

# 'OWN THE HEAT'

A RESEARCH ON THE DEVELOPMENT OF MENTAL OWNERSHIP  
OF RESIDENTS IN THE LOCAL HEAT TRANSITION PROCESS OF  
THE NEIGHBOURHOOD OF THE FUTURE

DOGGEN, J.P.L.

MASTER'S THESIS FOR THE SPATIAL PLANNING PROGRAMME  
CITIES, WATER, CLIMATE CHANGE

NIJMEGEN SCHOOL OF MANAGEMENT  
RADBOD UNIVERSITY  
FEBRUARY, 2021

# "OWN THE HEAT"

**A Research on the development of mental ownership of residents in the local heat transition process of the neighbourhood of the future**



**Radboud Universiteit**

## **Colophon**

### **Document Education**

Master thesis  
Master Spatial planning  
Cities, Water, Climate Change  
Nijmegen School of Management  
Radboud University

### **Key words**

Mental Ownership, Heat transition, Residents,  
Neighbourhoods, Engagement

### **Word Count**

34.930

### **Image front page**

Own photograph

### **Thesis supervision**

Dr. Ig. Linda Carton

### **Author**

Juul Doggen

### **Student number**

S1029541

### **E-mail**

juul.doggen@student.ru.nl / juuldoggen@home.nl

### **Date**

February 2021



## PREFACE

In March 2020, the journey of writing my master thesis started. The research process has had its ups and downs. The sudden Covid-19 virus, the connected lockdown and the struggle I had with finding the right topic and idea to research let to the fact that writing this master thesis became a bit of a struggle. However, once I found the right topic and motivation, the writing became much more comfortable and joyful, resulting in a thesis which I really enjoyed writing.

After 11 months of work, I now proudly present my master thesis; “Own the heat” for the spatial planning programme. These last two years on the Radboud University have thought me a lot, and let me grow as a person and professionally. It was the best decision for me to continue studying here after finishing my bachelor degree at the university of applied science. It has been a pleasure to fulfil the pre-master and master here in the beautiful Nijmegen.

I also would like to show my appreciation to everyone who helped and supported me during the thesis writing process. First of all, my university supervisor; Linda Carton, who has been nothing but supportive during my process and really helped me getting this thesis right with interesting and joyful feedback sessions. I would also like to thank all interviewees for their time and participation in this research. It was a pleasure to talk to them about the processes in the neighbourhoods. During the process, I joined the Scriptielokaal in zoom, which provided me structure and motivation to work in these strange times. The process support Andrina Sol feeds here helped me a lot. Finally, I would really like to thank my parents, sister, friends and housemates for their support and motivation during this process, especially Remco for proofreading my thesis and providing feedback. Without them, this thesis would not have been finished the way I was able to right now.

With these words, I finish this chapter in my life and six years of studying has come to an end. I am very much looking forward to what the future will bring me.

Juul Doggen  
February 2021

## SUMMARY

With the growing attention for the heat transition and the pressure on neighbourhoods to become natural-gas free, there is a strong interest in the residents' role in this transition. Residents are experiencing an increasing reliance on them to contribute to the local heat transition (van der Schoor, Sholtens, 2015; de Koning et al., 2020). The increasing demand for residents to become part of the transition process raises the question on how to facilitate and support this demand on the local scale, especially in combination with the shifting context from neighbourhood to neighbourhood (Engelenbrug & Maas, 2018; van de Schoor & Scholtens, 2015; Susser, Doring and Ratter, 2016). The context specificity of the transition knows two sides; (1) the physical context of a neighbourhood and (2) the residents within a neighbourhood (van den Wijngaard et al., 2017). The context specificity that the residents form in this transition can be described by the mental ownership residents have over the process. With mental ownership is meant; people who take or have responsibility for a process, object or neighbourhood wanting to protect this or make it better (Breiting, 2008; Pierce Kostova & Dirks, 2003; Avey et al., 2009). Mental ownership is closely related to commitment, engagement, involvement, and a sense of belonging and thus reflects residents' engagement in the process (Breiting, 2008).

Mental ownership can develop through the combination of the motives, mechanisms and additional contextual aspects (Pierce et al., 2003). The motives for mental ownership development are; efficiency and effectance, self-identity and having a place to dwell (Pierce et al., 2003). Motives for mental ownership should be present before the mechanisms can develop mental ownership (Pierce et al., 2003). Mechanisms for developing mental ownership are; control, getting to know the target and investing the self (Pierce et al., 2003). Final, additional factors influence mental ownership development; these factors are; object/target factors, individual factors, process factors and context factors (Pierce et al., 2003). To make mental ownership researchable for the local heat transition; these aspects are linked to three pillars formed through theories, shaping mental ownership; (1) informal processes, (2) Control and (3) collaborative institutional processes. The pillars also form the main research question:

*How is the mental ownership of residents formed by (a) the informal practices, (b), control and (c) the collaborative institutional process in the neighbourhood of the future local heat transition process?*

The answer to this research question is found by researching five cases of the neighbourhood of the future project in the province of Gelderland. These five cases are all different in the way residents cooperate in the process. The cases' outcomes let to a concept-indicator model showing the development of mental ownership from two main aspects; the situation before the process and the process itself. This concept-indicator model is translated back to the three formed pillars that resulted in the following conclusion. Mental ownership is formed and developed by four pillars. The motives for mental ownership are found in the neighbourhood *genius loci*; existing out of the neighbourhoods' current energy practice, focusing on neighbourhoods' physical aspects and the residents' social aspects. These social and physical aspects determine the basic mental ownership before the process starts and forms the first pillar.

Mental ownership is further developed by the three other pillars, the mechanisms of mental ownership. The first pillar is engagement of residents through communication and events and activities. This pillar includes residents in the process by showing them what the transition is like. The second pillar is control. Control looks at the decision and financial control of residents over the process and the risk-revenue distribution explaining the decisions made by residents. The more control residents have over the process, the more mental ownership is felt over the process. The final pillar is the collaborative institutional process. The collaborative institutional process pillar includes the actor-network, where the residents are a part of, the future institutional set-up, the formalisation of resident groups and the policy and constraints context. All four pillars are interrelated to each other and influence each other, such as the residents' role in the actor-network determining the control residents have over the process and the engagement process influencing the residents' willingness characteristics.

In conclusion, mental ownership is developed from the genius loci forming the "basic" mental ownership before the process started. The informal engagement processes, control and collaborative institutional process, make mental ownership occur and increase or decrease the "basic" mental ownership set by the genius loci.

## TABLE OF CONTENT

<b>Preface .....</b>	<b>3</b>
<b>Summary.....</b>	<b>4</b>
<b>Chapter 1: Introduction .....</b>	<b>9</b>
1.1. Introduction To The Research .....	9
1.2. Research Problem Statement .....	11
1.3. Research Aim + Research Questions .....	12
1.4. Scientific Relevance .....	13
1.5. Societal Relevance .....	13
<b>Chapter 2: Theoretical framework .....</b>	<b>15</b>
2.1. Mental Ownership.....	15
2.2. Informal Processes.....	19
2.3. Control .....	21
2.4. Collaborative Institutional Process.....	24
2.5. Conceptual Model .....	27
<b>Chapter 3: Research methods .....</b>	<b>29</b>
3.1. Research strategy .....	29
3.2. Research methods   Data collection   Data analysis .....	30
3.3. Validity and reliability of the research.....	34
<b>Chapter 4: Case studies.....</b>	<b>36</b>
4.1. Heveadorp Renkum .....	37
4.2. Benedenbuurt Wageningen .....	42
4.3. Kerschoten Apeldoorn.....	47
4.4. Spijkerkwartier, Arnhem .....	52
4.5. West-Midden Ermelo .....	56
<b>Chapter 5: Analysis .....</b>	<b>60</b>
5.1. The current situation.....	60
5.2. The process.....	64
<b>Chapter 6: Conclusion .....</b>	<b>70</b>
6.1. Informal processes.....	70

6.2. Control .....	72
6.3. Collaborative institutional process.....	75
6.4. Interdependence .....	76
6.5. Conclusion .....	78
<b>Chapter 7: Discussion.....</b>	<b>81</b>
7.1. Contribution to theory building. ....	81
7.2. Discussion on the recommendations for practice.....	83
7.3. Reflection on research .....	86
<b>References .....</b>	<b>88</b>
<b>Appendices.....</b>	<b>99</b>
Appendix 1: The effects of Mental Ownership.....	99
Appendix 2: Case Studies - Process Time Line Explanation.....	100
Appendix 3: The Concept-indicator Model.....	110
Appendix 4: Interview guides.....	111

## LIST OF FIGURES

Figure 1: Conceptual model .....	27
Figure 2: Research strategy .....	30
Figure 3: Actor network scheme heveadorp (own illustration).....	37
Figure 4: Process scheme Heveadorp (own illustration, Heveainitiatief, 2018b) .....	38
Figure 5: Actor network scheme Benedenbuurt (own illustration) .....	42
Figure 6: Process scheme Benedenbuurt (own illustration).....	43
Figure 7: Actor-network scheme Kerschoten (own illustration).....	47
Figure 8: Process scheme Kerschoten (own illustration).....	48
Figure 9: Actor-network scheme Spijkerkwartier (own illustration) .....	52
Figure 10: Process scheme Spijkerkwartie (own illustration) .....	53
Figure 11: Actor-network scheme Ermelo (own illustration).....	56
Figure 12: Process scheme Ermelo (own illustration).....	57
Figure 13: Schematic overview of the concept-indicator model (own illustration).....	60
Figure 14: Concept-indicator model; social aspects (own illustration) .....	60
Figure 15: Concept-indicator model; physical aspects (own illustration).....	63
Figure 16: Concept-indicator model; influence (own illustration).....	65
Figure 17: Concept-indicator model; engagement (own illustration).....	68
Figure 18: Concluded conceptual model.....	79
Figure 19: Concepts of the situation,.....	82
Figure 20: Concepts of the process.....	82

## LIST OF TABLES

Table 1: Connection sub-concepts to the definition of mental ownership.....	18
Table 2: Overview of the aspects connected to the sub-concepts .....	28
Table 3: Case study selection (own illustration).....	32
Table 4: Overview conducted interviews.....	33
Table 5: Overview statistic information neighbourhoods.....	36
Table 6: Conclusion informal processes (own table).....	70
Table 7: Conclusion control (own table) .....	72
Table 8: Conclusion collaborative institutional processes (own table).....	75
Table 9: Interrelations between the different pillars (own table).....	77
Table 10: Possible checklist of the concept-indicator model.....	83



## CHAPTER 1: INTRODUCTION

### 1.1. INTRODUCTION TO THE RESEARCH

'In 2050, 7 million houses and 1 million other buildings should be disconnected from the gas' (Ministerie van Economische Zaken en Klimaat, 2019).

With this quote, the goals were set for the built environment within the climate agreement. To achieve the 2050 goal, a neighbourhood-oriented approach is chosen. With this approach, municipalities become the central actor. Together with the residents and building owners, they determine the best solution regarding heat and power for each neighbourhood (Ministerie van Economische Zaken en Klimaat, 2019). The neighbourhood scale of implementation is the most manageable scale to make a step-by-step approach for transitioning, while working with and responding to natural moments in the neighbourhood that give transitioning opportunities (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019). As part of the climate agreement and the start of the neighbourhood-oriented approach, all Dutch municipalities are obliged to develop a heat transition vision accompanied by a neighbourhood transition plan. The heat transition vision is focussed on the insulation of homes and buildings and making them natural gas-free (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019). The neighbourhood transition plan states when the neighbourhoods of the municipality will start the transition and in what order (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019).

#### 1.1.1. The Local Scale

Thus, the focus of the transition is on the neighbourhood level, where heat measures are implemented. The local context of a neighbourhood determines whether an execution can occur in a particular location or not (van den Wijngaard, van Polen & van Bommel, 2017). With the focus on the local level implementation and the direct influence on the residents, the residents' role in the local heat transition process becomes interesting to research. Communities and individuals are recognised as significant contributors to the upcoming transitions (van der Schoor & Sholtens, 2015; de Koning, Kooger, Hermans & Tigchelaar 2020). The increasing pressure on the communities to transition is still evolving, and questions remain on supporting and facilitating this demand on the local scale (Engelenbrug & Maas, 2018; van de Schoor & Scholtens, 2015; Susser, Doring and Ratter, 2016). What can be said is that the participation of residents in the local heat transition processes is going beyond the regular participation of residents; their influence on the process is much more potent (Schöne, 2020). Residents become part of the collaborative process and encounter with the other actors, such as the government, in this process (Oxenaar, Wittmayer & De Geus, 2019).

An example of the neighbourhood-oriented approach is the process in the province of Gelderland, where they made a provincial energy agreement (Gelders energy agreement). The Gelders energy agreement is a cooperation of 250 different organisations and institutions in the province of Gelderland; who have the ambition to be natural-gas free in 2030 and energy-neutral by 2050 (Gelders energie akkoord, n.d.). Within the energy agreement, five different programmes initiated; one of them is built environment (Gelders energie akkoord, n.d.). The build environment program focusses on energy savings and the sustainability of houses (Gelders energie akkoord, n.d.). The biggest challenge in achieving their goals is making existing buildings natural gas-free; this asks for

a realistic step-approach carried by the residents (Gelders energie akkoord, n.d.). To support the built environment's ambitions, the Gelders energy agreement initiated the neighbourhood of the future project. This neighbourhood of the future project aims to get neighbourhoods natural gas-free using a step approach (Gelders energie akkoord, n.d.). Currently, the project involves 19 assigned neighbourhoods of the future throughout different municipalities in the province. The project's goal is that residents, municipalities, network operators, and local energy cooperation's start working together on becoming natural gas-free (Gelders energie akkoord, n.d.).

The new way of cooperating is still a work in progress, wherein the beginning some municipalities where reluctant towards the changes and the increasing role of the residents, there is now a shift visible where there is more room and support for citizen initiatives and decentralised solutions (Oxenaar et al., 2019). However, the question remains how to facilitate this shift matching the different context from neighbourhood to neighbourhood. The heat transition is a highly context-specific transition. There is no one standard solution for all neighbourhoods (van den Wijngaard et al., 2017). The technical solution chosen is based on the neighbourhood's contextual features, including house quality and quantity, the current gas and sewage network present, and the residents. Residents are co-determining with the other actors on the technological solution best suiting the neighbourhood (van den Wijngaard et al., 2017). The perfect solution does not exist for a new heating system in a neighbourhood; it is the challenge to search for a pragmatic mix of solutions (Oxenaar et al., 2019).

#### 1.1.2. Context Specific

The context specificness of the transition causes a lack of a central approach to transition. Within the neighbourhood of the future project, these contextual differences are also visible. Each neighbourhood has a different approach or set-up to become natural gas-free. However, the neighbourhoods do follow the same basic four-step-approach; 1) the initiative phase, 2) the orientation phase, 3) the feasibility and planning phase, and 4) the execution phase (Gelders energie akkoord, n.d.).

Context specificness in the transition comes from; physical characteristics, which determine the technological possibilities in the transition and the residents in a neighbourhood (van den Wijngaard et al., 2017). The context specificness that the residents form in this transition can be described by residents' mental ownership over the process. Mental ownership is seen as people taking or having responsibility for a process, object or neighbourhood wanting to protect this or make it better (Breiting, 2008; Pierce Kostova & Dirks, 2003; Avey et al., 2009). Mental ownership is closely related to commitment, engagement, involvement and a sense of belonging (Breitng, 2008). This responsibility for a process or the commitment to and engagement in a process derives from different aspects. Within this research, three pillars are chosen, affecting residents' mental ownership in the heat transition by changing the engagement, commitment, involvement, and sense of belonging.

The first aspect is the 'informal processes' in a neighbourhood and among the residents. Informal processes focus on the context of a neighbourhood. Because the heat transition is highly context-specific, neighbourhood's characteristics co-determine the process and possibilities for a neighbourhood (Van den Wijngaard et al. 2017). These characteristics could be physical and social.

Possible physical characteristics are housing quality and quantity, housing typology and the ratio of rental properties and homeowners (van den Wijngaard et al. 2017). For the social characteristics, the focus is on the neighbourhood's culture (van den Wijngaard et al. 2017). Besides the physical and social context characteristics of a neighbourhood, there is also the focus on engagement and mobilisation of residents in the heat transition process. It looks at how the residents are involved in the process, and the activities organised to create a support base among residents. Thus, this first aspect provides the context of (the process in) a neighbourhood regarding the heat transition and thus the context and engagement to mental ownership.

The second aspect is 'control'. Control is divided into power and control and the risk revenue distribution. Control over a process such as the heat transition gives power over the process and can increase the sense of belonging, commitment or responsibility from the residents towards the process (Chrislip & Larson, 1994; Ansell & Gash, 2007). The risk-revenue distribution shows the incentives of residents in joining the process or not. As described by Schöne & Rooijers (2020), not all residents want to join the process. With residents joining the process, there is an incentive to join the process or not. This incentive to join the process derives partly from a risk-revenue distribution decision. The incentives to join a process and the control over the process show residents' commitment over the process and thus give insight into the mental ownership.

The third aspect is the collaborative institutional process. As seen in the introduction section above residents are one way or another part of the actor construction of the upcoming heat transition (Oxenaar et al., 2019; Gelders energie akkoord, n.d.; Wijk van de Toekomst, n.d.). The collaborative institutional process focuses on how resident groups cooperate with other actors and how resident groups are situated in the actor construction and the role they take in the plan formation and policy process and future institutional set-up. These aspects reflect on the involvement of residents in the process and their role in the process in relation to the other actors involved. In understanding and researching the involvement of residents in the heat transition process, looking at the collaborative institutional process between the different actors and the process of plan formation is chosen to research residents' involvement and sense of belonging in the process, which influences the mental ownership.

## **1.2. RESEARCH PROBLEM STATEMENT**

The increasing importance of residents as contributors to the local heat transition process, the neighbourhoods of the future processes and the context specificity that comes with the transition raises the question of how the residents cooperate in these processes. Because the heat transition is highly dependent on the context of the neighbourhood, there is not one-way resident groups are cooperating in the process (van den Wijngaard et al., 2017). Residents can play an essential part in the local heat transition; however, not much research is done on the role residents take in the transition, the influence residents have over the process and why they have a particular role or influence. The reasoning behind residents' involvement also varies across neighbourhoods (van den Wijngaard et al., 2017). For instance, in some neighbourhoods, the residents might be hesitant to join the process, as it is not appealing to all the residents to become natural gas-free in their neighbourhood; while in other neighbourhood's residents initiate the transition (Schöne & Rooijers, 2020).

The involvement of residents in the process thus differs throughout neighbourhoods. However, the reasoning behind residents' involvement is an interesting one to study, as this might show why it works in some neighbourhoods, but others are struggling. As this is a relatively new subject, the choice is made for this research to focus on the development of mental ownership of residents in the process. How do residents get a sense of commitment and engagement for the transition, and what makes them feel responsible for the process. These questions ought to be answered by focussing on three pillars; informal processes (a), control (b), and the collaborative institutional process (c) as described in the paragraph above. These three aspects form the basis for the research. The aspects are developed into the research questions and theoretical framework for researching mental ownership of residents in the local heat transition process of the neighbourhood of the future.

### 1.3. RESEARCH AIM + RESEARCH QUESTIONS

The research is exploratory research aimed at researching a subject about which little or no knowledge is available, and focusses on how certain concepts are applied in practice (van Thiel, 2007). The research aims to determine which aspects influence and shape mental ownership, and how these aspects relate to the development of mental ownership of residents in the local heat transition process of the neighbourhood of the future project. The focus is on the informal processes, control, and collaborative institutional process to research this aim. The main research question matching this aim is:

*How is the mental ownership of residents formed by (a) the informal practices, (b), control and (c) the collaborative institutional process in the neighbourhood of the future local heat transition process?*

This main research question is divided into sub-questions where each question answers a part of the main research question (van Thiel, 2007) The sub-questions are:

1. What role do informal processes play in the development of mental ownership of residents in the local heat transition process?
2. What role does control play in the development of mental ownership of residents in the local heat transition process?
3. What role does the collaborative institutional process of the local heat transition play in the development of mental ownership of residents, specifically the institutionalisation of resident groups?
4. How do the informal practices, control and the collaborative institutional process influence each other, and determine the mental ownership of residents?

With residents joining the local heat transition process, they become part of a collaborative process in the neighbourhood they live in. Within this research, residents researched are the inhabitants of the neighbourhoods of future cases. In a collaborative process, each actor takes a particular role, of whom they think matches the process (Ansell & Gash, 2007). Residents also take a particular role in the process as residents are, as the introduction chapter shows, of great importance in the local heat transition process (van der Schoor, Sholtens, 2015; de Koning et al., 2020; van den Wijngaard et al., 2017; Oxenaar et al., 2019). The role residents take in the collaborative process, and the matching influence depend on residents' mental ownership for the process. The mental ownership of residents can be defined as how residents are involved, engaged and committed to the process. Mental

ownership is developed by many factors which are arranged in the three aspects as named above, and further elaborated in the theoretical framework (chapter 2).

