more rental income and spend less on permit procedures. This can be used to invest in extra sustainability measures. Furthermore, legally enabling space for sustainable energy supply also contributes to the implementation of sustainable techniques and saves investments on spatial permit procedures.

With the obtained answers on the two sub-questions, an answer can be formulated to the main question of this research:

Reward planning as a policy instrument is primarily a suitable solution for active property owners in Nijmegen who experience financial and legal barriers when wanting to implement techniques to improve the sustainability of their property. By offering the opportunity of extra building possibilities or less legal procedures as a municipal effort within the spatial domain, reward planning can strengthen the active attitude of actors towards carrying out pro-environmental behaviour and overcome part of the uncertainty in financial resources and unnecessary complicated permit procedures. Thus, for a select number of actors and under the right conditions, reward planning can be a suitable policy instrument to help achieve a sustainable built environment in Nijmegen.

PREFACE

After an inspiring year, I am happy to submit my master thesis to finish the Spatial Planning program at the Radboud University Nijmegen. During this time, I have been busy with studying literature, understanding theories, conducting interviews, analysing loads of data and writing this thesis. Altogether, it has been a rewarding and thought-provoking process with, in my opinion, a very interesting result.

But, this thesis could not have been finished without the support and help of a number of people. At first, I want to thank my university supervisor, Ary Samsura, for his sharp and constructive feedback during the research process. Secondly, I want to say a word of appreciation to my internship supervisor, Jan Oosterkamp, for the opportunity to do an internship at BügelHajema Adviseurs. With his enthusiasm for reward planning and great guidance during and after my internship, this thesis has definitely gotten better. Furthermore, I would like to thank the other colleagues in Amersfoort for their support, enjoyable conversations and interesting insights in various spatial projects. A special thanks goes out to Ruben, Mathieu and Dave who have made my internship-period even better by taking me to multiple BügelHajema projects, allowing me to contribute to a landscape development plan, teaching me the basics of InDesign, playing competitive table tennis battles and introducing me to the amazing sport of bouldering. And, of course, I would like to express my gratitude to all interviewees who could make time to respond to my questions and provide valuable input for this thesis.

All of your support was greatly appreciated when writing this thesis. I hope you enjoy reading it! For now, I am not done studying yet, since I have started a very interesting and instructive master program in administrative and environmental law last September. I hope to obtain this second master degree in 2021.

Martijn Stuiver

Rijssen, February 8, 2020

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1. INTRODUCTION

1.1 Research Problem

In 2015, the Paris Agreement came into effect. This agreement stated the urgent need to reduce greenhouse gas emissions in order to stop global warming. Every country that signed the Paris Agreement will have to provide a national strategy to contribute to this reduction (UNFCCC, 2015). The Dutch government presented its strategy, the concept Climate Agreement, in December 2018. This Agreement introduces various measures to reduce greenhouse gas emissions with 49% compared to 1990. With this Agreement, the Dutch government endorses the need for a more sustainable climate and provides guidelines on how it will be achieved (SER, 2018).

The Dutch concept Climate Agreement focuses on five sectors: the built environment, mobility, industry, agricultural land-use and electricity. The built environment consists of 7 million houses and 1 million buildings which are poorly isolated and heated by natural gas. The ambition for 2050 is to transform these houses and buildings into sustainable structures with sufficient isolation, heated by sustainable resources and supplied with clean energy (SER, 2018). To do so, municipalities are initially responsible. Local authorities have to compose a heat vision that contains how a municipality intends to gradually improve sustainability levels of the built environment within their jurisdiction. Since the built environment is largely owned by private parties, such as housing corporations and individual residents, municipalities cannot achieve a sustainable built environment without their cooperation. Therefore, the concept Climate Agreement contains various methods for municipalities to stimulate residents of owner-occupied housing to improve sustainability levels of their homes and make agreements with housing corporations about sustainably transforming their property (Harmelink & Van den Wijngaart, 2017; SER, 2018).

At the beginning of 2019, the Dutch Environmental Assessment Agency presented their calculations of the measures proposed in the concept Climate Agreement. They concluded that the Agreement contains a number of uncertainties because it is yet unknown how public policy methods will be able to achieve the climate ambitions (PBL, 2019). Especially the municipal instruments, aimed at stimulating housing corporations and individual residents, are expected not to be effective enough to successfully steer the energy transition of the built environment. New housing developments are obliged to 'get off the gas' and municipalities can easily unroll urban heat networks in greenfield development sites but transforming the built environment is much more difficult (Elzenga, Schwenke & Van Hoorn, 2017; Minister of Economic Affairs and Climate Policy, 2018). Within the built environment, municipalities are reliant on private property owners and their willingness to participate in the energy transition (Schilder, 2017).

So, municipalities miss an effective tool to steer housing corporations and individual residents towards improving the sustainability levels of their property (Hoppe, Van Bueren & Sanders, 2016). They have to rely on the willingness of these private parties and can only stimulate by offering financial aid, such as subsidies and loans. If housing corporations and residents do not want to implement sustainable techniques into their property and the financial stimulus is not sufficient, it is highly likely that the ambitions from the concept Climate Agreement on a sustainable built environment will not be achieved. This also means that the agreed CO2-reduction goals from the Paris Agreement will not be met. Therefore, it is very important that private property owners are willing to contribute to and participate in the national energy transition of the built environment.

1.2 Research Aim

As the foregoing indicated, achieving the goals of the concept Climate Agreement depends for a large part on stimulating private property owners. Therefore, it would be interesting to study how the current policy domain on a sustainable built environment is shaped and if other instruments can be applied which public authorities can use to speed up the energy transition of the built environment.

To study the existing policy domain on a sustainable built environment in detail, this research takes a closer look at the municipality of Nijmegen. Following the concept Climate Agreement, municipalities are initially responsible for achieving a sustainable built environment and the municipality of Nijmegen is one of the first municipalities in the Netherlands to have their approach thoroughly set out in a heat vision. By studying the strengths and weaknesses of their current policy domain on creating a sustainable the built environment, it can be examined if new policy instruments can speed up the process and be of added value.

Normally, public authorities make most use of financial incentives and compensation to motivate and support home-owners in improving the sustainability levels of their property (Kibert, 2002; Rooijers, Leguijt & Groot, 2010; Tambach, Hasselaar & Itard, 2010; Stern, 2011). However, as the Dutch Environmental Assessment Agency calculated, these incentives will be insufficient to achieve the ambitions from the concept Climate Agreement. Several studies have shown that property-owners can be particularly motivated by non-financial incentives to carry out pro-environmental behaviour (Pallak, Cook & Sullivan, 1980; Kollmuss & Agyeman, 2002; Bichard & Kazmierczak, 2009). This research aims at understanding if this also applies for implementing sustainable measures to achieve a sustainable built environment.

Studying multiple policy instruments would be unfavourable because it would be less possible to go in-depth and focus on all aspects of the instruments. Therefore, this research aims at studying one non-financial policy instrument in particular: reward planning. Reward planning is a form of spatial planning whereby room for development is offered by a public authority in exchange for the willingness of private parties to meet extra-legal requirements or choose for innovative techniques (BügelHajema, 2015). In the context of this research, the private parties would be housing corporations and individual residents and the innovative techniques would refer to implementing sustainable techniques, thus improving the sustainability levels of property. Instead of a regular financial compensation, housing corporations and residents would be compensated with spatial opportunities for their efforts. Reward planning is chosen because this instrument is scarcely researched but lends itself particularly well for achieving public goals with private means (J. Oosterkamp, personal communication, March 18, 2019). Since the energy transition of the built environment is a public goal which requires private efforts, reward planning could be a suitable instrument. Furthermore, reward planning offers compensation within the spatial domain which requires a municipal endeavour. This allows municipalities to be closely involved with their task of achieving a sustainable built environment, even though private parties put in the actual effort to improve the sustainability levels of property. So, in theory, reward planning possesses the characteristics to be a suitable instrument for achieving a sustainable built environment but has not been studied or implemented yet.

Therefore, this research aims at studying reward planning in-depth and focuses solely on the applicability of this instrument.

The results of this research could be used by academics who study energy transition policy and the effectiveness of non-financial policy instruments and practitioners who are responsible for the energy transition of the built environment and able to influence these plans. Since this is the responsibility of public authorities and the Dutch governmental system is decentralised, municipalities would be the first, direct practitioners who could make use of reward planning as a policy instrument. They could use the results of this research and implement it in their policies, such as the compulsory heat vision, to stimulate property owners to contribute to the energy transition of the built environment. To this background, my research aim is as follows:

'This research aims to investigate how suitable reward planning can be as a policy instrument to attain a sustainable built environment in Nijmegen. This is done by analysing the current policy domain on achieving a sustainable built environment in Nijmegen for possible opportunities and barriers and investigate to what extent reward planning is able to strengthen these opportunities and overcome the encountered barriers and be of complementary use to municipal energy transition policy.'

1.3 Research Questions

To realise the goal of this research, the research aim will be converted into research questions. Since the main aim of this research is to investigate the feasibility of reward planning as a policy instrument to create a sustainable built environment, less emphasis will be put on applying these concepts to a spatial plan or policy. A couple of recommendations based on the results of this research would be made, but it is not the primary goal of this research. Therefore, it will not be included in the research questions. Based on these annotations and the research aim, the main research question is the following:

'How suitable is reward planning as a policy instrument to achieve a sustainable built environment in Nijmegen?'

To formulate an answer to the main question, a couple of steps have to be taken. At first, the actual situation in Nijmegen has to be analysed in order to understand how reward planning could be useful as a policy instrument. Therefore, the current policy domain is studied for opportunities and barriers that could strengthen or obstruct achieving a sustainable built environment in Nijmegen. This is studied with the first sub-question:

'What are the opportunities and barriers within the current policy domain on achieving a sustainable built environment in Nijmegen?'

The second step concerns the actual applicability of reward planning. After the opportunities and barriers on achieving a sustainable built environment in Nijmegen are defined, this research aims at understanding if, and how, reward planning can be of added value as a policy instrument within this policy domain. This is done by building upon the encountered opportunities and barriers. This task is covered by the second sub-question:

'To what extent can reward planning be a suitable policy instrument to strengthen opportunities and overcome encountered barriers within the policy domain on achieving a sustainable built environment in Nijmegen?'

Together, the two sub-questions will provide the input to formulate an answer to the main question of this research.

1.4 Scientific Relevance

The scientific relevance of a research contains the value a research can add to a specific scientific field (Hessels, Van Lente, & Smits, 2009). In this case, the results of the research would contribute to the debate about sustainability and, more specifically, the energy transition of the built environment. Previous research is done to understand what resources municipalities can actively deploy (Elzenga et al., 2017) and which measures public authorities should focus on to achieve a sustainable built environment (Kibert, 2002; Menkveld, Boerakker & Mourik, 2005). But, the question remains how these measures can be successfully implemented. Most research focuses on financial policy instruments as motivation for property owners to implement sustainable measures (Rooijers et al., 2010; Tambach et al., 2010; Stern, 2011), but various non-financial compensation methods have been studied as well.

A classic example of a non-financial incentive to achieve sustainability goals is a study done by Pallak et al. (1980), whereby residents who used less gas than others were mentioned in newspaper articles as 'public-spirited, fuel conserving citizens' (Cialdini, 1993, p. 77). This non-financial reward motivated the residents to use a significant lower amount of gas than residents who did not have their name published in the newspapers. Thus, following this study, also non-financial incentives are able to stimulate property owners to carry out pro-environmental behaviour. Bichard & Kazmierczak (2009) even argue that non-financial incentives can be better stimuli for property owners to carry out sustainable behaviour than financial incentives are. Whether financial, non-financial or both instruments are most suited for achieving a sustainable built environment is therefore still subject of scientific discussion (Swan & Brown, 2013). By studying the applicability of another non-financial policy instrument, this research aims to contribute to this academic field on using policy instruments to achieve pro-environmental behaviour.

Reward planning is a form of non-financial compensation, but within the spatial planning domain. This means that the non-financial reward should be spatially relevant. Spatial rewards have been a subject of academic studies as well. National and international examples are: enabling Transferable Development Rights for different land parcels to stimulate desired land development (Carmichael, 1974; Spaans, Van der Veen & Janssen-Jansen, 2008), 'Space for Space' projects to enhance the overall quality of rural and urban landscapes (Janssen-Jansen, 2008) and using zoning incentives to achieve community benefits (Murphy & Stinson, 1996).

Reward planning itself caught attention as a public tool after the 2008 crisis. Flexible zoning instruments, like reward planning, were researched to serve as possible solutions for the stagnated urban and rural developments. Bomhof & Oosterkamp (2013) studied the possibility of creating more flexible zoning plans to enable new projects and initiatives more easily and speed up area development. Following this, reward planning has been subject of a few studies on different fields, but is not researched within the context of creating a sustainable built environment yet. Research focuses on the appliance of reward planning within the agricultural sector (Van Os, Bokma-Bakker, Kuindersma, Selnes & Gies, 2013; Van Dooren, 2016) and, laterally, within the context of urban development (Verplak, 2017).

By studying reward planning within the domain of the energy transition, and more specific the domain of a sustainable built environment, this research aims to contribute to the scientific field on reward planning as a policy instrument and non-financial spatial compensation policies for achieving sustainability targets in the built environment.

1.5 Societal Relevance

The societal relevance of a research refers to the practical applications of research outcomes (Hessels et al., 2009). By studying the feasibility of reward planning as a policy instrument, this research tries to provide an insight for practitioners who are responsible for policies on the subject of a sustainable built environment. In practice, this would be public authorities, such as municipalities, but also the consultancy firms advising them.

As briefly mentioned before, a new law (the '*Wet Voortgang Energietransitie*') forbids new buildings to connect to a gas network and thus forces new developments to be more sustainable (Minister of Economic Affairs and Climate Policy, 2018). But, making only the energy provision of the new housing stock more sustainable will not be sufficient to achieve national and international climate goals. Therefore, it is vital to transform the energy supply and usage of the built environment as well (SER, 2018; PBL, 2019). This could be accomplished by using reward planning as a policy instrument to stimulate home-owners to implement sustainable techniques in their property. If reward planning is able to effectively stimulate home-owners, public authorities could implement it in their policies concerning the sustainability of the built environment. Therefore, this research aims to contribute to the societal issue of climate change and the national energy transition of the built environment.

Reward planning as a policy instrument in general has already proven its practical applicability. It has been applied within the context of the agricultural sector (Van Os et al., 2013), recreational sector (BügelHajema, 2016) and to achieve structured organic development on an inner urban site (Gemeente Alphen aan den Rijn, 2018). Furthermore, it is proposed as a solution for a mismatch on the housing market (IJdema & Wierda, 2014) and to enhance the ecological qualities of natural scenery (Fransen, Kloen, Jansen & Pronk, 2018). The practical possibilities are widespread, but reward planning has not been studied or applied in the context of achieving a sustainable built environment. Therefore, this research hooks on the possibilities reward planning offers and tries to give an insight into its applicability as a tool to motivate home-owners in improving the sustainability levels of their property.

With the coming of the Environment and Planning Act in 2021, there is a need for more flexible spatial solutions (Ministry of Infrastructure and the Environment, 2015). Reward planning is a flexible planning instrument, which fits the assumptions of this new spatial act. By studying the practical possibilities of reward planning to create a sustainable built environment, this research also aims at meeting the criteria for new spatial developments in the spirit of the Environment and Planning Act.

2. THEORETICAL FRAMEWORK

With the research context and questions defined, the second chapter will elaborate on the multiple concepts and theories that lie at the foundation of this research. At first, in paragraph 2.1, the theory of transition management as overarching framework is explained. Then, in paragraph 2.2, the policy arrangement approach is discussed which will be applied to identify opportunities and barriers within the current policy domain on achieving a sustainable built environment in Nijmegen. Paragraph 2.3 will then address what reward planning as a policy instrument actually entails. Subsequently, in paragraph 2.4, the theory of planned behaviour is explained which will be used to understand how reward planning might change the existing policy domain. In conclusion, paragraph 2.5 displays the conceptual model which couples the previous concepts and theories together and functions as a theoretical guideline for this research.

2.1 Transition Management

In order to grasp how the policy domain on the energy transition is structured, it is important to understand the context wherein the energy transition is situated. With new actors, ideas and developments, environmental policy is constantly changing. This transition process is erratic and causes and consequences can be hard to distinguish. To cope with and guide this process along the way, the theory of transition management by Loorbach & Rotmans (2012) is useful. Therefore, this theory will be described first as the overarching framework wherein more substantial theories can be placed.

Transition management is a way of describing systematic changes. It elaborates on how every aspect relates to another and small changes can initiate a larger shift elsewhere (Shove & Walker, 2007). Transition management consists of the multi-phase and the multi-level model (Loorbach & Rotmans, 2012). The multi-phase model indicates four different phases of a transition. At first, the pre-development phase refers to the first steps leading to minor, yet invisible changes in the existing system. Subsequently, the take-off phase is about strengthening the developments whereby changes in the system become visible. Thirdly, the acceleration phase contains visible and structural changes within the existing system. Finally, the stabilisation phase refers to the implementation of new developments in the system, thereby restoring its equilibrium (Rotmans, 2012). Currently, the energy transition of the built environment can be placed within the take-off phase. Actors come up with various initiatives on different scales to create a sustainable built environment and contribute to the energy transition. But, this process has not yet led to structural changes within the existing system. To reach the acceleration phase and speed up the energy transition process, it is necessary to strengthen opportunities and overcome existent barriers. What these opportunities and barriers consist of and if reward planning can be a suitable instrument to reach the acceleration phase is subject of this study.

The multi-level model of transition management focuses on changes on three, hierarchically nested scales (figure 1). The macro-level (or landscape) sets the framework of the meso- and micro-level and consists of slowly changing trends, like climate change or the energy transition in general. The meso-level contains of various regimes, structures and practices, embedded within the macro-level and formed by stabilisation of various novelties originating at micro-level. The micro-level is the most dynamic of the three scales. This level consists of niches, new ideas and innovations which might alter the regimes at meso-level. The niches are crucial for transition management because these provide the building blocks for change. But, in order to accelerate and stabilise the niches into regimes and eventually alter the landscape, it is important to align the dynamic of the three different levels (Geels, 2002; Rotmans, 2012).

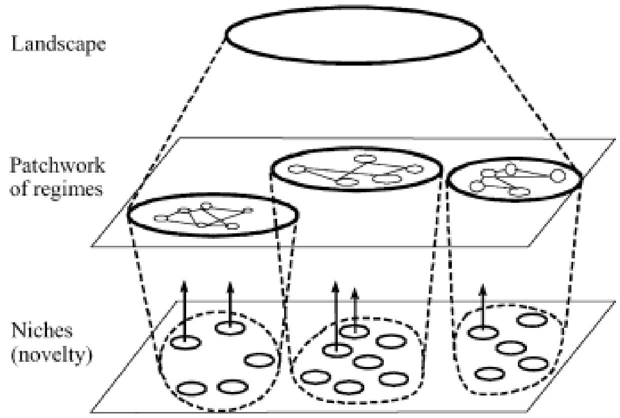

Figure 1: Multiple levels as a nested hierarchy (Geels, 2002)

When applying the theory of transition management to this research, the context would fit within the overarching subject of the energy transition. This would be the landscape level. Embedded within this theme would be regimes with practices to make the energy transition happening. Based on the concept Climate Agreement, five types of regimes on the meso-level can be identified: the built environment, mobility, industry, agricultural land-use and electricity. The built environment is the regime this research focuses on. Together with the other four regimes, the built environment contributes to the overarching theme of the energy transition.

From the micro level, new practices and ideas originate. These novelties are able to alter the existing regime of the built environment. Reward planning would be a new practice which, if it is useful to actors within the policy domain, could be embedded in the current regime. As a result, the regime would change. Therefore, reward planning could alter the way the built environment contributes to the overarching theme of the energy transition and the entire transition process might speed up. This means that the energy transition of the built environment could shift from the take-off phase to the acceleration phase and the general energy transition benefits from the introduction of reward planning as a policy instrument.

With the theory of transition management, it is possible to identify the effect of one small cog within the greater system. In the context of this research, reward planning as a policy instrument would be the cog within the energy transition system. But, as Shove & Walker (2007) note, this is a very systematic approach. It assumes a measurable and predictable reality, whereby one change is expected to lead to another. It is however not maintainable to calculate and predict how the system will change. It depends on too many factors to make an accurate prediction. For instance, if reward planning turns out to be an appealing tool for actors in Nijmegen, it does not automatically cause a progressive shift in energy transition policy. Other variables can still constrain the development of achieving a sustainable built environment, thus demanding more research into the applicability of new instruments. Therefore, policy is constantly changing. Especially long-term policies, such as energy transition policy with goals up to 2050, require continuous policy implementation, evaluation and re-design to achieve the eventual goal (Voß, Smith & Grin, 2009). The theory of transition management can therefore be used as an overarching framework for transitions, but does not offer enough profundity for this research. It is simply too abstract to study one particular policy instrument in detail. That is why the theory of transition management will only function as a framework within this research wherein other theories are used to go more in-depth on examining the policy domain and the possible changes reward planning might bring. The next paragraphs will elaborate on those theories.

2.2 Policy Arrangement Approach

With the broader theoretical context defined, this study first focuses on the existing policy domain on achieving a sustainable built environment in Nijmegen. To do so, the policy arrangement approach will be used. This approach offers an analytical framework to study and grasp the opportunities and barriers within existing policies and is based on three interrelated concepts: institutionalisation, political modernisation and policy arrangements. Based on Arts, Leroy & Van Tatenhove (2006) these concepts and their mutual relation are explained below.

2.2.1 Institutionalisation

Institutionalisation refers to the continuous process whereby people's actions and behaviour slowly solidifies into structures and how these structures, on their turn, influence people's actions and behaviour. This derives from structuration theory whereby agents' actions contribute to the creation of structures but these structures simultaneously enable us to perform these actions (Inglis & Thorpe, 2012). They are mutually dependent, which Giddens (1984) calls the 'duality of structure'. Regarding policy processes, institutionalisation indicates that problems, ideas and solutions present themselves in and around certain policies, resulting in stabilisation or alteration of patterns and rules. Actors put policy into practice on a daily basis, constantly acting within and reflecting on existing structures. This enables change from inside. Therefore, it is important to note that institutions 'are subject to continual change and adjustment, deconstruction and reconstruction' (Arts et al., 2006, p. 96). In relation to this research, it will help understanding how actors' actions have eventually turned into policies and how new ideas and problems may rise up and change these policies from within.

2.2.2 Political Modernisation

Political modernisation refers to the constant process of social change and its impact on power relations between different actors. Because of all kinds of economic, social and political processes, new ideas and insights on steering arise that shift the (power) relations between actors. There is a perceived shift from government to governance, wherein cooperation between actors is believed to be inevitable in order to fulfil policy goals and responsibilities are shared among all actors (Ansell & Gash, 2007; Rhodes, 2012). Political modernisation influences policy arrangements from the outside and helps understanding how changes in the political domain will lead to new ways of creating ideas and steering subsequent policies.

2.2.3 Policy Arrangements

Policy arrangements are defined as 'the temporary stabilisation of the content and organisation of a policy domain' (Van Tatenhove, Arts & Leroy, 2000, p. 54). Therefore, a policy arrangement derives from the process of institutionalisation and includes fixed patterns, rules and structures. But, these arrangements are under constant pressure because of the constant institutionalisation and outside processes like political modernisation. Therefore, policy arrangements are always amenable for change.

The changes within a policy arrangement can be analysed through four dimensions. These dimensions are: actors and coalitions, their views and ideas on the current policy discourse, their available resources and the rules of the game wherein they operate. The discourse dimension refers to the actual policy content whereas the other three indicate its organisation. These four dimensions are mutually interwoven, meaning that a change in one dimension always causes change in other dimensions. This mutual relationship is visualised by the tetrahedron in figure 2.

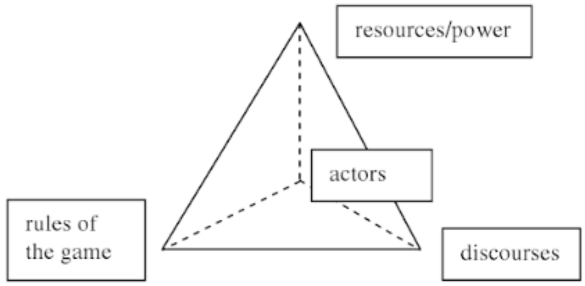

Figure 2: The tetrahedron, symbolising the interconnectedness of the four dimensions of a policy arrangement (Liefferink, 2006)

Actors and coalitions

The actor dimension refers to all relevant actors and their collaborations within the policy arrangement. Regarding the energy transition, public authorities start acting in a more facilitative way to achieve public policy goals. This opens up opportunities for others, such as housing corporations, network operators, experts, energy cooperatives and civil associations who are actively entering the policy domain. Rhodes (2012) calls this the perceived shift from government to governance, wherein the state's authoritative role is changing. Nowadays, actors are involved in a multi-actor network and can be found in each of the three societal domains: state, market and civil society. Within the multi-actor network, state and non-state actors are able to formulate, implement and enforce social relevant rules that apply to others and themselves (Steurer, 2013). Therefore, governance can be defined as 'the ways in which governing is carried out, without making any assumption as to which institutions or agents do the steering' (Gamble, 2000, p. 110).

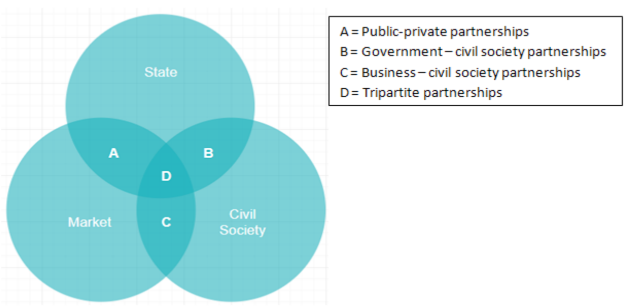

Figure 3: The multi-actor network (based on Van Tulder & Pfisterer, 2013)

To grasp the entire policy domain, actors cannot be seen independent from each other. State, market and civil society actors are often engaging in partnerships and thus crossing the borders of their societal domains (see figure 3). Ansell & Gash (2007) speak of collaborative governance wherein actors from the three spheres actively pursue collaborations in order to achieve policy implementation. The perceived shift from government to governance indicates that is it important to speak to multiple actors within the policy domain on achieving a sustainable built environment in Nijmegen, because market and civil society actors are influential on policy as well.

Because actors form one dimension of the policy arrangement approach, the multi-actor network can upgrade the earlier portrayed tetrahedron of the four dimensions. This new tetrahedron is visualised in figure 4. In the middle, the multi-actor network governance model is shown. Actors within the policy domain arise from state, market and civil society spheres but can also initiate cross-sectional partnerships. The mutual interconnectedness of the four dimensions within the policy arrangement approach is visualised by the dotted arrows.