#### **1.4. SCIENTIFIC RELEVANCE**

Research on the mental ownership of residents in the local heat transition process is not yet executed much. Only TNO presented research in January 2020 on gasless living with the focus on drivers and barriers of residents within the local heat transition process; they researched this by using a nine-step approach for residents to get to a gas-free house (de Koning et al., 2020; Tigchelaar et al., 2019). The research from TNO focusses on showing barriers and how these could be tackled to get the residents fully on board (de Koning et al., 2020). The research done for this thesis can use the data from the de Koning et al. (2020) but differs from it because this research focusses on the development of mental ownership of resident in the local heat transition and not necessary the development of the technological solutions. Mental ownership itself is not a new concept in spatial planning research; however, the concept is mostly linked to research on mental ownership of people renting houses (Rieuwerts, 2014; de Ruijter, 2013; van de Giessen & Janssen, 2015). The connection of mental ownership to the local heat transition is a new kind of research for both the heat transition and mental ownership as a concept. By looking at the development of mental ownership through the collaborative institutional process, the control they have on the process and the context of the informal processes in different cases, different aspects of mental ownership will be shown, making it a different and new kind of scientific research.

The scientific basis of researching the mental ownership residents have in the neighbourhood of the future local heat transition process is found in the research of Pierce, Kostova and Dirks (2003) on psychological ownership. This article provides the starting point for researching the mental ownership of residents in the local heat transition. Because this article is a general article on the development of psychological ownership with the motives, mechanisms and additional factors determining mental ownership, it is lacking in being precisely applicable and researchable for the local heat transition process. Therefore, the theory is supplemented and extended with other elements and theories explaining the motives, mechanisms, and additional factors of mental ownership research in the local heat transition process. Although the researched elements, being informal processes, control and the collaborative institutional process, are more or less present in the research of Pierce et al. (2003), more theories are added to the research to create a conceptual model that suits the local heat transition best. The used theories are illustrated down below in chapter 2.

The combination of used theories and the relatively new and different focus on residents' mental ownership in the local heat transition process of the neighbourhood of the future is what makes this research scientifically relevant. It presents a new way of looking at the role residents play in the heat transition with a new combination of existing theories and academic literature.

#### **1.5. SOCIETAL RELEVANCE**

With the focus of the heat transition in the Netherlands being on neighbourhood implementation and projects such as the neighbourhood of the future, the demand for residents to join the local heat transition process is growing. Communities and individuals are seen as essential contributors to the



transition process (van der Schoor, Sholtens, 2015). However, the question remains how exactly this demand for the residents' process involvement can be executed on the local scale (Engelenbrug & Maas, 2018; van de Schoor & Scholtens, 2015; Susser, Doring and Ratter, 2016). The neighbourhood of the future project can be seen as a test project for how to cope with the heat transition demands from the government. However, it is also a test project for researching the residents' involvement and commitment for the upcoming transition.

By researching how residents are present in multiple cases of the neighbourhood of the future project and how and if they take part in the process, conclusions can be given on the mental ownership residents could have in the process and how this is developed. Because the conclusions derived from different case studies, the outcomes can represent more neighbourhoods in the Netherlands. Other residents can learn from these test cases on how to tackle the heat transition in their neighbourhood and what influences mental ownership.

The research expects that mental ownership develops from the combination of many aspects, wherein each neighbourhood, different aspects could be encountered or present. The outcomes could be a learning process for other neighbourhoods to see how mental ownership develops and where the focus needs to be to increase mental ownership. The target audience of this research is, on the one hand, the municipalities in the heat transition process and municipalities starting the process. This research can provide information for municipalities on what they can do to increase residents' mental ownership for the project. However, residents who want to participate in the heat transition process in their neighbourhood can learn from this research and use it to see bottlenecks in the processes, common mistakes, and positive aspects and solutions to make the process work better.

## CHAPTER 2: THEORETICAL FRAMEWORK

To answer the main research question: *'How is the mental ownership of residents formed by (a) the informal practices, (b), control and (c) the collaborative institutional process in the neighbourhood of the future local heat transition process?'* The theoretical framework is formed. At the basis of this research lies the mental ownership of residents within the local heat transition process.

Within this chapter, there will first be dived into the meaning of mental ownership in general. The concept of mental ownership will be applied to the local heat transition, and theories are sought, making mental ownership more researchable for the local heat transition. Three pillars are formed to help research mental ownership in the local heat transition, which will be elaborated in this chapter.

### 2.1. MENTAL OWNERSHIP

Usually, ownership is related to owning an object or house, but mental ownership also exists. Mental ownership does not focus on owning an object but much more on mentally owning a situation or a process where energy is invested in (Breiting, 2008). Breiting (2008) developed the following definition of mental ownership:

A concept referring to a mental disposition combining affective and cognitive domains as these relate to a specific situation or certain achievements. Mental ownership develops in situations where you "invest" your mental energies in an activity, for example, when you are aiming for some kind of change in that situation (p.162).

Mental ownership is closely related to commitment, engagement, involvement, a sense of belonging and responsibility for something (Breiting, 2008). Mental ownership is also associated with citizenship behaviour, contributing to a community's wellbeing (Organ, 1988; Pierce, Kostova & Driks, 2003). Mental ownership brings about a certain responsibility people to have or take over an object, process or neighbourhood wanting to protect this or make it better (Pierce et al., 2003; Avey, Avolio, Crossley & Luthans, 2009; Ansell & Gash, 2007). Ownership in the local heat transition could be seen as mental ownership over the local heat transition process and the neighbourhood of question. This definition of mental ownership can be seen as the origination of mental ownership in a process.

#### Psychological ownership

For the operationalisation/determination of mental ownership, the concept of psychological ownership is used (Rieuwerts, 2014). This concept and theory describe the way ownership is formed and what aspects appear to determine mental ownership. Psychological ownership is defined by Pierce, Kostova, and Dirks, (2003) as:

The state in which individuals feel as though the target of ownership or a piece of that target is "theirs" (i.e., "It is mine!") (p.86) and 'A cognitive-affective state that characterises the human condition' (p. 84)

The definitions of mental ownership and psychological ownership are similar, and both definitions relate to the cognitive and affective domain. Mental or physical ownership can thus be seen as the same subject and develops from the idea that it is a condition that becomes aware by intellectual

perception and reflects the individuals' awareness, thoughts, and beliefs about a particular object or situation. This intellectual perception is coupled with emotions and feelings for a particular object or situation (Pierce et al., 2003). These two conditions together form the condition of mental or psychological ownership.

For the determination of mental/psychological ownership Pierce et al., (2003) defined four components; (1) motives, (2) mechanisms, (3) additional factors, (4) effects. The effects are part of the complete theory on mental ownership. However, because this research is focussing on the development of mental ownership the effects are not included in the main research but can be found in appendix 1.

#### 2.1.1. Motives

The motives or roots for mental ownership are efficacy and effectance, self-identity and having a place to dwell (Pierce et al., 2003). Efficacy and effectance relate to the possibilities and the right of individuals to change the surroundings which they control or where they execute the action. This control over surroundings can result in an intrinsic pleasure and extrinsic satisfaction because objects are acquired as theirs (Pierce et al., 2003). Self-identity and ownership are related to each other in the sense that ownership can help people define themselves. By owning something, people can express their self-identity to others and maintain this over time. People become psychologically attached to objects and integrate the object into their identity (Pierce et al., 2003). Having a place to dwell is the final motive for psychological ownership. Having a place to dwell is the individual's motive to own a space or area. It is the motive to belong somewhere. The motivation is grounded in having a home or a place of one's own (Pierce et al., 2003). When people develop a home base, they can start to emotionally attach to objects, material and immaterial (Pierce et al., 2003; Heidegger, 1967). The fulfilment of these pre-named motives allows individuals to feel a kind of ownership over an object. The motives do not cause mental ownership to occur, but, facilitates the development (Pierce et al., 2003).

#### 2.1.2. Mechanisms

Mental ownership occurs by experiences, i.e., mechanisms or routes. Pierce et al., (2003) propose three experiences which enhance the emergence of psychological ownership; controlling the ownership target, coming to know the target and investing the self in the target. Controlling the ownership target shows the relation between control over an object and the sense of ownership; where more control over an object results in more psychological ownership (Furby, 1978a; McClelland, 1951; Rochberg-Halton, 1980; Sartre, 1943/1969; White, 1959). Coming to know the target focusses on the association of a person with the object. If a specific object is associated with a person, this person will feel ownership over the target (Pierce et al., 2003). As described by Pierce et al., based on Sartre (1943/1969) and Furby, (1978b): "Something can be one's own in one's feelings, by virtue of one being associated and familiar with it. (p. 93). The final mechanism; investing the self in the target is about investing time and effort in the target and experiencing the effort put into the target (Pierce et al., 2003). Once a person feels responsible for a target, they will start to invest in the target, which develops ownership over the target (Pierce et al., 2003).

The combination of the motives and mechanisms provides psychological ownership. They are intertwined, and the mechanisms cannot occur if there are not motives for ownership in the beginning. The motives of ownership need to be present for one or more routes (mechanism) to develop and let ownership occur (Pierce et al., 2003).

### 2.1.3. Additional Factors

The additional factors influencing the psychological ownership are; object/target factors, individual factors, process factors and contextual factors.

Object/target factors build on the discussion on the roots and routes of psychological ownership. It determines whether ownership can be felt over a target (Pierce et al., 2003). Targets that are viable of having ownership over are targets which attribute to the satisfaction of the motives and facilitate the routes towards psychological ownership (Pierce et al., 2003). Once a target thus interferes with the motives and routes/mechanisms, psychological ownership is much more likely to arise. There are many targets possibilities named in literature, one possible target of psychological ownership that match this research is space and territory (Rudmin & Barry, 1987).

The second additional factor is the individual factors. Although there are set universal motives for the development of psychological ownership in the first place, it should be noted that there are individual differences in the development of ownership (Pierce et al., 2003). First, individuals can differ in the strength of the motives, which results in the varying likelihood of the development of ownership feelings (Pierce et al., 2003). Second, each individual has their personality, accompanied by traits. Traits affect how individuals pursue the ownership of targets and to what targets ownership can be felt. An individuals' traits can case for different motives and mechanisms to be upfront in the development and occurrence of psychological ownership (Pierce et al., 2003). Third, personal values make objects more or less present and respected in a persons life (Pelham, 1995). Different targets are essential for different people. Targets and objects that are important for people because of their values are more likely to become targets where psychological ownership is felt over (Pierce et al., 2003).

The third additional factor is the process factors. Process factors relate to the process of the emergence of psychological ownership. The emergence of psychological ownership comes from the complex interactions of the motives and mechanisms of ownership and the additional factors as described above (Pierce et al., 2003). The way the process emerges is dependent on the appearance of the motives and the relationships between the motives. Motives are interrelated, and one motives' appearance can cause another motive to appear (Pierce et al., 2003). However, the motives are also additive, and ownership can be felt when just one motive is fulfilled (Pierce et al., 2003). The mechanisms are distinct, complementary and additive (Pierce et al., 2003). If an individual takes one route, ownership can already be felt, independent of the other routes. However, it should be noted that ownership feelings can become more potent when an individual travels multiple routes (Pierce et al., 2003). The final remark made with the process factors is that ownership feelings do not last forever. Feelings of ownership can change over time due to different circumstances; it can become more substantial, but also decrease or leave (Pierce et al., 2003).

The fourth and final additional factor is the context factors. The process of experiencing ownership is also influenced by the context individuals live in (Pierce et al., 2003). The contextual aspects can be divided into the structural context and the cultural context. With the structural context, laws, norms, rules and hierarchy are meant. These aspects can prevent or promote individuals to experience ownership over a target (Pierce et al., 2003). With cultural context, individuals' culture and/or a place is meant (Pierce et al., 2003). Personal values and individuals' identity are often influenced by the culture these individuals are situated in, and personal values and identity are part of the occurrence and development of psychological ownership (Pierce et al., 2003).

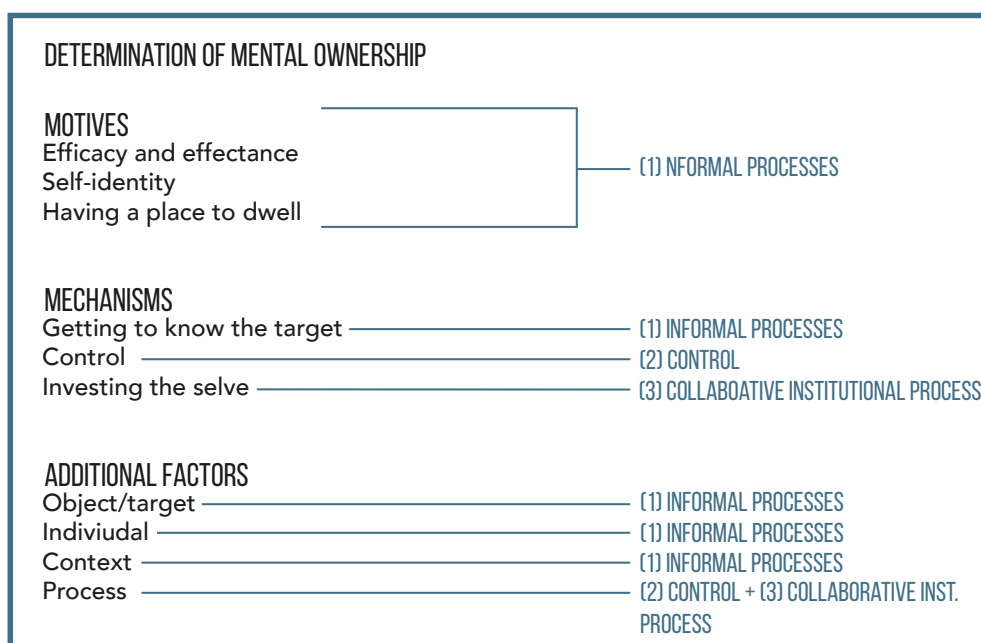
#### 2.1.4. Definition Of Mental Ownership

The definition of mental ownership and psychological ownership are translated into one definition for mental ownership used in this thesis;

*"Mental ownership can be defined as the concept developed by the combination of affective and cognitive domains, where the origination of the concept lays with the involvement of an individual and the investment of an individuals' mental energy in an activity. The determination of mental ownership comes from a combination of the roots, routes, and additional factors determining the development and occurrence of mental ownership." (Based on; Pierce et al., 2003; Van Luin et al., 2011; Breiting, 2008; and Pierce et al., 2013).*

To research the mental ownership of residents over the local heat transition, the concepts described in this paragraph are linked to concepts and theories explaining or researching them (see table 1). Three pillars are formed all related to one or more aspects describing mental ownership. The three pillars are, as named in the introduction chapter; (1) informal processes, (2) control, (3) collaborative institutional process.

Table 1: Connection sub-concepts to the definition of mental ownership





The first sub-concept; informal processes focus on the neighbourhood's physical and social context and the engagement processes in the neighbourhood. Informal processes connect to the following aspects of mental ownership; first, it connects to the participation and interest in the process which connects to the motives for the determination of mental ownership. Second, it connects to the mechanism of getting to know the target and final the object/target, individual and context additional factors. The physical context researches the having a place to dwell and the object/target and context additional factors. The social context researches the efficacy and effectance, the self-identity and the individual additional factors. The engagement processes research the process of getting to know the target.

The second sub-concept; control focuses on the power and control distribution of residents in the process and the risk-revenue distribution behind the choice for residents' cooperation. Control connects to the following aspects of mental ownership; First, the control mechanism of mental ownership and second the process additional factors. Both power and control and the risk-revenue distribution research the control mechanism and the process additional factors. The two aspects differ from each other in a way that power and control focus on the power distribution in the process and the control of residents over the process, where the risk-revenue distribution focusses on the drivers and goals behind the reasons of residents to join the process, which relates to the control over the process.

The final sub-concept of the collaboration; the collaborative institutional process focusses on the actor construction, the constraints to the transition, the plan formation and the institutional set-up. The collaborative institutional process connects to the following aspects of mental ownership; first, the mechanism of investing the self and second part of the process additional factors. The actor construction and institutional set-up research the mechanism of investing the self by researching the role of residents in this construction—the constraints to the transition and the plan formation research part of the process additional factors.

## **2.2. INFORMAL PROCESSES**

Informal processes are the practices in the neighbourhood that form the context of the transition process. The focus here is first on the *genius loci*, thus the neighbourhood's identity, which provides the physical and social context of the neighbourhood researched. The other focus is on the mobilisation and engagement of the residents in the neighbourhood. Mobilisation and engagement are the events, activities and actions done to involve the residents in the process and how the plan formation is taking place in the neighbourhood. It provides a context on the involvement of residents in the neighbourhood and what is done to achieve involvement.

### **2.3.1. The Genius Loci Of The Neighbourhood**

The *genius loci* of a neighbourhood relate to the identity of a place; it is the meaning given to a neighbourhood (Norberg-Schultz, 1979). The identity of a place is determined by the locations general spatial configuration and characterising articulation (Norberg-Schultz, 1979). In this research the identity of a neighbourhood is found by looking at not only the physical aspects of a neighbourhood, thus location, configuration and articulation, as Norberg-Schultz (1979) suggests, but also the social aspects and culture of the neighbourhood. The interplay between the social and

physical factors is what determines the identity of a place and provides insight into the context of the neighbourhood (Robertson, McIntosh and Smyth 2010).

### Physical aspects

Within the physical aspects, multiple parameters are considered to influence the process and the possibilities in the process. One of them is legal ownership; in here the differentiation is made into owner-occupants, a private landlord and the housing corporation. These are the three legal owners in the neighbourhood (van den Wijngaart et al., 2017). Legal ownership determines whether or not a home user has the complete power over the changes in their home; a tenant has less power than an owner-occupant (de Koning et al., 2020). Second is the housing typology and housing quality as this co-determines the way a house needs to be altered first before a new way of heating can be installed (van den Wijngaart et al., 2017). Third, the neighbourhood's structure influences the possible technological implementations (van den Wijngaart et al., 2017). The final physical aspect is the infrastructure in the neighbourhood. With infrastructure, the existing sewage infrastructure and the gas network is meant (Van den Wijngaart et al., 2017). The sewage system and gas network need to be changed and renovated in some of the technological options. Infrastructure can be leading in planning the project's continuation and making the final plans for the neighbourhood; the proceeding of the transition can depend on whether or not the networks are up for renovation (Gelders energie akkoord, n.d.; van den Wijngaart et al., 2017).

### Social aspects (culture of the neighbourhood)

Social aspects in a neighbourhood are related to the residents in a neighbourhood, their background, and the matter of collectiveness. For the social aspects in a neighbourhood, two parameters are chosen to research. These two parameters are the collectiveness in the neighbourhood, and the energy uses and practices.

The neighbourhood's collectiveness is based on the residents living in the neighbourhood and social cohesion in the neighbourhood. For the resident characteristics, a distinction is made between owner-occupants and tenants, income and educational level. Characteristics like these can cause for someone to become an early adopter of the transition measures, or make someone wait a little longer (de Koning et al., 2020). Social cohesion is the way residents are collaborating daily and in the process. Of importance for the growth of mental ownership here is the social comparison, where neighbours tend to look at each other. The more neighbours are investing, the higher the chances that other residents will also start investing (de Koning et al., 2020).

The energy practices focus on the current energy uses in the neighbourhoods. Practices as a concept can be exchanged by behaviour and are routinised everyday activities (Shove, 2010; Reckwitz, 2002). Practices lead to social reproduction and social transformation (Inglis & Thorpe, 2012). However, practices always can change; they are not guaranteed to be reproduced over time (Giddens, 1990). Shove, Pantzar and Watson (2012) explain energy practices further in their practice theory. In this theory, the elements of practices, a method to analyse change or stability, are explained. Within a practice, the following elements are present: meaning, material and competency (Shove et al., 2012). Meaning focusses on symbolic meaning, norms, values and ideas, which is in the energy practices, the ideas, norms and values people have on using gas, or alternative ways of heating (Shove et al.,

2012). Meaning in practice theory shows the self-identity of residents in the process. Materials focus on technologies and infrastructure (Shove et al., 2012). For the energy practices, this means the availability and applicability of new technologies and infrastructure (as explained in the physical aspects). The competency looks at the skills, knowledge and techniques and is for the energy practices focussed on the skills and knowledge residents have to make the shift to a natural gas-free neighbourhood (Shove et al., 2012). The competency is thus the efficacy and effectance on the process. Looking at energy practices thus means looking at energy behaviour and residents' willingness and possibilities to change this routinised behaviour. If a change of energy usage is required in a neighbourhood, it is necessary to know what the elements of an energy practice in the neighbourhood look like right now.

### 2.3.2. Engagement / Mobilising Residents

The other aspect connected to informal processes is the engagement of residents in the process and how residents are mobilised to join the process. The focus here is on the events, activities and actions in the neighbourhood planned for residents to get involved in the process and the involvement and time-investment of residents in the plan-making process.

Events, activities and actions focus on how residents are included in the process, the type of activities and the results of these activities, events or actions. To get residents thinking about whether they want to join the process, not join the process or reject the process, motivations to join ought to come from information and activities such as a residents' meetings (de Koning et al., 2020). Activities and events in the neighbourhood also provide insight into the drivers and barriers residents have regarding the heat transition process and facilitate the conversation between the residents and the initiators (de Koning et al., 2020). Events, activities and actions are thus relevant in providing a context on the residents' whereabouts concerning the heat transition in their neighbourhood.

The second aspect is the plan-making process, and the way residents are involved in this process. Residents need to make a decent decision for whether they want to join the process or not. To do so, residents need to know why a particular solution is chosen in a neighbourhood and thus be engaged in the process (de Koning et al., 2020). By focussing on the planning process, it becomes visible if and how the residents are engaged in the transition process and the outcomes of the transition process. With the engagement in the planning process also comes the time-investment in the plan formation process. Each actor involved invests a certain amount of time in the project. The actors such as the government and the housing association, thus invest money in the plan formation by making time available to join the negotiations (Emmerson et al., 2011). For actors to invest time in the process, the incentives to participate should be positive as well as the commitment to the process, they should be engaged in the process (Ansell & Gash, 2007). The time-investment of the residents in the process shows their involvement in the planning process of the transition; which helps to define mental ownership of residents in a neighbourhood.

## 2.3. CONTROL

Control focusses on the individual contributions and decisions made by residents in the process. Within the control pillar, two aspects are defined; power and control of residents over the process and the risk-revenue distribution. Power and control are related to the influence of residents over the

process. The risk-revenue distribution forms the reasoning behind decisions made. The combination of power and control and the risk-revenue distribution gives insight into the reasoning behind, and level of involvement of residents in the process.

#### 2.4.1. Power And Control

Power and control focus on the power distribution between the actors. It shows which actor has which power and who thus has a particular influence on the process. Power is seen as a resource, which is mostly unevenly distributed across the actors, like all resources (Bryson, Crosby & Stone, 2006; Huxham and Vangen, 2005). Different resources and control options that co-determine the power distribution are financial investments, time, technical and logistical support, decision making, e.g. (Emerson et al., 2011). Within the power and control in this research, the focus is on decision control and financial control from the residents in the neighbourhood.

Decision control focusses on who has the most significant say in making the decision; and who thus has control over the decision (Ansell & Gash, 2007; Emmerson et al., 2011). Within a collaborative process, leadership is seen as a critical element (Ansell & Gash, 2007). Leadership is necessary for setting ground rules, trust-building and facilitating the negotiations, but also to empower and involve other stakeholders (Chrislip & Larson, 1994; Ansell & Gash, 2007). Within this research, the focus is on the control residents have over the process. Decision control can be divided into two types, practical decision control and legal decision control. There can be a difference between the actors legally making the decision and the actors practically making the decision which can contradict or benefit each other. An example showing this is a neighbourhood where the municipality is in charge, and the residents are represented in an informal non-legal group. The residents in this case advice the municipality and are practically co-making the decision. However, the municipality is in charge and makes the legal decision because they are the legal actor. In this case, there is thus a difference between having the right to make a legal decision and practically being involved in deciding by still influencing the decision, thus giving residents power over the process (Ermelo duurzamer, n.d.). It can also work the other way around. When residents are a formalised group, they have a more substantial legal decision power. They can choose to do the process themselves and keep everything in their own hands without a legal decision from the municipality. Another example of control via decision-making is that no resident of a neighbourhood can be forced to join the heat transition process as there is no law obliging residents to become part of the natural-gas free neighbourhood. Meaning when a resident has the legal ownership over a property, they always have the legal decision right to not join in the process if wished, this is also part of the control and power in the process of the heat transition and effects the decision control of the residents (Heveainitiatief, n.d.).

Financial control focusses on the resources of the actors involved and how they can use them in the process. Each actor has different resources they can and or are willing to use in the transition process. For a plan to be implemented, investments should be made by the involved actors (van den Wijngaart et al., 2017). Within the vesta-mais model of van den Wijngaart et al. (2017) the investment costs for technological solutions can be calculated, which shows what kind of investments should be made and by which actor. Financial control also focusses on if an actor is involved with the financial possibilities to steer the negotiations and thus takes control by using his resources. Within the financial control also, subsidies are being considered to influence decision-making (van den Wijngaart et al., 2017).

The way residents are involved in the process, related to the kind of decision power they have over the process and the financial possibilities or restrictions, influences the control (and thus influences) of residents over the process.

#### 2.4.2. Risk-Revenue Distribution

The risk-revenue distribution focusses on the reasoning behind residents' choices to join or not join the process. The risk-revenue distribution can be divided into three parts, based on the goal-framing theory of Lindenberg and Steg (2007). In this theory drivers and goals of behaviour are presented. Residents make decisions based on one or more of these goals and drivers (Lindenberg & Steg, 2007). All three of the drivers represent a part of the risk-revenue distribution.

First, is the gain goal/driver and gain risk-revenue distribution. Gain goals focus on changing someone's resources; and the efficiency of resources (Lindenberg & Steg, 2007). Resources in the heat transition are closely related to cost-benefit ratios. The cost-benefit ratio of specific solutions can be calculated for each actor, thus also the residents, using the *vesta-mais* model of van den Wijngaart et al. (2017). In this model, the costs and benefits for each chosen and possible technological measurement can be calculated for a specific neighbourhood. However, next to the cost-benefit ratio, the gain goal can also be stirred by certain norms (Lindenberg & Steg, 2007), and collective values such as the people, planet, profit (Jonkers, 2012). These collective values are researched by Jonkers (2012) as multiple value creation; where next to economic values, social and ecological values are present in business models. If residents make a decision based on the gain goal, this means that they make decisions based on what the effect is on their resources.

Second is the normative goal/driver and normative risk-revenue distribution. The normative goal is focussed on acting appropriately, and doing what people think they ought to do according to themselves, others or what they see others do (Lindenberg & Steg, 2007). Normative goals are moral based decisions. Within the local heat transition, this means that residents make choices based on what they think they should do rather than the gains or the hedonic reasons behind it (Lindenberg & Steg, 2007). The normative goal is often seen as a social dilemma. People who decide on the normative goals tend to choose not to act in their interest but in the interest of a group or situation or because they see other people making the same decision (Lindenberg & Steg, 2007). When the individual and collective interest are at odds, people tend to choose the appropriate option (Dawes, 1980; Dawes & Messick, 2000). For the heat transition, which is an environmental decision, it is researched that people tend to choose the normative goal when they are aware of the environmental problems at stake and act pro-environmental (Lindenberg & Steg, 2007).

Third, is the hedonic goal/driver and the hedonic risk-revenue distribution. The hedonic goal is all about the way one feels in a situation. Making decisions from this goal is related to whether it increases or decreases their pleasure or affects their mood (Lindenberg & Steg, 2007). It is about emotions and effects that influence specific behaviour. It is thus about if actors involved think their mood changes within the heat transition by making an effort. Are people willing to change their way of doing right now, or is it good the way it is, living in a certain comfort; are the asked environmental shifts increasing the way residents feel, or are they happy with the way it is (Lindenberg & Steg, 2007).



Residents who make decisions based on the hedonic goal are thus focused on whether the changes asked are positively changing their living comfort.

Actors involved in the process can make decisions based on one of the goals, or a combination of the goals (Lindenberg & Steg, 2007). Goal framing theory can explain why certain resident groups made decisions in the process—their decisions and where these are based on influence the heat transition processes in the neighbourhoods.

## **2.4. COLLABORATIVE INSTITUTIONAL PROCESS**

The collaborative institutional process focuses on the way actors work together in the local heat transition process and the role residents take in the institutional side of the process. The collaborative institutional process is divided into three aspects; the actor construction and the way they work together, the plan formation and policy, focusing on the technological measures and constraints and the institutional changes that might occur during the heat transition process.

### **2.4.1 Actor Construction**

The actor construction focusses first of all on the involved actors in the process. With the focus on a collaboration, it is essential to know which actors are involved in this collaboration. A successful collaboration includes all stakeholders affected by the issue; if this is not the case, the legitimacy of the process is threatened (Gray, 1989; Reilly, 2001). Because the heat transition is happening behind the residents' front doors, the government is no longer the only active actor in the process; and entrepreneurs, civil society organisations, resident initiatives, and private individuals become active players (Oxenaar et al., 2019). By looking at the Vesta-mais model from van den Wijngaart et al. (2017), the following actors are noticeable in the local heat transition arrangement:

- Residents association
- Homeowners
- Renters
- Landlords
- Housing association
- Government
- Network Operator

These actors can play a significant role in the local heat transition, but not in every case. Not having all actors involved in the process, or critical actors who do not have the incentive to join the process is also a possibility within the cases (Ansell & Gash, 2007).

Next to the involved actors, an actor-network scheme can help visualise how actors work together. In this scheme, the "relations" between the different actors involved will become apparent. It shows where connections between different actors are present and where they are lacking (Nieuwbruut, n.d.). It also shows the actors commitment to the process (Ansell & Gash, 2007). Within a network scheme, the role of residents in the actor-network and their cooperation with the other involved actors become visible, showing how exactly the residents are involved in the process.

### **2.4.2 Plan Formation And Policy**

The plan formation process is focussing on the planning aspect of the heat transition. Within the planning formation, two themes will be discussed: the technological measures and constraints.

### Technological measures

The technological measures are the core of the neighbourhood's planning process; this is the essential outcome. The choice is made which technological solution will be implemented in the neighbourhood. A specific technological solution's choice depends on the neighbourhood's context and the wishes and demands from the involved actors, thus the informal processes (van den Wijngaart et al., 2017). Within the collaborative institutional process, the involved actors should develop a shared understanding of what they can achieve collectively and the best option for the neighbourhood (Ansell & Gash, 2007; Telt, Crowther & O'Hara, 2003). The outcomes this collaboration determine the technological solution for the neighbourhood to agree to and accept.

### Constraints

Within the local heat transition, there are a few constraints to the process that needs to be considered. These are general constraints applicable to all neighbourhoods but can be more or less present in a neighbourhood. First, there are local government policies such as the heat transition vision and the neighbourhood approach plan. Every municipality must create a heat transition vision and neighbourhood approach plan (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019). Within these plans, which need to be finished in 2021, the municipalities decide when and how each of the neighbourhoods in their municipality will become natural gas-free; making it the framework for the heat transition in a neighbourhood (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019). The transition visions and neighbourhood approach plan form the policy context for a neighbourhood, making them relevant to see as a constraint on the process, as a policy document might frame the process a certain way.

The second constraint is the current structure on delivering gas to the neighbourhood and the municipality's role in the processes. As discussed in the part on energy practices, the current structure could be seen as a practice, practices are routinised behaviour and can be reproduced or transformed (Reckwitz, 2002; Ingles & Thorpe, 2012). In the heat transition process, a shift is visible, changing the structure. The government is changing its role in the process, balancing between unburdening and strengthening the residents in the process (Oxenaar et al., 2019). Also, the residents becoming more critical in the process of changing the current structure of dealing with these kinds of subjects. Currently, gas is delivered to the houses with the help of utility companies, delivering gas as a publicly available utility (energiewijzer.nl, n.d.). With the upcoming changes, this also changes and possibilities arise for a new type of utility companies no longer in ownership of the municipality but in ownership of the residents or market parties (Spaans & Resink, 2019).

The third constraint is the path dependency on the usage of gas. Path dependency is "the tendency of institutions or technologies to become committed to developing in certain ways as a result of their structural properties or their beliefs and values" (Greener, 2019). A path dependency means that every decision is historically embedded in our structure (Arthur, 2011). Technological developments always build upon earlier innovations. The path dependency enhances the position of existing technologies while making it harder for new technologies to break through (Kupers, Faber &

Idenburg, 2015). The current usage of gas and the current energy infrastructure is a path dependency in the heat transition; it is harder for new technologies to break through as the choices made in the past, in this transition the choice for a gas network, keeps determining the system for a long time (Correlje, 2011), making the transition to a new system more complicated.

#### 2.4.3. Institutional Changes

The institutional set-up focusses on the institutional set-up in the following stages of the heat transition process. After the planning phase of the process, the execution phase and the maintenance phase take place. For these phases of the process, the possibility arises for a different institutional set-up (van den Wijngaart et al., 2017). A different institutional set-up means that a change in the actor construction could occur, including the network and the way of cooperating (van den Wijngaart et al., 2017). Changing the institutional set-up is seen as a slow and stately process, which is sometimes necessary (Harries, 2012). Within institutional change, new institutions are invented, others fade away, and others must adapt to remain sustainable (Harries, 2012). Within the heat transition, the institutional change might arise from a structural overlap between participating organisations, meaning that the boundary between public, private and voluntary sectors is blurred, which brings new participants in that have different backgrounds and interests to the field (Harris, 2012). The heat transition is seen as a social innovation that asks for new socially innovative relations within the process, enhancing new ways of thinking, organisation and doing (Oxenaar et al., 2019). Thus, social innovation asks for new ways of cooperation with hybrid ways of ownership and management (Oxenaar et al., 2019). For the heat transition, the pressure on the residents to join the process is increasing (Engelenbrug & Maas, 2018; van de Schoor & Scholtens, 2015; Susser, Doring & Ratter, 2016; Oxenaar et al., 2019), and with this there rises the opportunity for the formalisation of resident groups and resident initiatives, making them part of the hybrid organisational form. Besides this, the government is also changing its role in the process as they are balancing between unburdening and strengthening the residents (Oxenaar et al., 2019).

## 2.5. CONCEPTUAL MODEL

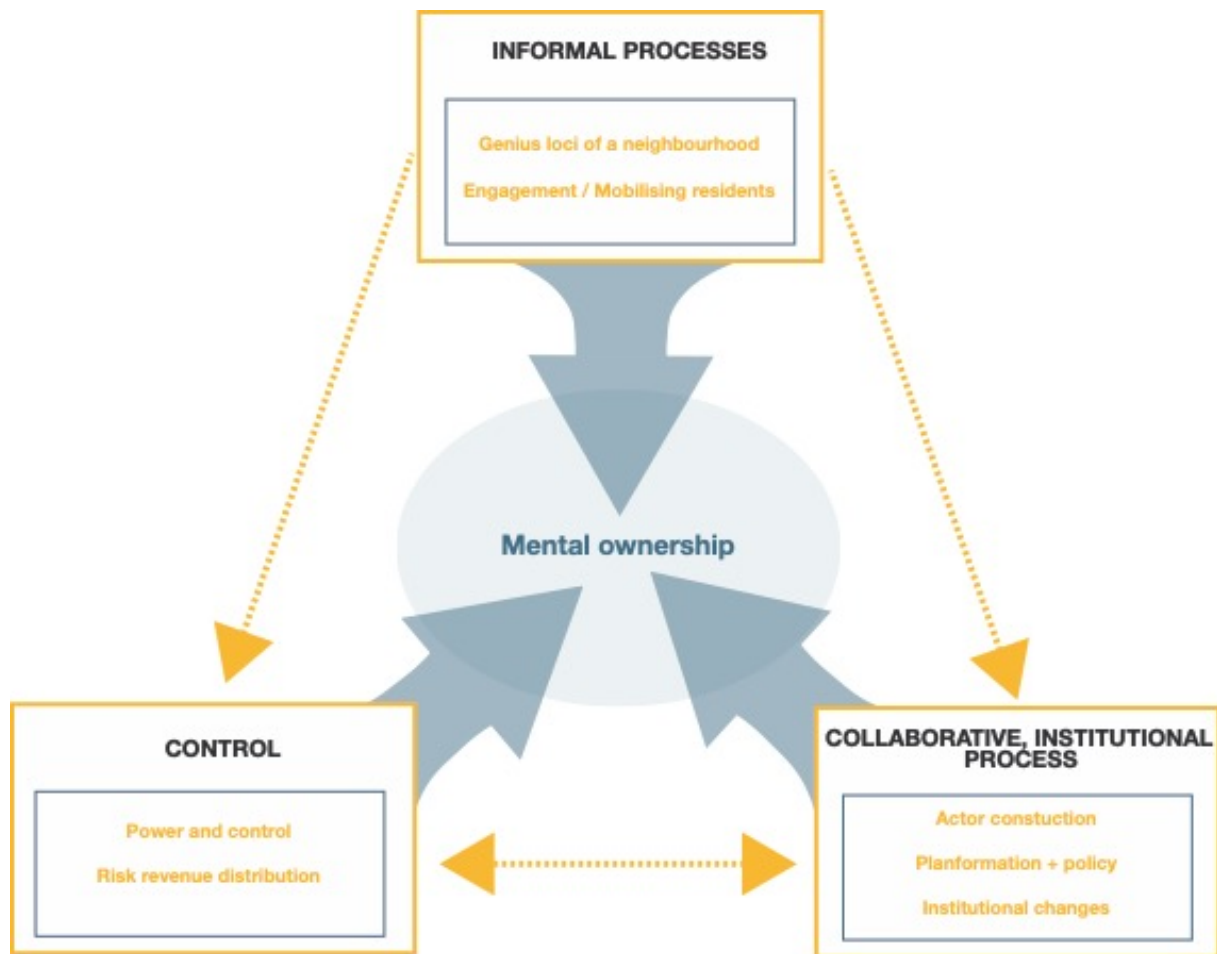


Figure 1: conceptual model

The central concept of this study is mental ownership. As described at the beginning of this chapter, mental ownership origination and determination develops from different aspects and factors. The aspects and factors described in the theory on mental ownership are translated and transformed into three pillars originating and determining mental ownership in the local heat transition. These three pillars are the elements in the conceptual model, influencing mental ownership. The three pillars are; the informal processes (1), control (2) and the collaborative institutional process (3). (see figure 1)

The informal processes focus on the neighbourhood's context in transition, thus the neighbourhood's genius loci and the mobilising and engagement of residents. As can be seen in the conceptual model, the box of informal processes is placed above the other two boxes as this pillar provides the context of the transition for the other two aspects, thus influencing them. The second pillar control focusses on the power and control and risk-revenue distribution. It focusses on the individual contribution of residents to the process and the reasoning behind the residents' choices. The connection between the first pillar; informal processes and the control pillar is that mobilisation of the residents and engagement of the residents can change the residents' risk-revenue perception to join or not join the process. The third pillar is the collaborative institutional process which focusses on the actor construction, the plan formation and policy of the heat transition and the institutional

changes. It focusses thus on the way actors work together and form the final plans. The pillar; informal processes influence the collaborative institutional process because the informal processes, such as the physical aspects, determine the technological measures taken (van den Wijngaart et al., 2019). Also, residents' engagement in the process influences the actor construction and the role residents take in the actor-network. The control pillar and the collaborative institutional process pillar also influence each other as the power and control (co)-determines the actor construction, and the role of residents in this construction.

All three pillars are thus interrelated to each other and originate and determine mental ownership in the local heat transition process in their way. For each of the three sub-concepts, there are multiple parameters formulated, these parameters are shown in the table 2 and explained in the text above.

Table 2: Overview of the aspects connected to the sub-concepts

INFORMAL PROCESSES	CONTROL	COLLABORATIVE, INSTITUTIONAL PROCESS
<b>Genius loci of a neighbourhood</b> <b>Physical aspects</b>  <b>Social aspects</b> - Collectiveness - Energy practices  <b>Engagement</b> Events, activities and actions  Plan making + Time investment	<b>Power and control</b> <b>Decision control</b> - Formal decision power - Pratical decision power  <b>Financial control</b>  <b>Risk revenue distribution</b> Gain goal  Normative goal  Hedonic goal	<b>Actor constuction</b>  <b>Planformation + policy</b> - Technologicial measures - Constraints  <b>Institutional changes</b>



## CHAPTER 3: RESEARCH METHODS

The methodology used to conduct the research is explained in the following chapter. This chapter explains the research strategy, research methods with the data collection and data analysis and the validity and reliability of the research.

### 3.1. RESEARCH STRATEGY

The research strategy is based on two things; the research paradigm and the research design. The research paradigm applied in this research is constructivism. Constructivism is based on a relativist ontology that believes in multiple realities that are local and specific and dependent on how individual persons and groups hold this reality (Guba & Lincoln, 1994). Constructivist research is person-centred, revealing individuals' values, beliefs and knowledge that frame how they see the world (Brown, 2003; Kolkman, Veen & Geurts, 2007). From a constructivist point of view, there thus exists multiple interpretations of the same phenomena. Within this kind of research, emotions, cultural background, social norms and experience of individuals play a more significant role (Moon & Blackman, 2014). Conducting this kind of research, the researcher creates a reality by giving meaning to what is observed (Guba & Lincoln, 1994). To conduct the research, the research's emphasis should be on the fact that knowledge needs to be discovered systematically (Guba & Lincoln, 1994). The final remark on the research paradigm is that the constructivist approach to researching fosters a hermeneutic-dialectic approach, which is interpretive and based on comparing and contrasting divergent constructions to achieve the synthesis of the same (Schwandt, 1994).