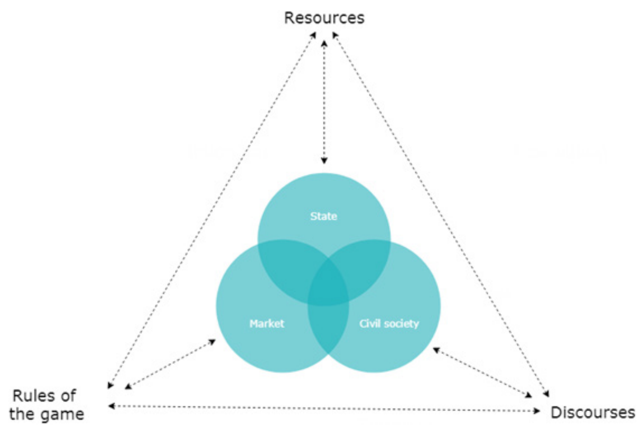

Figure 4: Tetrahedron including the multi-actor network

Discourse

The various actors share one objective within the context of the energy transition: to strive for a sustainable built environment in Nijmegen within the coming decades. Ideas and solutions on how to achieve this goal can differ between actors. This shared aim with different ideas indicates the discourse dimension. At a theoretical level, a discourse can be understood as a collection of ideas, knowledge, statements and regulated practices about a certain theme. This discourse structures the way of thinking within that theme and can change or be reconstructed because of new ideas and smaller, conflicting discourses. Thus, it is possible to have various conflicting discourses within a general discourse (Foucault, 1972).

Within the discourse of the energy transition, a discourse on the energy transition of the built environment can be distinguished. This discourse knows a variety of ideas, solutions and ways of thinking on how and why to achieve a sustainable built environment. As mentioned before, creating a sustainable built environment is initially a governmental objective but public authorities need market and civil society parties to carry out their plans. Market and civil society parties have entered the policy domain because of their own interest in improving the sustainability levels of their property. Their interests may differ from the public interest and conflicting interests can occur. This can be identified as various discourses within the general discourse. The ideas and solutions, based on public and private interests, are formed within the general discourse but are able to evolve into new discourses or reconstruct others.

Identifying conflicting interests is subject of agency theory, wherein the agent acts on behalf of the principal to achieve the principals' ambitions. A common issue within agency theory is a conflicting interest between the principal and the agent. Because both parties initially act because of self-interest, it is possible that the agents' actions and principals' desires do not match. Therefore, the principal is unable to achieve its goal (Eisenhardt, 1989). The agency theory can be applied to the policy framework of achieving a sustainable built environment. In this case, the public authority would be the principal and the property owners, such as housing corporations and residents, would be the agents. Without stimulating property owners to improve the sustainability levels of their property, public authorities would be unable to achieve a completely sustainable built environment. However, it is unclear if conflicting interests are present or market and civil parties are actually sharing the public ambition of a sustainable built environment. By applying the agency theory to this research, actors from the state, market and civil society sphere can identify if conflicting interests are present and how the principal-agent relation is functioning.

To determine if agents act according the principals' interests, the concept of agency loss is relevant. Agency loss measures the difference between the principal's desired outcome and the actual outcome. If the difference is zero, the agents' actions perfectly align with the initial ambitions of the principal. This is the most desirable outcome. When the agents' actions deviate from the principals ambitions, agency loss increases (Lupia, 2001). Agency loss can be measured by two criteria. At first, the principal and the agent should share common interests, thus initially desire the same results. Secondly, the principal should be aware of the consequences of agents' individual actions. The principal should be able to determine if the consequences of those actions are consistent with their own interests. If both of these criteria are true, agency loss is less likely to arise (Niskanen, 1971; Romer & Rosenthal, 1978; Lupia, 2001).

Resources

As mentioned, actors acting within the general discourse have various ideas on how to achieve a sustainable built environment. To carry out their ideas and work within the policy arrangement, resources as time, money and knowledge are valuable. The actor or group of actors with the most resources available is able to be the most powerful and influential towards the policy outcome.

Bourdieu (1986) refers to resources as capital, and distinguishes three main forms: economic, cultural and social capital. Economic capital consists of money, assets and material property. Within the context of this research, having a lot of economic capital will enable an actor to buy and implement sustainable techniques or make them an interesting negotiation partner because of their amount of property. Cultural capital can be described as the knowledge and intellectual skills an actor possesses because of their background. This form of capital indicates the intrinsic skills and possibilities an actor has. For instance, a housing corporation knows the possible sustainable solutions for their housing stock while an energy distributor knows the possibilities for using alternative energy sources. This indicates a high amount of specific cultural capital. Social capital indicates if and how much collaborations with other relevant actors are present. This type of capital focuses on the network of actors which enables an actor to benefit from the relevant economic and cultural capital of others. So, having a considerable amount of economic, cultural and social capital may enable an actor to have more influence than another on the outcome of the policy domain. It is hereby important to note that the amount of capital differs between specific fields (Inglis & Thorpe, 2012). Therefore, the most influential actors concerned with a sustainable built environment in Nijmegen should be identified because those actors possess the capital to be influential within the policy domain and might be able to benefit from reward planning.

To identify how powerful and important actors are, the Mendelow matrix can be helpful. This matrix, shown in figure 5, indicates four different 'types' of actors within a policy domain (Ackermann & Eden, 2011).

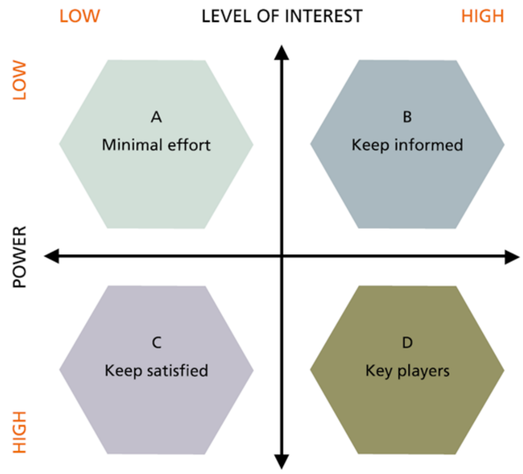

Figure 5: Power versus interest matrix (Adam et al., 2018)

'A'-actors have a low level of interest and power, meaning they play a part within the policy domain but are not actively participating or have the power to bring about change. They are, however, easy to convince and do follow instructions by others. 'B'-actors are interested in the deployed strategy to achieve policy goals, but lack the power to contribute to its achievement. It is important that they will not lose interest but gradually receive powers to put their interests into practice. This will make them skip box 'C' and hop straight to box 'D'. 'C'-actors do possess influential power but lack interest into the policy goal. If these actors move to box 'D', it could mean that the wrong interests will be implemented. Therefore, it is important to properly discuss and negotiate with them if their influential powers become necessary. 'D'-actors are the most important. These actors are the drivers of change and have the resources to implement plans from the right point of interest (Scholes, 2001; Ackermann & Eden, 2011). 'D'-actors are the key players within the policy domain of the energy transition concerning the built environment in Nijmegen. These actors have the required resources to be powerful and influential within the policy domain.

Rules

The fourth dimension contains the formal and informal rules of the game. This dimension indicates the current policies, agreements and laws present within the policy arrangement. Laws come from governmental authorities and directly bind actors. Policies come from governmental authorities as well, but are not legally binding and agreements can be made between all kinds of actors but only bind those actors (De Vries, 2010). As mentioned before, the '*Wet Voortgang Energietransitie*' forbids new housing to connect to a gas network (Minister of Economic Affairs and Climate Policy, 2018). With this law, the state compels project developers to find other ways of energy provision when constructing new buildings. This is an effective tool for public authorities to realise sustainable new housing. For the built environment, a similar law does not exist. Therefore, public actors do not directly possess powerful legal instruments to compel building owners to transform their property. If and how public authorities find ways to construct binding agreements with actors can be discovered using the policy arrangement approach.

The four dimensions of the policy arrangement approach are intertwined, meaning that a policy arrangement can change because of every dimension. Important factor is the constant dynamism and stabilisation of a policy arrangement due to the four dimensions and institutionalisation and political modernisation. Internal and external processes are constantly affecting a policy arrangement. Internal processes refer to changes within the policy arrangement due to a change in one of the four dimensions. Examples are: a new actor entering the market, the concept Climate Agreement altering the discourse or a new rule forbidding the use of gas within the built environment. External processes indicate autonomous developments and trends such as the gas price, technological innovations or earthquakes in Groningen.

Within this study, the focus lies on the policy arrangement variable of the policy arrangement approach. The other two variables, Institutionalisation and political modernisation, are deliberately ignored during the research process. This has two reasons. At first, the ambition of this research is to understand the applicability of reward planning. How the current policy domain is structured is important to understand the actual situation within Nijmegen, but is not the ultimate goal of this research. This knowledge is primarily required to study the applicability of reward planning within a specific time and place. Studying all three variables of the policy arrangement approach would not be necessary to formulate an answer, thus the focus lies on the policy arrangement variable and its four dimensions. This leaves more time to study the applicability of reward planning. Secondly, how politics and institutionalisation affect the policy arrangement is not taken into account because these are mainly long-term developments (Arts et al., 2006). This cannot be measured, simply because reward planning has not been applied as a policy instrument within the policy domain yet. A longitudinal study on its effects would thus be impossible. If this research eventually leads to the implementation of reward planning to achieve a sustainable built environment, a longitudinal study on its effects could be an interesting subject for further inquiry. So, concluding, the policy arrangement approach is a suitable theoretical framework to study the existing policy domain on the energy transition of the built environment in Nijmegen. But, because this research focuses on the applicability of reward planning, not the entire policy arrangement approach is used.

2.3 Reward Planning

After the opportunities and barriers have been analysed using the policy arrangement approach, this research aims at understanding to what extent reward planning could strengthen the opportunities and overcome encountered barriers. Reward planning is hereby studied as a new policy instrument which might be used to get closer to the ambitions set out in the concept Climate Agreement.

2.3.1 Policy Instruments

Policy instruments are usually divided into three variations: legal, financial and communicative instruments (De Vries, 2010). Common ground between all three is to achieve policy goals by influencing behaviour of companies, citizens and private organisations.

Legal instruments are the most radical instruments because it consists of rules and regulations to oblige allow or prohibit certain behaviour. If these rules or regulations are disobeyed, the government is allowed to step in and force compliance or punish undesirable acts. As mentioned before, the Dutch government lacks strict regulation to improve the sustainability levels of the built environment. They do not possess legal instruments to achieve the goals of the Climate Agreement. Therefore, the government relies for a large part on other instruments to achieve a sustainable built environment.

Financial instruments are used to stimulate desired behaviour by providing subsidies or introducing charges. This instrument aims at changing the pros and cons of an option to avoid unwanted behaviour and steer civil and market parties according to the government's policy aim. Contrary to legal instruments, compliance cannot be forced. Companies, citizens and private organizations decide for themselves if it is worth to act according to the governments' policy. Financial instruments are therefore less effective than legal instruments (De Vries, 2010). Regarding the energy transition of the built environment, the government does make use of financial instruments. The concept Climate Agreement contains financial aid in the form of a discount on the landlord tax for housing corporations and a building-related loan for individual residents (SER, 2018).

With communicative instruments, the government tries to convince citizens by transmitting information. By spreading information, the knowledge or appreciation citizens have about certain topics can change, which might lead to a change in behaviour. This is the most accessible way of governmental steering since it can be done in various ways and does not require large investments (De Vries, 2010). Regarding the energy transition of the built environment, information about how and why houses should be made more sustainable and clear insights in the costs are already applied communicative instruments. The concept Climate Agreement complements this by providing information about how to make different housing types more sustainable (SER, 2018).

The policy instrument that will be studied within this research is reward planning. Reward planning is a spatial instrument which can be useful when public goals have to be achieved through private means. Since the government relies for a big part on private parties to achieve a sustainable built environment, reward planning could be a suitable tool to fulfil this goal. In order to further define reward planning as a policy instrument, the Dutch spatial planning context wherein this instrument fits will be explained first.

2.3.2 Dutch Land-use Development

As in most countries, Dutch land-use developments were realised through 'passive planning' (*toelatingsplanologie*). Citizens and firms take the initiative to build and change the land within the institutional framework of rules set by public authorities. Public institutions coordinate spatial developments by issuing or refusing development permits. Therefore, the Dutch public authorities can prevent unwanted land-use and steer spatial development into the desired direction. However, passive planning is not effective in actively realising land-use change. Public authorities have to wait until civil or market incentives come up. Passive planning cannot encourage development (Needham, 2014). At the end of the 20th century, when the economy was booming, public authorities took a more active role on the land market and started to act as a developer. This can be defined as a shift from passive planning towards pro-active planning (*ontwikkelingsplanologie*). The main motive for public authorities to take on this role was to steer development in a pro-active way and earn money to finance new urban development (Van der Krabben & Jacobs, 2013; Needham, 2014). Until the 2008 financial crisis, public institutions actively participated on the land market and engaged in various partnerships with private companies. The crisis revealed the vulnerabilities of pro-active planning and burdened municipalities with enormous financial risks (Van der Krabben & Jacobs, 2013; Buitelaar & Bregman, 2016).

Therefore, municipalities sought a way of land-use planning with less financial risks but with a broad spectrum of possibilities for initiators to achieve desired land-use. This is called invitation planning (*uitnodigingsplanologie*) and can be regarded as an intermediate form between passive and pro-active planning. Invitation planning shows some similarities to passive planning: both forms require a public authority that acts in a facilitative manner towards societal initiatives. Key difference is the governmental attitude towards those initiatives. Passive planning frames the options and locations for spatial development and approves societal initiatives according to the "no, unless – principle". If a development proposal does not fit the framework, it cannot be carried out. With invitation planning, a broad strategy is formulated which should stimulate developments. There is no 'final destination' that has to be reached, but the focus is put on a continuous development with an open horizon. Societal incentives are considered based on the "yes, if – principle". The key role for public institutions is to invite citizens and societal organisations to start developing and facilitate their process (Bomhof & Oosterkamp, 2013).

This way of thinking also forms the basis of the new Environment and Planning Act, which will enter into force in 2021. Under this new spatial act, public authorities have to draft an Environmental and Planning Vision (*Omgevingsvisie*) for their municipal area. During this process, citizens are actively involved. The vision itself contains local values, characteristics and guidelines how citizens can contribute to enhance these values. Public authorities are expected to take on a more facilitative role and be open to every societal and market incentive (Ministry of Infrastructure and the Environment, 2015). Assessing the incentives is done based on the "yes, if – principle": if an incentive fits the local values and contributes to its development, municipalities should allow the submitter to carry out his spatial plan. This is fundamentally different than before, when the "no, unless – principle" used to be the standard. So, the new Environment and Planning Act actually follows the general practice of invitation planning and substantiates it with a legal framework (J. Oosterkamp, personal communication, March 18, 2019).

2.3.3 Reward Planning as Instrument

Reward planning can be seen as a form of invitation planning. When, according to a public perspective, quality improvement or spatial enhancement of private property is needed, reward planning can invite owners to do so. Instead of expropriation, the core idea is to stimulate private parties in fulfilling public goals by themselves. As a reward for their efforts, land owners would receive a spatial reward. The reward could be extra exploitation possibilities, a higher building density or a wider variety in functions. So, extra development space is offered to land owners as a prudential stimulus in order for them to revitalise their property (Bomhof & Oosterkamp, 2013).

Important factor is that the private party should be interested in this spatial reward, it has to add value to them and stimulate them to achieve public goals. Otherwise, reward planning might not be the most suitable instrument to realise public goals on private property. What kind of spatial reward a private party would benefit from, depends on the private party (J. Oosterkamp, personal communication, March 18, 2019). For example, a housing corporation could be interested in less parking space or extra building volume while one individual home-owner would rather have an expansion opportunity. Therefore, a custom approach per case is necessary.

Another important aspect is the fact that the reward should be spatial, and spatially relevant. If not, it cannot be classified as reward planning but just as a regular reward. For a spatial reward, a zoning plan change is often necessary. This is an effort the public authority can offer by legally changing or deviating from the zoning plan. Also, the spatial reward the public authority grants should be in proportion with the effort the private party took. For example: if a housing corporation places two extra solar panels on a roof, it is not acceptable if the public authority grants ten extra building layers. This reward would be disproportional. A reasonable reward is a condition to prevent arbitrariness. Furthermore, enforcing noncompliance is a necessary aspect as well. If property owners make no effort in line with the regulation, they get no reward at all. This has to be legally enforced by the public authority in order to make the reward work. If a public authority chooses to make use of reward planning, they have to be consistent in the implementation of their instrument use and only grant a reward to property owners that make an effort. Only desired behaviour should be rewarded (J. Oosterkamp, personal communication, March 18, 2019).

By rewarding desired behaviour with a spatial compensation, the public authority actually grants a right to a private party. And, if a private party makes no effort to make their property more sustainable, the public authority refuses this right. In this way noncompliance is enforced. Property owners, who will not invest in sustainability, cannot profit from the benefits reward planning offers. Out of the three aforementioned types of policy instruments, reward planning shows the most similarities with the legal one. Therefore, it can be argued that reward planning is a legal policy instrument and, thus, one of the more effective policy instruments.

The concept of reward planning has been applied by an advisory firm called BügelHajema (2015). This firm also provides a general definition of the concept:

'Reward planning is a form of spatial planning whereby room for development is offered by a public authority in exchange for the willingness of a private party to meet extra-legal requirements or choose for innovative techniques.'

In this research, especially a private party choosing for innovative techniques is relevant. This can refer to implementing sustainable techniques into private property, thus improving the sustainability of the built environment.

2.3.4 Dutch Reward Planning

Reward planning as a policy instrument is already used in various sectors. J. Oosterkamp (personal communication, March 18, 2019) states that it is particularly useful to improve the quality of areas that have been abstracted from their function, such as vacant shopping areas or impoverished vacation parks. The unsustainable built environment is not directly 'abstracted from its function', but it can be regarded that way if sustainable buildings become the norm. With a slightly different perspective, unsustainable buildings can be regarded as 'unwanted developments' that require a more flexible policy approach. An approach including new policy instruments like reward planning.

BügelHajema (2016) has successfully applied reward planning as a policy instrument to revitalize holiday parks within the nature reserve '*De Veluwe*'. Within this plan, owners of holiday parks are stimulated to enhance the quality and liveability of their park. In return, the owners will receive more freedom to arrange, use and build their park according to their desires. This example does not directly relate to sustainability, but shows how reward planning can be applied in practice to stimulate private parties in fulfilling public goals without the need of expropriation, force or monetary compensation.

Another practical application of reward planning comes from the agricultural sector. Multiple Dutch provinces strive for more sustainability in agricultural firms. To do so, the firms are responsible themselves and the public authority aims to stimulate this with reward planning: the more effort the agricultural entrepreneur puts in to be sustainable, the more freedom he receives to the exploit his business. This means less regulation and less limited building space for the entrepreneur (Van Os et al., 2013). This example indicates how sustainability can be stimulated by applying the policy instrument of reward planning. Making an effort to farm more sustainable directly results in spatial opportunities.

Various municipalities are experimenting with reward planning to transform old industrial sites into mixed-use areas. An example is Rijnhaven-Oost in Alphen aan den Rijn. Reward planning is used here as a stimulus to invite project developers in realising mixed-use areas whereby they can earn extra building possibilities, such as a larger building surface or higher building density. In return, the project developer should make an effort to meet some spatial conditions. For Rijnhaven-Oost, these conditions consist of realising public green spaces in order to create a liveable and sustainable area (Gemeente Alphen aan den Rijn, 2018; P. Klompen, personal communication, March 14, 2019). In this example, reward planning is used to connect a sustainable and vivid living environment to extra planning possibilities. Therefore, it does not precisely meet the criteria of this research, but can be considered as an example of stimulating sustainable urban development through reward planning.

Related to reward planning, but not exactly the same, is the 'Space for Space' regulation. This regulation enables farmers to demolish old or unused agricultural buildings and build private residences instead. The new residences can be developed anywhere in the municipality. With this incentive, the 'Space for Space' program aims at revitalising the rural landscape (Janssen-Jansen, 2008). Because this regulation couples two locations together and aims at new development, it does not directly correspond with the rationale behind reward planning. However, the 'Space for Space' regulation shows the practical applicability of a spatial compensation for private efforts.

2.3.5 International Reward Planning

Outside of the Netherlands, variations of reward planning exist as well. The most well-known example would be Transferable Development Rights (TDR). Development rights indicate how a land owner can use his land. If the government enrols plans or regulations that impair the land owner in his development rights, the government should compensate the land owner for his financial loss. Instead of financial compensation, the government could introduce Transferable Development Rights. This is a tradable right, offered to the land owner which can be bought by a third party in another area. With this right, the third party can realise land-use in a different area which would not have been possible without the TDR (Carmichael, 1974). This indicates the essential purpose of TDR: 'recapturing part of the extra value generated by increased development potential and using it to compensate for the reduction of development potential elsewhere' (Nelson, Pruetz & Woodruff, 2012, p. 24). TDR have been used in various countries to compensate and stimulate developers into realising desired land-use (Spaans et al., 2008). The just-mentioned 'Space for Space' regulation is a Dutch example of this (Janssen-Jansen, 2008). When comparing TDR to reward planning, the main purpose of TDR is compensation between different areas and to stimulate new development, while reward planning focuses more on achieving policy goals by offering a spatial reward. Thus, TDR does not completely match with the assumptions of reward planning.

Incentive zoning is more in line with reward planning. This concept is described as the possibility for local authorities to use zoning incentives to tempt land developers in providing community benefits (Murphy & Stinson, 1996). Examples of incentives are 'allowing more residential units or a greater building floor area than is otherwise permitted under the zoning law' or including 'adjustments to the height, open space, use, or other requirements of the underlying zoning law' (Nolon, 2003, p. 232). In order to regulate incentive zoning and stimulate land developers to contribute as much as possible, a reward scale is connected to the incentives. To earn more planning freedom and opportunities, the land developer has to fulfil more community goals.

Incentive zoning has a legal basis. The local legislator keeps existing zoning plans in place but legally allows a 'broader' use. Therefore, incentive zoning can be classified as a legal policy instrument. The underlying assumption behind this derives from principal-agent theory, wherein the public authority is the principal and the land owner the agent, acting on behalf of the principal. This theory assumes that granting certain rights will lead to greater agent commitment than a regular financial compensation (Spaans et al., 2008).

If incentive zoning is compared to reward planning, it corresponds to the basic principles of reward planning but primarily aims at land developers. Reward planning comprises more and focuses on private parties in general. However, the underlying principles are similar. Both reward planning and incentive zoning are used as a legal policy instrument to achieve public goals through private means by 'offsetting private interest against general interest and ensuring that public policy objectives for the spatial distribution of activities and development are met' (Van der Veen, Spaans, Putters & Janssen-Jansen, 2008, p. 246).

Why public authorities would make use of non-financial compensation can be caught in four motives: (a) a compensation for lost opportunities; (b) a lack of public resources, (c) increasing ineffectiveness in the management of urban plans and (d) the improvement of the overall quality of urban and regional space (Spaans et al., 2008, p. 20). These motives can overlap and apply simultaneously to the same subject. Regarding the energy transition of the built environment, the second and fourth motive would be most applicable to the energy transition of the built environment. Public authorities lack the resources to create a sustainable built environment on their own and carry the responsibility to improve the quality of the living environment. By creating a more sustainable built environment, the overall quality of urban and regional space can be bettered.

2.3.6 Assumptions Reward Planning

Reward planning, TDR and incentive zoning are various forms of non-financial compensation in spatial planning. The main difference with financial compensation is that the government grants the private party a right that represents a value instead of compensating them with money. Based on national and international literature on non-financial compensation in spatial planning, an overview of the assumptions of reward planning as a policy instrument can be distinguished.

- At first, reward planning can only be applied as an instrument by a public authority when it requires development on or using private property. After all, if the public authority owns the property already it can realise policy without non-state cooperation.

- Secondly, the reward a private party receives cannot be of any monetary value. It has to be a spatial reward. The public authority should offer a reward that requires efforts within the spatial domain, otherwise it cannot be classified as reward planning.

- Thirdly, the reward should stimulate the private party to act differently than they would have acted without that reward. Otherwise, using reward planning would be useless.

- Fourthly, the reward to be earned should be in proportion to the effort the private party puts in. This prevents the public authority from acting arbitrary.

- Finally, the policy instrument should be maintainable. Private parties that are not using the reward planning instrument cannot get access to the benefits it offers. Otherwise, reward planning would not be of added value.

If these cumulative criteria are met, reward planning could be applied as a policy instrument to attain a certain goal. The fact that all of these criteria should be met before reward planning could work indicates the difficulty of this instrument. It is not easily applied. Therefore, reward planning is, theoretically seen, already a much more difficult instrument to use than standard monetary incentives which will be kept in mind during this research.

2.4 Theory of Planned Behaviour

This research focuses on the question if reward planning is able to achieve a sustainable built environment in Nijmegen. In order to do so, the theory of planned behaviour by Ajzen (1991) can be useful to understand how reward planning can influence certain behaviour, in particular pro-environmental behaviour. Before this theory is explained, a critical note on its usefulness for this research is necessary. The theory of planned behaviour is designed to study individual human action and behaviour (Ajzen, 2002b). This research, however, focuses on various kinds of actors, such as (groups of) individuals and organisations. The 'actor-dimension' comprises more than solely individuals and can therefore exist of multiple actions and behaviours within one actor. Since the theory of planned behaviour is geared towards behaviour of the individual, it does not precisely fit this research. However, this theory is used anyway because of two reasons. At first, the theory of planned behaviour offers a fairly accurate theoretical disentanglement of what drives behaviour (Armitage & Conner, 2001; Abrahamse, 2019). Because this research aims to study a possible change in sustainability behaviour by introducing reward planning, in-depth knowledge about actors' behaviour is required. The theory of planned behaviour provides the most suitable framework to gather this (Abrahamse, 2019). Furthermore, organisations and groups of individuals tend to pursue the same objectives and goals, and can therefore be seen as one entity carrying out collectively agreed on behaviour (Tyler, 1999; Haslam, Powell & Turner, 2000). Organisational behaviour can be attributed to all members of an organisation, enabling actors to be seen as one entity for which the theory of planned behaviour can still be used. The behaviour of organisations and groups of individuals can therefore be adequately studied by the theory of planned behaviour as well. So, because the theory of planned behaviour offers an ideal framework to study behaviour and organisations and collective groups of individuals tend to act as one entity, this theory can be suitable for this research. When drafting conclusions, attention will be paid to the foregoing points of criticism.

2.4.1 Pro-environmental Behaviour

Before the theory of planned behaviour is further elaborated, what is meant by pro-environmental behaviour in the context of this research will be explained first. The goal of this research is to understand if reward planning can be a useful policy instrument to stimulate pro-environmental behaviour among actors and, thus, achieve a sustainable built environment. Pro-environmental behaviour simply entails 'behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world' (Kollmuss & Agyeman, 2002, p. 240). Pro-environmental behaviour can come from numerous variables, one being more influential than the other. In general, a distinction can be made between internal and external factors. External factors originate outside of individuals, enabling or constraining their actions. Examples are institutional factors (the *Wet Voortgang Energietransitie* or an available heat network), economic factors (subsidies or the return on investment of solar panels) and social and cultural factors (emerging of civil incentives and general attitude towards the energy transition). Internal factors emerge from individuals themselves. The most important are motivation and its underlying values (Kollmuss & Agyeman, 2002; Steg, Lindenberg & Keizer, 2016).