Constructivism suits this research well because the focus is on the local level where the processes differ from one neighbourhood to another. Each neighbourhood included in this study is going through a different process, meaning that each neighbourhood could have a different approach to or level of mental ownership. The residents of the neighbourhoods in this study might experience mental ownership differently, which can thus provide for different realities on the development of mental ownership of residents. This research aims to compare the different cases to find out common pillars and aspects that are involved in the development of mental ownership; matching the constructivist paradigm.

The research design for this thesis is explorative. Explorative research investigates a subject where little or no knowledge is available (van Thiel; 2007). The result of explorative research is a detailed empirical description and is often used to assign meaning to concepts and how they are applied in practice (van Thiel, 2007). The research itself is qualitative, aimed at understanding a concept (Streefkerk, 2020). Qualitative research enables a researcher to gain in-depth insights into a topic, of which little to no knowledge is available (Streefkerk, 2020); matching the explorative research design.

The subject of which there is little to no knowledge about is in this research is; 'mental ownership in the local heat transition process'. As described in the following paragraph on methods, multiple cases are selected to present different ways of resident groups involvement. All the cases are analysed using the same criteria found in theories and articles as described above. The cases and the involved resident groups will be analysed and described according to the conceptual model's predefined aspects, equalling empirical research where the application of a concept in practice is researched. The research is a combination of deductive and inductive. The concept of mental

ownership in the local heat transition is a concept with little available knowledge, making an inductive research a better option. With inductive research, the researcher explains the topic by developing a theory, where deductive research explains a topic by testing an existing theory (Streefkerk, 2019). This research creates a theoretical model for analysing the concept of mental ownership in the local heat transition. This theoretical model is inductively formed and the basis of the research. In the following steps of the research, this formed theory is tested through different cases. The research of the different cases is combined in an emergent model aggregated from empirical data. The model deriving from this empirical research is compared to the theoretical framework, to test if the framework is correct; making it a deductive study.

The research strategy (see figure 2) is divided into four phases; the operationalisation phase, case study, analysis, and conclusion and discussion. The first phase is the operationalisation of the used aspects in the conceptual model. These terms need to be explicitly defined to use them in executing the case study analysis and answering the main research question. Operationalisation translates the theoretical concepts into variables that can be observed and measured in reality; thus, in practice (van Thiel, 2007). After the terms and aspects are well defined and operationalised; the second phase starts where multiple cases are reviewed on the previously defined aspects. Each case selected will extensively be reviewed by using documents that are found online, thus desk research, and one or two additional interviews for each case. In the third phase, the described cases are analysed.

The cases' analysis is an inductive analysis where a concept-indicator model will be formed aggregated from the empirical data. This concept-indicator model is compared to the theoretical framework in phase four of the research; the conclusion. The conclusion thus tests the theories formed in chapter two using the empirical data to answer the main research question.

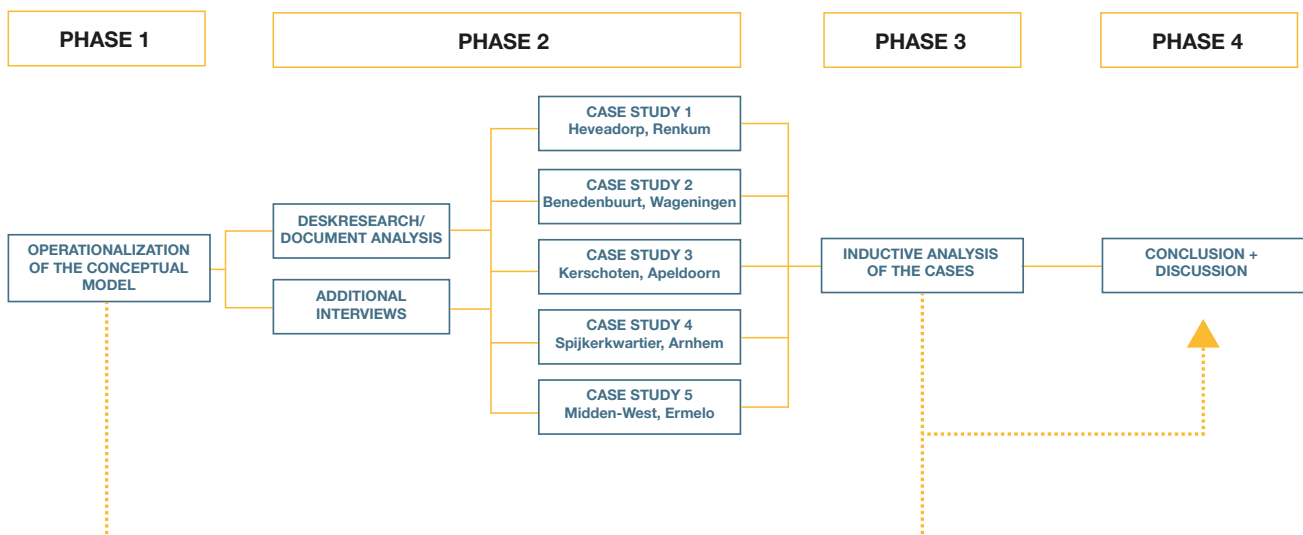


Figure 2: research strategy

## 3.2. RESEARCH METHODS | DATA COLLECTION | DATA ANALYSIS

### 3.2.1. Research Methods

The primary method of the research is case study analysis. A case study analysis is a method which can be used to explore real-life situations through in-depth data collection (Creswell, 2013). A case

study research matches this research because a real-life practical implementation of mental ownership is sought; matching the explorative research design where detailed empirical descriptions are used to assign meaning to concepts and the practical implementation of concepts. The case study chosen is a holistic multiple case study design. By using multiple cases, the evidence is more compelling, and the study is more potent than single case studies (Herriott & Firestone, 1983). Each chosen case is a holistic case which means that one unit of analysis in each case is present, and these cases are separate from each other and not examined together (Yin, 2003). Each case is a separate experiment within this research with one unit of analysis; mental ownership of resident groups. Although the cases are separate experiments, the outcomes of the analysis of the cases will be compared in order to analyse the development of mental ownership in the neighbourhoods.

The cases are chosen by purposeful sampling, based on their characteristics and not random (Creswell, 2013). The cases are chosen by using three criteria all cases should comply with and one criterion where they should deviate from each other. The criteria they all should comply with are; (1) they all need to be an assigned neighbourhood of the future related to the Gelders energy agreement. (2) All the cases need to have a resident group involved in the process, and (3) all used cases are working on the local heat transition process. The selected cases need to vary in the way residents are involved in the process and the type of group formation in a case. By having diversity in the cases on the criteria, the research question will be more broadly answered, making the research viable and reliable.

Each of the chosen cases represents a different type of resident involvement and group formation. When reviewing all the complicated cases in the neighbourhood of the future project, it showed that there are four common types of residential group formation visible (see table 3); these are (1) foundation, (2) cooperation, (3) project collaboration, and (4) platform. Besides these four common types, there is also the category 'others' where multiple group formations are located that do not match any of the four common types. The cases chosen are Heveadorp Renkum, Benedenbuurt Wageningen, Kershoten Apeldoorn, Spijkerkwartier Arnhem and, Midden west Ermelo. These cases comply with the three essential criteria and differ on the first review from each other on the fourth criteria. Heveadorp has a foundation as resident group formation, Benedenbuurt has a cooperation, Kerschoten works from a project collaboration and, Spijkerkwartier uses a platform. The fifth chosen case from the other category is Midden west Ermelo, which is based on a municipal initiative and complements the other four cases in this case study research. The choice for these specific cases as representatives of the residential group formation type is mainly because these cases had the best access to online information necessary for the desk research, within their category.

Table 3: Case study selection (own illustration)

TYPE OF RESIDENT INVOLVEMENT / GROUP FORMATION				
FOUNDATION	COLLABORATION	PROJECT COLLABORATION	PLATFORM	OTHERS
Loenen - Apeldoorn	Hoogkamp - Arnhem	<b>Kerschoten - Apeldoorn</b>	<b>Spijkerkwartier - Arnhem</b>	Neighbourhood Company - Hart van Zuid - Wijchen
<b>Heveadorp - Renkum</b>	Lanxmeer, Achter 't Zand, Voorkoop - Culemborg	Zilverkamp - Huissen	Hengstdal - Nijmegen	Initiative group - De Parken - Apeldoorn
	<b>Benedenbuurt - Wageningen</b>	Laren - Lochem	Lombok, Heijenoord, Klingelbeek - Arnhem	Working group - Cranevelt Alteveer - Arnhem
	Angerlo - Zevenaar	Bloemenbuurt - Didam - Montferland		<b>Municipal Initiative - West Midden - Ermelo</b>
				Municipal initiative - Voorsteralleekwartier noord en Berkel-park Zutphen
				Owners association - Nude - Wageningen

### 3.2.2. Data Collection

The data is collected in two main ways; desk research and additional semi-structured interviews. Desk research is the primary method of data collection. For this research, different policy documents of the local municipalities, project reports on the different cases, website information, meeting reports, e.g., are used for the case study analysis. The chosen cases all have their website where information can be found on the processes so far, and the processes for the future. These websites are the primary information source. Using desk research is an efficient strategy in doing research, which causes the researcher to not interfere with the research situation, reducing threats to validity and reliability as discussed below (van Thiel, 2007).

Next to the desk-research, one or two additional interviews for each case are done to gather extra information on the neighbourhoods' processes. In total, six interviews took place. In the table down below the overview of the conducted interviews is shown.

Table 4: Overview conducted interviews

Case	Interviewee	Role in process
Heveadorp	Joa Maouche	Alderman
Heveadorp	Wim Schoonderbeek	Initiator
Benedenbuurt	Wanka Lelieveld	Member of the project team, for the cooperation
Kerschoten	Marjolein Tillema	Energy director
Spijkerkwartier	Marc van den Burgt	Municipality of Arnhem
Ermelo	-	Project leader, municipality

\*Note that the interviewees whose names are written down here, gave their consent to use their name in this research.

The usage of interviews complementary to desk research gives room to the researcher to ask supplementary questions or better understand subjects found in the desk research (van Thiel, 2007). In general, interviews can be structured, unstructured or semi-structured (Gubrium & Holstein, 2001). For this research, the choice is made to conduct semi-structured interviews. A semi-structured interview makes sure there is some structure in the interview and keeps the interview focused, while also giving room to the interviewer and interviewee to improvise and have a conversation. Within a semi-structured interview, an interview guide is created. Within this interview guide, topics that the interviewer would like to discuss are named, as are some question (van Thiel, 2007). The interview guides for this research all have the same build-up with a general introduction to the research and interview, and some more general questions. Because the cases are very different, each interview also had case-specific questions. The interview guides as used for the conducting of the interviews are included in appendix 4. Due to the covid-19 virus, all interviews were conducted online with usage of Zoom and Teams. The interviews are used in the case analysis and the creation of the concept-indicator model.

### 3.2.3. Data/Case Analysis

The cases will be researched and analysed using the same step approach for each of the separate cases.

- General introduction of the case, the neighbourhood and the actors
- The process of the case, both the planning process and the engagement process
- The key moments of the process
- Resident involvement in the cases
- Emergence of mental ownership

By describing the cases, in the same way, using the desk-research data and the conducted interviews, a detailed description of the cases is formed concluded with a small paragraph on the emergence of mental ownership in the neighbourhoods. This description of the cases is then analysed distinctively to form a concept-indicator model of the case studies. The definition of a concept-indicator model is as described by Holton (2007);

The concept-indicator model requires concepts and their properties or dimensions to earn their relevance in theory by systematic generation and analysis of data. This forces the researcher into confronting similarities, differences, and degrees in consistency of meaning

between indicators, generating an underlying uniformity which in turn results in a coded category and the beginnings of the properties of that category.

Thus, what is done for the analysis is the extensive review of the case study, using all documents found and interview transcriptions, which were recorded with the consent of the interviewee. All information is coded into a concept-indicator model, where the relevant aspects of the case study analysis were put in to. The concept-indicator model shows the hierarchy of aspects related to mental ownership as found in the cases and is compared to the theoretical framework in the conclusion of the research. To find the aspects of the model, the cases are compared to each other to find underlying uniformity and differences.

### **3.3. VALIDITY AND RELIABILITY OF THE RESEARCH**

The validity and reliability of the research can be split up into internal validity, external validity/generalisability and, reliability.

#### **3.3.1. Internal Validity**

Internal validity is about if with the research done, the predefined question is answered (van Thiel, 2007; Becker, Bryman & Ferguson, 2012; Yin, 2003). It refers to the appropriateness of the methods used (Leung, 2015). In this research, this mainly has to do with the delimitation of the project and controlling if the outcomes represent the main research question. Within this research, internal validity is protected by the usage of desk-research as a primary method. As described, desk research causes the researcher to not interfere with the research situation; this strengthens the internal validity and makes the research objective. Where the internal validity is targeted is with the semi-structured interviews. Here, the interviewer can become part of the research situation or steer the interview into the wished direction. It is of importance in this research that the interviews follow the structure as defined in the interview guide, with the general and specific questions, to make sure that the interviews provide the answers needed for the research question. Because the interviews are conducted online, and not face to face, there might be issues with the data collection; there could be a bad internet connection, which can cause an information deficit. The interview will be recorded via zoom to solve this issue, giving the researcher access to both the audio files and video files.

#### **3.3.2. External Validity/Generalisability**

External validity has to do with the applicability of the done research towards similar cases (van Thiel, 2007; Becker et al., 2012; Yin, 2003). The outcomes of the research should apply to all other cases dealing with the same research subject. For this research, this means that the selected cases are representing all other cases. It helps that multiple cases are researched with a different form of residential group formation; this will make it easier to generalise the outcomes as more possibilities are covered in the research. However, it should still be noted that there are only five cases researched, which does make it less generalisable. With this also comes that the concept of mental ownership is highly complex and possibly difficult to grasp within all the cases, which might also cause mental ownership to be less generalisable.



### 3.3.3. Reliability

Reliability has to do with the research's repeatability (van Thiel, 2007; Becker et al., 2012; Yin, 2003). Repeatability requires that the research steps are documented well and used well in order for someone to do the same research and get the same results as this research gives (Van Thiel, 2007; Becker et al., 2012; Yin 2003). Using a step approach in analysing the cases, and the way the analysis is done, the focus of the analysis becomes precise and repeatable. What also helps with reliability is the operationalisation of the used aspects of the conceptual model. By doing this in a concise manner, the usage of the aspects in the case study analysis will become better repeatable as the definition is clear. What makes the reliability more difficult is the inductive side of the research. Mental ownership is a broad and challenging concept to grasp; making the research's repeatability more difficult. In this research, it is thus important to systematically analyse the cases to make sure they are repeatable.

### 3.3.4. Ethics

Some final words on the validity and reliability of the research consider research ethics. Of importance here is that for participants in the research, their privacy is respected and protected during the research process (Diener & Crandall, 1978; Becker et al., 2012). The interviewees must be well informed about the research, the research goals, and how the interviews are used within the research done here. By doing this, the research ethically consents.

## CHAPTER 4: CASE STUDIES

Within this chapter, the five chosen case studies are described. The cases as selected in chapter three are described through the same step-approach. First, an introduction to the case is given, followed by an introduction of the actors involved in the process. Second, the neighbourhood process is shown in a time-line where the knowledge and plan formation process is visualised by the yellow text blocks and the engagement process by the blue text blocks. The process description of all cases can be found in appendix 2. After the process time-line, the key moments of the process are described in more detail. Following is an explanation of the resident involvement in the neighbourhood, and the case studies are ended with a conclusion on the emergence of mental ownership in the cases.

To give an overview of the cases on some necessary statistical information, this table is formed. It also provides some background information on the cases which is necessary for the case description.

Table 5: Overview statistic information neighbourhoods (centraal bureau voor statistiek, 2020; gelders energie akkoord, n.d.)

Aspects Neighbourhoods	Total houses	Rental property	Housing corporation	Private rental	Owner Occupant	Single family homes	Multiple family homes	Residents
Heveadorp Renkum	320	27%	24%	4%	73%	97%	3%	705
Benedenbuurt Wageningen	490	35%	35%	22%*	43%	77%	23%	1000
Kerschoten Apeldoorn	1910	64%	46%	18%	36%	52%	48%	3665
Spijkerkwartier Arnhem	3200	67%	25%	42%	33%	12%	88%	6730
Midden-West Ermelo **	484	66%	66%	0%	34%	-	-	-

\*In Benedenbuurt there are no private rental properties, the number here is for the percentage of apartments part of an owners' association.

\*\*Because midden-west Ermelo is part of a neighbourhood the numbers on the final three aspects are missing.

## 4.1. HEVEADORP RENKUM

Heveadorp is a small village in the municipality of Renkum, Gelderland. The village used to be a factory village nominated to be demolished once the factory was shut down. The demolishing did not happen, and new homes were built and the old homes renovated. Since the renovations in the eighties, the residents' associations also came into existence which brought the village back to life (W. Schoonderbeek, personal communication, October 13, 2020). Heveadorp is known for its highly present social cohesion. Everyone knows everyone, and because of the village's small scale, it is easy to connect to everyone. The social cohesion is enhanced by the local community association that organises activities for the entire neighbourhood (W. Schoonderbeek, personal communication, October 13, 2020). Next to the community association, 'Hevea initiatief' started as a group of enthusiastic residents willing to make Heveadorp more sustainable. 'Hevea initiatief' has multiple projects running, including the neighbourhood of the future project since 2018 (Hevea initiatief, 2018a).

### 4.1.1 Actors

In figure 3 the actor-network scheme is shown. What is seen here is that Hevea Initiatief became a foundation. One of the working groups within the foundation focuses on the natural gas-free neighbourhood; this working group is in the centre of the process and has an advisory group of residents connected to them (Hevea initiatief, 2019b). The working group is taking the initiative in the neighbourhood and organises the research, the activities and events and

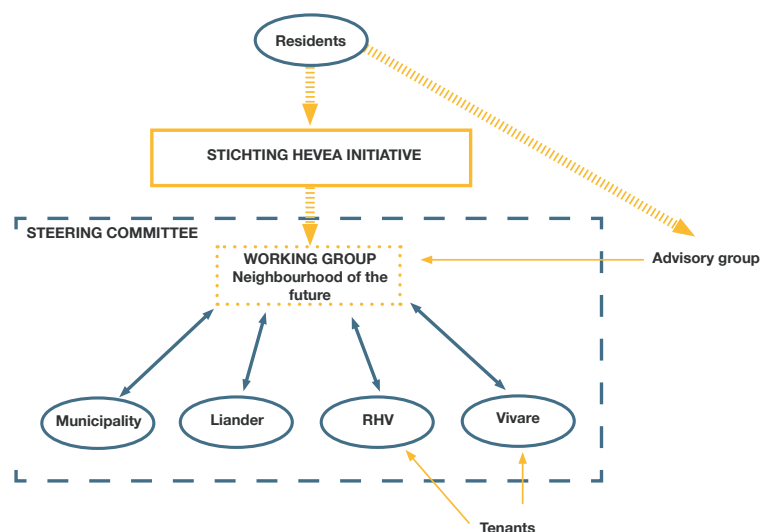


Figure 3: actor network scheme heveadorp (own illustration)

other actions done to communicate the process to the residents. They are the representatives of the residents in the steering committee (Hevea initiatief, 2020, November 5; W. Schoonderbeek, personal communication, October 13, 2020). Besides 'Hevea initiatief', the municipality of Renkum, the network operator Liander, housing corporation Vivare and the Renkumse tenants' association (RHH) are also part of the steering committee (W. Schoonderbeek, personal communication, October 13, 2020). The municipality facilitates the process in Heveadorp where possible but is somewhat struggling with which role to take in the process (J. Maouche, personal communication, October 1, 2020; W. Schoonderbeek, personal communication, October 13, 2020). Housing corporation Vivare is slowly starting to join the process but remains reserved in the transition process (Hevea initiatief, 2020e; W. Schoonderbeek, personal communication, October 13, 2020). Liander is the network operator and thus in charge of the neighbourhood's current network and focused on how this network needs to be changed, with the possible solutions (Hevea Initiatief, Vivare, Gelders Energieakkoord, & Gemeente Renkum. 2018). The final actor is the Renkumse tenants' association which is representing the tenants in the process. They recently joined the process as a reaction to the tenants not having a representative in the steering committee (W. Schoonderbeek, personal communication, October 13, 2020).