Motivation is understood to be the reason for behaviour. In general, two types of motives can be distinguished: primary and selective motives. Primary motives indicate the larger scope that drives selective motives. Primary motives regarding this research would be to strive for a sustainable built environment or an environmentally responsible lifestyle in general. Selective motives refer to the motives that influence one specific action. Selective motives in the context of this research would be placing solar panels, implementing a heat pump, turning down the central-heating or purposely showering less long (Moisander, 2007). For a large part, personal values influence motivation. Individual values on their turn derive mostly from the immediate social sphere such as family, friends and peers. But also media, political organisations and the cultural environment can shape one's personal values. The personal values form the basis of intrinsic motivation and thus the actor's motivation to contribute to a more sustainable society (Kollmuss & Agyeman, 2002).

In general, individuals consider between three motivations when making a choice: 'the hedonic goal to feel better right now, the gain goal to maintain or improve one's resources (e.g., money, status), and the normative goal to do the appropriate and right thing' (Steg et al., 2016, p. 181). All three motivations are taken into account but only one is dominant when individuals make a decision. When applying this to the context of the energy transition, individuals can base their decision on either of these goals. If the hedonic goal is dominant, individuals may choose to keep using gas because it is currently the most convenient for them and thus offers them the most comfort. If the gain goal is dominant, individuals may choose to keep using gas because other energy sources would increase their monthly charges. If the normative goal is dominant, individuals may choose to get off the gas because it would be better for the environment and that is what they understand to be the appropriate and right thing to do (Steg et al., 2016). Regarding the energy transition of the built environment, individuals strive for one of the following three goals: a high living comfort, low housing costs or high sustainability standards (SEN, 2019). According to SEN (2019), only 18% of individuals find the normative goal to be dominant. This means that the remaining 82% would not be motivated to improve the sustainability levels of their property if it leads to a lower or the same living comfort and higher housing costs. Because motivation is an influential factor for pro-environmental behaviour, a shift in motivation towards the normative goal is necessary to achieve a sustainable built environment.

2.4.2 Theory of Planned Behaviour

This research aims to understand if reward planning could be an incentive to stimulate actors in creating this motivational shift to carry out pro-environmental behaviour. Reward planning can be regarded as an external factor, namely an institutional one. This means that reward planning could only influence pro-environmental behaviour to a certain extent, unless it is also able to change internal factors. As shown in the previous paragraph, this internal motivation can be triggered if the hedonic and gain goal are not disadvantaged by the proposed instrument. In order to predict and explain how individual behaviour might change by applying reward planning, the theory of planned behaviour by Ajzen (1991) is applied. This theory is visualised in figure 6.

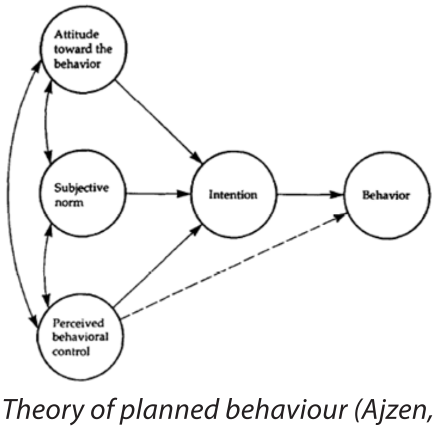

Figure 6: Theory of planned behaviour (Ajzen, 1991)

Intention
According to the theory of planned behaviour, the central factor is the intention to perform certain behaviour. Intentions capture the underlying motivational factors that influence behaviour. These motivations consist of the amount of effort individuals are willing to take in order to carry out certain behaviour. The stronger the intention is, the more likely it is that this intention actually turns into behaviour. How strong this intention is, depends on three variables: the attitude towards behaviour, the subjective norm and the perceived behavioural control (Ajzen, 1991).

Attitude towards behaviour
The attitude can be defined as how individuals react to certain behaviour. Individuals can have a positive or negative attitude towards the behaviour they do, or do not, intent to perform. Within the context of this research, individuals can think positively or negatively about the energy transition of the built environment which influences their intention and thus their behaviour. The same applies to market parties. If a housing corporation has the internal policy to be more sustainable, their attitude towards improving the sustainability levels of their housing stock will tend to be more positive.

Subjective norm
The subjective norm refers to the perceived social pressure from other actors to perform or not perform certain behaviour. For example, if a lot of residents in a certain neighbourhood choose to improve the sustainability levels of their property by putting solar panels on their roof and installing a heat pump, it will be more likely that other residents will follow. This applies to market parties as well. If it is the norm that housing corporations make an active effort to improve the sustainability levels of their housing stock, it will strengthen the intention of a single housing corporation to perform pro-environmental behaviour. Or, if an increasing number of energy

distributors deliver 'green' energy, it will become more likely that others will follow and start investing in sustainable energy as well. However, Ajzen (2002a) states that not every sort of social pressure directly influences the way actors behave. Actors look at others to determine what kind of behaviour is normal or necessary, but do not assign the same weight to every actor. The social pressure has to come from an important actor to be influential (DiMaggio & Powell, 1983). For instance, if housing corporations in Amsterdam start to implement sustainable measures on a large scale, but housing corporations in Gelderland only value the opinion of nearby corporations, it would not be likely that a housing corporation in Nijmegen experiences pressure from the corporations in Amsterdam to implement sustainable measures. Thus, it is important to understand the relationship between actors as well.

Perceived behavioural control

Attitude and the subjective norm both influence the intention to carry out certain behaviour. But, it also important to understand the ability of an actor to carry out this behaviour. To some extent, this ability lies beyond people's control. If the intention is to make an entire neighbourhood more sustainable but a heat network is not unrolled yet or there are not enough subsidies available, it gets harder to turn the intention into behaviour. These have nothing to do with individual attitude, the subjective norm or even the intention itself but are factors that lie beyond the individual's control. Perceived behavioural control indicates the effect this has on the actual behaviour. This part of the theory of planned behaviour consists of 'the *perception* of behavioral control and is [*sic*] impact on intentions and actions' (Ajzen, 1991, p. 183, emphasis in original). In other words, it means that if an actor thinks it is possible to perform desired behaviour, it is more likely that the intention will also turn into behaviour. This is not about whether the intended behaviour is physically possible or not, but only refers to what extent actors think it is possible.

If, for example, a heat network will be unrolled across a city, which enables multiple neighbourhoods to use a more sustainable source of energy, the actual ability and the psychological ability both improve. Because property owners can use this heat network, it is easier to put their sustainable intentions into practice. If a heat network is not available, property owners within a neighbourhood should search for other options and, since they are missing an option, already have a lower possibility of performing their intended behaviour. Not only because the actual availability is lower, but mostly because actors think it is harder to carry out their intended pro-environmental behaviour. This is the core idea behind perceived behavioural control.

In this research, reward planning could respond to this psychological factor. By introducing reward planning as a new policy instrument, it might open up opportunities that did not exist before. This could trigger how actors think about carrying out their intended behaviour. It could enhance the perceived ability, thus the perceived behavioural control. The theory of planned behaviour is therefore applied to find out if any practical form of reward planning would enable actors to perform their intended pro-environmental behaviour more easily.

2.5 Conceptual Framework

In the previous paragraphs, the concepts and theories that will be consulted in this research were outlined and defined. In order to create a workable overview for this research, the theory of transition management, the policy arrangement approach, the theory of planned behaviour and reward planning are presented in a schematic overview below (see figure 7). The visualisation of these linkages is based on the consulted literature and the overview will also function as the conceptual framework for this research.

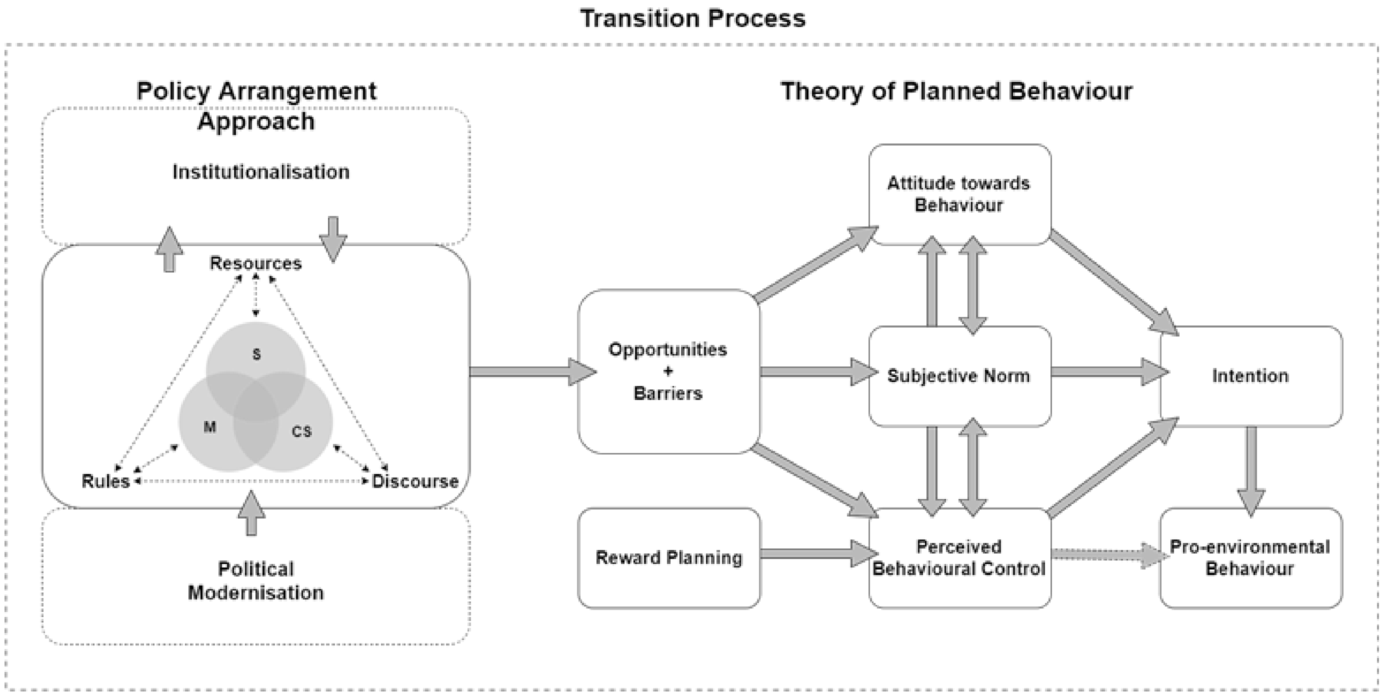

Figure 7: Conceptual model

The theory of transition management forms the overall framework wherein the other three more substantial concepts and theories are placed. Due to changes within the policy arrangement approach and the theory of planned behaviour, novelties arise which eventually may or may not bring change into the system. The dotted box within the conceptual model for transition management, labelled as 'transition process', only indicates how the other theories and concepts are the variables that can speed up or slow down the transition process. Further use of transition management would go beyond the scope of this research and is therefore not incorporated in this research, nor in this model. The focus lies on the policy arrangement approach, the theory of planned behaviour and reward planning.

On the left side of the model, the policy arrangement approach is shown. A policy arrangement, consisting of actors from the three spheres, the discourse, resources and rules occupies the central position within the policy arrangement approach. The policy arrangement is under constant pressure from the institutionalisation process on one hand and political modernisation on the other hand. Institutionalisation refers to individual actions solidifying into structures, the policy arrangement itself, and the policy arrangement on its turn structuring individual actions. Furthermore, political modernisation indicates outside trends and developments which influence ways of acting and thinking within the policy arrangement. The reciprocal relation between institutionalisation and the policy arrangement is visualised by the two arrows and the unilateral relation from political modernisation to the policy arrangement is shown with one arrow. The latter two aspects of the policy arrangement approach are not analysed in this research because the focus lies on the policy arrangement itself. Nevertheless, institutionalisation and political modernisation are part of the policy arrangement approach and therefore included in the conceptual model as dotted boxes. Following the arrow to the right, the outcome of the policy arrangement approach forms the input for the theory of planned behaviour. The encountered opportunities and barriers directly influence the attitude towards behaviour, the subjective norm as well as the perceived behavioural control. These three components are subsequently formed through the actors' discourse, pressure from other actors and rules and (perceived) available options and resources. Furthermore, the attitude towards behaviour, the subjective norm and perceived behavioural control mutually influence each other as well as the intention to carry out pro-environmental behaviour. The perceived behavioural control can be classified as the most influential variable, since it can also directly influence pro-environmental behaviour. After all, if actors perceive certain pro-environmental behaviour as possible, it is much more likely for an intention to actually turn into behaviour. This relation is visualised with the dotted grey arrow from 'perceived behavioural control' to 'pro-environmental behaviour'.

Reward planning is placed as an external input for behaviour, with one arrow pointed towards perceived behavioural control. In this research, reward planning is introduced as a policy instrument that may or may not stimulate pro-environmental behaviour. It is therefore part of the transition process. The envisaged change by introducing reward planning as a policy instrument is expected to have effect on the way actors perceive their behavioural control, which has an immediate effect on the actual behaviour. This causal relation is visualised with the arrow towards the intention (to perform behaviour) and the dotted arrow pointed to the actual pro-environmental behaviour.

3. METHODOLOGY

To gather the information needed to formulate an answer to the research question, a couple of important decisions regarding the research methodology have to be made. At first, in paragraph 3.1, the research paradigm is elaborated to understand from what perspective this research is carried out. Then, in paragraph 3.2, the research strategy is explained which consists of the data operationalisation, collection and analysis. To conclude this chapter, paragraph 3.3 discusses the status of validity and reliability in this research.

3.1 Research Paradigm

As already mentioned, this research aims at an in-depth understanding of the applicability of reward planning. Therefore, one particular case is chosen: the municipality of Nijmegen. A case study is a qualitative research strategy whereby interpretation is a key factor. It gathers a holistic view on reality by exploring social phenomena through the perspective of all relevant actors (Gaber & Gaber, 2007). A case study is therefore a subjective way of doing research. Subjective in two ways, because the researcher itself chooses the 'study objects', the case and interviewees, and because all recipients formulate their own view on reality which is then interpreted by the researcher through qualitative research methods (Bryman, 2012; Wahyuni, 2012).

In order to structure this, the research paradigm of this inquiry is defined. A research paradigm includes fundamental believes on how different variations of social research should be carried out. At first, two dimensions form the basis of multiple research paradigms: ontology and epistemology (Bryman, 2012). Ontology relates to the form and nature of reality, including what can be known about this reality. Epistemology indicates the relationship between the researcher and this reality. The answers to both dimensions are interlinked, meaning that a vision about what can be known about reality already steers towards a certain relationship between the researcher and reality (Guba & Lincoln, 1994). As mentioned, this research follows a subjective approach. This fills in the ontology-dimension, whereby 'reality is dependent on social actors and assumes that individuals contribute to social phenomena' (Wahyuni, 2012, p. 69). Reality is shaped by social actors in a certain time and place and can therefore be classified as a social construct. Various social constructs can coexist between (groups of) individuals which enables multiple observable realities. Because epistemology logically follows this vision, the relationship between the researcher and this reality is subjective as well. Through interpretation from the multiple social constructs by the researcher, the research findings are gradually formed during the research process. Thus, the research is shaped through multiple constructed views on reality, interpreted by the researcher through his own framework. This indicates a constructivist research paradigm (Guba & Lincoln, 1994).

In this research, the policy arrangement of the existing policy domain on a sustainable built environment within Nijmegen is studied before addressing reward planning as a policy instrument. As elaborated in the second chapter, the policy arrangement is formed through actors, their discourse, their resources and the rules they are bound to. This requires in-depth information from multiple actors concerned with the energy transition of the built environment in Nijmegen. All these actors construct their own reality about this subject, which is collected and subsequently analysed through a framework wherein reward planning is added as a tool to stimulate pro-environmental behaviour. Because of this predefined framework, the information from actors is socially constructed into a new reality wherein this framework forms the guideline. This strengthens the rationale behind the constructivist approach. A constructivist research paradigm therefore perfectly suits the assumptions and methodological choices behind this research (Bryman, 2012).

3.2 Research Strategy

To gather the required information about the energy transition of the built environment within Nijmegen, a sufficient research strategy is needed. The research strategy concretises the steps between theory and practice and concretises how the required data is going to be gathered and analysed (Guba & Lincoln, 1994; Bryman, 2012).

3.2.1 Operationalisation

At first, the concepts and theories presented in the conceptual model will be translated from theoretical and more abstract definitions to indicators and other practically manageable terms. This enables respondents to understand every concept or theory in the same way and makes the concepts and theories measurable as well. This is also convenient for drafting the interview guides, later on (Bryman, 2012). The policy arrangement approach, excluding institutionalisation and political modernisation, the components of the theory of planned behaviour and reward planning are roughly the concepts that require operationalisation in this research. In table 1, an overview of the concepts and theories translated into indicators is presented. This transformation largely follows from the theoretical underpinning in chapter 2.

Policy arrangement approach

The policy arrangement approach consists of four dimensions: the actors and coalitions, the discourse, the resources and the rules. These four dimensions will be subsequently turned into measurable indicators, starting with the actors and coalitions.

According to Gamble (2000) and Steurer (2013), influential actors come from the state, market and civil society spheres. This division is important because it already indicates the actors' role in a policy domain. It is likely that state, market and civil society actors all have a different view on if and how a sustainable built environment in Nijmegen can be achieved. To understand the entire policy domain, it is important to speak to parties from each of these three spheres. Furthermore, this dimension also focuses on mutual collaborations and projects actors engage in. Actors cannot be seen as independent but collaborate with other actors to achieve policy goals (Ansell & Gash, 2007). It is thus necessary to understand what kind of collaborations are present within the policy domain and can influence its outcome.

Following Foucault (1972), the discourse can be explained as a collection of ideas, statements and practices on a certain subject whereby Eisenhardt (1989) notes how a different vision between principal and agent can be present and influential for the outcome of the policy domain. Lupia (2001) calls this agency loss. For this research, especially the difference in motivation between public authorities and market and civil society actors is relevant, because it influences the feasibility of public policy. Furthermore, the intrinsic motivation of actors requires attention as well, since it is an influential factor for actors to carry out pro-environmental behaviour and thus shapes the actors perception on a sustainable built environment (Ajzen, 1991; Kollmuss & Agyeman, 2012).

The resources actors can possess can be divided into economic, cultural and social capital (Bourdieu, 1986). The amount and sort of capital actors have influences their position within a specific field (Inglis & Thorpe, 2012). Only the key players, with high interest and high power due to their amount of capital, are interesting actors who can be influential within the policy domain on achieving a sustainable built environment in Nijmegen (Scholes, 2001; Ackermann & Eden, 2011). Therefore, it is important to distinguish the actors who can be marked as key players. These actors are necessary to implement or make use of reward planning.

The rules-dimension is broad and consists of formal and informal rules between actors, such as laws, policies and agreements, whereby the most effective tools are laws, followed by agreements and policies, if ranked by the ability to be legally binding (Arts et al., 2006; De Vries, 2010). For this research, only rules with a direct or indirect relation to improving sustainability of the built environment are relevant.

Theory of planned behaviour

The theory of planned behaviour consists of five components: the attitude towards behaviour, the subjective norm, the perceived behavioural control, the intention to carry out behaviour and the behaviour itself. In this research, the latter is understood to be pro-environmental behaviour. Measuring these components for the current policy domain basically follows from the policy arrangement approach already, because the opportunities and barriers are the input for the ability to carry out pro-environmental behaviour.

The outcome of this research focuses on pro-environmental behaviour. Pro-environmental behaviour is a broad concept that entails every action that contributes to a more sustainable environment (Kollmuss & Agyeman, 2002). In this research, the concept is narrowed down by focusing only on behaviour that improves the sustainability level of the built environment. To measure behaviour, Ajzen (2002a) suggests using the TACT method, whereby the Target, Action, Context and Time components define the behaviour of interest. For this research, the target would be the built environment, the action would refer to improving its sustainability, the context would be the municipal area of Nijmegen and the time would indicate the timeframe from now to the policy deadline described in the concept Climate Agreement or Nijmegen heat vision. Using the TACT method defines the subject and time frame, but does not make 'a sustainable built environment' measurable. Additional data is necessary. Zimmermann, Althaus & Haas (2005) use three factors to measure the sustainability levels of the built environment: the amount of environmental loads, greenhouse gas emissions and energy use. These factors enable to quantify what can be understood as 'a sustainable built environment'. However, this research follows a qualitative approach by studying the perception of actors on a sustainable built environment. Also, it goes beyond the scope of this research to measure and take into account the sustainability levels for all houses and buildings in Nijmegen. It is only relevant to understand how actors perceive 'a sustainable built environment' and if reward planning could enhance achieving this goal. Therefore, actors will be asked for their idea on a 'sustainable built environment' and how they intend to improve it. The TACT-components form the framework and the three factors from Zimmermann et al. (2005) can form a guideline to keep in mind, but the focus lies on how actors perceive to achieve 'a sustainable built environment'. Therefore, 'achieving a sustainable built environment' forms the only listed variable to measure pro-environmental behaviour with.

The intention to perform certain behaviour directly influences the ability to carry out pro-environmental behaviour. But, the intention itself derives from the attitude towards behaviour, the subjective norm and perceived behavioural control (Ajzen, 1991). So, in order to measure the intention, the weight and influence of these three components have to be taken into account. Aj-

zen (2002a, p. 1) mentions the following rule: 'the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behavior in question'. Even though this research focuses on actors instead of individuals, this rule can be used to measure the intention to perform pro-environmental behaviour. How favourable the attitude and subjective norm or great the perceived behavioural control should be depends on the recipients, because the actors make a consideration for themselves on how the three components lead to an intention to carry out pro-environmental behaviour.
The attitude towards behaviour can be understood as how individuals think about and react to certain behaviour (Ajzen, 1991). This is already measured by the discourse dimension from the policy arrangement approach, but puts the focus solely on ideas and intrinsic motivation. Following Kollmuss & Agyeman (2002), acting (un) sustainable partly derives from the personal values actors have about the energy transition of the built environment. Personal values are not studied in this research, but the intrinsic motivation of actors is relevant for their overall attitude on carrying out certain behaviour. Therefore, the intrinsic motivation of actors will not only be measured for the discourse dimension but for the 'attitude towards behaviour'-variable as well.

The subjective norm refers to the perceived social pressure to perform or not perform certain behaviour. Social pressure can come from other actors in any form, as it is the recipient who classifies it as pressure (Ajzen, 1991). This makes it hard to concretise. Therefore, the subjective norm is indicated as 'external pressure' within this research to be able to measure all external pressure actors experience. Furthermore, the greatest pressure for an actor only comes from organisations or individuals who are important to them. It is therefore necessary to understand the weight actors assign to pressure from different actors as well (DiMaggio & Powell, 1983; Ajzen, 2002a).

Perceived behavioural control indicates the way actors think about the ability to carry out certain behaviour (Ajzen, 1991). This aspect can be measured by understanding the capability of actors to carry out behaviour (Ajzen, 2002b). In this research, the capability follows logically from the opportunities and barriers coming from the policy arrangement approach. After all, if an actor marks a lack of resource or an agreement as a barrier, it directly decreases their opportunity to carry out pro-environmental behaviour. Otherwise, it would not be a barrier. Therefore, perceived behavioural control consists of all encountered opportunities and barriers during the policy arrangement approach.

Reward planning
To measure the applicability of reward planning, five cumulative criteria were distinguished in the second chapter. At first, reward planning can only be applied as an instrument by a public authority when it requires development on or using private property. Thus, it is important to define if achieving a sustainable built environment is, indeed, a public goal and specifically requires private means to do so. If the public authority can achieve a sustainable built environment without having to use private resources, reward planning will not be a suitable tool. Public bodies, such as the municipality of Nijmegen and the Province of Gelderland, will be questioned to elaborate on this matter.

Secondly, if achieving the public goal requests private means, the private party should receive a reward for their efforts. After all, it invests in fulfilling a public goal. The core of reward planning is that this reward cannot be of monetary value, but consists of public efforts within the spatial domain. Otherwise, it cannot be classified as reward planning but as a regular reward. The spatial reward should be useful to private parties to take action and actively fulfil the public goal. Therefore, private parties that might be interested in this construction will be asked to describe if a spatial reward could be useful to them to invest in achieving the public goal of sustainable built environment.

Thirdly, the spatial reward should not only be useful, but appealing as well. The reward should stimulate private parties to invest more in achieving a sustainable built environment than they would have without the spatial reward. If private actors only benefited from the spatial reward but implemented the same measures that they would have without the availability of a spatial reward, using reward planning would be useless. It would not help getting closer to a sustainable built environment. Therefore, private actors will be asked on what spatial reward would enable them to act more sustainable than they would have without the presence of the sustainable reward.

Furthermore, if a useful and appealing spatial reward is determined, the risk for the municipality of acting arbitrarily should be evaded. The spatial reward should be in proportion to the efforts a private party puts in and cannot vary too much between actors. Of course, it is very likely that a housing corporation would be interested in a different reward than a private home owner, but the public authority should be able to make an objectively justified distinction in order to avoid arbitrariness. To do so, the public authorities as well as private parties are questioned for their perception on this issue. The public authorities will be asked on how to establish a justified package of rewards and if avoiding arbitrariness is possible and the private parties are asked to describe their point of view on different spatial rewards for different parties.

The fifth and last criterion is about enforcing noncompliance. Private parties that are not using the reward planning instrument cannot get access to the benefits it offers. The responsibility to maintain this primarily lies at the public authorities. They cannot grant benefits to private parties who have not (completely) fulfilled the demands for a spatial reward. To measure this, public authorities will be questioned about the feasibility of enforcement and how to link this to earnable rewards.

An overview of the indicators as described in this paragraph can be found in table 1 down below.

Theory/Concept	Dimension	Indicators
Policy Arrangement Approach	Actors and coalitions	▪ State actors ▪ Market actors ▪ Civil society actors ▪ Mutual collaborations/projects
	Discourses	▪ Ideas ▪ Statements ▪ Practices ▪ Agency loss ▪ Intrinsic motivation
	Resources	▪ Economic capital ▪ Cultural capital ▪ Social capital ▪ Power and interest
	Rules	▪ Laws ▪ Policies ▪ Agreements
Theory of Planned Behaviour	Pro-environmental behaviour	▪ Achieving a sustainable built environment
	Intention	▪ Favourability of attitude ▪ Favourability of subjective norm ▪ Extent of perceived behavioural control
	Attitude towards behaviour	▪ Ideas ▪ Intrinsic motivation
	Subjective norm	▪ External pressure ▪ Weight of pressure
	Perceived behavioural control	▪ Opportunities ▪ Barriers
Reward Planning	Reward planning	▪ Public goals, private means ▪ Spatial reward ▪ Effectiveness of reward ▪ Proportionality of reward ▪ Enforcement of noncompliance

Table 1: Operationalisation

3.2.2 Data Collection

As briefly mentioned already, the required data for this research on the applicability of reward planning for a sustainable built environment in Nijmegen is acquired through a case study. A case study is a typical qualitative research strategy which explores one or more real life case(s). During a case study, social phenomena are studied in their natural environment through triangulation, a data collection method whereby multiple data sources are addressed to thoroughly understand the phenomenon. The most common sources are: relevant documents, interviews with key actors and participatory observation. By using data triangulation, a case can be studied and interpreted via various perspectives (Swanborn, 1996). Another aspect of a case study is that the research domain is physically defined. This makes it possible to study the perceived phenomenon in detail. If the research aim is to understand how or why the phenomenon exists within its natural environment, a case study is the ideal research method because it helps understanding the causal factors behind it (Yin, 1989).