#### 4.1.2 Processes

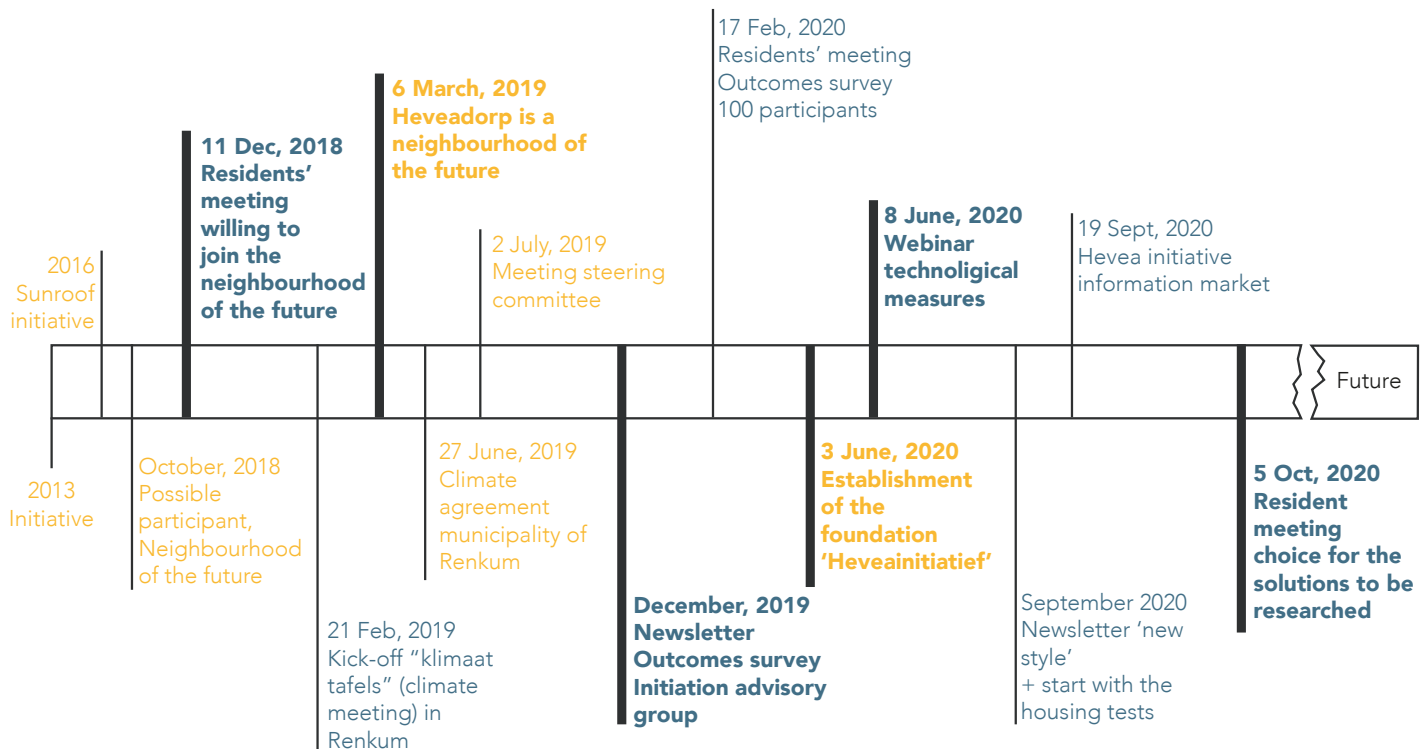


Figure 4: process scheme Heveadorp, blue- knowledge/plan-making yellow - engagement (own illustration, Heveainitiatief, 2018b)

The explanation of the process time-line on both the knowledge/plan-making process and engagement process can be found in appendix 2.1.

#### 4.1.3 Key Moments

Within the process of Heveadorp, six key-moments are defined. (The bold text blocks in the process time-line, see figure 4)

##### 1. Residents are willing to join the process of the neighbourhood of the future

On December 11th, 2018 the municipality presented the plans for making Heveadorp a neighbourhood of the future. At this first resident meeting, 100 of the almost 800 residents showed up. In this meeting, residents were informed about the plans for becoming a natural gas-free neighbourhood. Residents were told that it was a plan to start researching the opportunities of becoming natural gas-free, and the benefits of starting now with this research. Residents also had the opportunity to comment on the plans, ask questions and express their concerns. The comments were mostly on forced participation and the central heating changes. At the end of the meeting, the residents agreed to join the process. With this agreement, the neighbourhood applied to the neighbourhood of the future project (Hevea initiatief et al., 2018).

##### 2. Heveadorp is officially a neighbourhood of the future

On March 6th, the application of Heveadorp to become a neighbourhood of the future was honoured. From this moment on Heveadorp was officially a neighbourhood of the future meaning that the process could start in the neighbourhood (Hevea initiatief, 2019)

### 3. Home visits with a survey

In 2019 the steering committee decided that to create different scenarios and test them it was essential to clarify what the residents expected from the plans (W. Schoonderbeek, Personal communication, October 13. 2020). To research the expectations, a neighbourhood survey was set up. The initiators went by every household in the neighbourhood to see how they responded to the ideas for a natural gas-free neighbourhood. In the survey questions were asked on the urgency of the process, the concerns for the process, the measures taken by residents, terms and conditions to join the process, the wish for individual or collective measures, and other neighbourhood wishes. The most important outcomes of the survey are that most residents see the urgency for the process, and want to join the process; however, there are some concerns regarding finances and the technique's trustworthiness (Egmond & Schoonderbeek, 2020; Hevea Initiatief, 2020b).

### 4. Establishment of 'Hevea initiatief' as a foundation

On the June 3rd, 2020 Hevea initiatief' became a foundation. By becoming a foundation, the possibility to apply for subsidies increased (J. Maouche, Personal communication, October 1st, 2020). Besides subsidies, the other benefit is that with becoming a legal and formalised entity, the initiative also became a partner to the municipality, province and other actors. It gave the residents a stronger position in the process (Hevea initiatief, 2020c).

### 5. Webinar about the technological measures

Due to the covid-19 virus, no physical meetings were possible in 2020; this meant that the meetings continued online and became webinars. In the webinar of June 8th 2020, 50 residents joined the online meeting to discuss the process' continuation. Within this meeting, scenarios for the heat transition were discussed and building blocks and assessment criteria for evaluating the scenarios were formed. The working group and the advisory group formed these building blocks and assessment criteria. In this meeting, the criteria were discussed and put in a line of importance. The criteria decided on this evening were social engagement, freedom of choice, technological applicability, financial feasibility, comfort and convenience, and the effect on the surroundings (Hevea Initiatief, 2020a).

### 6. Choice moments for the solutions to be researched

On October 5th, 2020, a new webinar took place. In this webinar, the choice for three scenarios to research further was made. The research on the different technological measures was explained, and the 52 residents present in the meeting could comment on the research and the scoring for the different options (Hevea Initiatief, 2020g). Because there were only 52 people present in the meeting, the report was sent to all residents in the neighbourhood, and everyone got a chance to comment on the report (Hevea initiatief, 2020f). During this meeting the question was also asked whether or not to continue with the process. 2 of the 52 present residents wanted to quit the process in the neighbourhood, which meant that 50 people still supported the process (Hevea initiatief, 2020g). This question is also asked to residents not present in the meeting, with the outcome that 52% did not agree with the plans, and those people do not support the working group anymore. Which means a loss in the support base and the question on how to continue the process (Werkgroep Heveadorp, 2020).

#### 4.1.4 Resident Involvement

Within Heveadorp, there is a difference between involvement from tenants and owner-occupants. The owner-occupants are quite involved in the process; the tenants, however, have their concerns when it comes to process, they are afraid of what the changes will do to their rent (*J. Maouche, personal communication, October 1, 2020*). Housing corporation Vivare now said that the changes done will not affect the rent of the tenants (*W. Schoonderbeek, Personal communication, October 13 2020*). Aspects that helped the growth of residential involvement in the neighbourhood are the motivation and especially the initiators' intrinsic motivation. The initiators, who later formalised as the foundation, really want this process to succeed. The initiators are investing much time in the process and want to keep the initiative in their hands. It is their process, their research, and because they represent the residents as residents, they can go to their neighbours to talk to them about the process happening (*W. Schoonderbeek, Personal communication, October 13 2020; J. Maouche, personal communication, October 1, 2020*). The initiators have the possibility to invest this much time in the process, because they are mostly retired, it would not be feasible to execute this process in the same way with residents who have a full-time job (*J. Maouche, personal communication, October 1, 2020*).

The initiators spent much time on the process and continuously ensured that every resident was informed about the process. They checked with the residents if they still wanted to continue the research or if they should stop. Of course, there are people in the neighbourhood not interested in the process or the plans, but they are also heard and listened to (*W. Schoonderbeek, Personal communication, October 13 2020*). Everyone has the opportunity to speak up. The people that do not feel the engagement for the process or do not feel the ownership over the process, mostly say that they do not believe in the usefulness and necessity of the transition; with the argumentation that in countries around the Netherlands, the usage of natural gas is just implemented (*W. Schoonderbeek, Personal communication, October 13 2020*). Residents are also questioning why the neighbourhood has to do it right now, and not in a couple of years. Another reason why people do not join the process or at least be reluctant in the process is that there are certain fears and uncertainty about the possible technological solutions (*J. Maouche, personal communication, October 1, 2020*). The foundation keeps investing in communicating with the residents and keeps emphasising that it is still just research to tackle these concerns. At the moment there is no plan yet, there is no final decision, and this decision will be made when there is an offer and a plan that is proven (by experts) to be the best possible offer for the neighbourhood and the best possible technological solutions (*W. Schoonderbeek, Personal communication, October 13 2020*).

#### 4.1.5. Emergence of Mental Ownership

The emergence of mental ownership in Heveadorp has had its ups and downs. Heveadorp is a neighbourhood with a strong social cohesion where everyone knows everyone. The initiators from the foundation used this strong social cohesion to roll out the process of becoming a natural-gas free neighbourhood; this resulted in a high level of mental ownership at the beginning of the process, which was tested and evaluated through continuously verifying the decisions made by the foundations' working group. The positive outcomes showed the interest and willingness of residents for the process, which showed strong mental ownership. This strong mental ownership is achieved through the working group's high effort in the process, wanting to show the residents what they were doing continuously. However, what seemed as strong mental ownership shifted during the last

meeting in October 2020, where the residents rejected the working group as representers of the residents in the transition process after they presented the plans for the three possible technological solutions. This is a massive change in the way residents experience and review the heat transition and led to a decrease in mental ownership in this neighbourhood. The result of this switch is that the foundation needs to refigure how to increase the mental ownership of residents again and what exactly caused the drop of mental ownership in the process.



## 4.2. BENEDENBUURT WAGENINGEN

Benedenbuurt is a neighbourhood located in the east of Wageningen. It is a green neighbourhood with grand public gardens that are located throughout the neighbourhood (W. Lelieveld, personal communication, October 19, 2020). For the heat transition project in Benedenbuurt, a small part of this neighbourhood is chosen to become natural gas-free (Wijk van de Toekomst, n.d.; Wageningen woont duurzaam, 2020). In 2016 during the climate street fest, one resident started with the idea of a heat grid once he found out that the sewage system needed to be renovated. Quite fast this one initiator became a group of enthusiastic residents willing to make Benedenbuurt more sustainable (W. Lelieveld, personal communication, October 19, 2020). In 2018 this initiative for the heat grid was formalised and structured into the cooperation 'Warmtenet Oost Wagening' (WOW); which made the residents a formal and legal actor in the process (Cooperatie WOW, 2019a)

### 4.2.1. Actors

Cooperation WOW is leading the process in Benedenbuurt and is currently focused on finding a heat partner. WOW was in charge of the process so far and is continuously communicating with the other actors involved and representing the residents. Both members of the cooperation and other residents are involved in the process. The difference is that members of the cooperation have the right to co-decide what will happen in the neighbourhood. Non-members do not have this opportunity but are still involved in the process through meetings, e.g. (W. Lelieveld, personal communication, October 19, 2020). The cooperation exists out of a board group, a project group and a working group each formed by residents (Cooperatie WOW, 2020d).

Within the process, WOW is cooperating with a few other actors, see figure 5. One of them is the municipality of Wageningen. Wageningen is helping to realise the heat grid by facilitating human resources, knowledge and financial support. With the municipality facilitating the process, the cooperation can execute the process the way they anticipated (W. Lelieveld, personal communication, October 19, 2020; Cooperatie WOW, 2020a). Another actor involved in the process is the housing corporation 'de Woningstichting'. The housing cooperation is slowly starting to see the urge to join the process, but stays reluctant; they are however actively involved in the neighbourhood's communication and plan formation (W. Lelieveld, personal communication, October 19, 2020; Cooperatie WOW, 2020a). Another actor involved are the owners' associations of the apartment buildings in the neighbourhood. These associations were challenging to involve in the process, but they are now starting to be involved in the process and cooperate with the cooperation (W. Lelieveld, personal communication, October 19, 2020). The final involved actor in the process is the expert

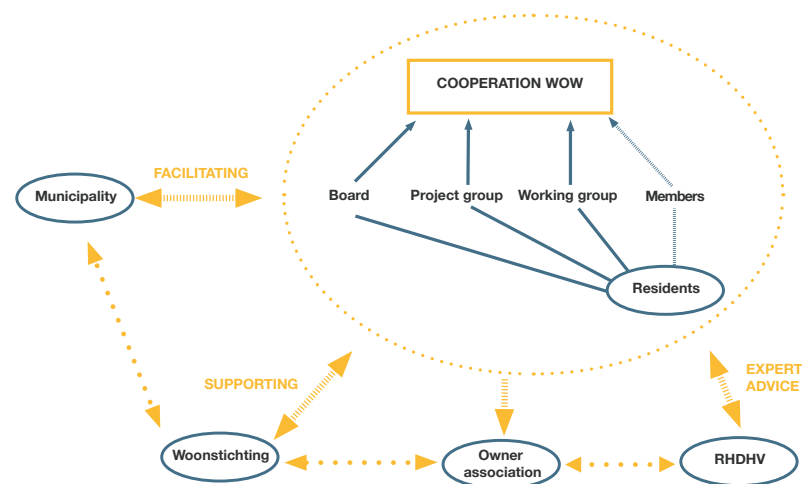


Figure 5: actor network scheme Benedenbuurt (own illustration)

actor RHDHV. RHDHV is an advisory company who made the start design for the heat grid in Benedenbuurt. They also provided a business case to see if the ideas are plausible and financially feasible and helped the cooperation in working through some possible scenarios for the ownership, exploitation and tender (Cooperatie WOW, 2020a).

#### 4.2.2. Process

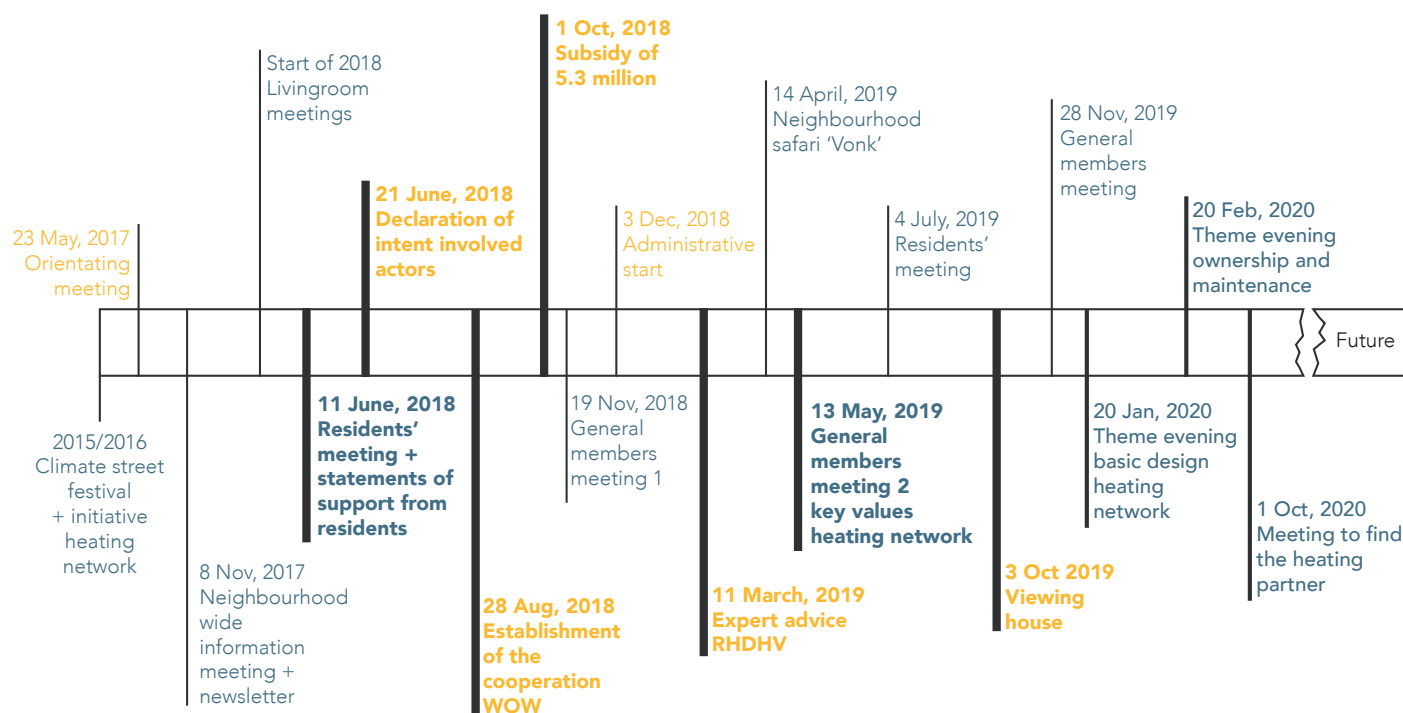


Figure 6: process scheme Benedenbuurt, blue - knowledge/plan-making, yellow - engagement (own illustration)

The explanation of the process time-line on both the knowledge/plan-making process and engagement process can be found in appendix 2.2.

#### 4.2.3. Key Moments

Within the process, seven key moments are identified (bold text blocks in the process time-line, see figure 6).

##### 1. Statement of support from residents

On June 11th, 2018, the second information meeting took place for the residents. In this meeting, the initiators informed the present residents on the development of the plans for the heat grid and the possibility of the national subsidy. To give more strength to this subsidy application and see what the residents thought of the plans in general, an inventory was made on the residents' support for the heat grid. Straight up, 100 residents signed the statement of support. This question was also asked throughout the neighbourhood, and 200 people signed the statement of support which is 44% of the total households in the neighbourhood (Cooperatie WOW, 2019a).

##### 2. Declaration of intent from involved actors

On June 21st 2018 the municipality of Wageningen, housing corporation 'de Woningstichting' and cooperation WOW in formation signed the declaration of intent. This declaration meant that the municipality and the Woningstichting officially supported the idea of a heat grid in the neighbourhood of Benedenbuurt. The promise made by the actors signing, was that the heat grid could have 500 houses cost-neutral connected to it (Cooperatie WOW, 2019a).

### 3. Establishment of cooperation

On August 28<sup>th</sup>, 2018, six residents from the neighbourhood established cooperation WOW (Warmtenet Oost Wageningen). The cooperation thus became a legal and formalised actor, with more power over the process; meaning that the residents also have more power over the process by becoming a member of the cooperation. The cooperation now has access to various financial possibilities such as municipal subsidies and is carrying the process with facilitation and cooperation of the municipality and the Woningstichting (Cooperatie WOW, 2019a).

### 4. Subsidy of 5.3 million

In October 2018 Benedenbuurt was assigned a subsidy of 5.3 million euros for their plans of becoming a natural gas-free neighbourhood. The subsidy will be spent on both the process and execution of the heat grid. A small part of the subsidy is used to pay the cooperation's process hours and the residents' meetings. Nevertheless, the majority of the subsidy is for the implementation of the heat grid. The subsidy needs to cover the heat grid's expenses because the cooperation does not want to ask residents to invest much money; to keep the threshold to join as low as possible (Cooperatie, 2019a; W. Lelieveld, personal communication, October 19, 2020).

### 5. Expert advice of RHDHV

In March 2019 RHDHV, an advisory company, started working on the design of the heat grid. RHDHV made the basic design for the heat grid and a business case showing the project's financial feasibility and the expected expenses of implementing a heat grid and some scenarios for the exploitation, ownership, and tender invitation. This expert advice is used right now to find a heat partner matching the business case (Cooperatie WOW, 2020c; Cooperatie WOW, 2020e).

### 6. General member meeting on the key values of the heat grid

In general member meetings, members of the cooperation can co-decide on plans and ideas for the neighbourhoods' heat grid. In the general member meeting on May 13<sup>th</sup>, 2019, the cooperation's members discussed the core values of the to be implemented heat grid. The selected core values are that the neighbourhood wants to keep control over the heat grid, supporting the urge for an as sustainable as possible heat generation. The heat grid should be reliable and futureproof with a price that is the same as gas by using local suppliers and maximum transparency. These core values are used in the search for a heat partner (Cooperatie WOW, 2020c).