This research aims at understanding the opportunities and barriers present within the policy domain on achieving a sustainable built environment in Nijmegen and how reward planning could contribute to this goal. Therefore, insight into the causal factors behind energy transition policy within Nijmegen is crucial to understand whether reward planning could be a useful tool. This data can be acquired by analysing documents on energy transition policy and especially by interviewing actors concerned with the energy transition in Nijmegen. It is for that reason a case study is the most sufficient research strategy to obtain the required data for this research.

General information on the energy transition

But, before purposeful research into the Nijmegen case can be done, information about the energy transition of the built environment and reward planning in general is required first. To gather this information, a document analysis will be done. These documents can be scientific articles and studies but also national and international policy documents. By performing a thorough document analysis, various insights and perspectives on the energy transition of the built environment can be acquired. When doing this document analysis, it is important to critically analyse the consulted literature and only use policies and studies that are directly relevant for the research (Bryman, 2012). For this research, literature about the energy transition in general and the energy transition of the built environment from various perspectives is useful. This will map out the general and conflicting discourses on the energy transition but also provide an insight in relevant actors, their applied techniques and resources and might even display opportunities and barriers already. Furthermore, to understand why reward planning has not been applied as a policy instrument for the energy transition, it is interesting to look at studies and policy documents of other sectors where reward planning has been applied as a public instrument already. This will yield valuable insights into the basic assumptions of reward planning as a policy instrument for a later analysis.

To complement the document analysis, interviews are an often used qualitative research method. Interviews can offer more profundity to supplement the already gathered information. Especially since large-scale sustainable renovations are mainly covered in policies and plans, actual experiences are not directly available in documents. By speaking to participants within the field, in-depth experiences can be gathered and applied to the framework used later on in the case study. The same applies to reward planning as a policy instrument. This particular instrument has been scarcely used, so not much information can be found with a document analysis alone. To gather in-depth information about the assumptions and practicability of this instrument, interviews with relevant actors are held.

Patton (1980) distinguishes four types of interviews, based on their degree of structure. The first variant is the informal conversation interview, which is the least structured. The questions are not prepared in advance but merely popping up during the interview. What topics will be discussed varies between each interview. The second type follows an interview guide and is somewhat more structured. Beforehand, the interviewer drafts a list of topics that will be discussed. The formulation and sequence of the topics is also prepared by the interviewer. This offers a bit more guidance during the interview and ensures that prepared topics will be discussed. The third option is a standardised open-ended interview, also known as the semi-structured interview. This interview format consists of formulated questions and a fixed sequence. This is helpful when the researcher wants to address various topics and subtopics in a vast sequence. However, the questions are open-ended and the interviewee does not have to choose between fixed answer possibilities. This enables different conversations with various respondents while still receiving the desired opinions. The last interview form is the closed, fixed field response interview. This contains a fixed formulation and sequence of the questions but also answer categories the interviewee has to choose from. Therefore, this type of interview can be classified as an oral survey.

To gather general information on the energy transition and reward planning, the second interview format will be the most useful. Therefore, this type of interview is used to guide these interviews. The topics will come from the document analysis and will therefore broadly structure the interview, but the interviewee is free to bring in own topics and opinions. The goal is to acquire any information necessary to carry out more targeted interviews during the case study in Nijmegen later on. Information from the general interviews is therefore woven into this document instead of explicitly described during the analysis in chapter 4. The interview guide and list of respondents addressed for this general information can be found in annex 7.2.3 and 7.1 respectively.

Case study Nijmegen

For the case study on the municipality of Nijmegen, a similar approach is taken. At first, an analysis on available documents about the energy transition in Nijmegen is done to grasp what actors are involved, what these actors plan to do and how these plans will be carried out. Since most documents are visions and plans for the future, evaluative documents are rare. Therefore, it would be a necessity to supplement the data with interviews. Contrary to the interviews for general information, interviews on the Nijmegen case require a decent structure because particular information is needed. Various respondents have to be asked the same questions to find out about present opportunities and barriers, compare answers between actors and be able to draft a conclusion about the applicability of reward planning. Therefore, a semi-structured interview form will be the most suitable (Patton, 1980).

The draft this interview guide, table 1 from the operationalisation chapter will be the guideline. This table is based on consulted literature and theories and supplemented with general information about the energy transition from interviewees. The topics are therefore fixed. However, the answer possibilities should be open. It is unsure what respondents will answer and to fully grasp the opportunities and barriers within the policy domain, it is not desirable to formulate standardised answers beforehand. This would create a high risk of missing certain topics that did not emerge earlier. In order to speak the most influential actors in Nijmegen, all actors that came forth during the document analysis are filtered using the earlier mentioned Mendelow matrix. Only key players within the policy domain on achieving a sustainable built environment within Nijmegen are contacted for an interview since they might have the influential power to make use of reward planning as a policy instrument. Because it is possible that some actors might have been missed during the document analysis, the contacted actors are also asked to identify actors they are currently working together with or find relevant within the policy domain. If these actors turn out to be key players, they are also approached for an interview. This is so-called snowball sampling, whereby the pool of respondents can grow exponentially, like a snowball (Farthing, 2016). The interview guide and list of respondents addressed during the case study on a sustainable built environment in Nijmegen can be found in annex 7.2.2 and 7.1 respectively.

To further demarcate this study, a few areas within Nijmegen are explicitly focused on. The municipality of Nijmegen is following a 'neighbourhood-approach', whereby stepwise every neighbourhood will get off the gas. Which neighbourhood comes first, is decided together with actors within those neighbourhoods. The first parts of the city are the district of Dukenburg, the neighbourhoods Hatert, Hengstdal and Bottendaal and the station area around Heijendaal (Gemeente Nijmegen, 2018). These areas are visualised on the map below (figure 8). This map also shows the existing and proposed heat network with the black line and the dotted black line respectively. Most neighbourhoods will be (partly) connected to this network. Because the municipality has already started implementing measures in these neighbourhoods, this study focuses on these neighbourhoods as well. It will be the most suitable way to acquire in-depth and specific information about opportunities and barriers and the possibility to implement reward planning.

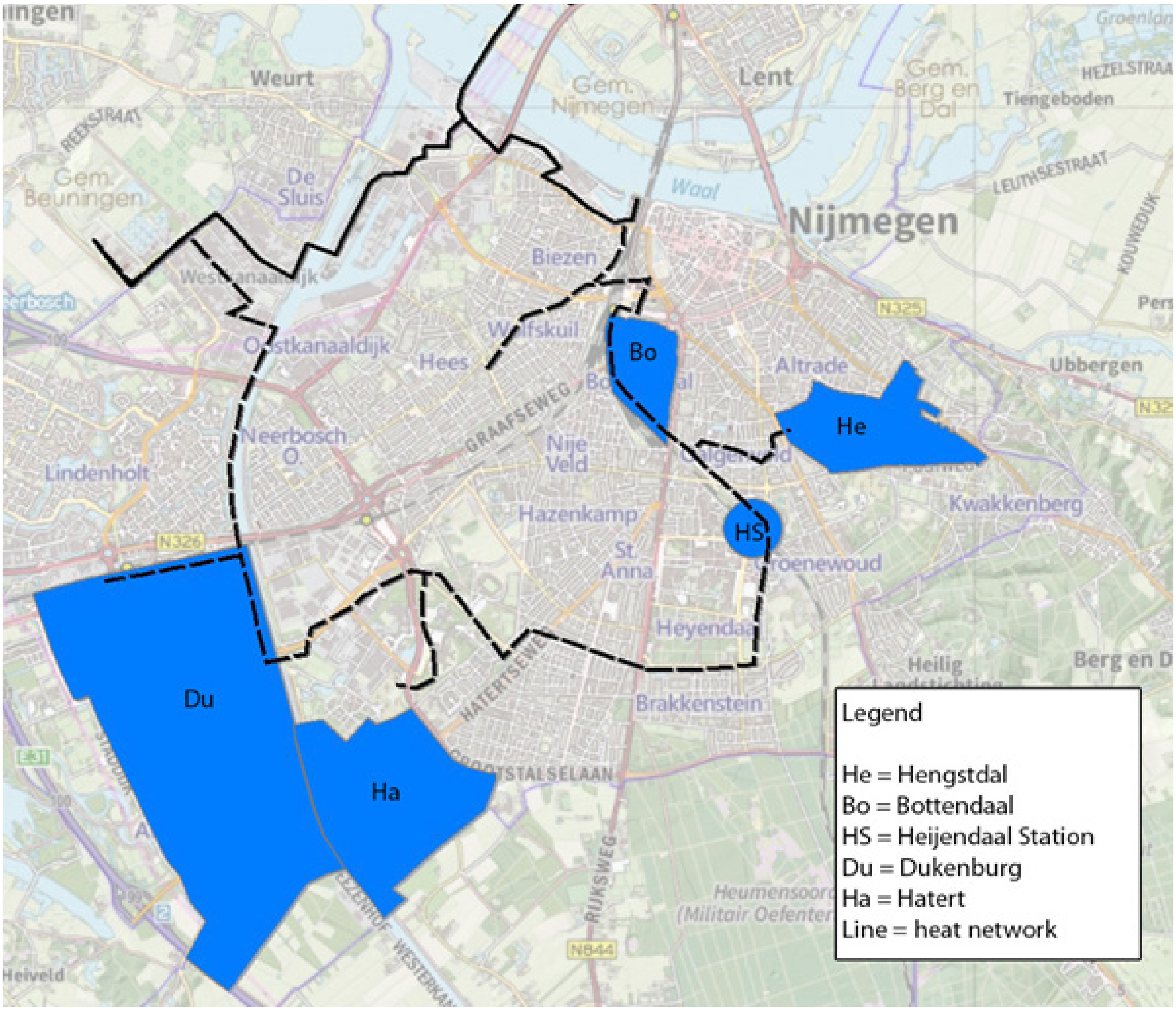

Figure 8: Neighbourhood-approach and proposed heat network Nijmegen (based on Gemeente Nijmegen, 2018)

Dukenburg and Hatert
The biggest project is the Dukenburg district. Dukenburg is appointed as one of the 27 experimental neighbourhoods in the Netherlands that will receive state support to get off the gas. With this support, Dukenburg will be able to test various sustainable techniques for different housing types. A part of this neighbourhood will most likely be connected to the heat network, but an all-electric concept will be tested as well. The acquired knowledge and experience from this process can be used to improve the sustainability levels of other neighbourhoods in Nijmegen and other cities in the Netherlands. So, together with the other 26 neighbourhoods, Dukenburg is especially chosen to function as a neighbourhood where a variety of sustainable solutions can be tested to enable scaling up to other neighbourhoods in the Netherlands later on (Gemeente Nijmegen & Ministry of the Interior and Kingdom Relations, 2019).

Because Dukenburg has degraded on multiple aspects over the years, the municipality of Nijmegen plans to renovate this entire district. This means that not only the built environment but also social problems like loneliness, poverty and an unhealthy lifestyle will be dealt with. The starting point is the energy transition of the entire Dukenburg district but because transforming the built environment of housing corporations and individual residents is such a thorough project, it enables to take on other problems as well.

Close to Dukenburg, the neighbourhood Hatert is situated. This part of Nijmegen mostly consists of homogenous post-war housing types. Because the houses are often stacked and lack diversity, a heat network would be the most suitable opportunity for this neighbourhood. If the proposed expansion of the heat network will connect to Hatert, is unsure. A local heat network for this neighbourhood is also a possibility. Furthermore, like Dukenburg, Hatert also knows some social issues. The municipality intends to also take on these problems when improving the sustainability levels of the built environment.

Hengstdal and Bottendaal
In both Hengstdal and Bottendaal the initiative to improve the sustainability levels comes from inhabitants. Both neighbourhoods have active groups of residents that want to achieve a sustainable neighbourhood together. The municipality of Nijmegen cooperates with them to find the most suitable solutions for these neighbourhoods.

In Hengstdal and Bottendaal a variety of housing typologies can be found. The neighbourhoods know various high-rise buildings and family housing because they are built over the course of multiple decades. This asks for a diverse approach. In Hengstdal, an all-electric solution, local heat networks and a connection to the city heat network would be the most favourable. For Bottendaal, a connection to the city heat network will be the primary energy source. Small scale solutions are not directly possible because of Bottendaal's status as a protected cityscape. Furthermore, to both neighbourhoods applies that most houses need isolation improvement first before a heat network or an all-electric solution is completely attainable.

Because multiple solutions on various housing types will be 'tested', Hengstdal and Bottendaal are also experimental neighbourhoods. The lessons learned from the process of achieving a sustainable Hengstdal and Bottendaal can be taken into account when improving the sustainability of houses and buildings in other neighbourhoods in Nijmegen later on. This is also an important reason for why the municipality of Nijmegen is investing in making these neighbourhoods more sustainable first.

Heijendaal station area
The area around Heijendaal is the fifth area wit-

hin the municipality of Nijmegen where the energy transition of the built environment will start. This area consists of multiple buildings from the Radboud University, the Radboud medical centre and student housing. For Heijendaal, the municipality aims at connecting the entire area to the proposed heat network. Because especially the medical centre requires a high amount of energy, this network would be profitable. On the long term, the Radboud medical centre aims at resupplying residual heat as well, which could be used to expand this energy transition of the built environment to nearby neighbourhoods more easily.
Since this research focuses mostly on housing corporation and residential property, the Heijendaal station area is not directly the most relevant. Only the student housing would fall within the research framework. However, multiple residential neighbourhoods are situated close to the Heijendaal area and with the expected residual heat, transforming the energy supply of nearby neighbourhoods can be done rather quickly. Therefore, it is interesting to look at the energy transition of this area as well.

3.2.3 Data Analysis

After the data is gathered, it will be analysed to come to useful conclusions. The conducted interviews about general information on the energy transition are only transcribed if certain information is necessary to support argumentation. Together with the document analysis during this phase, the information is used throughout this thesis to describe and substantiate choices made during the research.

The interviews done during the case study are all fully transcribed and processed with Atlas.ti. This program enables to code the interview transcripts by labelling certain words and passages with overarching concepts. These concepts, or codes, help to structure the data with the purpose of finding patterns and mutual relations. Coding can be divided into three phases: open coding, axial coding and selective coding. The first step, open coding, means that the transcripts will be read and similar chunks of data will be labelled, without referring to the theory yet. During the open coding-phase, numerous codes can be distinguished, eventually structuring the contents of the transcript into a variety of codes. When performing axial coding, relations between open codes are identified. During this step, overarching concepts defining groups of open codes are found. Axial coding can be seen as the intermediate step between open and selective coding. The last phase, selective coding, tries to group axial codes into an overarching concept that relates to the core of participants' answers (Friese, 2019). These overarching concepts derive from the theoretical and literature research done prior the case study and will follow the concepts used in the operationalisation chapter (table 1). An overview of the selective codes on reward planning and the Nijmegen case can be found in annex 7.3.

3.3 Validity and Reliability

The validity of a research can be divided into internal and external validity. Internal validity is concerned with whether the research actually studies what is intended (Bryman, 2012). For example: this research intends to grasp the policy arrangement on a sustainable built environment within Nijmegen. Any information on this topic for the province of Gelderland or the Arnhem-Nijmegen region could be relevant background information but the geographical scope is too large for this research. This information should not be incorporated in the final analysis, since it does not match with the intended goal of this study: achieving a sustainable built environment in Nijmegen. It would decrease the internal validity. To enhance internal validity in qualitative research, data triangulation is important. Data triangulation means using 'multiple and different sources, methods, investigators, and theories to provide corroborating evidence'

(Creswell, 2013, p. 251). Information from interviews can be verified through document analysis, observation and through other interviewees. This helps strengthening the credibility of data sources and finding results that the research intended to find (Bryman, 2012; Farthing, 2016).

External validity refers to the generalisability of the research. Thus, a research has a high external validity if the findings are applicable in other settings or with a different population (Kirk & Miller, 1986). In general, external validity is hard to determine since it takes just one other study which contradicts the claimed relationship to question the external validity of the earlier research. This derives from the idea of falsification: if a study is done with a result that contradicts previous findings, the claimed 'truth' is already jeopardised (Guba & Lincoln, 1994; Farthing, 2016). This research focuses on one municipality in particular, the municipality of Nijmegen. Just like every other municipality, Nijmegen is characterised by particular features. The city size, municipal policy, demographic and geographical characteristics can differ tremendously between municipalities. Therefore, it is almost impossible to apply the research findings to other municipalities and the external validity of this research is low. In order to somewhat enhance the external validity, Guba & Lincoln (1985) suggest adding a thorough and detailed description of the characteristics of a research site. Even though the research results would be almost impossible to reproduce, because of the cases' intensive description overdoing this research in a similar setting is not directly impossible. Therefore, the Nijmegen case is extensively described in the previous paragraph.

Reliability of a research relates to the consistency of the taken research approach. A research is reliable if the research is repeated with the same set of research tools and follows the same approach which subsequently produces the same results. Therefore, high research reliability is an indication of clear research methods and sticking to those methods during the research (Kirk & Miller, 1986). According to Bryman (2012), reliability 'is a difficult criterion to meet in qualitative research, since (...) it is impossible to 'freeze' a social setting and the circumstances of an initial study to make it replicable' (p. 390). In this research, various actors will be addressed to understand their point of view on the policy domain concerning a sustainable built environment in Nijmegen. This is only a snapshot of the current policy arrangement in Nijmegen, and will much likely be different if this research would be repeated another time. To enhance reliability in qualitative research, some actions can be taken. At first, well-considered research methods and a consistent research approach are crucial to have actors understand the purpose of the research. This avoids misinterpretation among actors and diminishes the chance of them answering in different ways (Kirk & Miller, 1986). A consistent research approach affects internal validity as well, because it helps finding results that the research intended to find. Therefore, reliability and validity are closely interrelated (Farthing, 2016). In order to further improve reliability, providing perusal on the research tools and its contents is proven to enhance reliability in qualitative research (Guba & Lincoln, 1985; Bryman, 2012). Therefore, table 1 within the operationalisation chapter and the interviewguides in annex 7.2 aim to be as precise and extensive as possible. Furthermore, to strengthen reliability, consistency in the data analysis is required as well. Coding can be a subjective process, as the researcher itself assigns codes based on its own judgement. Creswell (2013) suggests avoiding the risk of subjective coding by using 'intercoder agreement', whereby multiple researchers code independently and compare coded transcripts afterwards. This can make the data analysis more reliable. Intercoder agreement is not applied in this research, because this thesis is an individual project with a limited amount of time. Having the assistance of multiple coders would enhance the reliability but requires too much time and detracts the individual aspect of the thesis. Therefore, this research accepts a lower reliability on this point. In relation to the previous-mentioned perusal on research methods, a list of used codes is presented in annex 7.3 which derives to a great extent from the operationalisation table 1. By coding from a strong theoretical basis, the reliability during data analysis can be somewhat enhanced (Krippendorff, 2011). However, due to the choice for qualitative research and deliberate rejection of intercoder agreement, this research knows lower reliability which will be kept in mind when drafting conclusions.

4. ANALYSIS

This chapter elaborates on the analysis done to answer the research questions. At first, in paragraph 4.1, the Nijmegen case is elaborated on and, following the policy arrangement approach, the opportunities and barriers within the current policy domain are identified. Subsequently, paragraph 4.2 describes the theory of planned behaviour to understand how pro-environmental behaviour is currently carried out and if reward planning could bring any change.

4.1 Case Study Nijmegen

The Nijmegen case focuses on opportunities and barriers present within the policy domain on achieving a sustainable built environment in Nijmegen. It hereby aims to provide an answer to the first research question of this thesis:

'*What are the opportunities and barriers within the current policy domain on achieving a sustainable built environment in Nijmegen?*'

4.1.1 Neighbourhood-approach

Following the Nijmegen heat vision, the municipality aims to be energy neutral in 2045 (Gemeente Nijmegen, 2018). This means that almost 80.000 houses and other buildings cannot rely on natural gas anymore and have to use another source of energy. This will be accomplished by switching to four alternative energy sources: heat networks, all-electric concepts, renewable gas and biomass. Future developments like hydrogen gas, heat from surface water and geothermal energy are anticipated on and are expected to complement the already available alternatives. The heat network will be the biggest energy supplier, for about 30.000 to 50.000 houses, followed by all-electric concepts that will be implemented in approximately 25.000 to 35.000 houses. All forms of sustainable energy supply will be tested during the 'neighbourhood-approach' explained in paragraph 3.2.2.

4.1.2 Actors and Coalitions

To identify opportunities and barriers that are present within the policy domain, the policy arrangement approach is applied. Before that, actors that more or less influence the energy transition of the built environment within Nijmegen are analysed first. This is done based on a document analysis research and interviews with actors. Via policy documents, relevant actors were defined. Using the Mendelow matrix, the most influential actors were sorted out, the so-called 'key actors', and approached for an interview. Key actors are actors that are highly interested in the policy domain and have the power to be influential (Scholes, 2001). Interviewees were asked to further identify relevant actors around them to grasp the actor-dimension of the policy arrangement approach as completely as possible.

To start the document analysis, the concept Climate Agreement will be studied first since it contains national guidelines for the energy transition and forms the starting point for local and regional plans (SER, 2018). Therefore, it is studied to identify state actors that are involved with the local and regional plan making. Furthermore, the *Gelders Energieakkoord* (Van Der Ploeg, Vintges, Visschers & De La Court, 2015) is consulted. This document contains a regional strategy for the Province of Gelderland wherein the ambitions of the Dutch Climate Agreement take shape. Every party that signed this agreement agrees to contribute to a climate neutral Gelderland in 2050. How this can be achieved is broadly described and will be further elaborated by the responsible actors. In line with the *Gelders Energie-*

akkoord, the municipality of Nijmegen drafted a heat vision (Gemeente Nijmegen, 2018). This vision is briefly described in the previous paragraph and throughout this thesis. The *Gelders Energieakkoord* and the Nijmegen heat vision give a nearly complete overview of relevant actors within the policy domain. In order to not miss any actors, interviewees were asked to map out other relevant actors as well. An overview of every identified actor is given below (figure 9). To visualise the position of every actor, the multi-actor governance system is used whereby every actor is placed in or across the state, market or civil society sphere. This does not indicate the importance of an actor within the policy domain.

The concept Climate Agreement mentions the importance of public authorities, as it states how 'municipalities, provinces and water boards draft (...) Regional Energy Strategies' (SER, 2018, p. 213) for the regional approach on achieving a sustainable built environment. From these governmental actors, especially the local authorities are important, as the concept Climate Agreement mentions how 'municipalities play a crucial role' (SER, 2018, p. 21) when drafting the heat vision based on a neighbourhood-approach. So, according to the concept Climate Agreement, municipalities play a big part in the plan-making of achieving a sustainable built environment. But, the importance of collaborating with residents and property owners during this process is also highlighted, as the concept Climate Agreement states how together 'with inhabitants and property owners (…) a consideration should be made to find the most suitable solution per neighbourhood' (SER, 2018, p. 21). From the document analysis on the concept Climate Agreement alone, three key players can be identified: municipalities, residents and property owners. Which parties are especially important for Nijmegen can be derived from the *Gelders Energieakkoord* and the Nijmegen heat vision.

In the *Gelders Energieakkoord*, various regional actors and stakeholders are mentioned. At first, the document is drafted together with 'businesses, the province, the water boards, municipalities, Klimaatverbond Nederland, the Gelderse Natuur- en Milieufederatie, and almost all energy cooperatives from Gelderland' (Van der Ploeg et al., 2015, preface). This directly indicates the most important players within Gelderland. To grasp the most important actors within the Nijmegen region, the Nijmegen heat vision is consulted. This vision identifies 'housing corporations, the grid operator, heat companies and (...) residents and other property owners' as the most influential actors (Gemeente Nijmegen, 2018, p. 3). This means that, for the energy transition of Nijmegen, the municipality is directly working with 'housing corporations Portaal, SSHN, Standvast Wonen, Talis, Woningbouwstichting De Gemeenschap (WBSG) and Woongenoot' and grid operators 'Liander, Alliander DGO, Nuon and Engie' (Gemeente Nijmegen, 2018, p. 7). Those are actors that are involved in the plan-making process. Civil actors are not directly mentioned in the heat vision, but, according to the municipality of Nijmegen, citizens are involved in the plan-making per neighbourhood later on. P. Blankenstein (personal communication, March 25, 2019) and E. Maessen (personal communication, May 9, 2019) from the municipality of Nijmegen mentioned the presence of an active residential group within the area of Hengstdal, called Duurzaam Hengstdal. This group contributed to the plan-making for this neighbourhood. To grasp the entire policy arrangement, it is important to understand the perspective from actors from all three spheres: state, market and civil society. Therefore, Duurzaam Hengstdal is a key player as well. Because this cooperative solely focuses on Hengstdal, a broader vision on civil actors is desired. According to the *Gelders Energieakkoord* (Van der Ploeg et al., 2015), Burgers Geven Energie is a collective who represent multiple energy cooperatives in southern Gelderland and is therefore able to present an overview of the perspective from multiple civil cooperatives in Nijmegen. Therefore, they are a key player as well.

The document analysis and identification of actors by interviewees resulted into the following multi-actor governance system for Nijmegen (see figure 9). Most of the key players, as elaborated above, were approached for an interview. This eventually resulted in 9 interviews with actors, who have been marked with a red border. An overview of the interviewees can be found in annex 7.1.