### 7. Viewing house

On October 3<sup>rd</sup>, the viewing home of the housing corporation 'de Woningstichting' opened. This home is already made natural gas-free, and residents can experience here what it is like to live without gas. Each street of the neighbourhood came by this house to talk to each other about the house and the heat grid. In this way, neighbours were brought into contact with each other and discussed the

upcoming changes. The house was visited quite differently throughout streets; sometimes there were ten people present and sometimes just two; which gave an overview for the cooperation which streets might need more attention (Cooperatie WOW, 2020c; W. Lelieveld, personal communication, October 19, 2020).

#### 4.2.4. Resident Involvement

Within the neighbourhood, the owner-occupants are quite involved in the process; they live in the neighbourhood for the longest time, are in charge of their central heating and have a direct interest in the changes coming with the heat grid (W. Lelieveld, personal communication, October 19, 2020). The owner association members, and thus the residents of the apartment buildings, are not that much involved. Some of these residents are living there for 60 years already and still have a gas heater instead of central heating, which results in the need to invest a lot more to become suitable for the heat grid. The other residents in this owner association are people who generally live in these homes for only five years (W. Lelieveld, personal communication, October 19, 2020). The relocation rate in the apartments is relatively high. Because people know beforehand that they will probably live there for only five years, the willingness to join the process and invest money in the process is low, as this is not beneficial for them (W. Lelieveld, personal communication, October 19, 2020). At the moment, the cooperation did start a specific project to get these people involved in the process. The final group of residents are the tenants from the housing cooperation 'de Woningstichting'. They leave the process in the hands of 'de Woningstichting' and are personally little involved in the process. They do not own their home and are thus dependent on what 'de Woningstichting' will do for them. The Woningstichting is quite reluctant in this process, resulting in the tenants being reluctant as well (W. Lelieveld, personal communication, October 19, 2020).

The engagement in the process of Benedenbuurt is thus currently mostly based on the involvement of the owner-occupants. They are owners of the houses; they will live in the neighbourhood for a more extended period, have a more considerable income and are also higher educated in most cases. By investing time in meetings and newsletters, the whole neighbourhood is reached, and it is up to the people to join the process or not. Nevertheless, it should not be forgotten that a group of people is not interested in the process or the subject and might just be interested in the final offer brought to the table to decide then to join or not join the transition (W. Lelieveld, personal communication, October 19, 2020).

#### 4.2.5. Emergence of Mental Ownership

Concluding for the emergence of mental ownership in the neighbourhood of Benedenbuurt is that the owner-occupants living in the neighbourhood have strong mental ownership for the process. Because the process started with a group of people of which was known they had the initial interest in the transition, the starting group's mental ownership was also high. This first group created the first plans which were presented to the rest of the neighbourhood. The other residents in the neighbourhood gave their mandate for the process continuation and the heat grid implementation, showing that they also have mental ownership over the process. What helps the development of mental ownership in this neighbourhood is the fact that residents can become a member of the foundation giving them a direct formal influence in the process and decision rights. The residents with strong mental ownership possibly have this because of their direct influence on the choices

made in the process. Another aspect helping the growth of mental ownership is the fact that there are subsidies present financing the implementation of the heat grid, resulting in lower investments needed from residents. The cooperation stimulates the residents with lower mental ownership for the process through special projects targeting the owner associations whose residents are way less involved, and the connection of the heat transition to other sustainability projects. The high mental ownership in this neighbourhood is thus carried by the owner-occupants but stimulated for the rest of the residents through engagement processes.

### 4.3. KERSCHOTEN APeldoorn

Kerschoten is a neighbourhood in the city of Apeldoorn where many people want to live, making the neighbourhood's relocation rate lower than in other neighbourhoods. The neighbourhood is quite dense compared to the whole city, but because of the neighbourhood's structure and the present green structure, this is experienced differently (Wijk van de Toekomst, n.d.-b).

#### 4.3.1. Actors

In Kerschoten the natural gas-free process is initiated by the municipality. The municipality made the first plans and presented this to the neighbourhood. Together with the residents and the housing corporations, they created KEN (Kerschoten energy neutral) (Kerschoten Energie Neutraal, n.d.-b.). To get the project running in the neighbourhood and get the residents to join the process, the KEN-director is introduced. The KEN-director is a resident of the neighbourhood, paid by the municipality but operating for the residents and impartial in the process. The KEN-director is mostly in charge of creating movement and a support base in the neighbourhood. The KEN-director stands in-between the different involved actors and tries to keep the process moving (M. Tillema, personal communication, September 29, 2020). The residents are represented by the KEN-director and can become part of the process by joining the working group. This working group is an advisory group, with no legal decision rights (Kerschoten Energie Neutraal, n.d.-d). Another involved actor in KEN are the housing corporations; 'De Goede Woning', 'Ons Huis' and 'de Woonmensen'. The housing

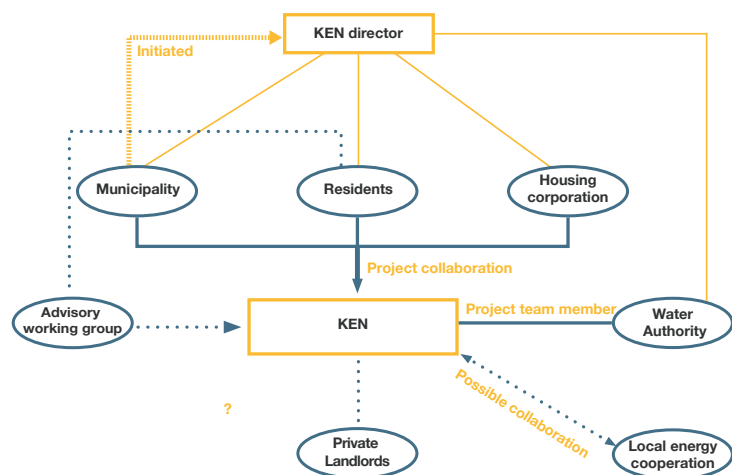


Figure 7: actor-network scheme Kerschoten (own illustration)

corporations are positive towards the upcoming transition and the implementation of the heat grid, and currently working on the plans to renovate their housing stock (M. Tillema, personal communication, September 29, 2020). The pressure to join the process is more substantial because the housing corporation has the so-called performance arrangements, focusing on the sustainable development of the social housing stock (M. Tillema, personal communication, September 29, 2020). This positive involvement of the housing corporations is in strong contrast with the landlords of the private rental homes in the neighbourhood, which are not yet involved in the process in any way, and are thus a missing actor (M. Tillema, personal communication, September 29, 2020). Another actor in the process is the local energy cooperation. The energy cooperation focusses on solar panels in Kerschoten and the close by neighbourhood de Naald; which allows for a possible collaboration in providing sustainable energy to the neighbourhood (Wijk van de Toekomst, n.d.-c). The final actor involved in the process is the water authority. The water authority has a sewage purification close by Kerschoten. It is now the plan to use the wastewater from the sewage flows to generate heat. Thus, the water authority is involved in the process to find out if this idea is plausible and profitable, and if the water authority can be the source of the heat (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, n.d.-c.).

#### 4.3.2. Process

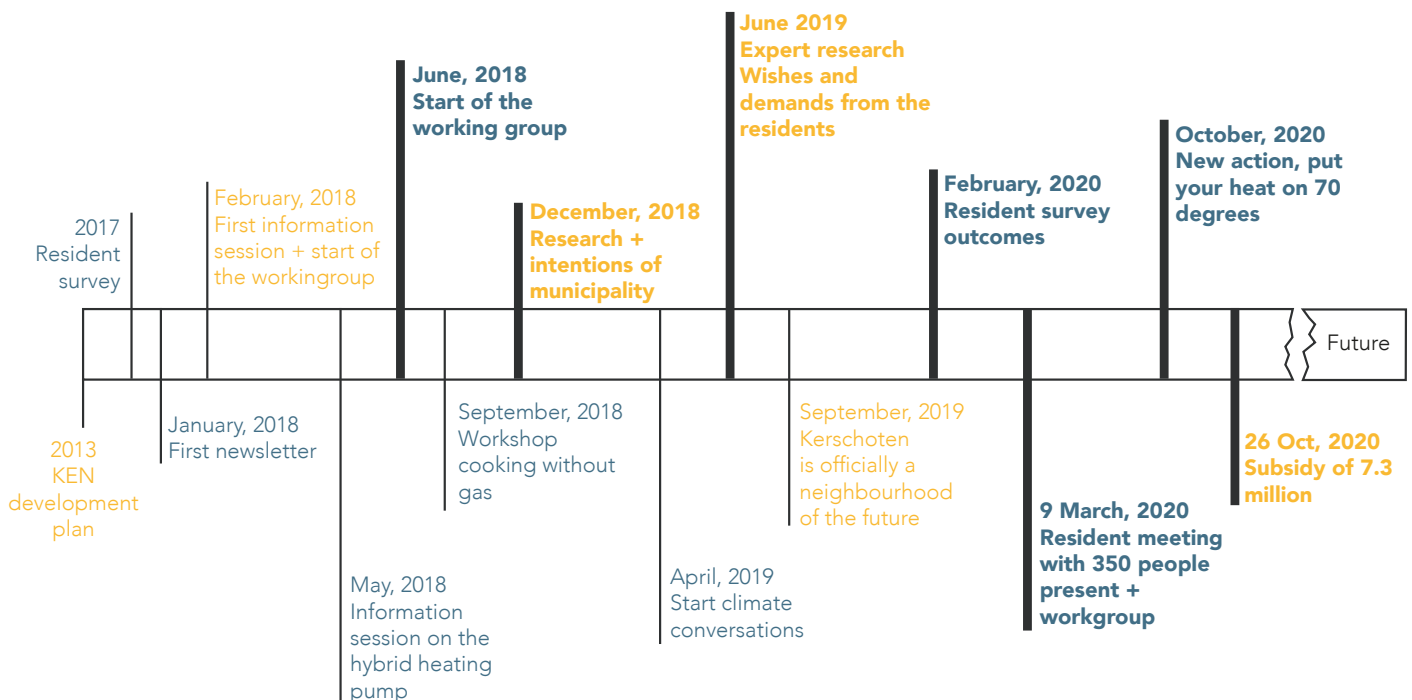


Figure 8: process scheme Kerschoten, blue - knowledge/plan-making, yellow - engagement (own illustration)

The explanation of the process time-line on both the knowledge/plan-making process and engagement process can be found in appendix 2.3.

#### 4.3.3. Key Moments

Within Kerschoten seven key moment are defined (Bold text blocks in the process time-line, see figure 8).

##### 1. Start of the working group

In June 2018 six residents with and without experience and knowledge started with the working group. They asked all residents to send in their questions about the heat grid (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, n.d.-d). The working group became a formal actor in the process in March 2020 (Kerschoten Energie Neutraal, n.d.-d). Although the working group does not have legal decision rights, their advice and ideas are considered by the legal actors (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, 2020c). Next to the working group, a panel of residents is formed to be the advisory group. In this way, the working group tries to test and reflect that the residents still support what they do (M. Tillema, personal communication, September 29, 2020). Currently, the working group extended to 14 members, of which three members are representatives of the tenants' associations (Kerschoten Energie Neutraal, 2020c).

##### 2. Research + intentions of the municipality

In December 2018 the newsletter reflected on some research processes. The municipality created a heat opportunity map where they researched the possibilities of heating the neighbourhood without



natural gas and its costs. They presented this to the advisory group of KEN and the members of the working group. Besides this also expert research was done by advisory company "Overmorgen". They researched the possibility of a heat grid in the neighbourhood. Finally, there has also been talked to the housing corporations about the plans for the heat grid and what this means for the character and image of the neighbourhood. The conclusion at the end of 2018 was that the process of the natural gas-free neighbourhood is running with the involvement of key actors (Kerschoten Energie Neutraal, 2018b).

### 3. Expert research, wished and demands from the residents

In June 2019 two researchers of 'Overmorgen' and 'Syntraal', which are advice companies specialised in the heat transition and role of residents, started researching the wishes and demands of the neighbourhood's residents. What was seen here is that the manageability and height of the costs for residents are of great importance for all actors involved in the process. Following this research, the different actors discussed the bottlenecks together and decided if they want to continue the process or not. With the research done, it currently looks like the heat grid will be implemented in phases. The knowledge learnt from the research is also closely monitored by the working group, who decided to start with an insulation campaign to keep the process moving (Kerschoten Energie Neutraal, 2019).

### 4. Resident survey

In 2019 students from the HAN (University of applied science in Arnhem and Nijmegen) executed a resident survey about the heat grid plans. 20% of the residents participated of whom where 31 tenants and 62 owner-occupants. The survey showed that tenants are not aware of the process happening and the plans for Kerschoten or at least not as much as owner-occupants. In general, the people who responded are positive towards the plans for a heat grid instead of natural gas, more than half of the people want to be connected to the heat grid and, 14% does not want this. Reasons to shift to a heat grid are mostly related to the gas price in the future and sustainability. Reasons to stick with natural gas are the heat grid's costs and the uncertainties a heat grid brings. Most people want to know where the heat comes from and want this to be sustainable. Finally, people expect support and guidance from the housing corporations and municipality (Kerschoten Energie Neutraal, 2020a; M. Tillema, personal communication, September 29, 2020).

### 5. Resident meeting and working group

On March 9th 2020 the municipality organised a residents' meeting together with the other actors. Four hundred fifty residents were present this evening, and around 50 people watched the live stream. In this meeting, there is spoken about the ideas for the heat grid; supported with an explanation about the choice for a heat grid and the subsidy of the national government. Within this meeting, there was also a call for residents' involvement by joining the working group or advisory group. Some outcomes of the evening for the residents were that there is a lack of an explanation of why the transition is taking place now, and why the heat grid is chosen as the best measure. Many questions were asked regarding who will lead the process and what will happen when the subsidy is not honoured. Overall, the residents are critical towards the process, and it still has a long way to go (Kerschoten Energie Neutraal, 2020b; M. Tillema, personal communication, September 29, 2020).

#### 6. New action, 70 degrees

In October 2020, a new action was initiated. The 70 degrees action checks if a home is insulated enough to be heated with the mid-temperature heating grid, as planned for Kerschoten. To check the insulation, the central heating is put to 70 degrees; the heat grid's temperature. With this alteration, the residents can experience the new temperature and see whether their home is ready for the change. KEN is leading this action and takes a survey with the residents on their experiences with this temperature. The outcomes of this action will be communicated with all residents (Kerschoten Energie Neutraal, 2020d).

#### 7. Subsidy of 7.3 million

On October 26th, Kerschoten was honoured with a subsidy of 7.3 million euros for the research, design and execution of the heat grid. This subsidy was granted to the neighbourhood by the national government for the program natural gas-free neighbourhoods. With this subsidy, the execution of the heat grid becomes more realistic. Much research on the heat-grid is still necessary, but this subsidy means that it is possible (Neusink, 2020). Without the subsidy, the heat grid could not have been executed (M. Tillema, personal communication, September 29, 2020).

#### 4.3.4. Resident Involvement

From the start in 2013 and the KEN-development plan with the decision to implement a heat grid in the neighbourhood, the engagement in the process is going up and down. Because the residents had little involvement in the decision for a heat grid, resistance towards implementing a heat grid raised (M. Tillema, personal communication, September 29, 2020). People did not understand the choice for a heat grid and questioned why a heat grid is the best solution for the neighbourhood. The questions are tackled by the KEN-director who is continuously trying to explain to the residents why the heat grid is the right solution for the neighbourhood (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, n.d.-a). During the process, the engagement was low at one point, and if at that moment, the KEN-director did not do anything to keep the process running, the process would have stopped (M. Tillema, personal communication, September 29, 2020). Within the residents' working group, it is also visible that the process is going up and down. The working group has lost some of its members due to the information they needed to process and use to implement the heat grid being too complicated and challenging. The people who are still present in the working group are higher educated residents, that can handle the information, and they are mostly owner-occupants (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, n.d.-d). The working group remains an advisory group and finds the risks of taking on the responsibility for a heat grid way too high, and thus do not want to formalise. They feel that the heat grid implementation's responsibility is in the municipality's hands since they wanted this process to happen (M. Tillema, personal communication, September 29, 2020).

The tenants of the housing corporations are less engaged in the process; some joined the process and the working group. However, the majority is holding back, as they are dependent on the decisions the housing corporations make (M. Tillema, personal communication, September 29, 2020). The housing corporations are working on the processes and maintain their quota that if 70% of the residents agrees to the plans, everyone joins (M. Tillema, personal communication, September 29, 2020). One group that is missing in the process are the tenants of the private rent homes. They

are not actively involved in the process, and the municipality does not have the resources to involve them (M. Tillema, personal communication, September 29, 2020).

The residents choose the role of wait and see and do not have the intention to change this. They are waiting for a concrete offer on which they will make the decision. At the moment, the residents are missing the tangible side of the transition; they do not know what the changes done in the homes will do for their living comfort. Until the concrete offer, this will remain questionable, and the residents will keep on waiting to see what the transition will bring them (M. Tillema, personal communication, September 29, 2020).

#### 4.3.5. Emergence of Mental Ownership

The emergence of mental ownership in the neighbourhood of Kerschoten is known for its ups and downs. Because the municipality initiated the process, the mental ownership of residents started low and needed to develop from there. What is seen in the neighbourhood is that the assigned KEN-director and the municipality emphasise engagement processes to increase all residents' involvement in the neighbourhood, resulting in the development of residents' mental ownership. With the origination of the residents' working group as the main influence on the process, the mental ownership in the neighbourhood also grew. At the moment the main struggle in this neighbourhood is to keep the mental ownership high, what is seen is that the residents take a more passive role in the process, and wait and see what will happen. They are not taking the lead, which makes the mental ownership also less present. The mental ownership is hard to keep in the neighbourhood as the needed knowledge and time to understand the technologies and information for the development of a heat grid is way too high, resulting in people leaving the working group, and thus lowering their mental ownership over the process. The main goal for Kerschoten is to emphasise the importance of mental ownership and involvement in the process and show residents what it can do for them. The latest development in the neighbourhood with the granted subsidies might have the effect on the mental ownership that is now needed.

#### 4.4. SPIJKERKWARTIER, ARNHEM

Spijkerkwartier is a neighbourhood in the municipality of Arnhem, located close to the city centre and known for its diversity in residents, housing types and building functions. Within the neighbourhood, there are many single-person households, student homes, and a high relocation rate. Some of the houses are government-protected townscape and thus have restrictions on changing (Wijk van de Toekomst, n.d.-b). Spijkerenergie is leading the neighbourhood process and works with a route map to get to a sustainable energy supply in 2050. This route map's scope is an affordable natural gas-free Spijkerkwartier with the focus on the heat supply in the neighbourhood (Spijkerenergie, 2018). The natural gas-free project is part of the broader sustainable energy project in Spijkerkwartier. It connects to the plans for a blue-neighbourhood economy, where they wish to develop a local neighbourhood scale economy (mijnspijkerkwartier.nl, n.d.)

##### 4.4.1. Actors

There are six main actors involved in the process (see figure 9). At the core of the process is the platform by and for residents; Spijkerenergie. Spijkerenergie is a working group consisting of residents. The focus of the working group is to provide information to the residents about a range of different topics connected to the heat transition (Spijkerenergie, n.d.-a). By doing this, they try to create a more significant support base for the upcoming transition. Spijkerenergie is an independent working group but supported by a process attendant from the municipality. The platform is voluntary based and not part of the municipality or any other legal formalised institution; however, if the workload exceeds the voluntary basis, they request that the municipality takes over (Spijkerenergie, 2018). The second actor is the municipality of Arnhem. The municipality designed the neighbourhood operated energy transition vision for the whole municipality, which forms the basis for the route map of Spijkerkwartier (Spijkerenergie, 2018). The municipality supports and assists Spijkerenergie in their plans and installed a project attendant in the neighbourhood; as part of the project ArnhemAan, which is the energy transition facilitation project from the municipality (Spijkerenergie, 2018; Arnhem Aan, 2020). The third actor involved in the process is the current network operator within Spijkerkwartier; Alliander. Alliander is involved in the process of disconnection from the gas and in charge of the gas network and the decision made regarding the network (Spijkerenergie, 2018).

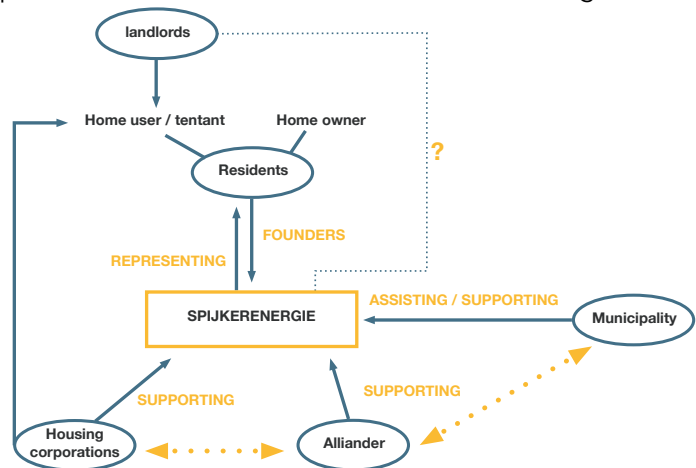


Figure 9: actor-network scheme Spijkerkwartier (own illustration)

Many residents of Spijkerkwartier are tenants, both from the corporation as well as private rent. The fourth involved actor are the housing corporations; 'Volkshuisvesting', 'Mooiland', 'Portaal' and 'Omnia' who are quite involved in the neighbourhood process, and cooperating with the other actors (M. van der Burght, personal communication, October 8, 2020). The private rent landlords are the final involved actor. Around 44% of the houses are owned by landlords, making them an important

actor in the transition process (Centraal bureau voor statistiek, 2020; Wijk van de Toekomst, n.d.-b). However, these private landlords are not yet involved in the process, and it is unclear how these actors will be involved in the future (M. van der Burght, personal communication, October 8, 2020).