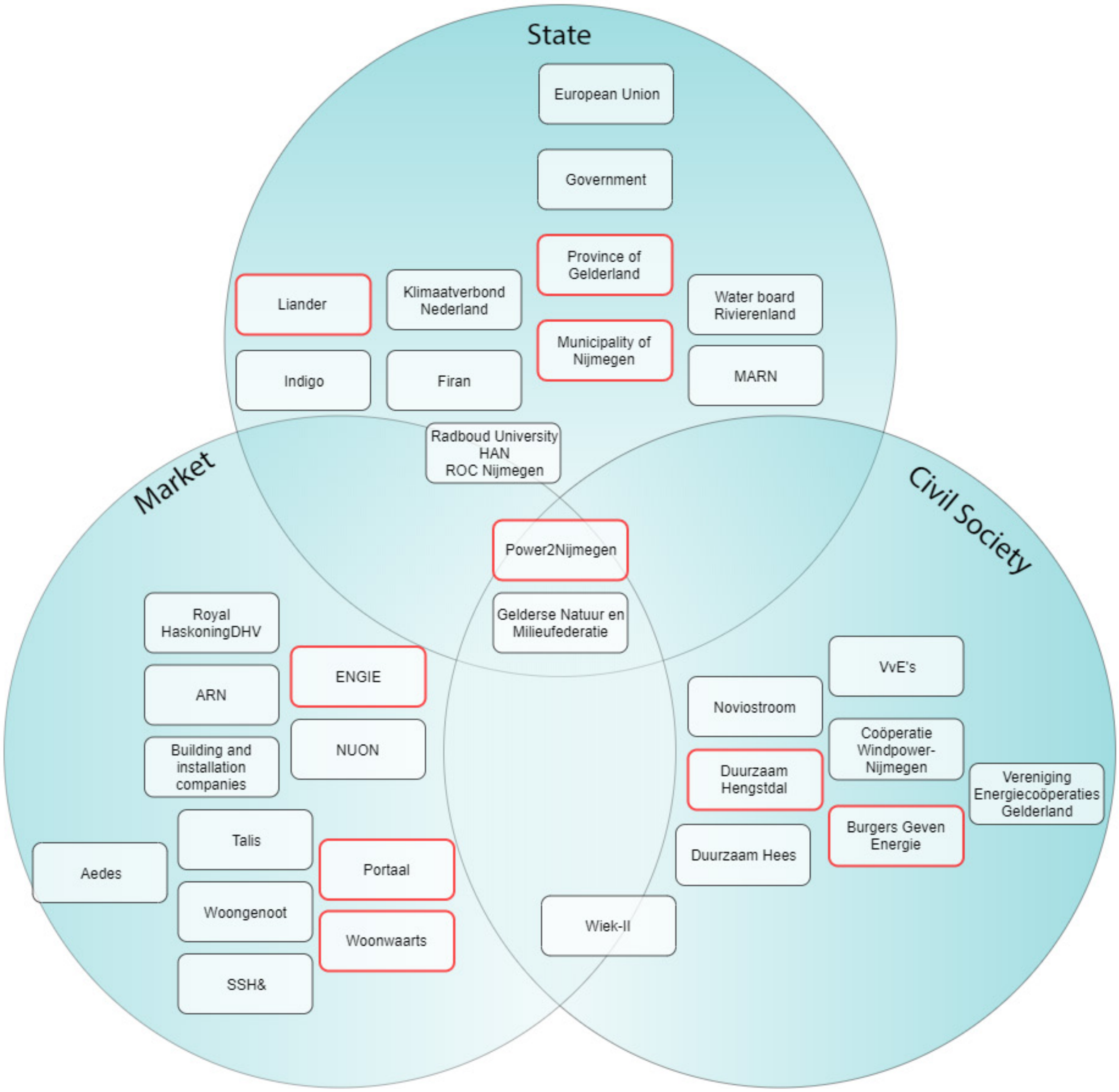

Figure 9: Multi-actor network Nijmegen

State actors

Within the state sphere, 13 actors have been defined. At first, the European Union is important since it aims to harmonise the reduction targets of European countries and has intentions to increase these targets for some countries, including the Netherlands. This means that the Netherlands should strive for 55% reduction in 2030, instead of the original 49% agreed on in the concept Climate Agreement (SER, 2018). The Dutch government is responsible for drafting measures that local authorities should implement, which is done with the concept Climate Agreement. Because the European Union and the Dutch government only set out broad policy goals and measures, they have not been approached for an interview.

Also active on a national scale is Klimaatverbond Nederland. This organisation is a collaboration of Dutch municipalities, water boards and provinces to discuss and align climate policy. An example of their task is initiating the *Gelders Energieakkoord* (Van der Ploeg et al., 2015). Because Klimaatverbond Nederland operates nationally, they are not directly involved with the energy transition process in Nijmegen and therefore not addressed for an interview.

On a lower scale, the province of Gelderland is responsible for drafting Regional Energy Strategies (RES) which will consist of agreements between regional stakeholders on how and where sustainable energy will be generated, stored, transported and implemented in the entire region. Transforming the existing housing stock is an important question within the RES and to guide this process across Gelderland, the Province is directly involved (H. Wouters, personal communication, May 10, 2019). However, the responsibility to draft a plan for the municipal region lies at municipal level (SER, 2018). Therefore, the municipality of Nijmegen is one of the most important actors to achieve a sustainable built environment within Nijmegen and both the Province of Gelderland and the municipality of Nijmegen have been approached for an interview.

Two other state actors are the local water board, Rivierenland, and the MARN. The local water board is a relevant actor because some neighbourhoods in Nijmegen are exploring the possibility of a local heat network, fuelled by surface heat (Gemeente Nijmegen, 2018). The water board then becomes a direct stakeholder. The MARN, a collaboration between municipalities in the Nijmegen region for environmental and waste disposal projects, will become an important stakeholder if waste will stay the primary fuel for the city heat network. Both parties have not been addressed for an interview because their importance within the energy transition of Nijmegen is merely secondary. The water board and the MARN are not directly 'key players'.

Three similar state actors are the grid operator Liander, energy infrastructure builder Firan (former Alliander DGO), and 'Special Purpose Vehicle' Indigo. These actors derive from the national utility company Alliander, but serve different purposes. Firan focuses on sustainable area development. Indigo is a so-called 'Special Purpose Vehicle' with the task to manage the city heat network from the ARN to the neighbourhoods *Waalfront* and *Waalsprong* (H. Wouters, personal communication, May 10, 2019). Liander manages the energy network. If a neighbourhood in Nijmegen will be made more sustainable by implementing all-electric solutions, Liander is responsible for providing enough capacity within the electricity grid. Without enough capacity, an all-electric solution is not feasible. This means that Liander is an important stakeholder to achieve a sustainable built environment in Nijmegen (Gemeente Nijmegen, 2018; Liander, personal communication, May 17, 2019). From the three actors, Indigo and Liander are most concerned with making Nijmegen more sustainable. Because Indigo only focuses on the existing heat network and Liander is involved in the entire energy network of Nijmegen, only Liander has been approached for an interview. Liander can be best classified as a 'key player' and will be the most suited to present an overview of the strengths and weaknesses from the grid operators' perspective on the energy transition of the built environment within Nijmegen.

A small group of actors consist of knowledge institutions. The Radboud University, the HAN and ROC Nijmegen are all involved in the energy transition of the built environment in Nijmegen. Together with other actors, the knowledge institutions conduct research, test and apply practical solutions to create a more sustainable built environment and educate people within the field. According to Dijkstra and Dronkers (2000) it is somewhat vague if a knowledge institution can be classified as a state, market or civil society party. I argue that, because the institutions contribute to societal knowledge gathering and finance this largely with governmental funding, the Radboud University, the HAN and ROC Nijmegen can be best considered as a state actor. Their role is to support other, more important actors within the energy transition of the built environment in Nijmegen. Therefore, the knowledge institutions are not classified as 'key players' and have not been addressed for an interview.

Market actors

The market actors are also well-represented within the multi-actor governance system with 11 actors. To support the Province of Gelderland and the municipality of Nijmegen in drafting their policies, the expertise of Royal HaskoningDHV is often used. Royal HaskoningDHV advises the public authorities on their energy and climate policies and provides technical knowledge on how to stop using gas. This also resulted in a collaboration between Royal HaskoningDHV and the municipality of Nijmegen, called Power2Nijmegen (Gemeente Nijmegen & Royal HaskoningDHV, 2013). This partnership will be further elaborated later on. Because Power2Nijmegen is specifically constituted to deal with the energy transition of Nijmegen, Power2Nijmegen is contacted for an interview instead of Royal HaskoningDHV.

Another market actor is the ARN, the waste disposal facility that functions as the source for the city heat network. The facility produces 100% sustainable heat with landfill gas and grid cooling but most heat is generated through waste incineration. Generating heat by burning waste produces 70% less CO_2 emission than a regular boiler system (Gemeente Nijmegen, 2018). This means that the ARN is a more sustainable heat source than a regular gas boiler but is not completely sustainable. Because the ARN is an executor of the city heat network and not a key player within the energy transition of the built environment in Nijmegen, the ARN is not approached for an interview.

Installation and building companies are part of the energy transition as well. All innovations, such as a heat pump or solar panels, have to be placed and installed in houses. Building and installation companies are the actors that will eventually have to install these innovations for the consumer. This makes these actors also executors of the energy transition instead of policy makers. Therefore, installation and building companies are not addressed for an interview.

Nuon and Engie are both energy distributors who have played an important role when the Nijmegen heat vision was drafted. Regarding the city heat network, Nuon takes over the energy supply from Liander and delivers it to residents in the *Waalfront* and *Waalsprong*. Via this construction, Nuon uses the city heat network to deliver its energy. When this heat network will be expanded through the rest of Nijmegen, Engie wants to join and be able to also deliver energy through the same network (P. Wolbert, personal communication, May 27, 2019). If the city heat network is expanded and how it will operate are important factors for the energy transition of the built environment in Nijmegen. More than half of the built houses are namely expected to connect to this network (Gemeente Nijmegen, 2018). Since Nuon and Engie have contributed to the heat vision of Nijmegen and are expected to have individual interests in the further development of the city heat network, both parties were contacted for an interview. Nuon did not respond, but Engie was able to present their view on the opportunities and barriers within the current policy domain as well as their vision and ideas on its further development. Therefore, Engie is marked in red on the diagram shown in figure 9 as well.

Big players in Nijmegen are the housing corporations. In the Dutch concept Climate Agreement, housing corporations are called the 'starting motor' of the energy transition and the municipality of Nijmegen also perceives housing corporations that way (SER, 2018; J. Tan, personal communication, May 9, 2019). In Nijmegen, five major housing corporations can be found: Talis, Woongenoot, SSH&, Portaal and Woonwaarts. All these corporations were involved when the Nijmegen heat vision was drafted (Gemeente Nijmegen, 2018). Talis, Woongenoot and Woonwaarts are all three only active in the Nijmegen region. From these three housing corporations, Talis and Woonwaarts were approached for an interview. Both parties own a lot of houses in Nijmegen and are actively involved in the plans concerning the energy transition of the built environment. Talis was unable to make time, but Woonwaarts could present a thorough overview of the opportunities and barriers within the policy domain on achieving a sustainable built environment within Nijmegen and their future prospects on this subject. Since the first of May 2019, Woningbouwstichting the Gemeenschap and Standvast Wonen merged into Woonwaarts. This gives Woonwaarts the advantage of owning the majority of houses in a particular neighbourhood. In Hengstdal, about two-third of the corporation property is owned by Woonwaarts. This enables them to execute their sustainability plans more easily.

The SSH&, the student housing association for Arnhem and Nijmegen, owns various complexes throughout Nijmegen and deploys various projects to improve the sustainability levels of their property. By renovating project-based, the SSH& will gradually make their property more sustainable the coming decades. Together with the Radboud medical centre, HAN and ROC, the SSH& investigates how to improve the sustainability levels of houses and buildings on the Heijendaal campus. However, most of their sustainable renovation projects are undertaken alone (Gemeente Nijmegen, 2018). This makes them less interesting for this research since the focus lies on the opportunities and barriers within the entire policy domain of a sustainable built environment. The SSH& could give insight in their projects but would be less suited to present an overview of the opportunities and barriers experienced when planning to achieve a completely sustainable neighbourhood or municipality. Also, other key players did not mention SSH& as an important stakeholder. Therefore, the SSH& is not contacted for an interview. The last major housing corporation in Nijmegen is Portaal. Portaal is one of the biggest players in Dukenburg and Hatert and actively involved in the process of improving the sustainability within these neighbourhoods. Especially how the city heat network can provide energy for these neighbourhoods is subject of discussion (Gemeente Nijmegen, 2018; M. Peterse, personal communication, April 5, 2019). Since these neighbourhoods are one of the first scheduled to get off the gas, insight in this process would be useful to understand the opportunities and barriers within the current policy domain on achieving a sustainable built environment. Therefore, Portaal can be classified as a key player in Nijmegen and is addressed for an interview. So, to elaborate on the opportunities and barriers from the perspective of housing corporations, Woonwaarts and Portaal are selected and marked with a red border in figure 9.

The last actor within the market sphere is Aedes. Aedes is the national sector association that represents the majority of Dutch housing corporations in the national climate debates. The above-mentioned five housing corporations are all represented by Aedes. Therefore, Aedes implicitly influences the policy of the Nijmegen housing corporations and can be defined as an actor within the policy domain on achieving a sustainable built environment within Nijmegen as well. However, Aedes would not be able to give an overview of the opportunities and barriers present in the policy domain since their work field includes all housing corporation property within the Netherlands and sustainability is only one of their work aspects. Aedes would be unable to present a detailed insight in the Nijmegen situation and is not approached for an interview.

Civil society actors

Contrary to the market actors, civil society actors are more homogenous and less present within the multi-actor governance system with a total of 7 actors. The overarching, provincial organisation is the Vereniging Energiecoöperaties Gelderland. This cooperation aims to join forces of individual energy cooperatives in order to achieve mutual goals, such as large scale energy production. Therefore, the Vereniging Energiecoöperaties Gelderland represents the individual energy cooperatives in provincial debates and has also contributed to the *Gelders Energieakkoord* (Van der Ploeg et al., 2015). Under the umbrella of this provincial cooperation fall multiple cooperatives from Nijmegen as well. Because these cooperatives would have a better insight into the local opportunities and barriers, they were approached for an interview instead of the Vereniging Energiecoöperaties Gelderland.

On a somewhat more local scale, Burgers Geven Energie (BGE) operates. This platform supports energy cooperatives within the southern part of Gelderland in successfully establishing their sustainable projects (I. de Jong, personal communication, May 21, 2019). In Nijmegen, multiple energy cooperatives are active. Noviostroom and Coöperatie WindpowerNijmegen both focus on local, sustainable energy production. Noviostroom aims at realising solar roofs with collective purchase for inhabitants of various neighbourhoods across Nijmegen and Coöperatie WindpowerNijmegen is formed through citizen participation and aims to develop energy production locations such as wind turbine and solar parks around Nijmegen (I. de Jong, personal communication, May 21, 2019). Together with other parties, Coöperatie WindpowerNijmegen has realised a wind turbine park alongside the A15. This is done under the name of Wiek-II, which is a coalition between actors that will be further explained later on (Wiek-II, 2013). Because Noviostroom and Coöperatie WindpowerNijmegen operate project-based, the BGE platform is a much more interesting party within the context of this research. BGE supports every energy cooperative within the Nijmegen region and is therefore more likely to know the opportunities and barriers within the entire policy domain from a civil society perspective. Therefore, BGE is addressed for an interview.

Energy cooperatives also originate in neighbourhoods. Since 2018, the neighbourhood Hees knows the energy cooperative Duurzaam Hees. This cooperation aims to stimulate residents within Hees to improve the sustainability levels of their houses and wants to realise a collective sustainable energy production source, such as a solar-roof (Vereniging Dorpsbelang Hees, 2018). An energy cooperative that came forth during interviews with municipal officers is Duurzaam Hengstdal. The municipality of Nijmegen and housing corporations in Hengstdal wanted to involve citizens in their plan-making for this neighbourhood. Therefore, they started Duurzaam Hengstdal as a semi-citizen initiative. Nowadays, this cooperation is an independent cooperation controlled by local citizens with the purpose of achieving a sustainable built environment within the Hengstdal neighbourhood. Their most important task is getting off the gas because, as described before, the municipality aims to achieve a sustainable Hengstdal before 2030 (P. Daanen, personal communication, June 21, 2019). Duurzaam Hees is merely in a starting phase, while Duurzaam Hengstdal is already working closely together with market and state actors and has direct contact with a lot of citizens in the neighbourhood. This makes Duurzaam Hengstdal the most interesting party to talk to about achieving a sustainable the built environment. Duurzaam Hengstdal would be able to present a citizen perspective on the opportunities and barriers the cooperation and citizens within Nijmegen experience. Therefore, Duurzaam Hengstdal is approached for an interview.

The last civil society party are the VvE's. A VvE is an association of home owners that live in the same complex but all own a separate apartment. Together, the home owners can decide to improve the sustainability levels of their complex. The VvE's are only briefly mentioned in the concept Climate Agreement by the SER (2018) and the municipality of Nijmegen has not involved them when drafting the heat vision. This is probably due to the fact that VvE's are often small parties that single-handedly renovate their property. For my research, larger parties within Nijmegen are more interesting. VvE's cannot be classified as key players and are thus not approached for an interview.

Cross-boundary actor coalitions

Some of the previously described actors have initiated collaborations crossing the boundaries of their spheres with the purpose of achieving a sustainable Nijmegen or the Gelderland region. These collaborations have been placed in figure 9 on the overlay between two or three spheres.

Power2Nijmegen is a network organisation of various state, market and civil society parties within Nijmegen and is placed in the overlay amidst the three spheres. The organisation is an initiative from the municipality of Nijmegen and Royal HaskoningDHV to share knowledge between the stakeholders who are concerned with a sustainable Nijmegen (E. Maessen, personal communication, May 9, 2019). During meet-ups, local actors are invited to think about the future developments to achieve a sustainable Nijmegen and co-create plans (Gemeente Nijmegen & Royal HaskoningDHV, 2013). Because a variety of actors from the state, market and civil society sphere join these meet-ups, Power2Nijmegen can give a broad insight on the opportunities and barriers of the Nijmegen energy transition. Therefore, it is relevant to speak to a member of this network organisation and Power2Nijmegen is approached for an interview.

The Gelderse Natuur en Milieufederatie (nature and environmental federation of the Gelderland province, henceforth referred to as GNMF) is an umbrella organisation of various stakeholders in Gelderland from the state, market and civil society sphere. Actors such as the Province of Gelderland, environmental concerned companies, nature- and environmental associations, energy cooperatives and active citizens can join the federation. All the actors endorse the purpose of the GNMF on taking care of the nature and environment within Gelderland. Together with the Province, Klimaatverbond Nederland and Alliander, the federation takes care of consultation between other regional actors (Van der Ploeg et al., 2015). Because the GNMF is particularly active on the provincial level, the federation is not directly involved with the energy transition in Nijmegen. Associated parties, such as local energy cooperatives or active civil groups, would be better suited to present opportunities and barriers within the policy domain on achieving a sustainable built environment within Nijmegen. Therefore, the GNMF is not approached for an interview.

The last collaboration is Wiek-II, an institution specifically founded to create a wind turbine park next to the highway A15. The Coöperatie WindpowerNijmegen and BGE have joined forces with a project developer and the GNMF to establish this wind turbine park (Wiek-II, 2013). Because this cooperation indirectly contributes to the energy transition of the built environment by providing sustainable energy, it is relevant for this research. However, Wiek-II cannot be marked as a key player within the policy domain of a sustainable built environment within Nijmegen and is therefore not addressed for an interview.

4.1.3 Discourse

The second step of the policy arrangement approach consists of identifying the discourses within the policy domain. How the actors think about improving the sustainability of the built environment and act within this domain is central to this discourse. In order to already identify if reward planning might be applicable as a policy instrument, special attention is given to the principal-agent relation between the public authorities as the principal and market and civil actors as agents.

Most state actors can be marked as principal. They are responsible for drafting policies, initiating projects and meet-ups and motivating private parties. The Dutch government authorises lower public authorities to act according to their goals. For regional energy production, the concept Climate Agreement mentions how 'Municipalities, provinces and water boards create, together with grid operators and other stakeholders, Regional Energy Strategies (RES), at least for electricity and heat' (SER, 2018, p. 213). The Dutch government thereby compels regional and local authorities to follow and realise their discourse: the agreed on 49% CO2 reduction. Furthermore, the concept Climate Agreement states how municipalities are 'the directors in the transition to natural gas-free neighbourhoods' (SER, 2018, p. 210). Municipalities are expected to draft a plan to achieve a sustainable built environment which supports the national climate goals.

Regional and local authorities are generally endorsing the governments' goals, thus sharing the discourse. The Province of Gelderland has established a team to realise the goals for the energy transition, with a special department focused on sustainability within the built environment. The department is concerned with supporting and co-funding the municipalities in their energy transition objective. Achieving a sustainable built environment is a local task and should be done by municipalities itself. Municipalities are the directors when it comes to improving the sustainability levels of the built environment. The Province focuses on the entire energy transition and supports municipalities if necessary. Their tasks entail finding feasible locations for electricity and heat production, managing the energy supply to different municipalities and the governance around these processes (H. Wouters, personal communication, May 10, 2019). So, the Province supports municipalities by locating and managing potential energy sources in the area, but expects municipalities to take on their assigned role of director and use the provincial support to achieve a sustainable built environment within their municipal area. Therefore, the Province of Gelderland shares the discourse from the national government and expects local authorities to take on theirs.

The municipality of Nijmegen takes on their role as director of the energy transition. To get every neighbourhood in Nijmegen 'off the gas' before 2045, a project management team has been appointed called '*Nijmegen Aardgasvrij*' which assigns a project manager to every neighbourhood. This manager coordinates with other stakeholders on how to achieve a natural gas-free neighbourhood (P. Blankenstein, personal communication, March 25, 2019). Therefore, this manager, and thus the municipality, relies on stakeholders as well. The stakeholders have to endorse the vision of the municipality in order to avoid agency loss, the phenomenon whereby the interests of the principal (the public authority) and the agent (the executing party) do not match.

The grid operator Liander wants to join the plan-making as soon as possible, because sustainability measures have direct impact on their grid infrastructure. If property owners in a neighbourhood collectively decide to get off the gas, it will immediately require a different demand from the grid infrastructure. Liander is therefore obliged to jump in on time and be prepared for a potential switch from natural gas to alternative energy sources. They have value a sustainable built environment because Liander is one of the facilitators to make it happen (Liander, personal communication, May 17, 2019). They cannot ignore the discourse set by others and have to anticipate on how the ruling discourse will be structured. Since the discourse moves to a more sustainable built environment, Liander has to act accordingly.

Energy distributor Engie strives to be sustainable as well and intends to 'fully move along and take initiatives towards complete sustainability' in which improving the sustainability of the built environment is one of the most important aspects (P. Wolbert, personal communication, May 27, 2019). In Nijmegen, the city heat network is expected to provide a lot of residents an alternative for fossil fuels. This heat network is open, but currently only in use by Nuon due to a contract with the heat networks' owner Indigo. In order to realise sustainable ambitions in Nijmegen, Engie wants to distribute energy through this network as well. If multiple energy distributors are allowed to use the city heat network, it is conceivable that the consumer will profit from lower energy prices. This gives Engie the opportunity to extend their sustainable energy supply while connecting new consumers (P. Wolbert, personal communication, May 27, 2019). So, Engie endorses the general discourse on achieving a sustainable built environment because of their intrinsic values and their perspective as a market party.

The interviewed housing corporations in Nijmegen, Portaal and Woonwaarts, take on the general discourse on improving the sustainability levels of the built environment if it does not increase their tenants' rent. Affordability is a hard demand for housing corporations. M. Peterse (personal communication, April 5, 2019) states how Portaal strives for 'an energy neutral, climate adaptive, circular housing stock in 2050' because it is 'socially and politically motivated' and by improving the sustainability levels of their property 'it is possible to control or restrain the energy bill (...) helping the affordability of our tenants'. So, they view improving the sustainability levels of the built environment as a win-win situation: it supports the societal and political perspective on sustainability and enables them to get a grip on their tenants' energy consumption, which could lead to lower rental costs. Portaal can therefore identify itself with the general discourse of the municipality of Nijmegen. Woonwaarts takes on a practical point of view, as J. Tan (personal communication, May 9, 2019) mentions how 'most corporations, like us, focus on affordability. (...) An alternative energy solution cannot cost more than what a tenant pays for its energy at this moment'. Woonwaarts is willing to go along with the discourse of public authorities but puts their tenants in the first place: 'we are no sustainable corporation, liveability and affordability take precedence'. But, Woonwaarts 'follows all the national rules and is one of the first in Nijmegen who has finished improving the sustainability levels of their property to label B, which is due next year'. This means that, according to national agreements, Woonwaarts is a sustainable corporation. But, they mainly act sustainable because of these targets. J. Tan (personal communication, May 9, 2019) continues with the fact that 'sustainable energy' from the ARN is not completely sustainable, but 'if the municipality asks us to join, (…) then they can't blame us if it is not CO2-neutral. I consider it as 'check', I took part in making Nijmegen sustainable.' So, even though the general discourse to achieve a sustainable built environment does not come from housing corporations in Nijmegen, the corporations are willing to make theirs as long as it does not financially disadvantage their tenants. To a certain degree, they are willing to put in an extra effort to do more than the agreed on targets, but it is not their primary concern. The municipality is responsible for setting the discourse and finding a way for housing corporations to act accordingly.

Most civil actors have been established with the objective of contributing to the energy transition. Therefore, most of them already endorse the general discourse. Duurzaam Hengstdal, for instance, is established with the purpose of achieving a sustainable Hengstdal and improving the sustainability levels of the built environment is one of their most important aspects (P. Daanen, personal communication, June 21, 2019). Hengstdal has lots of active residents that are willing to take on this objective and improve the sustainability of the neighbourhood together. However, it cannot be said that every citizen within Nijmegen is a proponent of the municipalities' sustainability policy. Lots of citizens in Nijmegen think: 'it is what the municipality wants, so they can make it happen'. Unfortunately, the gas supply will stop one day. And to prevent citizens from being left in the cold, it is important that they understand the consequences of the energy transition (E. Maessen, personal communication, May 9, 2019). Woonwaarts also stresses the hesitancy from residents and renters: 'the urgency is just not felt by residents and individual home owners' (J. Tan, personal communication, May 9, 2019). Mostly wealthy people do it because of their own interest, and not because the government wants them to act this way. 'There is a lot to win there,' continues J. Tan, 'how do we get people to join this turnaround?'.

Between the actors in Nijmegen, a certain degree of agency loss is present. Most executing actors endorse the discourse of the public authorities. They share the same interests and pursue the same objectives. This can be classified as an opportunity, since the willingness of private parties is required to successfully improve the sustainability levels of the built environment. Only the housing corporations act primarily on behalf of their tenants' affordability. This might lead to agency loss, since housing corporations will only strive for sustainability if the affordability demand is met. Until now, housing corporations found a way to reach the agreed on energy targets and agency loss is not directly present. But, it might be a future risk factor if housing corporations are not willing to share the general discourse, because the municipality needs property owners to carry out their energy transition. If housing corporations 'do not cooperate (...) municipalities will never achieve their sustainability goals' because 'addressing individual home owners is certainly not working', states J. Tan (personal communication, May 9, 2019) from Woonwaarts. This is true, because between the public authorities and citizens, agency loss is much more likely to happen. Many citizens do not endorse the general frame of thought on the energy transition and do not feel the urgency to get off the gas. But, as E. Maessen (personal communication, May 9, 2019) mentions, the municipality 'cannot pass through the front door'. Every citizen decides for themselves whether they want to improve the sustainability levels of their property or not. A great number of people do not share the municipalities' interest and has no intention to improve the sustainability levels of their property. This indicates agency loss and is the first actual barrier to emerge out of this research.

4.1.4 Resources

Resources can be mainly divided in to economic, cultural and social capital. What kind of, and how many resources an actor possesses, influences the amount of power the actor has to change the outcome of the policy domain. All interviewees were selected as 'key players' with enough resources to be influential within the policy domain, but the mutual differences in type and amount of resources has not yet been addressed. This will be explained in this paragraph to understand the relations between actors.

The governmental actors feature mostly economic capital. By issuing subsidies or investing in sustainable projects, they aim to stimulate and support other actors who require funding to improve the sustainability levels of their property and contribute to the energy transition. For Gelderland, the Province has agreed to invest €30 million annually to support projects in favour of the energy transition (H. Wouters, personal communication, May 10, 2019). With this investment, the Province endorses their vision on the importance of the energy transition. However, the entire province should benefit from this investment and it is therefore focused on projects. Property owners can only claim other subsidies. The subsidies are still fully available because of the early stage the energy transition is currently in. Thus, as a citizen, it is sensible to improve the sustainability levels of their property as soon as possible (P. Daanen, personal communication, June 21, 2019). The problem is that these subsidies do not cover all the costs and property owners still have to finance about €30.000+ for sustainable measures themselves, depending on the state of their property. Most of them are not capable or willing to pay this (J. Tan, personal communication, May 9, 2019). This is also related to the fact that a lot of citizens do not see the necessity of the energy transition right now. For the growing number of citizens that wants to improve the sustainability levels of their property, funding is an enormous barrier. This makes acting in favour of the energy transition less appealing. The government should provide opportunities to increase the attractiveness of improving the sustainability levels of the built environment, and there are multiple ways to achieve this argues P. Daanen from Duurzaam Hengstdal (personal communication, June 21, 2019). The most realistic measure is building-related financing, which also came forth out of the concept Climate Agreement. This form of financing has not been implemented yet, because 'there are numerous preconditions we encounter, these have to be arranged first', states E. Maessen from the municipality of Nijmegen (personal communication, May 9, 2019). So, the municipality lacks the knowledge, or cultural capital, to carry out a proposed measure from the concept Climate Agreement. This causes a domino-effect, because it thereby fails to support property owners in their desire to create a sustainable home and contribute to the energy transition.

The lack of knowledge also plays a part for housing corporations. Corporations are the most interesting partner for municipalities, since they own a lot of economic capital in the form of property which the municipality aims to use as 'starting motor'. Without the cooperation of housing corporations, the municipality will never succeed in achieving a sustainable built environment (J. Tan, personal communication, May 9, 2019). But, as mentioned before, housing corporations put affordability in the first place. In order to improve the sustainability of their housing stock, housing corporations have to be sure it will not lead to extra costs they have to pass on to their tenants. M. Peterse (personal communication, April 5, 2019) adds another restraining variable: the amount of available rental housing. Housing corporations have to provide the agreed on amount of (social) rented property in a municipality. He describes this objective as the 'devil's triangle' between 'affordability for the tenant, availability, having enough rental housing, and sustainability, the costs of improving sustainability levels of their property'.

This compels them to take on safe and smaller sustainable investments first. A common method are the so-called 'no regret'-measures, such as improving isolation. Woonwaarts mentions that they are 'trying to implement as many 'no regret'-measures as possible, (...) because keeping the produced heat in a house is never regrettable' (J. Tan, personal communication, May 9, 2019). Portaal agrees to this by stating how they 'absolutely stimulate isolation measures to the shell (of a house) and in engineering', whereby M. Peterse (personal communication, April 5, 2019) with the latter refers to upcoming innovations in isolation-techniques. Isolation measures guarantees housing corporations a lower energy bill, thus lower costs. So, these are measures housing corporations are always willing to implement.

Bigger sustainable measures have less certainty because housing corporations cannot oversee the consequences. They are therefore reluctant to act directly (J. Tan, personal communication, May 9, 2019). The heat network in Nijmegen is a good example. As shown in figure 8 (paragraph 3.2.2), the heat network will be extended like a loop through the city. This is agreed on in the Nijmegen heat vision (Gemeente Nijmegen, 2018). According to J. Tan (personal communication, May 9, 2019), a high-temperature heat network is the most affordable solution to get their property off the gas. Housing corporations are satisfied with the proposed loop, because it offers certainty on which houses can connect to it. However, it is still uncertain when this heat network will be realised, thus housing corporations lack the necessary information and prefer to wait until the municipality concretises their plans for the Nijmegen city heat network. M. Peterse (personal communication, April 5, 2019) nuances the affordability of a heat network. If the Nijmegen heat network is going to be expanded, the owner of the network contacts housing corporations first. Housing corporations can provide a large housing stock at once, thus is the most interesting negotiation partner to make a large-scale heat network profitable. Starting with individual residents is a very uneconomical investment. However, housing corporations need the guarantee that residents will connect as well because otherwise it is too expensive for housing corporations and it will put the affordability for their tenants at stake. Therefore, the lack of knowledge about external developments slows down the investments housing corporations can make.

The uncertainty with regard to the heat network reaches beyond its consumers. E. Maessen (personal communication, May 9, 2019) states that 'a lot of issues are present about: where ends the ownership of the heat pipe? Is it until the front door? Is it until the heat regulator? (...) Who wants to be responsible for what?'. This discussion plays in particular between the grid operator and energy distributors. As mentioned, Nuon currently has the exclusive right to distribute energy through this network. Engie wants to use it as well, especially if the heat network will be expanded (P. Wolbert, personal communication, May 27, 2019). The discussions between Firan, Liander, Nuon and Engie about who fulfils what role are currently taking place but have not led to any certainties about the future of the city heat network (Liander, personal communication, May 17, 2019). The source for the city heat network is at stake as well. The heat generated by the ARN relies for a big part on waste incineration. If the heat network will expand and must supply a large part of the homes in Nijmegen, a lock-in situation is possible. This would make

Nijmegen 'depend on waste' whereby 'you have to make an effort to create waste flows because you need it for your heat provision' (H. Wouters, personal communication, May 10, 2019). Therefore, the municipality of Nijmegen is occupied with finding other sustainable energy sources for the city heat network, which complicates the process even more (E. Maessen, personal communication, May 9, 2019).

Because numerous actors are involved in the exploitation and usage of the heat network, actors are left in uncertainty and refrain from taking action. This links to social capital, the form of capital that indicates the network between actors that enables them to benefit from the economic and cultural capital of others. If it is certain who will own the heat network and when it is going to be realised, the owner can start negotiating with housing corporations and other potential consumers in the area, such as citizens and companies.

An external factor which is able to influence the economic capital of multiple actors is the economic cycle. After the economic crisis, building prices have skyrocketed. Due to the enormous building costs at this moment, improving the sustainability levels of property is for a lot of actors unaffordable. 'We are spending insane amounts of money for a regular renovation, fár above hundred grand', states M. Peterse (personal communication, April 5, 2019) from Portaal. But, housing corporations do profit from the economic cycle. Whatever the conjuncture looks like, housing corporations have a steady income. The rental revenues do not differ. This enables housing corporations to always implement 'no regret'-measures and built a buffer for bigger expenses. With the larger expenses, it is favourable to wait until the economy falls into the next crisis. When the economy collapses, housing corporations continue to earn rental revenues but also have money to invest in sustainable projects. During low conjuncture, building prices are much more favourable. Therefore, M. Peterse (personal communication, April 5, 2019) mentions: 'it is almost waiting on the next crisis that would be positive for achieving a sustainable built environment'.

As the foregoing indicates, several barriers can be distinguished from the resources-dimension. At first, the municipality of Nijmegen (and other public authorities) possess the economic capital in the form of subsidies and investments, but they have not found a way to fully deploy their capital in favour of the energy transition. In other words: the municipality lacks the knowledge to use their economic capital as motivation for property owners to improve the sustainability levels of the built environment. But without the cooperation of property owners, the municipality of Nijmegen will have a hard time to achieve their sustainability ambitions. This lack of knowledge also reflects in another barrier: the uncertainty about the heat network. Numerous actors are involved in the debate about managing the proposed heat network and possible consumption of its energy. But, it is still uncertain who will be the owner of the heat network, where this ownership ends, who is allowed to use it, when it is going to be built and what the connection fees will be for consumers. These are a lot of unknown variables among actors in Nijmegen that affect others and lead to uncertainty on a social capital level as well. None of the actors knows for sure what kind of economic and cultural capital another actor can bring in and how they can benefit from their capital, so they refrain themselves from taking action. Thus, all three forms of capital are present among various actors in the policy domain on achieving a sustainable built environment in Nijmegen, but especially the lack of cultural and social capital leads to barriers within this domain.

4.1.5 Rules

The fourth and last dimension of the policy arrangement approach consists of the rules. With the *Wet Voortgang Energietransitie*, newly built housing cannot connect to a gas network anymore. This type of strict regulation is not available for the built environment. The municipality of Nijmegen mentions this as a barrier: 'We come across a lot of legal bottlenecks. We are not allowed to say: the gas supply stops. We still have the gas connection obligation for the built environment' (E. Maessen, personal communication, May 9, 2019). They expect that some kind of regulation will come in the future, however it is not something the municipality desires: 'At this moment, support from residents is something we would much rather have', he continues, 'but it is the last solution for people who are absolutely reluctant to participate. Look, at a given time, it is unaffordable to preserve the gas network for only one citizen'. The housing corporations see a strict regulation as the most effective tool as well: 'if you want to collectively change something, it is necessary', J. Tan (personal communication, May 9, 2019) says. 'And definitely for private homeowners, because for them, there is nothing going on right now'. From a civil society perspective, Duurzaam Hengstdal agrees on how binding regulation would help to motivate individual homeowners. P. Daanen (personal communication, June 21, 2019) states: 'What is missing is specific legislation. (...) for example the permission to get rid of the gas connection obligation'. This will help to set a deadline, and is favourable for every party concerned with achieving a sustainable built environment in Nijmegen. 'People have to know 8 years in advance when the gas supply stops, this gives them enough time to take measures. This law must be enacted quickly because it will make it clear for everyone: Hengstdal will get off the gas in 2030'. The lack of these clear deadlines enables the municipality to 'let it float (…) it is useful for everybody to have clear deadlines, even though some people won't like it', argues P. Daanen.

For housing corporations, the municipality has made agreements with housing corporations, the so-called 'performance agreements'. These include national agreements, such as the demand for label B isolation. The performance agreements are currently the most concrete form of agreements between the municipality and housing corporations to achieve a sustainable built environment (P. Blankenstein, personal communication, March 25, 2019; E. Maessen, personal communication, May 9, 2019). But, 'only making agreements with housing corporations (...) is a single drop in the ocean', states J. Tan (personal communication, May 9, 2019), 'all the property of housing corporations in the Netherlands is only 28%, (...) this means that not even one-third of the housing market will be made sustainable' by only addressing this part of the built environment. So, the performance agreements can be seen as a 'false security', J. Tan states. Only making housing corporation property more sustainable – and not paying enough attention to private home owners – will never result in reaching the sustainability targets from the municipality or the agreements set out in the concept Climate Agreement.

Another important rule housing corporations are bound by is the minimum of 70% residential support. If a housing corporation decides to improve the sustainability levels of their property, 'the rule is that we are required to have 70% approval from our residents in order to carry out our measures' (M. Peterse, personal communication, April 5, 2019). So, if not enough renters agree on the proposed measures, the project cannot proceed. Therefore, housing corporations put a lot of effort in communicating with residents, M. Peterse from Portaal states: 'communication is thé key to be successful in achieving a sustainable built environment'. J. Tan (personal communication, May 9, 2019) from Woonwaarts agrees: 'it is not just the built environment, but it is about people who are going to live in these houses. I do not think you can see them separately'. So, because of the mandatory 70% residential support, housing corporations are putting effort in motivating their residents as well. In this case, a strict regulation stimulates communication between the housing corporations and residents which eventually leads to a better understanding among renters about the need and urgency of the energy transition.

For individual residents, and especially residents within an energy cooperative, the long permit procedures and complicated bureaucracy of the municipality is a barrier. For example: if a group of residents wants to improve the sustainability of their terraced house, 'there is often trouble with having to go to the municipality for a building permit and also the aesthetics committee who interferes again' (P. Daanen, personal communication, June 21, 2019). This takes extra time but also increases the costs for individual residents, which feels like an extra barrier. Residents rather spend this time and money on implementing sustainable techniques into their homes. Predetermined rules and regulations about sustainable measures would increase the opportunity for individual residents to actually get started on making their homes more sustainable, P. Daanen argues.

Also, the spatial legislation about citizen participation can delay large-scale energy production projects. Project developers aim at realising as quickly as possible, but tend to forget the importance of local citizens. With the upcoming Environment and Planning Act, having residential support will become a strict norm before projects can start. With the current legislation, it is desirable but not always required. So, it is conceivable that the new legislation will delay projects because project developers are not accustomed to involving local residents and energy cooperatives in every stage of their project (I. de Jong, personal communication, May 21, 2019).

Less obvious, but definitely important for Nijmegen, are the aesthetic demands of old dwellings. Nijmegen has a lot of historical buildings and protected cityscapes which may not be renovated due to their aesthetic demands. This is a legal barrier, because a special commission can issue a permit to deviate from the demands. According to the municipality of Nijmegen, a permit is rarely granted (E. Maessen, personal communication, May 9, 2019).

So, most proponents of the energy transition expect no big results without binding regulation. This binding regulation is desired because it offers guidance and a clear deadline to every actor to realise a sustainable built environment. However, the municipality prefers to accomplish it with residential support, instead of having to use some form of legislation. This is also in line with the way of thinking from the upcoming Environmental and Planning Act, wherein citizen participation has been identified as one of the foundational pillars.

4.1.6 Opportunities and Barriers

Based on the analysis of the policy domain, numerous opportunities and barriers can be distinguished. These will be briefly summarised below. Especially the barriers can be considered as underlying reasons for why the built environment in Nijmegen is not so easily made more sustainable. Therefore, most attention is paid to the barriers in this paragraph.

Actor analysis
As the actor analysis described, numerous actors who are more or less involved with achieving a sustainable built environment in Nijmegen can be found. These actors are mostly present within the state or market sphere. Examples are the Province of Gelderland, the municipality of Nijmegen and grid operator Liander as state actors and energy distributor Engie and housing corporations Portaal and Woonwaarts as market parties. The variety in actors, such as policy makers, energy suppliers, grid operators, know-

ledge institutions and property owners is regarded as the first opportunity in this research. The multiple professions allow for a holistic approach to the sustainability issues in Nijmegen and offer the opportunity to start partnerships. In the civil society sphere, smaller energy cooperatives, like Duurzaam Hees or Hengstdal, are actively involved with achieving a sustainable built environment. However, these actors focus on one neighbourhood in particular and there is no civil collective organisation for all neighbourhoods in Nijmegen. Therefore, the state and market parties are over-represented in comparison to civil society actors. This indicates a possible barrier, namely the lack of interest from the civil society sphere.

Discourse analysis

This lack of interests from individual residents is mentioned by several respondents in this research. Individual residents, who are not connected to the energy cooperatives, usually do not feel the urgency of the energy transition. Therefore, only the civil collectives are actively involved with achieving a sustainable built environment in Nijmegen. The lack of urgency among residents is a barrier because the municipality needs the cooperation of every individual resident. The municipality cannot, and does not want to, 'force' residents to improve the sustainability levels of their property. The difference between the municipals policy and individual residents' interest indicates agency loss – whereby the municipality is struggling to achieve their policy goals. However, this lack of cooperation only comes from the civil society sphere. State and market parties are actively participating in the energy transition by drafting and carrying out sustainable plans and ideas, establishing departments dedicated to sustainability and meeting with other stakeholders. The intrinsic motivation from these parties to act pro-environmentally helps achieving the municipalities' energy goals and motivates other parties to contribute as well. There is, however, one reservation from housing corporations that came forth during the discourse analysis: corporations in Nijmegen are only willing to improve the sustainability levels of their property if it does not lead to rent increase for their tenants. This means that housing corporations set conditions to their willingness of taking measures to achieve sustainable property. This is a barrier, since the municipality of Nijmegen is also, for a large part, dependent on housing corporations to fulfil their energy transition targets.

Resource analysis

The resource dimension for Nijmegen is complex. Obviously, housing corporations and individual residents own a large part of the property in Nijmegen that is in need of sustainable transformation. This is one of the most important resources. To improve the sustainability levels of this property, housing corporations and individual residents require economic resources. Governmental parties try to provide housing corporations and individual residents with economic resources, such as loans and subsidies. However, the municipality lacks the know-how to effectively do so. It is uncertain what financial resources are available for sustainable development on the long term. This refrains individual residents, and to some degree even housing corporations, from investing in sustainable measures to improve the sustainability levels of their property. This is a clear barrier.

The concrete plans for the development of a heat network in Nijmegen can be regarded as an opportunity. The heat network is proven to be effective in the northern part of Nijmegen and it can be unrolled as a loop through the city and offer a more sustainable heat source to almost half of the 80.000 houses. With the presence of this system, Nijmegen knows an important resource to propel the energy transition.

However, it is yet uncertain what resources can and will deployed to effectively achieve a sustainable built environment. An obvious solution is the proposed extension of the heat network, but how this will be extended and who will own this network is still uncertain. This also counts for how this heat network will be sustainably fuelled, since the ARN is not completely sustainable. Actors concerning the (possible) exploitation of the heat network are left in the dark when it comes to what resources they can deploy and how they can benefit from others. If the heat network will be expanded, it is too expensive for property owners to invest in other sustainable measures. So, the uncertainty about division and usage of resources also leads to delay and can be defined as a barrier.

Rules analysis

As for the rules dimension, multiple actors mention that the lack of active regulation leads to not enough results in achieving a sustainable built environment. Especially market and civil society actors are proponents of a strict legal deadline to get off the gas. They argue that it creates awareness among citizens and will be the only effective solution when Nijmegen wants to realise its climate ambitions. This type of regulation cannot be fixed so easily. By drafting this law, people will be limited in their rights. If Nijmegen decides to invoke this law and get off the gas, housing corporations and residents are compelled to do so. Otherwise they will be, literally, left in the cold. This kind of law is probably not favourable by regular residents who do not experience the urgency of the energy transition. It can therefore only be seen as the final option if less radical measures do not lead to the desired results. The absence of this law can be seen as a barrier, because the current measures have not led to sufficient results.

On the other hand, the necessity of too much regulation on simple sustainable renovations is experienced as a barrier. Members within an energy cooperative have to spend time and money on building permits and other permit procedures. These procedures hinder the opportunity to spend all available resources on the implementation of sustainable techniques. The presence of too many procedures is therefore appointed as a barrier, because it slows down the actual energy transition.

Furthermore, the public authorities preferable make use of agreements with market and civil society parties. For instance, the performance agreements with housing corporations compel the corporations to take action and gradually improve the sustainability of their property. More informal agreements with civil collectives, such as with Duurzaam Hengstdal, put pressure on the implementation of sustainable measures. These agreements are marked as opportunities, since it helps speeding up the energy transition of the built environment within Nijmegen.

Schematic overview

In the previous paragraphs, a number of opportunities and barriers came forth. To construct a clear overview, these opportunities and barriers are schematically presented in the table below.

Dimension	Opportunities	Barriers
Actors and Coalitions	Various state and market parties present	Few civil society parties present
Discourse	Intrinsically motivated and active state and market parties	Lack of urgency among residents
		Housing corporations have set reservations regarding rent increase
Resources	The (possible) deployment of a city-wide heat network	Uncertainty about the availability of financial resources
		Uncertainty about sustainability measures
Rules	Agreements between municipality and private parties	Lack of effective regulation
		Too much complicated permit procedures for individuals

Table 2: Opportunities and barriers

4.2 Reward Planning

As paragraph 4.1 elaborated on, numerous opportunities and barriers can be found within the policy domain on achieving a sustainable the built environment in Nijmegen. To strengthen the opportunities and overcome the barriers, the applicability of reward planning as a policy instrument is analysed. Therefore, paragraph 4.2 focuses on answering the second research question:

'*To what extent can reward planning be a suitable policy instrument to strengthen opportunities and overcome encountered barriers within the policy domain on achieving a sustainable built environment in Nijmegen?*'

4.1.3 Theory of Planned Behaviour

To analyse the applicability of reward planning, Ajzens' (1991) framework of the theory of planned behaviour is applied. This is done to understand what the attitude of actors in Nijmegen is towards acting pro-environmentally at this moment and to what extent reward planning as a policy instrument can change this behaviour.

Attitude towards behaviour

The first variable is the attitude of actors towards carrying out pro-environmental behaviour. The discourse analysis mainly provides the answer to this. Public authorities are positive towards acting sustainable, and aim at stimulating market and civil society actors to share their discourse. Most residents do not feel the urgency of the energy transition, nor the need to act pro-environmentally. Among some residents the desire to act pro-environmental is present, and they unite themselves into energy cooperatives with the purpose of improving the sustainability levels of their property and motivate others to do the same. For housing corporations, being sustainable is something they want to, more or less, act upon. However, this attitude is often constrained by financial barriers. Other market parties, such as the grid operator and energy distributors, have a positive attitude towards sustainability and see no future without being sustainable. They are actively deploying means to give body to this attitude. So, between parties the attitude towards pro-environmental behaviour differs. Especially single property owners are not directly positive towards sustainability.

Subjective norm

The subjective norm indicates the perceived social pressure to perform or not perform pro-environmental behaviour. The municipality of Nijmegen experiences pressure through agreements made with the provincial and national government and through their own, established vision to get off the gas before 2045. These agreements force them to act pro-environmental. And Nijmegen values their pioneering role. They are striving to be one of the first sustainable municipalities in Gelderland (P. Blankenstein, personal communication, March 25, 2019). In order to reach the agreed on targets, the municipality also puts pressure on market and civil society parties.

For instance, Duurzaam Hengstdal is one of the first civil cooperatives that actively aim to achieve a sustainable neighbourhood. This goal is largely influenced by the municipality (E. Maessen, personal communication, May 9, 2019). The municipality of Nijmegen puts pressure on this cooperative, and the residents of Hengstdal, to achieve a sustainable neighbourhood because the acquired knowledge can be applied by the municipality to improve the sustainability of other neighbourhoods in Nijmegen. The municipal pressure in Hengstdal led to resistance at first, but inhabitants have become more accustomed to their faith as one of the experimental neighbourhoods in Nijmegen. The energy cooperative contributes to this by showing the advantages of being a starter, such as the ample availability of subsidies (P. Daanen, personal communication, June 21, 2019). Via the municipality and the energy cooperative, residents in Hengstdal perceive social pressure which may or may not change their environmental behaviour.

Housing corporations experience pressure from public authorities with performance agreements and other housing corporations by them successfully implementing sustainability projects. As mentioned before, housing corporations do not put sustainability as their top priority. But, through social pressure from others, housing corporations feel the need to act pro-environmental (M. Peterse; personal communication, April 5, 2019; J. Tan, personal communication, May 9, 2019). Thus, the perceived social pressure is an important factor for housing corporations to act pro-environmentally.

Other market parties, like the grid operator or energy distributor, indicate that, except from their inner values, especially societal pressure influences their behaviour. Liander (personal communication, May 17, 2019) mentions how residents, housing corporations and organisations who want to improve the sustainability levels of their property compel the grid operator to act pro-environmentally. Liander has to operate the supporting energy grid. Their public task is to be prepared for the changes the energy transition is going to bring on their grid network. Therefore, pro-environmental behaviour is directly influenced by societal pressure from other parties, such as the energy consumers. P. Wolbert (personal communication, May 27, 2019) from Engie states that, because of the energy transition in general, their business as a energy distributor is totally going to change: ‘the only way to keep developing as a company (…) is to move along, or even better: take the lead’. Engie’s intention to carry out pro-environmental behaviour is, thus, also shaped through the societal trend of the energy transition in general. This translates into their own values and the desire to take on a pioneering role. Furthermore, the willingness of other parties to act pro-environmentally also structures their behaviour, because, just like Liander, Engie relies on the actions of energy consumers for their business.

Perceived behavioural control

The perceived behavioural control implies the perception actors have to carry out pro-environmental behaviour. The actual ability to carry out certain behaviour is also influenced by the perception actors have on the physical practicability of this behaviour. For instance, if solar panels are completely subsidised, it will be much more feasible for less wealthy actors to place them on their roofs. This enhances the perceived ability to carry out pro-environmental behaviour.

P. Daanen (personal communication, June 21, 2019) from Duurzaam Hengstdal mentions the importance of perceived behavioural control. When the neighbourhood wanted to get off the gas, various studies have been done to find the most suitable option. Connection to the city heat network was not feasible and converting all houses to an all-electric solution was not possible either. Because there was no ‘general solution’, achieving a sustainable built environment within Hengstdal became much more complex. This increased the reluctance to act pro-environmentally among residents. Residents experience uncertainty with regard to pro-environmental measures to be taken, thus choose to wait or not act at all. Associated to this, is the bureaucracy of public authorities. If residents want to take action, they await various contact points and long permit procedures within the civil service. Whether their actions can be put into practice is often uncertain from the beginning. This lowers the perceived ability to carry out desired pro-environmental behaviour.

From the public authorities’ point of view, the municipality is not able to give certainty about pro-environmental measures because the numerous developments are still in progress. They do not have enough certainty themselves. An important aspect which has been mentioned before is the unknown outcome of the proposed city heat network (E. Maessen, personal communication, May 9, 2019). If the energy sources for every neighbourhood are mapped out, individual residents have much more certainty on which measures to take.

The uncertainty concerning the heat network affects the perceived behavioural ability of market parties as well. Housing corporations mention how they are willing to connect to the heat network, thus act pro-environmentally, if it does not financially jeopardise their tenants. They request certainty in order to act (M. Peterse, personal communication, April 5, 2019). The same applies to Engie, who is willing to deliver sustainable heat through the proposed city heat network if they have the certainty to build a profitable business case (P. Wolbert, personal communication, May 27, 2019). Liander, on the other hand, has no profit motive. They are a publicly-regulated company and act on behalf of the energy consumers in their operating area (Liander, personal communication, May 17, 2019). But, since Liander takes on a facilitative role, they mostly act in response to social movements, such as an entire neighbourhood wanting to get off the gas. This makes their perceived behavioural ability initially difficult. Liander partly relies on other actors and is, thus, partly dependent on others to carry out their pro-environmental behaviour.

So, concluding, most actors in Nijmegen hesitate to act in favour of the energy transition because of the uncertainties present in the existing policy domain. This uncertainty mainly results from the ambiguity about the proposed sustainable energy sources that may or may not be implemented in Nijmegen. Acting pro-environmental is thereby partly blocked.

4.2.2 Reward Planning as Instrument

To understand if pro-environmental behaviour can be stimulated by applying reward planning, it is added to the framework of the theory of planned behaviour. Reward planning is an external factor, which can influence the perceived behavioural control. Via the possible influence on behavioural control, pro-environmental behaviour might be stimulated. If an end-user, such as (a group of) residents or a housing corporation, experiences the availability of reward planning as stimulant to strengthen opportunities or overcome encountered barriers, it can be argued that reward planning adds value as a policy instrument to achieve a sustainable built environment.

Because of the scarce research on reward planning, the content-related information used in this paragraph is mostly gathered through interviews held with J. Oosterkamp, a senior environmental law expert and creator of reward planning-policies, and P. Klompen, a municipal officer and expert in the field of applying reward planning as a policy instrument. Their expertise is woven through this paragraph. In addition, more practical information on the Nijmegen case is provided by the interviewees shown in figure 9. To structure the analysis on reward planning, the five criteria for successfully implementing reward planning as a policy instrument were used (see paragraph 2.3.6).

Public goals, private means

The first criterion is about applicability in general. A public authority, in this case the municipality of Nijmegen, can only make use of reward planning if they aim at realising public goals on or using private property. After all, if the municipality owns the property itself, it does not require any policy instrument to fulfil their desires. This applies to the policy instrument reward planning as well.

E. Maessen, from the municipality of Nijmegen, states the following: 'the crux with the entire energy transition is that we cannot pass through the front door. So, everybody decides for themselves whether they cooperate or not' (personal communication, May 9, 2019). This directly indicates that the first criterion is met. If the municipality owns the built environment itself or is able to upgrade the sustainability levels of property without citizens' cooperation, the whole energy transition would be less difficult. The fact that the municipality (and higher governmental institutions) aim to create a more sustainable built environment but cannot realise it themselves makes policy instruments necessary. Thus, reward planning could be suitable policy instrument for this topic.