#### 4.4.2. Process

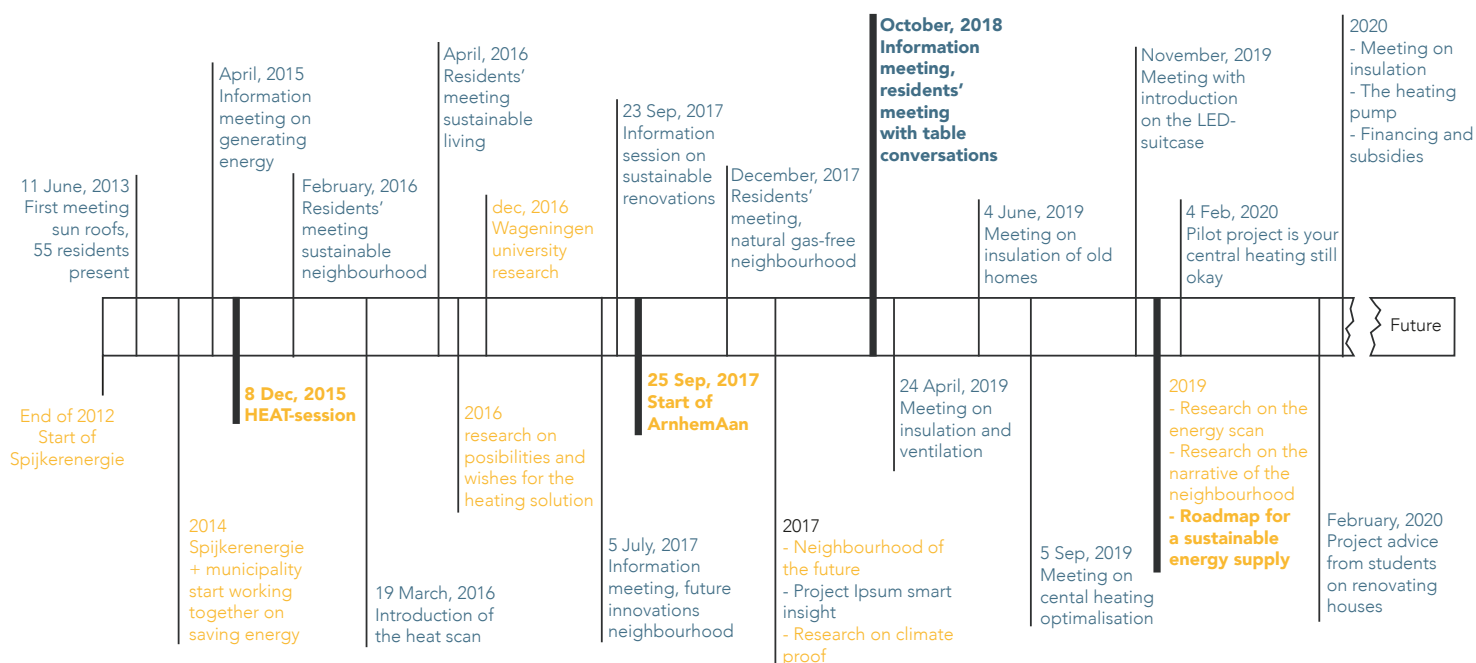


Figure 10: process scheme Spijkerkwartier, blue - knowledge/plan-making, yellow - engagement (own illustration)

The explanation of the process time-line on both the knowledge/plan-making process and engagement process can be found in appendix 2.4.

#### 4.4.3. key Moments

Within Spijkerkwartier four key moment are defined (Bold text blocks in the process time-line, see figure 10).

##### 1. Heat session

In December 2015 the HEAT-simulation took place in Spijkerkwartier; which focussed on the energy transition and the possibilities of a heat grid in the neighbourhood. Spijkerenergie took the lead for the research and set the wishes and demands to be considered with the implementation of a heat grid. The results of this session and research were presented to the residents but received backlash. The residents were resistant to a heat grid as the residents do not want a large-scale collective solution in the neighbourhood. Residents also had many questions regarding the implementation and financing of the changes. The resistance arose because the HEAT-simulation reasoned from the solution and not the residents (Spijkerenergie, 2017).

##### 2. Start of ArnhemAan

ArnhemAan is an initiative of the municipality, the energy desk mid-Gelderland and a group of residents in Arnhem that wants to stimulate local, sustainable energy processes (Arnhem Aan, 2020). The organisation supports locale initiatives in the different neighbourhoods of Arnhem and works

from a neighbourhood approach (Arnhem Aan, 2020). The municipality of Arnhem divided the neighbourhoods of Arnhem into neighbourhoods that could be natural gas-free by 2030 and neighbourhoods that need to focus first on energy-saving measures (Arnhem Aan, 2020; M. van der Burght, personal communication, October 8, 2020). Within the program, neighbourhoods are supported with a roadshow, a unique bus line, a booster fund, and many other measures. All to help support local initiatives and set the processes into motion in the different neighbourhoods (Arnhem Aan, 2020; M. van der Burght, personal communication, October 8, 2020). Spijkerkwartier is seen as a neighbourhood that is not promising enough to be natural gas-free in 2030, resulting in the focus on energy-saving measures (Arnhem Aan, 2020; M. van der Burght, personal communication, October 8, 2020).

### 3. Information meeting with table conversations

On October 3th 2018 an information meeting was held about the neighbourhood changes and the natural gas-free future. Sixty residents were present in this meeting. Within this meeting, there is spoken about the wishes from the involved residents and Spijkerenergie being mostly that the neighbourhood wants to be in charge and determine the sustainable energy sources suitable for Spijkerkwartier. During the evening, it became clear that the residents require more information on the process, and information needs to be shared more actively. The meeting also showed that residents could help each other with questions they have and bring each other further in the process. The first timeline of development was discussed, and during the meeting table conversations between residents were held. Questions were asked on; what they know about their energy use, what they see as the solution for a natural gas-free Spijkerkwartier, what they want to do themselves and if they want to do more. Some doubts and discussion were raised from this, but it also gave insight into what the residents thought about the process (Spijkerenergie, 2018b)

### 4. Roadmap to sustainable energy

The roadmap to sustainable energy is the plan made by Spijkerenergie to make Spijkerkwartier a natural gas-free neighbourhood. The plan's scope is an affordable, natural gas-free Spijkerkwartier with the focus on the heat supply of the future. The extended scope of the roadmap is the wish for a co2 neutral neighbourhood. It is, therefore, that the combination is made with other sustainability processes. The great variety of houses and residents makes it difficult to implement a solution. The idea is that the neighbourhood can serve as a test neighbourhood where multiple measures can be tested simultaneously. In this way, the houses and residents get the solution that best matches them. The roadmap further follows the principles as set by the municipality, and shows a step-by-step approach for Spijkerkwartier to become natural gas-free (Spijkerenergie, 2018).

#### 4.4.4. Resident Involvement

The residents in Spijkerkwartier are rather diverse with owner-occupants, tenants from the housing corporation and private rental tenants (Wijk van de Toekomst, n.d.-2; M. van der Burght, personal communication, October 8, 2020). The residents in this neighbourhood have a strong opinion regarding the heat transition; as was visible with the HEAT-session. The outcome of this session was the implementation of a heat grid. Once presented, the residents turned out to be reluctant towards this idea of a large-scale collective solution in their neighbourhood. They were reluctant to the idea of a supplier that decided the price and the fact that the heat arrived from a large waste processor.

This reluctance towards a large-scale collective solution ensured that the new ideas for becoming natural gas-free are small scale collective or individual and matching the residents' wishes and demands (Spijkerenergie, 2017).

Within the neighbourhood, it is mostly the owner-occupants who are involved with Spijkerenergie (M. van der Burght, personal communication, October 8, 2020). However, because the process in Spijkerkwartier is way bigger than just the natural gas free neighbourhood, and is about a blue-neighbourhood economy, the people with a specific interest in the energy side is a little less (M. van der Burght, personal communication, October 8, 2020). Nevertheless, by making the combination with the blue-neighbourhood economy, the residents might see that the natural gas free neighbourhood is cooperative with the blue-neighbourhood economy (M. van der Burght, personal communication, October 8, 2020; Spijkerenergie, 2018). Almost 50% of the houses in the neighbourhood is private rent based (Centraal bureau voor statistiek, 2020). The people who rent their homes from a private landlord are dependent on what their landlords are willing to do. Most of the tenants from these houses are not involved because their landlords are not involved in the process (M. van der Burght, personal communication, October 8, 2020). This group of tenants remains essential in the process because they are a massive part of the neighbourhood.

The final resident group in this neighbourhood are the people who rent their homes from the housing corporations; they are also dependent on what the housing corporations are willing to do in the process. The housing corporations are involved in the process, and thus these tenants are more engaged as well (M. van der Burght, personal communication, October 8, 2020). One final remark to make on the engagement in Spijkerkwartier is that the residents who rent a home here do not tend to live in the neighbourhood for a long time. The neighbourhood has a high relocation rate, which does not help with the involvement in the process (Wijk van de Toekomst, n.d.-b). The owner-occupants tend to live in the neighbourhood a lot longer and thus are more likely to get involved in the process.

#### 4.4.5. Emergence of Mental Ownership

With the neighbourhood being known for their diversity and high relocation rate, the emergence of mental ownership is rather complicated. Currently, involvement in the process comes mostly from the owner-occupants who are only 33% of the residents and the housing corporations who account for 25% of the residents. The focus of the process of Spijkerkwartier is on the involvement of these two resident groups. The mental ownership of these two groups has grown over the last couple of years. The process had a rough start with the HEAT-session and its rejection from the residents, resulting in low mental ownership. By redoing the research from a residential perspective with much emphasis on the neighbourhood's diversity, the mental ownership in the neighbourhood started to grow. More people became interested in the process, and due to the engagement processes in the neighbourhood, this increased even more. It is visible that there is much attention for a diversity of subjects connected to the heat transition, which results in much information for the residents and the connection of the heat transition to other projects; increasing the mental ownership. One remark to be made for this case is that the engagement of almost 50% of the residents being the private rent tenants is low and mental ownership from them over the process is not present at the moment.



## 4.5. WEST-MIDDEN ERMELO

Ermelo is a municipality in the north-west of the province of Gelderland. Within this municipality part of the neighbourhood 'West' is assigned as a neighbourhood of the future. Many households have a lower-than-average income in the neighbourhood, and there live quite a few older people. Within the neighbourhood, the natural-gas network is financially written off; this means that the network's replacement or change can happen on a shorter term (Wijk van de Toekomst, n.d.-a).

### 4.5.1. Actors

The municipality of Ermelo initiated the process in 2018 and is taking the lead (Project leader, personal communication, October 6, 2020). The municipality is advised by a residential working group existing out of both owner-occupants and tenants. The working group organises meetings, excursions and expert sessions and is asked to critically think about the process, plan of approach, subsidy arrangement, and possible techniques (Project leader, personal communication, October 6, 2020). The working group is the neighbourhood's eyes and ears and represent the residents and their wishes, demands, and questions. The residents' working group is supported by the neighbourhood association who join the residents in their meetings (Project leader, personal communication, October 6, 2020). The working group is not formalised and does not have legal decision rights. Nevertheless, their advice is taken into consideration by the project group (Project leader, personal communication, October 6, 2020). Within the project group the following actors are present; the municipality, who is in charge of the process, network operator Liander, Housing cooperation UWOON, and select

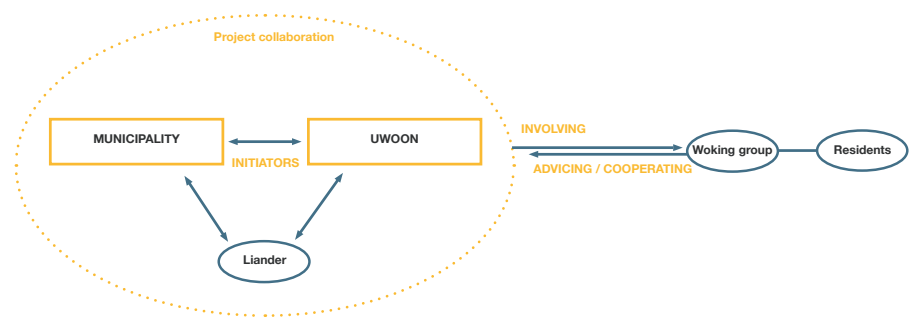


Figure 11: actor-network scheme Ermelo (own illustration)

members from the municipality for the communication and well-being (Gemeente Ermelo, 2019b). Within the municipality, there is also cooperation from the departments of finances, housing and realisation and maintenance, and there is a subsidy advisor incorporated in the process. However, the municipality's primary cooperation comes from the process and project leader assigned to this project (Gemeente Ermelo, 2019b). The municipality is carrying the process in the neighbourhood together with housing corporation UWOON. UWOON is strongly involved in the process. As shown in table 5, UWOON is the owner of 2/3 of the houses in the neighbourhood (Wijk van de Toekomst, n.d.-a). At the moment, UWOON is taking the lead in the transition regarding, renovating the houses and making them ready for a transition. Almost all of their houses are renovated towards energy label 'A'; this means that all homes of UWOON are insulated well and ready for a new way of heating (Project leader, personal communication, October 6, 2020). Within the process, UWOON can become the leading actor and already try out new heating methods on a short term; this makes UWOON an example for owner-occupants. The tenants of UWOON are also used to inspire owner-occupants to join the process (Project leader, personal communication, October 6, 2020). The network operator Liander is also involved in the project, with their network being financially written-off opportunities rise to change the network according to the measures chosen (Wijk van de Toekomst, n.d.-a)

## 4.5.2. Process

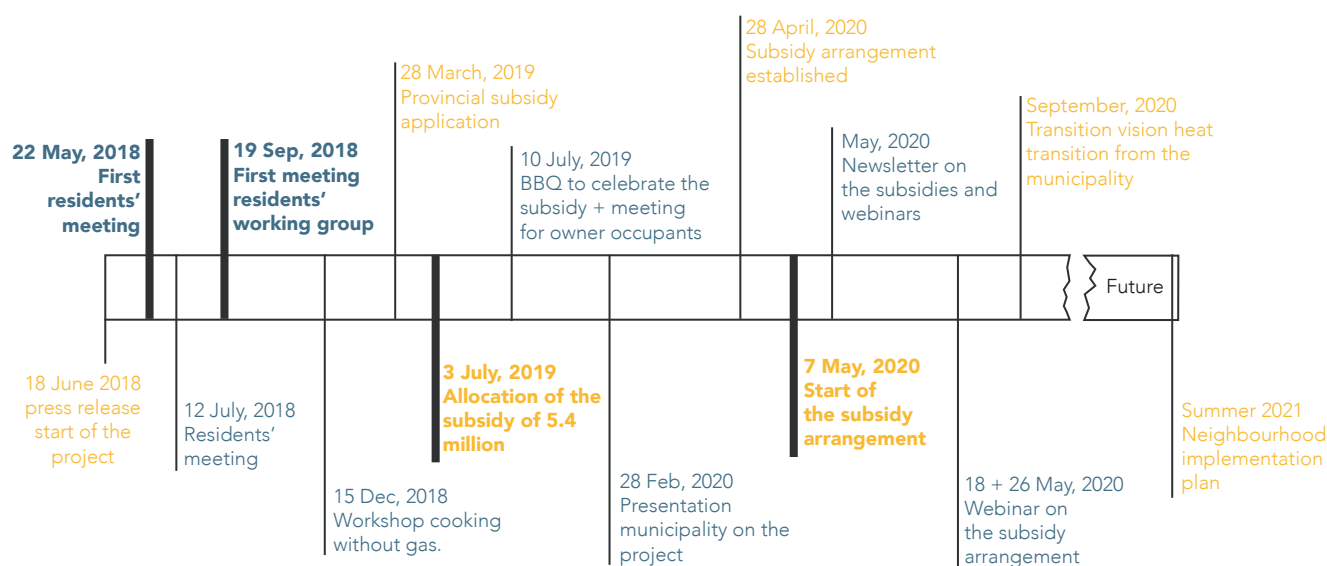


Figure 12: process scheme Ermelo, blue - knowledge/plan-making, yellow - engagement (own illustration)

The explanation of the process time-line on both the knowledge/plan-making process and engagement process can be found in appendix 2.5.

## 4.5.3. key Moments

Within Ermelo four key moment are defined (Bold text blocks in the process time-line, see figure 12).

### 1. First residents' meeting

On May 22<sup>nd</sup>, 2018, the first resident meeting for a natural gas-free Ermelo west took place. In this meeting, hosted by the municipality, the main goal was to talk to the residents about what would happen in the neighbourhood. The municipality started this meeting by telling the residents they had no definite plans yet on what would happen. They immediately asked residents to join them in the search to make the neighbourhood natural gas-free; which led to the formation of the residents' working group. Although there were many questions on what was going to happen, the residents overall seemed enthusiastic (Project leader, personal communication, October 6, 2020).

### 2. First meeting residents' working group

On September 19<sup>th</sup>, 2018, the residents' working group first came together. This working group came into existence after the first residents' meeting in May. In the working group, around 10-15 people are present, and they form an advisory group for the municipality. They do not have a legal decision right and are not formalised, but their ideas influence the decisions made by the project team. The working group advises on the newsletters, helped with the subsidy request, and is strongly involved in designing the neighbourhood approach plan. Every month they have a meeting with the municipality to discuss the process (Project leader, personal communication, October 6, 2020).

### 3. Allocation of the subsidy

On July 3<sup>rd</sup>, 2019, the neighbourhood was assigned a subsidy of 5.4 million euros from the province of Gelderland. This subsidy was assigned to the neighbourhood for their ideas and strategies to make the neighbourhood natural gas-free. With this subsidy, the execution of a natural gas-free

neighbourhood became much more feasible, and the subsidy supports the residents in the neighbourhood in achieving the set goals. Without the subsidy, the process would not be where it is now, and it helped to create more engagement from the residents because they will receive some of the subsidies to improve their homes (Project leader, personal communication, October 8, 2020; Gemeente Ermelo, 2019b; College van burgemeester en wethouders, 2020)

#### 4. Start of the subsidy arrangement

The assigned subsidy is distributed among the housing corporation and the residents. Each household in the neighbourhood receives 12.000 euro in total; 6000 for insulation and 6000 for installation. The idea of the subsidy arrangement is that residents start with insulation measures. All households receive energy advice from where they can start with insulations measures and thus use the subsidies. In the meantime, the research continues about what installations are possible and applicable in the neighbourhood. The subsidy's idea is that residents can get 50% of their expenses for measures taken subsidised. The subsidy arrangement started in May 2020, and so far, 16 subsidy applications are made; which is 10% of the owner-occupants. The rest of the residents is not yet busy with insulation, and the municipality is also not pushing this and let residents do it at their own pace. The housing corporation, which also received a part of the subsidy, is almost finished with insulation and making their housing stock ready for the installation phase (Project leader, personal communication, October 8, 2020; Gemeente Ermelo, 2019b; College van burgemeester en wethouders, 2020).

#### 4.5.4. Resident Involvement

The engagement of the residents is physically present in the working group. The working group is supporting the municipality in the process and is an advisory group. They have no formal influence, are not formalised, nor do they have the intentions to formalise as a group (Project leader, personal communication, October 8, 2020). The residents involved are content with how it goes right now, the municipality is hearing them, and working with them, but they do not want the pressure on them from other neighbours (Project leader, personal communication, October 8, 2020). They are not responsible for the plans, the municipality is, and they can be addressed if needed. In their turn, the municipality is very transparent about the process they are going through, their decisions made, and why they make them. In this way, they try to convince the residents that what they are doing is not random but thought through (Project leader, personal communication, October 8, 2020). Of course, not everyone is equally enthusiastic about the process. Residents have concerns about the reliability of technological solutions. To handle these concerns the municipality is taking it slow in the process. It is continuously comforting the residents that nothing is set in stone at the moment, and all their concerns will be researched before a final offer is made (Project leader, personal communication, October 8, 2020). The focus is still on the insulation of homes and later comes the installation; thus, there is time to research the concerns and people are not rushed in taking measures (Project leader, personal communication, October 8, 2020; Gemeente Ermelo, 2019b). The residents who are against the plans are also heard. They are invited to share the reasons behind their ideas and concerns; these concerns are also taken into consideration and listened to. In this way, the municipality is hearing everyone, and no one is left behind (Project leader, personal communication, October 8, 2020). However, when it comes to boosting these people into joining the process, they will be the last group to be tackled by the municipality. The municipality makes sure that everyone

can do the process at their own pace, and own time. They know that the neighbourhood is diverse; not everyone has the income or savings to insulate right now, there is a difference in the houses' quality and how many measures need to be done (Project leader, personal communication, October 8, 2020; Gemeente Ermelo, 2019b). The municipality thinks that supporting these differences and acknowledging the differences between residents will give them the flexibility in pace, budget, and technological choices matching the residents' situation (Gemeente Ermelo, 2019b)

The tenants of the housing corporation UWOON are also involved in the process. Because UWOON is a precursor in the process, most of the tenants' houses are already insulated. The tenants of UWOON are involved in the process and used as examples to speak about the difference it made in their home. In the following phases of the project, UWOON will collaborate with their tenants on the installation phase (Project leader, personal communication, October 8, 2020).