Spatial reward

The second requirement is the policy instruments form. As elaborated before, reward planning is about granting a certain right to private parties when they fulfil public goals. Only the public authority is authorised to change these spatial rights, thus reward the private party for its efforts. This is an important condition of reward planning: the public authority should make use of its exclusive power to alter spatial rights. Otherwise, there can be no question of reward planning as a policy instrument.

For private parties, the exclusive spatial right they will receive in return for their favours should be appealing. It should offer a solution to the problems they encounter or be stimulating enough to change their minds and act in favour of the energy transition. From the discourse analysis arose that mainly citizens do not see the urgency of the energy transition, refraining them from taking action. The urgency itself cannot be triggered by applying reward planning, but, by offering spatial rewards, residents might consider thinking about the energy transition. If a spatial reward is suitable for citizens, reward planning could work as a trigger. But, to understand what kind of spatial reward is suitable for a citizen, gaining knowledge in individuals' motives and considerations is a necessity. This goes far beyond the scope of this thesis and can therefore only be recommended as a suggestion for further research.

If residents have explicitly expressed the desire to improve the sustainability levels of their property, such as members of energy cooperatives, a spatial reward would be better conceivable. Members of an energy cooperative have issues concerning the affordability of implementing sustainable measures and the legal barriers hindering the practicability of their plans. But, they do have thought about and calculated what measures they want to implement (P. Daanen, personal communication, June 21, 2019). Therefore, it is easier to strive for a customised spatial reward that enables them to carry out their plans. For example, if the spatial reward takes away (part of) the legal barrier, it can become more interesting for residents to invest in implementing their sustainable measures. Therefore, a spatial reward can be a stimulus for members in an energy cooperative.

For the biggest property owners – the housing corporations – the willingness to cooperate largely depends on the rent affordability for their tenants. If rent increase is not necessary, housing corporations are willing to cooperate. This creates an opportunity for the municipality to offer some form of reward planning to housing corporations. Housing corporations have to choose between affordability for their tenants, availability of enough rental property and improving the sustainability levels of their property. These all require financial investments. By coupling these variables together and offering a spatial reward that enables housing corporations to invest more in sustainability, reward planning could be a useful policy instrument. The most obvious would be to link sustainability to availability. Reward planning provides a spatial reward, such as extra exploitation possibilities, a higher building density or a wider variety in functions. As a reward for their sustainability efforts, housing corporations could be granted the legal possibility to expand their housing stock.

Another barrier concerns the proposed expansion of the city heat network. Because of numerous conflicting interests, if and how the city heat network will be extended is not yet fixed. Since this is merely a governance problem, a spatial reward would not directly be a suitable solution. The parties behind the (possible) exploitation of the city heat network do not benefit from a higher building density or a greater functional variety. Their aim is to create a sustainable but also profitable way of distributing heat. To do so, they require the cooperation of property owners as well. Maybe in a later phase, when the exploitation of the city heat network is certain, reward planning could be used as a stimulus to start negotiating with consumers. Extra exploitation possibilities are then expected to be the most suitable spatial rewards. However, since the plans for extension of the city heat network are in such an early stage, concrete conclusions on the applicability of a spatial reward are hard to determine.

Based on the foregoing, the applicability of reward planning as a policy instrument would be most suitable for end-users, thus the property owners. Especially the larger groups of property owners, members of energy cooperatives and housing corporations, know in general terms how their property can be made more sustainable. A spatial reward could be suitable for both parties.

Effectiveness of reward

The third criterion concerns the contents of the spatial reward. The proposed spatial reward should be the stimulus to act, meaning that the private party would not have made an effort to improve the sustainability of their property without the proposed spatial reward.

For the members of an energy cooperative, this might be the case. The financial and legal barriers refrain them from taking action, but it is unclear if a spatial reward would be the stimulus to act. Energy cooperatives are founded with the purpose to stimulate residents in improving the sustainability of their property. But, every member joins this cooperation if the desire to act sustainable is already present. Their intrinsic motivation can be the incentive to act as well. Therefore, it is expected that the members of an energy cooperative would act either way, whether a spatial reward is present or not. But, the energy cooperative itself could use a spatial award as the necessary incentive for non-members that hesitate to join. If, for instance, half of a neighbourhood is member in an energy cooperative and wants to improve the sustainability level of their property and the other half hesitates, the energy cooperative can use the availability of a spatial reward as motivation for the 'hesitators'. In that case, a spatial reward is useful and would lead to the extra effort intended by the public authority providing the policy instrument.

For housing corporations, acting sustainable is not their primary goal. Realising affordable housing for their tenants is. Therefore, a spatial reward might offer the required incentive to make an extra effort and improve the sustainability levels of their property. J. Tan (personal communication, May 9, 2019) from Woonwaarts defines it as follows: 'If you [the municipality] want us to do more and to take risks, (...) come up with positive incentives. (...) It can be done by making it as unappealing as possible, by raising taxes or making permits more stringent and leaving us no choice. Or by rewarding us. (...) those are the two extremes that the government can use to achieve their goals'. Tan identifies a trigger why reward planning, in theory, could work. In general, the government enforces undesired behaviour negatively. Within the context of the energy transition, improving sustainability of the built environment is seen as 'desired behaviour', because it is consistent with the public authorities' discourse. Not participating in the energy transition, thus not making an effort towards sustainable property, can be classified as 'undesired behaviour'. The government enforces this by increasing taxes or creating stricter regulations. As Tan mentions, this feels like punishment. Reward planning aims at avoiding unwanted behaviour from a different perspective: by rewarding desired behaviour. By acting according to the municipalities' discourse, private parties are rewarded for their efforts. So, a spatial reward would offer a much more appealing incentive to housing corporations in Nijmegen than normally used 'punishments'. Furthermore, applying reward planning as a policy instrument would make investing in sustainability measures more affordable and attainable. This makes it a more accepted form of motivation than negative incentives. Therefore, housing corporations definitely benefit from a spatial reward and, because it directly relates to affordability, it would be a positive incentive to act.

Proportionality of reward

The final two criteria, proportionality and feasibility, ensure compliance of reward planning. In order to effectively make reward planning as a policy instrument work, the public authority should prevent arbitrariness and enforce non-compliance. Since the municipality is a public actor who is in charge of policy-compliance, it should be aware of unreasonable rewards. This means that the reward private parties earn should be in proportion with the effort they put in. Otherwise, the municipality can get accused of acting arbitrarily.

To ensure a proportional spatial reward, guidelines are necessary. This could be realised in the form of a program with fixed values. If a value is met, the private party receives a corresponding spatial reward based on that program. The public authority should establish this program beforehand, as part of the policy instrument. This ensures certainty for every party that can make use of this program.

As argued, especially for groups of pro-environmental residents and housing corporations reward planning could be useful instrument. These parties would benefit from different spatial rewards. P. Daanen (personal communication, June 21, 2019) from Duurzaam Hengstdal mentions how permits and aesthetic demands quickly become relevant when (groups of) residents want to improve the sustainability levels of their property, because it requires altering the exterior of a house. Since this involves the cooperation of the municipality, a spatial reward can be directly linked to the private parties' effort, namely obtaining a permit for changing the outside of the house with the purpose of a more sustainable property. This is one example of a possible spatial reward that can be included in the program. What kind of other spatial rewards are possible to stimulate (groups of) residents and how this program could look like can be subject of further research into the practical use of reward planning.

Housing corporations would benefit from other spatial rewards. M. Peterse (personal communication, April 5, 2019) from Portaal and J. Tan (personal communication, May 9, 2019) from Woonwaarts both mention how they would benefit from expanding their housing stock. But, an important requirement is the demand for rental housing. Housing corporations do not build for vacancy and rely on market-demand. With the booming housing market, there is definitely enough demand in Nijmegen at this moment. This makes extra building density, as a spatial reward, appealing to the housing corporations. However, only expanding is not financially feasible. It has to go hand-in-hand with selling or demolishing old, energy-consuming houses. By renewing their housing stock, housing corporations are able to replace their old houses with new, sustainable housing and stay financially sound. For housing corporations, that would be the ideal situation to make reward planning as a policy instrument work. This kind of arrangement can complicate the situation, because selling energy-consuming houses is not contributing to the energy transition but passing the problem on to society. The house still exists, only the housing corporation is not responsible anymore. Therefore, this option is not favourable. On the other hand, renewing the housing stock would be a possible solution that can fit the assumptions of reward planning as well. In order to demolish and build houses, the corporation has to obtain a development permit from the municipality. This enables the opportunity to link a spatial reward to the housing corporations' effort. For instance: if a housing corporation wants to demolish some unsustainable houses and aims at building new ones, the municipality can stimulate to go further than the regular sustainability norms. A reward could be a higher building density on the development site if the housing corporation is willing to improve sustainability levels of their existing property, from label B to A for example. The difficulty here is to link one development site to sustainability efforts elsewhere. This requires a custom approach but also equal rewards per situation, in order to prevent arbitrariness. Further research is encouraged into the practical applicability of this reward planning measure for a proportional and fair policy program.

Another possible reward housing corporations found stimulating was creating space for energy provision (J. Tan, personal communication, May 9, 2019). This links the spatial reward directly to sustainable effort. If, for instance, a housing corporation wants to be more sustainable and cannot connect to the heat network, local energy production is necessary. By enabling public space for this energy provision installation, the housing corporation can improve sustainability levels of their building complex. The public authority can allow this public space to be used for energy production, if the housing corporation meets fixed conditions. Conditions could be isolating the complex and putting solar panels on the roof. With the energy provision installation, the building would be completely sustainable. The effort the housing corporation puts can be isolation and placing solar panels and as a reward, the municipality creates the planning possibility to build an energy provision installation. That would meet the criteria of reward planning. To make a proportional reward, a policy program beforehand is recommended.

Enforcement of noncompliance

The last criterion of reward planning is its practical enforcement. When the public authority chooses to make use of reward planning, it has to enforce noncompliance as well. Only private parties who actively make use of reward planning get access to the rewards it offers. This can be illustrated by reference to the last example, on building an energy provision installation for housing corporations. The municipality only creates the spatial possibility if the housing corporation meets the conditions from the program. If the housing corporation wants to build an energy provision installation to improve a building its sustainability levels but does not meet the requirements set out in the program for reward planning, the municipality should not cooperate to grant the planning possibilities. The housing corporation does not meet the criteria for reward planning, thus cannot benefit from the reward. In order to make reward planning as a policy instrument work, it is important that the public authority should enforce noncompliance and stick to the conditions of this instrument.

5. CONCLUSION

The final chapter of this research presents the conclusion, a couple recommendations for further inquiry and a reflection on this research. At first, in paragraph 5.1, the conclusion is set out based on the main- and sub-questions. Subsequently, paragraph 5.2 gives five recommendations for further practical and scientific research based on the research findings from this thesis. In conclusion, paragraph 5.3 reflects on the research process, encountered difficulties and limits of this inquiry.

5.1 Conclusion

By doing literature research and conducting multiple interviews on reward planning and the energy transition of the built environment in Nijmegen, this research has tried to answer the following research question:

'*How suitable is reward planning as a policy instrument to achieve a sustainable built environment in Nijmegen?*'

This main question is divided into two sub-questions. These will be addressed first before providing an answer to the main research question.

5.1.1 Opportunities and Barriers

The first sub-question refers to the opportunities and barriers present within the policy domain on achieving a sustainable built environment within Nijmegen. This sub-question is formulated as follows:

'*What are the opportunities and barriers within the current policy domain on achieving a sustainable built environment in Nijmegen?*'

The opportunities and barriers are explored using the policy arrangement approach. This approach consists of four, mutually intertwined variables: actors and coalitions, the discourse, the resources and the rules. The actors and coalitions dimension is hereby upgraded to a multi-actor network, placing actors within and across state, market and civil society spheres. In this thesis, four clear opportunities and seven barriers came forth. An extensive description can be found in the previous chapters, a brief overview is presented here to formulate an answer to the first sub-question.

A big opportunity for achieving a sustainable built environment in Nijmegen is the interest and active involvement from multiple actors and professions into improving the sustainability of the built environment. Especially state and market parties are making plans, deploying sustainable resources and willing to legally bind themselves to accomplish sustainability goals. But, civil energy collectives are also actively participating in this debate. There is consensus among actors that achieving a sustainable built environment is necessary and will actively contribute to the energy transition. Another opportunity is advanced plans regarding the expansion of the city heat network. It will offer a (more) sustainable energy source for approximately half of the 80.000 houses in Nijmegen. If these plans will be pursued, improving the sustainability of a large part of the built environment within Nijmegen can be accomplished more easily.

But, some barriers are present as well. In contrast to active involvement from various state and market professions, individual residents often do not feel the urgency to participate in the energy transition. This is a clear barrier, because the municipality needs cooperation from every property owner. Other barriers are related to the availability of resources. Public authorities cannot offer stable financial support for sustainability measures to property owners. Especially individual residents and housing corporations are therefore reluctant to invest in sustainable measures. Housing corporations have also noted that without financial security, large-scale investments could financially jeopardise their tenants. Housing corporations therefore prefer to invest in smaller, no-regret measures first. Furthermore, the earlier-mentioned expansion of the city heat network can also be a barrier. At this moment, how it will be extended and who will exploit it are important issues before property owners can hook on. There is no certainty for (possible) suppliers and consumers about the proposed expansion of the city heat network yet. Thus, at this moment, the city heat network is more of a barrier than an opportunity. The final two barriers are found within the legal domain. On one side, effective regulation is missing. Especially market and civil society actors miss a strict, legally enforceable deadline that sets hard targets for every party concerned with achieving a sustainable built environment in Nijmegen. On the other side, members of civil energy cooperatives are constrained by long and complicated permit procedures for simple sustainable renovations.

5.1.2 Reward Planning

The second sub-question refers to the applicability of reward planning within the policy domain on achieving a sustainable built environment within Nijmegen. This sub-question is formulated as follows:

'*To what extent can reward planning be a suitable policy instrument to strengthen opportunities and overcome encountered barriers within the policy domain on achieving a sustainable built environment in Nijmegen?*'

Reward planning can be unravelled into five underlying assumptions: accomplishing public goals with private means, the possibility of a spatial reward in return for private efforts, the spatial reward as the stimulus to act for private parties, the proportionality of the reward and enforcement of noncompliance. These assumptions are consecutively described in this thesis. In order to formulate an answer to this sub-question, only the general conclusion of the applicability of reward planning is given in this chapter.

For property owners, a spatial reward can be a suitable stimulus to make an effort in implementing sustainable measures in their property. This is the case for individual residents within energy collectives and housing corporations. For residents with no interest in the energy transition and parties with no residential property, a spatial reward is not found to be stimulating or helpful. Citizens within an energy cooperative would benefit from an easier permit procedure when wanting to implement sustainable measures in their homes. The unnecessary time and costs that are involved with applying for permits is rather spent on the actual implementation of sustainable techniques. Reward planning could be a suitable policy instrument to achieve this. Housing corporations' willingness to invest in the energy transition largely depends on rent affordability for their tenants. If housing corporations are legally allowed to have extra exploitation possibilities, a higher building density or a wider variety in functions, it enables them to have more rental income and spend less on permit procedures. This can be used to invest in extra sustainability measures. Furthermore, legally enabling space for sustainable energy supply also contributes to implementation of sustainable techniques and saves investments on spatial permit procedures. This spatial reward is therefore also appealing to housing corporations. Thus, a spatial reward that grants the legal possibility to expand the housing stock of housing corporations or enables space for sustainable energy devices would be favourable in return for their efforts to implement sustainable techniques.

Both parties, citizens in energy cooperatives and housing corporations, perceive financial difficulties to achieve a sustainable built environment. With reward planning as a solution, carrying out pro-environmental behaviour becomes easier because less financial resources have to be spent on long and complicated permit procedures and more income can be generated through extra building possibilities.

5.1.3 Main Conclusion

With the obtained answers on the two sub-questions, an answer can be formulated to the main question of this research:

Reward planning as a policy instrument is primarily a suitable solution for active property owners in Nijmegen who experience financial and legal barriers when wanting to implement techniques to improve the sustainability of their property. By offering the opportunity of extra building possibilities or less legal procedures as a municipal effort within the spatial domain, reward planning can strengthen the active attitude of actors towards carrying out pro-environmental behaviour and overcome part of the uncertainty in financial resources and unnecessary complicated permit procedures. Thus, public authorities can use reward planning as a policy instrument to reward property owners with appealing spatial rights if these actors have made an effort to contribute to a sustainable built environment in Nijmegen.

5.2 Recommendations

Based on the research results, a couple of recommendations can be made for further inquiry. At first, this research aimed at studying the general applicability of reward planning as a policy instrument to stimulate private parties. A couple of ideas emerged, such as rewarding housing corporations with extra building possibilities and to simplify the permit processes for sustainable renovations. The practical feasibility of these ideas is not studied in-depth, because that would outreach the scope of this research. In addition to this thesis, practical research can be done to find out what particular spatial rewards housing corporations and residents are motivated by. A few ideas came up during this research, but practical applicability in specific cases definitely requires more research.

To complement the first recommendation, practical research could go in on developing a scale, or guideline, to work with reward planning. In order for the municipality to act impartial when making use of reward planning, a step-by-step guide on how to apply reward planning is necessary. This provides certainty to property owners, they know what spatial reward to expect when improving the sustainability levels of their property, contributes to the practical feasibility of the instrument and forces the municipality to be transparent on the rewards that can be earned. How such a guide can be shaped, what the contents are and how it will work in practice can be interesting topics to do further research on.

Another follow-up study could look at the applicability of reward planning in other cities and municipalities. The scope of this research was geographically bound to the municipal borders of Nijmegen. What the opportunities and barriers are in other municipalities and if this leads to a different view on the applicability of reward planning could be interesting stud subjects. In Nijmegen, the advanced plans for a city-wide heat network steers actors towards (waiting on) using this form of sustainable energy. In other municipalities, where a city heat network is not going to be realised, the vision of actors on how to achieve a sustainable built environment could be entirely different. This would also affect the possible applicability of reward planning. Therefore, studies on the opportunities and barriers within other municipalities and how reward planning could be of added value in another context would be useful to understand the full competences of reward planning as a policy instrument.

Based on this research, a few recommendations for further development of theory can be made as well. At first, this research combined the policy arrangement approach with the theory of planned behaviour. These theories do not directly fit into each other, since the former focuses on a policy domain and the latter on individuals' behaviour. But, as argued in the theoretical chapter, the theory of planned behaviour can be more widely applied than focusing solely on individuals. This research is an example of this. Further research into applying the theory of planned behaviour for collective actors would offer interesting insights on the theory its practical usage.

Furthermore, this thesis contributes to scientific research on non-financial policy instruments to achieve sustainable behaviour as well as non-financial incentives to achieve spatial goals. As mentioned in the first chapter of this research, both subjects are usually studied separately. This research combines both fields by studying a spatial policy instrument to stimulate sustainable behaviour. Therefore, this study is an original contribution to both theoretical fields. But, because this study solely focused on reward planning as the policy instrument and a sustainable built environment as the sustainable ambition, studying other instruments or other sustainable goals can be interesting subjects for further scientific research.

5.3 Reflection

During the research process, several difficulties have emerged. An important issue concerned the eventual research goal. From the university, a more theoretical approach was preferred while the internship company favoured a more practical view on the applicability of reward planning. This was solved by providing a presentation on the practical workability for the internship company and putting the focus in this thesis on the theoretical aim. Nevertheless, it has been a tough objective to carry out research that could be useful to both parties. Because a strong and well-underpinned thesis is required for graduation, most effort has been put into the theoretical approach on the applicability of reward planning.

Another difficulty regarded the selection of a case and availability of respondents. Multiple municipalities in the Netherlands had, at the start of this research, drafted a heat vision. Utrecht, Leiden or Amersfoort could have been subject of this study as well. In order to get a grip on the research topic and case, (non-transcribed) interviews were held with municipal officers, housing corporations and civil energy collectives (see annex 7.1). During these interviews, Nijmegen was mentioned by multiple actors as progressive and far advanced in their ambitions to achieve a sustainable built environment. In combination with the location of the university and previous knowledge on sustainability efforts in Nijmegen, the choice for Nijmegen as the research case is partly subjective. As mentioned in the previous paragraph, location specific characteristics influence the possible opportunities and barriers and hence the applicability of reward planning. If another city had been chosen, the outcome of this research could have been entirely different. Thus, the subjective choice for Nijmegen as the case has been definitely influential for the outcome of this research.

At last, a critical note should be given about the problem-solving capabilities of reward planning. The conclusion of this research contained how reward planning could be a stimulus to active property owners who experienced financial difficulties or are hindered by unnecessary complex permit procedures. There are some side notes to this. At first, it is only applicable to end-users, thus (groups of) residents and housing corporations. And, even for them, applicability is subject to numerous conditions and uncertainties. Housing corporations should benefit from extra building possibilities, which are partly dependent on supply and demand on the housing market, to have reward planning function as a motivating incentive. For individual residents, reward planning should offer an attainable solution to their problems. Most problems concern the costs of implementing sustainable measures, which is something reward planning cannot directly solve. Thus, some problems are too complex to simply use reward planning as the solution. Furthermore, reward planning does not lend itself for all encountered opportunities and barriers within the current policy domain. An important issue within Nijmegen is the uncertainty concerning the city heat network. How the loop will run, who is going to exploit it, how it can be completely sustainable and when it is going to be realised are crucial questions for the energy provision of Nijmegen. This requires negotiation between actors instead of a motivating policy instrument. Reward planning is not directly applicable in this situation and it is therefore important to keep the limits of this instrument in mind.

6. BIBLIOGRAPHY

Abrahamse, W. (2019). *Encouraging Pro-Environmental Behaviour: What Works, What Doesn't, and Why*. London: Academic Press.

Ackermann, F. & Eden, C. (2011). Strategic Management of Stakeholders: Theory and Practice. *Long Range Planning, 44*(3), pp. 179-196.

Adam, P. Ovseiko, P. V., Grant, J., Graham, K. E. A., Boukhris, O. F., Dowd, A. M., Balling, G. V., Christensen, R. N., Pollitt, A., Taylor, M., Sued, O., Hinrichs-Krapels, S., Solans, M. & Chorzempa, H. (2018). ISRIA statement: Ten-point guidelines for an effective process of research impact assessment. *Health Research Policy and Systems, 16*(1), pp. 1-16.

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), pp. 179-211.

Ajzen, I. (2002a). *Constructing a TpB Questionnaire: Conceptual and Methodological Considerations.* Amherst: University of Massachusetts.

Ajzen, I. (2002b). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. *Journal of Applied Social Psychology, 32*(4), pp. 665-683.

Ansell, C. & Gash, A. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory, 18*(4), pp. 543-571.

Armitage, C. J. & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*, pp. 471-499.

Arts, B., Leroy, P. & Van Tatenhove, J. (2006). Political modernisation and policy arrangements: a framework for understanding environmental policy change. P*ublic organization review, 6*(2), pp. 93-106.

Bichard, E. & Kazmierczak, A. (2009). *Resilient Homes: Reward-based methods to motivate householders to address dangerous climate change*. Salford: University of Salford.

Bomhof, W. & Oosterkamp, J. (2013). *Flexibele bestemmingsplannen stimuleren gebiedsontwikkeling*. The Hague: Platform31.

Bourdieu, P. (1986). The Forms of Capital. In J. G. Richardson (Ed.), *Handbook of Theory and Research for the Sociology of Education* (pp. 241-258). New York: Greenwood Press.

Bryman, A. (2012). *Social Research Methods, 4th edition*. New York: Oxford University Press.

BügelHajema. (2015). *Uitnodigingsplanologie & beloningsplanologie in het buitengebied*. Retrieved on the 25th of September, 2018 from https://www.bugelhajema.nl/uitnodigingsplanologie buitengebied.html

BügelHajema. (2016). *Vitale parken, op weg naar beter: Een planologisch bonusmodel voor de vakantieparken op de Noord-Veluwe*. Amersfoort: BügelHajema Adviseurs.

Buitelaar, E. & Bregman, A. (2016). Dutch land development institutions in the face of crisis: trembling pillars in the planners' paradise. *European Planning Studies, 24*(7), pp. 1281-1294.

Carmichael, D. M. (1974). Transferable Development Rights as a Basis for Land Use Control. *Florida State University Law Review, 2*, pp. 35-107.

Cialdini, R. B. (1993). *Influence: The Psychology of Persuasion*. New York: Quill William Morrow.

Creswell, J. W. (2013). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches, 3rd edition*. Thousand Oaks: Sage Publications.

De Vries, M. S. (2010). *The Importance of Neglect in Policy-Making*. London: Palgrave Macmillan.

Dijkstra, A. B. & Dronkers, J. (2000). Education Between State and Private Delivery: Civil Society as Equilibrium. The Dutch Case. In J. L. Peschar & M. van der Wal (Eds.), *Education Contested: Changing Relations between State, Market and Civil Society in Modern European Education* (pp. 105-120). Lisse: Swets & Zeitlinger B.V.

DiMaggio, P. J. & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *American Sociological Review, 48*(2), pp. 147-160.

Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review. *The Academy of Management Review, 14*(1), pp. 57-74.

Elzenga, H., Schwenke, A. M.& Van Hoorn, A. (2017). *Het handelingsperspectief van gemeenten in de energietransitie naar een duurzame warmte- en elektriciteitsvoorziening: Een onderzoek naar 10 stadswarmte- en 9 windenergiecasussen*. The Hague: PBL.

Farthing, S. (2016). *Research Design in Urban Planning*. London: Sage.

Fransen, A., Kloen, H., Jansen, J. & Pronk, J. (2018). *Bestemmingsplan Buitengebied 2018: ontwerp.* Amersfoort: BügelHajema Adviseurs.

Friese, S. (2019). *Qualitative Data Analysis with ATLAS.TI: Third Edition*. London: Sage.

Foucault, M. (1972). *The Archaeology of Knowledge and the Discourse on Language* (A.M. Sheridan Smith, Trans.). New York: Pantheon Books.

Gaber, J. & Gaber, S. (2007). *Qualitative Analysis for Planning and Policy.* New York: Routledge.

Gamble, A. (2000). Economic Governance. In J. Pierre (Ed.), *Debating Governance: Authority, Steering and Democracy* (pp. 110-137). Oxford: Oxford University Press.

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy, 31*(8-9), pp. 1257-1274.

Gemeente Alphen aan den Rijn. (2018). *Chw Omgevingsplan Rijnhaven-Oost*. Retrieved on the 3rd of March, 2019 from http://ro-online.alphenaandenrijn.nl/plannen/NL.IMRO.0484.OPrijnhavenoost-/NL.IMRO.0484.OPrijnhavenoost-VA03/t_NL.IMRO.0484.OPrijnhavenoost-VA03.html

Gemeente Nijmegen. (2018). *Warmtevisie: Op weg naar een aardgasvrij Nijmegen*. Nijmegen: Gemeente Nijmegen.

Gemeente Nijmegen & Ministry of the Interior and Kingdom Relations (2019). *Convenant grootschalige proeftuin met een aardgasvrije wijk: Aardgasvrij te maken wijk Dukenburg in de gemeente Nijmegen*. Nijmegen/The Hague: Gemeente Nijmegen & MIKR.

Gemeente Nijmegen & Royal HaskoningDHV. (2013). *Power2Nijmegen: Op weg naar een energieneutrale stad in 2045.* Nijmegen: Gemeente Nijmegen & Royal HaskoningDHV.

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge: Polity Press.

Guba, E. G. & Lincoln, Y. S. (1985). *Naturalistic Inquiry*. Beverly Hills: Sage Publications.

Guba, E. G. & Lincoln, Y. S. (1994). Competing Paradigms in Qualitative Research. *Handbook of Qualitative Research, 105*(2), pp. 163-194.

Harmelink, M. & Van den Wijngaart, R. (2017). *Beleidsruimte energietransitie gebouwde omgeving van gemeenten: Casestudie Utrecht*. Utrecht: Harmelink Consulting & PBL.

Haslam, S. A., Powell, C. & Turner, J. C. (2000). Social Identity, Self-categorization, and Work Motivation: Rethinking the Contribution of the Group to Positive and Sustainable Organisational Outcomes. *Applied Psychology, 49*(3), pp. 319-339.

Hessels, L. K., Van Lente, H. & Smits, R. (2009). In search of relevance: the changing contract between science and society. *Science and Public Policy, 36*(5), pp. 387-401.

Hoppe, T., Van Bueren, E. & Sanders, M. (2016). Besluit themanummer 'Energietransitie en lokaal bestuur'. *Bestuurswetenschappen, 70*(3), pp. 75-79.

IJdema, S. & Wierda, K. (2014). *Betaalbaar wonen: Advies van experts aan Schiermonnikoog*. Leeuwarden: Partoer & Provincie Fryslân.

Inglis, D. & Thorpe, C. (2012). *An Invitation to Social Theory*. Cambridge: Polity Press.

Janssen-Jansen, L. B. (2008). Space for Space, a transferable development rights initiative for changing the Dutch landscape. *Landscape and Urban Planning, 87*(3), pp. 192-200.

Kibert, C. J. (2002). Policy instruments for sustainable built environment. *Journal of Land Use Environmental Law, 17*(2), pp. 379-394.

Kirk, J. & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Beverly Hills: Sage Publications.

Kollmuss, A. & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research, 8*(3), pp. 239-260.

Krippendorff, K. (2011). Agreement and Information in the Reliability of Coding. *Communication Methods and Measures, 5*(2), pp. 93-112.

Liefferink, D. (2006). The Dynamics of Policy Arrangements: Turning Round the Tetrahedron. In B. Arts & P. Leroy (Eds.), *Institutional Dynamics in Environmental Governance* (pp. 45-68). Dordrecht: Springer.

Loorbach, D. A. & Rotmans, J. (2012). *Transities & transitiemanagement: Oorsprong, status en toekomst*. Rotterdam: DRIFT.

Lupia, A. (2001). Delegation of Power: Agency Theory. In N.J. Smelser & P.B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 3375-3377). Oxford: Elsevier Science Ltd.

Menkveld, M., Boerakker, Y. & Mourik, R. (2005). *Energietransitie in de gebouwde omgeving*. Petten: Energy Research Centre of the Netherlands.

Minister of Economic Affairs and Climate Policy. (2018, April 26). Wijziging van Elektriciteitswet 1998 en van de Gaswet (voortgang energietransitie). *Staatsblad*. 2018, 109.

Ministry of Infrastructure and the Environment. (2015). *Omgevingswet in thema's: De stelselherziening uitgediept*. The Hague: MI&E.

Moisander, J. (2007). Motivational complexity of green consumerism. *International Journal of Consumer Studies, 31*, pp. 404-409.

Murphy, M. & Stinson, J. (1996). *Incentive Zoning.* White Plains: Pace University.

Needham, B. (2014). *Dutch Land-use Planning: The Principles and the Practice*. New York: Routledge.

Nelson, A. C., Pruetz, R. & Woodruff, D. (2012). *The TDR Handbook: Designing and Implementing Transfer of Development Rights Programs*. Washington D.C.: Island Press.

Niskanen, W. A. (1971). *Bureaucracy & Representative Government*. New York: Routledge.

Nolon, J. R. (2003). *Open Ground: Effective Local Strategies for Protecting Natural Resources*. Washington D.C.: The Environmental Law Institute.

Pallak M. S., Cook, D. A. & Sullivan, J. J. (1980). Commitment and energy conservation. *Applied Social Psychology Annual, 1*, pp. 235-253.

Patton, M. Q. (1980). *Qualitative evaluation methods*. Thousand Oaks: Sage Publications.

PBL. (2019, March 28). *Effecten Ontwerp Klimaatakkoord*. The Hague: Planbureau voor de Leefomgeving.

Rhodes, R.A.W. (2012) Waves of Governance. In D. Levi-Faur (Ed.), *The Oxford Handbook of Governance* (pp. 33-48). Oxford: Oxford University Press.

Romer, T. & Rosenthal, H. (1978). Political Resource Allocation, Controlled Agendas, and the Status Quo. *Public Choice, 33*(4), pp. 27-43.

Rooijers, F. J., Leguijt, C. & Groot, M. I. (2010). *Halvering CO2-emissie in de Gebouwde Omgeving: Een beoordeling van negen instrumenten*. Delft: CE Delft.

Rotmans, J. (2012). *In het oog van de orkaan: Nederland in transitie*. 's-Hertogenbosch: Aeneas Media.

Schilder, F. (2017). *Waarom lukt het (nog) niet met de energietransitie op de woningmarkt?* Retrieved on 27th of November, 2018 from https://www.ruimteenwonen.nl/waarom-lukt-het-nog-niet-met-de-energietransitie-op-de-woningmarkt

Scholes, K. (2001). Stakeholder mapping: A practical tool for public sector managers. In G. Johnson & K. Scholes (Eds.), *Exploring Public Sector Strategy* (pp. 165-184). London: Pearson Education Ltd.

SEN. (2019). *Versnelling van de verduurzaming van woningen van huiseigenaren*. Retrieved on the 15th of March, 2019 from https://bareau.nl/wp-content/uploads/2019/03/Versnelling-verduurzaming-woningen-met-AHPD-technologie.pdf

SER. (2018). *Ontwerp van het Klimaatakkoord*. The Hague: SER.

Shove, E. & Walker, G. (2007). Caution! Transitions Ahead: Politics, Practice and Sustainable Transition Management. *Environment and Planning A: Economy and Space, 39*(4), pp. 763-770.

Spaans, M. Van der Veen, M. & Janssen-Jansen, L. (2008). The concept of non-financial compensation in spatial planning. In L. Janssen-Jansen, M. Spaans & M. Van der Veen (Eds.), *New instruments in spatial planning: An international perspective on non-financial compensation* (pp. 17-40). Amsterdam: IOS Press.

Steg, L., Lindenberg, S. & Keizer, K. (2016). Intrinsic Motivation, Norms and Environmental Behaviour: The Dynamics of Overarching Goals. *International Review of Environmental and Resource Economics, 9*(1-2), pp. 179-207.

Steurer, R. (2013). Disentangling governance: a synoptic view of regulation by government, business and civil society. *Policy Sciences, 46*(4), pp. 387-410.

Swan, W. & Brown, P. (2013). *Retrofitting the Built Environment*. Chichester: John Wiley & Sons Ltd.

Swanborn, P.G. (1996). *Case-study's: Wat, wanneer en hoe?* Meppel: Boom Uitgevers.

Tambach, M., Hasselaar, E. & Itard, L. (2010). Assessment of current Dutch energy transition policy instruments for the existing housing stock. *Energy Policy, 38*(2), pp. 981-996.

Tyler, T. R. (1999). Why people co-operate with organizations: An identity-based perspective. In R. I. Sutton & B. M. Staw (Eds.), *Research in organizational behavior, 21* (pp. 201-246). Greenwich: JAI Press.

UNFCCC. (2015). *Adoption of the Paris Agreement*. Retrieved on the 20th of November, 2018 from http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

Van der Hoeven, L. (2019). *Apartment building Nijmegen* [cover image]. Retrieved from author.

Van der Krabben, E. & Jacobs, H. (2013). Public land development as a strategic tool for redevelopment: Reflections on the Dutch experience. *Land Use Policy, 30*(1), pp. 774-783.

Van der Ploeg, P., Vintges, V, Visschers, M. & De La Court, T. (2015). *Verbreden, verdiepen en versterken: Gelders Energieakkoord.* Arnhem: Alliander, Gelderse Natuur- en Milieufederatie & Klimaatverbond Nederland

Van der Veen, M., Spaans, M., Putters, B. & Janssen-Jansen, L. (2008). Comparing the cases and planning for the future of non-financial compensation. In L. Janssen-Jansen, M. Spaans & M. Van der Veen (Eds.), *New instruments in spatial planning: An international perspective on non-financial compensation* (pp. 229-256). Amsterdam: IOS Press.

Van Dooren, K. (2016). *Voor wat hoort wat: Een onderzoek naar de betekenis en mogelijkheden van beloningsplanologie voor de veehouderijtransitie* [masterthesis]. Nijmegen: Radboud University.

Van Os, J., Bokma-Bakker, M.H., Kuindersma, W., Selnes, T. & Gies, E. (2013). *Nieuwe wegen naar ontwikkelingsgericht werken: handelingsperspectieven voor de overhead rond duurzame ontwikkeling en maatschappelijke acceptatie van veehouderij*. Wageningen: Alterra & WUR.

Van Tatenhove, J., Arts, B. & Leroy, P. (2000). *Political Modernisation and the Environment. The Renewal of Environmental Policy Arrangements*. Dordrecht: Kluwer.

Van Tulder, R. & Pfisterer, S. (2013). (2013). Creating partnering space: exploring the right fit for sustainable development partnerships. In M. M. Seitanidi & A. Crane (Eds), *Social Partnerships and Responsible Business. A Research Handbook* (pp. 105-124). London: Routledge.

Vereniging Dorpsbelang Hees. (2018). Duurzaam Hees: samen naar een energiezuinige en gasloze wijk. *de stenenbank, 28*(3), pp. 10-11.

Verplak, J. (2017). *Ruimte bieden: Een kwalitatief onderzoek naar de succesfactoren van organische gebiedsontwikkeling en de rol die de Nederlandse overheid hierbinnen vervult* [masterthesis]. Utrecht: Utrecht University.

Voß, J-P, Smith, A. & Grin, J. (2009). Designing long-term policy: rethinking transition management. *Policy Science, 42*(4), pp. 275-302.

Wahyuni, D. (2012). The research design maze: Understanding paradigms, cases, methods, and methodologies. *Journal of Applied Management Accounting Research, 10*(1), pp. 69-80.

Wiek-II. (2013). *windpowernijmegen: groene stroom van hier*. Nijmegen: Wiek-II.

Yin, R. K. (1989). *Case study research: design and methods*. London: Sage.

Zimmermann, M., Althaus, H. & Haas, A. (2005). Benchmarks for sustainable construction: A contribution to develop a standard. *Energy and Buildings, 37*(11), pp. 1147-1157.

7. ANNEX

7.1 List of Respondents

Reward Planning				
Organisation/company	**Name**	**Function**	**Date**	**Transcript no.**
Gemeente Alphen aan den Rijn	Peter Klompen	Program Manager	14-03-2019	I
BügelHajema Adviseurs	Jan Oosterkamp	Manager / Environmental law expert	18-03-2019	II

Nijmegen				
Organisation/company	**Name**	**Function**	**Date**	**Transcript no.**
Gemeente Nijmegen	Pieternel Blankenstein	Strategic Area Manager	25-03-2019	III
Portaal	Mark Peterse	Program Manager Sustainability	05-04-2019	IV
Woonwaarts	Jeanette Tan	Organisational Strategist	09-05-2019	V
Gemeente Nijmegen/ Power2Nijmegen	Erik Maessen	Project Manager Energy Transition Hengstdal and Bottendaal	09-05-2019	VI
Provincie Gelderland	Hans Wouters	Program Member Sustainability and Built Environment	10-05-2019	VII
Liander	N/A	Relationmanager Strategy and Environment	17-05-2019	VIII
Burgers Geven Energie	Ineke de Jong	Representative	21-05-2019	IX
Engie	Peter Wolbert	Business Manager Sustainable Energy and Area Development	27-05-2019	X
Duurzaam Hengstdal	Peter Daanen	Coordinator Duurzaam Hengstdal	21-06-2019	XI

General Information				
Organisation/company	**Name**	**Function**	**Date**	**Transcript**
Energy cooperation I	N/A	N/A	19-03-2019	N/A
Municipality	N/A	Senior Advisor	22-03-2019	N/A
University / Energy cooperation II	N/A	Professor / Chairman of Board	29-03-2019	N/A
Housing corporation I	N/A	Development Manager	17-04-2019	N/A
Housing corporation II	N/A	Senior Asset Manager	18-04-2019	N/A

7.2 Interviewguides

Reward Planning

Geachte heer/mevrouw,

Momenteel ben ik bezig met een afstudeeronderzoek naar de energietransitie van de gebouwde omgeving. Dit onderzoek voer ik uit als masterstudent Planologie aan de Radboud Universiteit en afstudeer stagiair bij BügelHajema Adviseurs.

Het doel van mijn onderzoek is inzicht verkrijgen in het huidige beleid omtrent de energietransitie van de gebouwde omgeving en onderzoeken of beloningsplanologie als beleidsinstrument kan bijdragen aan de verdere ontwikkeling daarvan. [Bedrijf/organisatie/instantie] heeft ervaring/kennis van dit beleidsinstrument en daarom ben ik verheugd dat u mij te woord kunt staan.

Om dit interview uit te kunnen werken, zou ik het graag willen opnemen. Hiervoor heb ik wel uw toestemming nodig. Vindt u het goed dat ik dit gesprek opneem?

Algemene vragen

- Wat is uw functie binnen [bedrijf/organisatie/instantie]?
- Wat houdt uw functie in?

Beloningsplanologie – algemeen

- Wat houdt beloningsplanologie in?
- Hoe kan beloningsplanologie bestaande beleidsinstrumenten aanvullen?
- Ziet [bedrijf/organisatie/instantie] beloningsplanologie als een effectief instrument om private partijen te sturen?

Beloningsplanologie – project [bedrijf/organisatie/instantie]

[Bedrijf/organisatie/instantie] heeft in project X beloningsplanologie toegepast.

- Waarom is er destijds gekozen om beloningsplanologie in dit project toe te passen?
- Hoe is beloningsplanologie juridisch vastgelegd in dit project?
- Hoe wordt beloningsplanologie toegepast binnen dit project?
    - Wat zijn de voor- en nadelen van beloningsplanologie binnen dit project?
    - Welke beloningen kan een private partij ‘verdienen’?
    - Wie beslist over de te verdienen beloningen?
    - Hoe worden de beloningen juridisch vastgelegd?
    - Hoe reageren private partijen op deze mogelijkheid?
    - Is de beloningsplanologie regeling nadien nog gewijzigd op basis van praktijkervaringen?
    - Heeft het toepassen van beloningsplanologie binnen dit project een meerwaarde?

- In wat voor projecten is beloningsplanologie nog meer voorgesteld?
  - Waarom?

Beloningsplanologie – eigen onderzoek

Zoals genoemd wil ik onderzoeken of beloningsplanologie als beleidsinstrument van toegevoegde waarde kan zijn voor het verduurzamen van de gebouwde omgeving.

- Ziet u een toepassing voor beloningsplanologie binnen de energietransitie?
  - Waarom wel/niet?
  - Welke ruimtelijke beloningen zouden kunnen worden ingezet?
- Ik heb een aantal voorbeelden hoe beloningsplanologie zou kunnen worden toegepast om de gebouwde omgeving te verduurzamen. Deze wil ik graag aan u voorleggen. Wat vindt u van idee X, Y en Z?
- Welke kansen en barrières ziet u voor de toepassing van beloningsplanologie om de ge bouwde omgeving te verduurzamen?

Afsluiting
- Zijn er nog zaken die we niet hebben besproken maar wel relevant kunnen zijn voor dit on derzoek?
- Zijn er binnen uw netwerk nog personen die mij van relevante informatie over belonings planologie kunnen voorzien?
- Heeft u verder, naar aanleiding van dit interview, nog vragen?
- Mag ik u met naam, [bedrijf/organisatie/instantie] en functie in dit onderzoek vermelden?
- Heeft u interesse in het einddocument van dit onderzoek?

Dan wil ik u heel hartelijk bedanken voor uw tijd en de moeite die u heeft genomen om mij te woord te staan. Mochten er achteraf nog vragen zijn, dan kunt u mij altijd bereiken via mijn e-mailadres.

Nijmegen

Geachte heer/mevrouw,

Momenteel ben ik bezig met een afstudeeronderzoek naar de energietransitie van de gebouwde omgeving. Dit onderzoek voer ik uit als masterstudent Planologie aan de Radboud Universiteit en afstudeer stagiair bij BügelHajema Adviseurs.

Om mijn onderzoek in de werkelijkheid te kunnen plaatsen, voer ik een casestudy uit. Deze casestudy betreft de gemeente Nijmegen, omdat zij als een van de eerste gemeenten in Nederland al een Warmtevisie heeft opgesteld. [bedrijf/organisatie/instantie] heeft een rol gespeeld bij het tot stand komen van deze Warmtevisie/ is een sleutelspeler in het beleidsdomein van de energietransitie in Nijmegen. Ik ben daarom verheugd dat u mij te woord kan staan en mee wilt werken aan mijn onderzoek.

Het doel van mijn onderzoek is inzicht verkrijgen in het huidige beleid omtrent de energietransitie van de gebouwde omgeving en onderzoeken of beloningsplanologie als beleidsinstrument kan bijdragen aan de verdere ontwikkeling daarvan. Wat de uitgangspunten van dit instrument zijn zal ik later in ons gesprek nader toelichten. Ik wil namelijk eerst ingaan op het huidige beleid.

Om dit interview uit te kunnen werken, zou ik het graag willen opnemen. Hiervoor heb ik wel uw toestemming nodig. Vindt u het goed dat ik dit gesprek opneem?

Algemene vragen

- Wat is uw functie binnen [bedrijf/organisatie/instantie]?
- Wat houdt uw functie in?
- Hoe bent u betrokken bij het verduurzamen van de gebouwde omgeving van Nijmegen?

Energietransitie gebouwde omgeving – actoren en coalities

- Welke partijen zijn betrokken bij het verduurzamen van de gebouwde omgeving in Nijme gen?
- Met welke partijen wordt er door [bedrijf/organisatie/instantie] samengewerkt?
- Waarom wordt er door [bedrijf/organisatie/instantie] met deze partijen samengewerkt?
- Wat is de rol van [bedrijf/organisatie/instantie] binnen de samenwerkingen?

Energietransitie gebouwde omgeving - discourse

- Wat vindt [bedrijf/organisatie/instantie] van het verduurzamen van de gebouwde omge ving?
- In hoeverre is het verduurzamen van de gebouwde omgeving volgens [bedrijf/organisatie/ instantie] belangrijk voor de energietransitie?
- In hoeverre delen andere partijen deze mening?
- Wat zijn de ambities van [bedrijf/organisatie/instantie] voor het verduurzamen van de ge bouwde omgeving in Nijmegen?
- Wat is de achterliggende motivatie om de gebouwde omgeving te verduurzamen?

Energietransitie gebouwde omgeving – resources

- Hoe pakt [bedrijf/organisatie/instantie] het verduurzamen van de gebouwde omgeving aan?
- Welke knelpunten komt zij hierbij tegen?
- Welke middelen heeft zij tot haar beschikking om de gebouwde omgeving te verduurza men?
- Welke middelen mist zij?
- Hoe wordt dit aangevuld door andere partijen?
- In vergelijking met andere partijen, hoeveel invloed heeft[bedrijf/organisatie/instantie] om de gebouwde omgeving te verduurzamen?

Energietransitie gebouwde omgeving – rules

- Aan welk beleid, visie of afspraken is [bedrijf/organisatie/instantie] gebonden bij het ver duurzamen van de gebouwde omgeving?
- Aan welke wettelijke regels is [bedrijf/organisatie/instantie] gebonden?
- Zijn er nog andere regels die het transitieproces beïnvloeden?
- Wat is het effect van deze wetten en regels op de uitvoerbaarheid?
- Mist [bedrijf/organisatie/instantie] regelgeving dat de energietransitie kan sturen?

Eigen onderzoek – beloningsplanologie

Zoals genoemd wil ik onderzoeken of beloningsplanologie als beleidsinstrument van toegevoegde waarde kan zijn voor het verduurzamen van de gebouwde omgeving.

Beloningsplanologie is een publiek instrument, gebaseerd op het 'voor wat, hoort wat'-principe. Hierbij worden planologische mogelijkheden geboden als beloning voor een investering van huizenbezitters/marktpartijen. Deze investering is het verduurzamen van de woning(en). De planologische beloning die hier tegenover kan staan is bijvoorbeeld het dichter of hoger mogen bebouwen van een kavel. Hiermee kan de woningvoorraad dus gemakkelijker worden uitgebreid. Beloningsplanologie biedt dus nadrukkelijk geen financiële compensatie.

- Is er, volgens [bedrijf/organisatie/instantie], sprake van dat private partijen de verduur zaam heidsopgave op zich nemen en de overheid daarbij een faciliterende rol speelt?
- In hoeverre is er behoefte aan een niet-financiële compensatie voor het realiseren van deze doelstellingen?
- Kan deze compensatie ook planologisch zijn?
- Wat voor planologische mogelijkheden kan [bedrijf/organisatie/instantie] bieden/ heeft [bedrijf/organisatie/instantie] baat bij?
- Biedt een planologische compensatie een meerwaarde voor [bedrijf/organisatie/instantie]?
- In hoeverre is een planologische compensatie te handhaven?

Afsluiting

- Zijn er nog zaken die we niet hebben besproken maar wel relevant kunnen zijn voor dit on derzoek?
- Zijn er binnen uw netwerk nog personen die mij van relevante informatie kunnen voorzien?
- Heeft u verder, naar aanleiding van dit interview, nog vragen?
- Mag ik u met naam, [bedrijf/organisatie/instantie] en functie in dit onderzoek vermelden?
- Heeft u interesse in het einddocument van dit onderzoek?

Dan wil ik u heel hartelijk bedanken voor uw tijd en de moeite die u heeft genomen om mij te woord te staan. Mochten er achteraf nog vragen zijn, dan kunt u mij altijd bereiken via mijn e-mailadres.

General information

Geachte heer/mevrouw,

Momenteel ben ik bezig met een afstudeeronderzoek naar de energietransitie van de gebouwde omgeving. Dit onderzoek voer ik uit als masterstudent Planologie aan de Radboud Universiteit en afstudeer stagiair bij BügelHajema Adviseurs.

Het doel van mijn onderzoek is inzicht verkrijgen in het huidige beleid omtrent de energietransitie van de gebouwde omgeving en onderzoeken of beloningsplanologie als beleidsinstrument kan bijdragen aan de verdere ontwikkeling daarvan. Omdat [bedrijf/organisatie/instantie] zich actief bezighoudt met het verduurzamen van de gebouwde omgeving wil ik u graag een paar vragen stellen. Vind u het goed dat ik dit gesprek opneem?

Algemene vragen

- Wat is uw functie binnen [bedrijf/organisatie/instantie]?
- Wat houdt uw functie in?

Energietransitie – verduurzamen gebouwde omgeving

- Wat vindt [bedrijf/organisatie/instantie] van het verduurzamen van de gebouwde omge ving?
  - (Achterliggende motivatie; belang van verduurzaming voor energietransitie)
- In hoeverre delen andere partijen deze mening?
- Hoe wordt het verduurzamen van de gebouwde omgeving aangepakt door [bedrijf/organi satie/instantie]?
  - (Kansen; knelpunten; haalbaarheid)

Energietransitie – beleidsinstrumenten

- (Hoe) wordt er gebruik gemaakt van beleidsinstrumenten door [bedrijf/organisatie/instan tie] om de gebouwde omgeving te verduurzamen?
  - (Waarom; effecten)
- Zou [bedrijf/organisatie/instantie] baat hebben bij meer beleidsinstrumenten?
  - (Waarom (niet); welke)

Beloningsplanologie

Om de gebouwde omgeving te verduurzamen wil ik gebruik gaan maken van beloningsplanologie. Hierbij worden ruimtelijke mogelijkheden geboden wanneer wordt voldaan aan verschillende voorwaarden: het 'voor wat, hoort wat'-principe. Over dit concept wil ik graag de mening van [bedrijf/organisatie/instantie] weten.

- Wat vindt [bedrijf/organisatie/instantie] van een ruimtelijk beleidsinstrument als middel

het verduurzamen van de gebouwde omgeving
- Biedt een ruimtelijke beloning een oplossing voor de knelpunten die [bedrijf/organisatie/instantie] ervaart/heeft [bedrijf/organisatie/instantie] er baat bij om een ruimtelijke belo ning te bieden aan partijen?

Afsluiting

- Zijn er nog zaken die we niet hebben besproken maar wel relevant kunnen zijn voor dit on derzoek?
- Zijn er binnen uw netwerk nog personen die mij van relevante informatie kunnen voorzien?
- Heeft u verder, naar aanleiding van dit interview, nog vragen?

Dan wil ik u heel hartelijk bedanken voor uw tijd en de moeite die u heeft genomen om mij te woord te staan. U wordt anoniem verwerkt in mijn onderzoek. Mochten er achteraf nog vragen zijn, dan kunt u mij altijd bereiken via mijn e-mailadres.

7.3 Codes

Reward Planning

Code Groups
Area Improvement (7)
Cons (13)
Enforcement (5)
Financial Reward (3)
Implementation Difficulty (4)
Legitimacy (2)
Municipal Effort (13)
Own Project (4)
Private Effort (8)
Pro's (15)
Public Goals (22)
Reward Effectiveness (19)
Reward Planning Meaning (13)
Reward Proportionality (3)
Rewards (10)
Risks (9)
Safety (2)
Spatial Problem (8)
Spatial Reward (24)
Stimulating Pro-Environmental Behaviour (9)
Target Group (4)
Usefulness (8)

Nijmegen

Code Groups
Area Improvement (7)
Barriers (43)
Civil Actors (13)
Collaborations (18)
Complications (10)
Discourse Energy Transition (33)
Discourse Sustainable Built Environment (15)
Dukenburg and Hatert (11)
Enforcement (6)
Feasibility Reward Planning (13)
Financial Barrier (29)
Financial Reward (17)
Heijendaal and other Neighbourhoods (6)
Hengstdal and Bottendaal (14)
Housing Corporations (4)
Law (24)
Market Actors (27)
Motivation to act Sustainable (21)
Municipal Effort (7)
Mutual Agreements (11)
Nijmegen (28)
Opportunities (27)
Organisational Responsibility (10)
Own Project (3)
Policies (19)
Power (5)
Public Goals (24)
Residents (15)
Resources (29)
Responsibility (4)
Reward Effectiveness (21)
Reward Planning (33)
Reward Proportionality (4)
Spatial Reward (27)
State Actors (22)
Stimulating Pro-Environmental Behaviour (14)
Sustainability (41)
Tenants (3)
Usefulness (17)