#### 4.5.5. Emergence of Mental Ownership

With the ideas for the heat transition process being initiated by the municipality, the emergence of mental ownership of residents started when the municipality organised the first meeting. From this moment on the mental ownership of residents developed and became stronger. This growth was seen in the development of the working and advisory groups, which are resident groups with direct influence on the process and higher mental ownership. The growth of mental ownership with residents who are not part of the working or advisory groups is stimulated with the organisation of activities and events and the non-obligatory way of communication from the municipality. The municipality made it clear from the beginning that they were researching the possibilities for alternative heating and nothing was set in stone already. This meant no obligations just yet and the time for residents to get used to the idea of a changing heating network. This idea is enhanced with the way of working from the municipality regarding the granted subsidies. The subsidies are directly rewarded to residents to finance insulation and installation, which provides the residents with a direct influence on how they want to spend the money and increases mental ownership. To support the residents with this subsidy, the focus lies on the peak-residents first and use them as examples to get the rest to join and thus let the others' mental ownership also grow. This way of learning from each other is also done with the residents of the housing corporation. Because of the strong involvement of the housing corporation, they already have adjusted homes, and are used as examples for the owner-occupants. In this way, the municipality is increasing the mental ownership for the tenants and the owner-occupants.

## CHAPTER 5: ANALYSIS

In appendix 3, the concept-indicator model of the analysis can be found. This model is an emergent model based on the empirical data, thus the case study research with the data as described in the previous chapter. The concept-indicator model is evaluated and described in this chapter.

The core of the concept-indicator model is the research's main topic; mental ownership of residents in the heat transition. Mental ownership develops from two main aspects; the current situation and the process happening. The current situation is related to the social and physical aspects of a neighbourhood, and the process is related to influence and engagement. These aspects have again sub-aspects which play a role in the obtaining of mental ownership. The current situation aspects form the foundation of mental ownership of residents which is altered and changed by the process aspects (see figure 13).

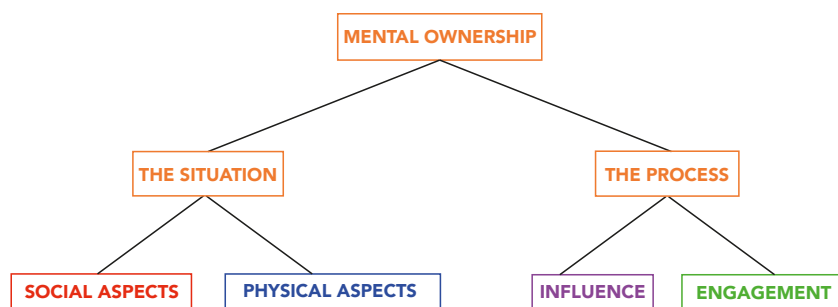


Figure 13: schematic overview of the concept-indicator model (own illustration)

### 5.1. THE CURRENT SITUATION

The neighbourhood's current situation is based on social and physical aspects of a neighbourhood and provides the context of the neighbourhood and process. The aspects of the current situation form the foundation of mental ownership before the process in the neighbourhood starts. The mental ownership, as set by the current situation, is then altered by the process aspects.

#### 5.1.1. Social Aspects

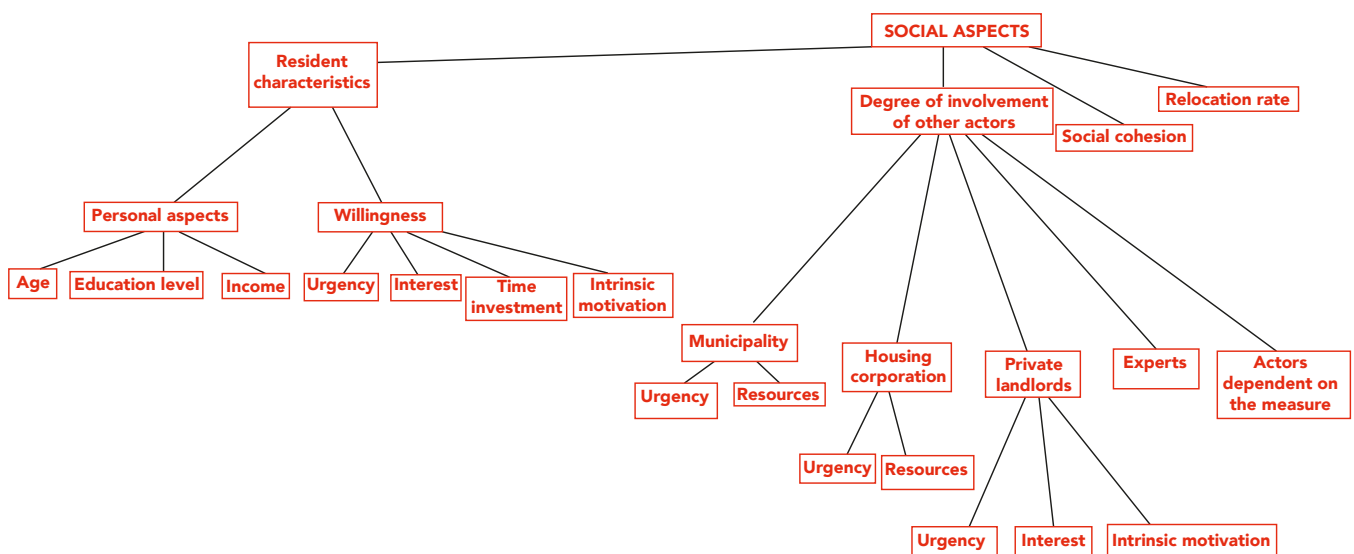


Figure 14: concept-indicator model; social aspects (own illustration)

Social aspects that play a role in the obtaining of the foundation of mental ownership are the resident characteristics, the degree of involvement of other actors, social cohesion in a neighbourhood and the relocation rate of a neighbourhood or part of a neighbourhood (see figure 14).

### Resident characteristics

The residents' characteristics are personal criteria and residents' willingness, which partly defines residents' mental ownership for the transition. Personal criteria which play a role in the mental ownership are; age, education level, and income. As Heveadorp showed, people with an age of 65 or older, and thus retired, tend to take a more present role in the organisation of the transition because they have more time to invest in the process, which is sometimes asked or required. This division is also applicable to people with a higher level of education. They tend to understand the complex issues arising with the heat transition better than lower educated people, which was seen in Kerschoten. Income plays a role in the personal investments' residents have to or can make regarding insulation and installation. People with a higher income have more possibilities to invest themselves than people with a lower income, who might be dependent on financial help or support as was seen in almost all cases.

Next to the personal criteria, there is the aspect of willingness. Willingness to join the process is dependent on the sense of urgency, interest, the time investment and the intrinsic motivation. The urgency residents feel for the transition plays a role in the willingness to get involved in the process. If a resident does not feel the transition's relevance or need, they are less likely to join the process; same goes for interest in the transition. The time-investment asked from the residents, and the time residents want to invest themselves reflects residents' willingness to join the process. If residents do not want to invest time in the process, they are less likely to join the process in the first place. The final aspect relating to the willingness of residents to join the process is intrinsic motivation. The intrinsic motivation of residents shows how eager residents are in joining the process or even initiate it. If the intrinsic motivation for the heat transition is high, the residents are more likely to carry the process, as was seen in the case of Heveadorp; this will increase the willingness to join the process.

### Degree of involvement of other actors

The degree of involvement of other actors than the residents shows the criteria actors have for joining the process or not. The criteria for involvement in the process are different for each actor. The degree of involvement of actors in the process influences residents' role in the process as was seen in, for example, Kerschoten where the residents took the role of wait and see and waited for the municipality to take the lead in the process.

The first actor involved in the process is the municipality. The involvement of the municipality is determined by urgency and resources. Municipalities have the obligation from the national government to make all neighbourhoods natural gas-free. A neighbourhood's urgency to get off the gas is often determined by the municipality (co-)deciding which neighbourhood can start the transition. The municipality needs to see the urgency for a neighbourhood to transition to get involved themselves. Next to the urgency of municipalities for specific neighbourhoods, there is the aspect of resources. Resources are essential for a municipality in order to join the process in a neighbourhood. Resources can be quite low for municipalities, and with the sometimes limited

resources, they still need to invest money and time in the neighbourhood processes. A municipality's resources can cause the municipality to be involved differently than anticipated or wished by the residents.

The second actor is the housing corporation. The involvement of housing corporations is essential for residents who rent their homes from corporations as these residents are dependent on the housing corporations' involvement. The housing corporations base their involvement on the urgency they feel for the process in the neighbourhood and their resources. The housing corporation's urgency depends on the neighbourhood the process takes place in, the current housing stock quality, and the so-called sustainable performance deals. If the housing corporation does not see the relevance and need for a neighbourhood to transition, they will alter their neighbourhood involvement because they have other plans for the neighbourhood or do not want to work on it right now. Resources are also crucial for the housing corporations. Changing their housing stock and insulating homes can cost much money. They need the resources to do this; otherwise, the willingness to join the process is less present.

The third actor is the private landlord. The private landlords are of importance in the process for the tenants of their homes. For the private landlords to join the process, they need to have a sense of urgency, interest and intrinsic motivation. These aspects are interrelated to each other. When the landlords feel a sense of urgency for the transition and thus see the relevance and need for the transition to happen in the neighbourhood, their interest in the process might also change and increase. However, as could be seen in the case studies, private landlords are a difficult actor to reach, which results in lower mental ownership of private tenants over the transition.

The fourth actor in the transition is the expert. Experts are called into the process when research is needed on the technological aspects of the transition. They mostly hand out advice to the neighbourhood. Because this advice is independent of any actors, the outcomes are also independent and not connected to an active actor in the process. This independence provides opportunities for the residents to believe that the experts gave the best possible solution without any biases, which can result in more mental ownership and believe in the technological solution.

The fifth and final actor in the transition process is a group of actors which is unknown until the technological solution is found. As could be seen in the case studies, this could be the heat partner or heat deliverer for a heat grid. With these new actors joining the process also comes the involvement of these actors and their effect on mental ownership. Once a heat partner, for example, joins the process, the residents should trust this partner to deliver heat to the neighbourhood fairly. Which actors join the process is, however, to be determined when the solution is chosen.

### Social cohesion

The third social aspect is the social cohesion in the neighbourhood. Social cohesion is related to social activities in a neighbourhood present before the transition process started. In a neighbourhood where the social cohesion is high, people can influence each other into joining the transition process and increase with this the mental ownership over the process. Social cohesion in the neighbourhood can be present in different scales, from a street to a whole neighbourhood. Social



cohesion can be advanced by, for example, a strongly present neighbourhood association. In neighbourhoods with a high present social cohesion, the tendency to join in such a process is higher as seen in Heveadorp and Ermelo where the neighbourhood association is presently involved in the process.

### Relocation rate

The fourth and final social aspect affecting mental ownership is the relocation rate of residents. As could be seen in the neighbourhoods of Benedenbuurt and Spijkerkwartier, there is a high relocation rate among some residents. These residents know beforehand that they will not stay in the neighbourhood or home where they live right now; this gives them less motivation and willingness to step in the process. If a neighbourhood is known for its high relocation rate, residents' willingness to join the process is lower, and thus the mental ownership is also lower.

### 5.1.2. Physical Aspects

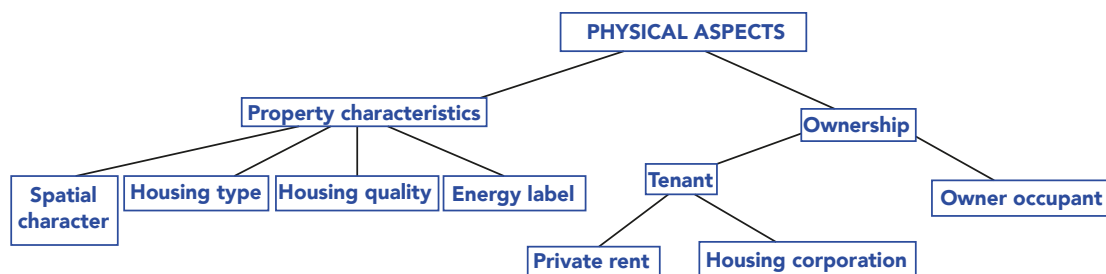


Figure 15: concept-indicator model; physical aspects (own illustration)

The physical aspects that play a role in the development of mental ownership can be divided into property characteristics and physical ownership in a neighbourhood (see figure 15). These physical aspects provide a context necessary for residents to base decisions on.

### Property characteristics

Property characteristics, first of all, relate to the spatial character of the neighbourhood. The spatial character of a neighbourhood determines the possibility of implementing specific technological solutions. If the neighbourhood is spacious with lots of green, or denser can co-determine a neighbourhood's possibilities. Thus, a neighbourhood's spatial character might eliminate some technological options for a neighbourhood, as was seen in Ermelo, where they concluded that large-scale collective solutions were not possible in the neighbourhood. This could affect residents' mental ownership in a way that their preferred technological measure might not be possible. Next to the spatial character of a neighbourhood, the housing typology plays a role. Different housing types need different measures when it comes to insulation or installation. Connected to this are the housing quality and the energy label of a house. The housing quality influences the need for specific insulation measures before an installation might work, and the energy label of a house shows this housing quality insulation wise. The lower to A the energy label is, the fewer investments are asked for insulation of houses. What was seen in Kerschoten is that they decided on a measurement which led to minimal adjustments in the houses, thus fitting the current housing quality. The influence of the property characteristics on residents' mental ownership is that residents might decide not to join the

process when their home has a lower energy label or worse quality, resulting in more investment needed.

### Physical ownership

The second physical aspect is physical ownership. Physical ownership in a neighbourhood knows three forms. First, there are owner-occupants. These people own the house they live in. As seen in the cases, most of the people involved in the process are the owner-occupants. Because they have full consent over their house, they can make their own decisions and can feel more mental ownership in the process. The second and third options are both tenants. First, there are the tenants from the housing corporation. These tenants are feeling more substantial mental ownership once the housing corporation is joining the process. If the housing corporation does not join the process, the tenants are less likely to join either. Most housing corporations work with the 70% rule; once 70% of the tenants are on board, the rest is forced as well; this means that for the tenants there is the principle of majority vote as was noted in Kerschoten. The tenants' mental ownership can increase once the housing corporation starts working on the process, and changes happen. They can then even become an example for owner-occupants, as seen in Ermelo. The third and final option are the tenants of the private landlords. As seen in the cases of Spijkerkwartier and Kerschoten, landlords are a difficult actor to involve in the process. Thus, these houses' tenants are also challenging to reach, as they are entirely dependent on their landlords. Because private landlords are hard to reach, these tenants do not have much mental ownership over the process; this might grow when the landlords decide to join the process and involve the tenants in the process.

## 5.2. THE PROCESS

The process side of mental ownership knows two main concepts; influence and engagement. These two concepts are reflecting the process of the transition in a neighbourhood. All aspects of these two concepts tend to decrease or increase residents' mental ownership as founded in the situation.

### 5.2.1. Influence

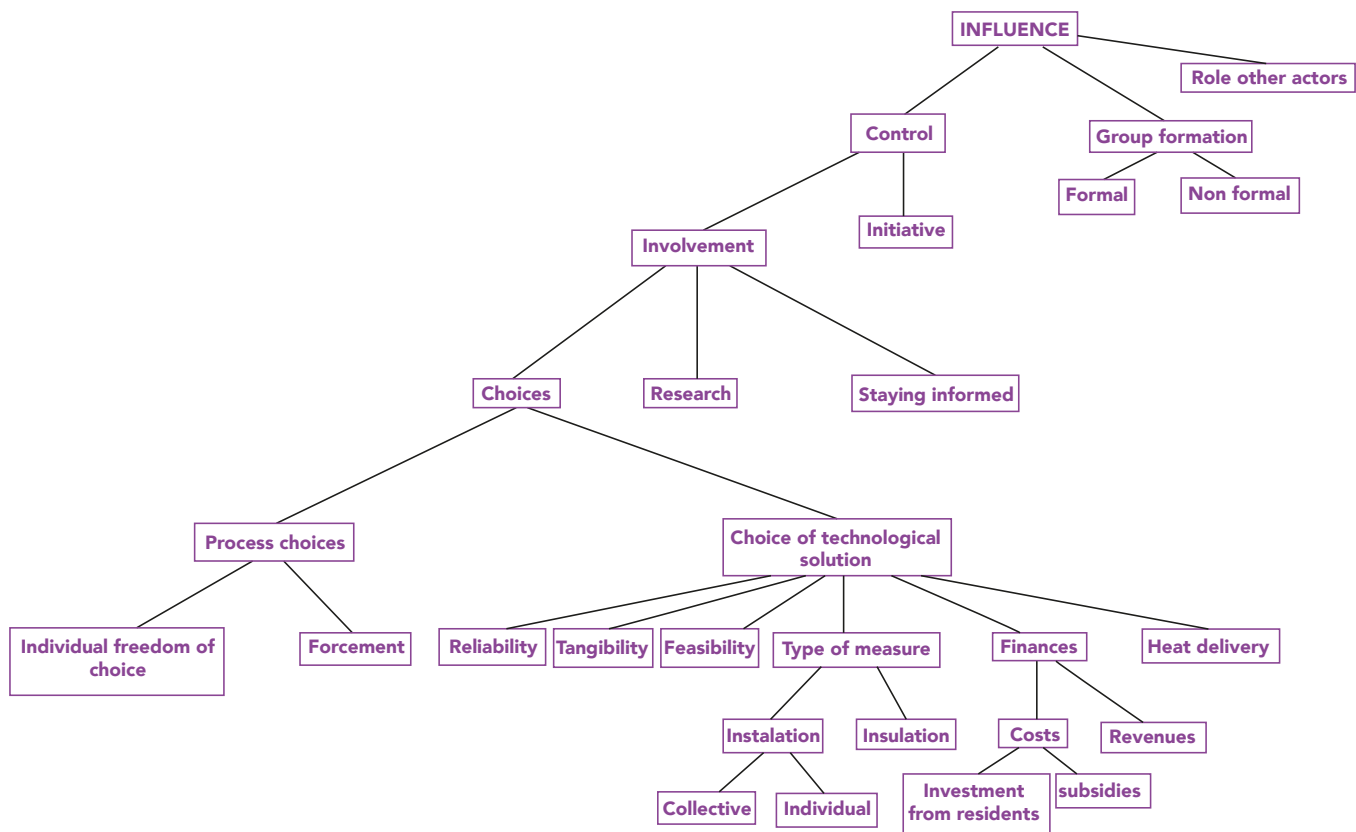


Figure 16: concept-indicator model; influence (own illustration)

Influence in the process exists out of control over the process, the group formation in a process and the role other actors take in the process (see figure 16). Influence on a process tends to increase the mental ownership over the process. The more influence someone has the more mental ownership is felt over the process.

#### Control

The first aspect of influence is control. Control over the process is based on involvement and initiative in the process. Involvement in the process is achieved on multiple levels. Residents can be involved in choice moments, participation in research and by staying informed. These are different types of involvement which all have their effect on the mental ownership (See figure 16).

#### Involvement

Starting with the aspect which gives the most vigorous involvement; choice making. There are two types of choices seen in the cases; process choices and choices for the technological solution. Process choices are choices which determine the continuation of the process. For example, in Heveadorp, the question was asked if they should continue with the research process for a solution or not. These decisions could shift or change the process or even stop it. With these decisions also come the aspects of individual freedom of choice and force. Within the process choices, everyone has the freedom of choice to stay in the process. These are moments when residents' mental ownership is tested, and it reflects the question if there is enough mental ownership in the process for residents to continue. This decision can be made by everyone individually. However, what is seen is that when the majority is for the continuation of the process, the process continues. For some

residents, mostly the tenants of the housing corporations and private landlords, they can be forced to join the process even though they do not want to. When the housing corporation or private landlord decides to join the process, each resident can choose for themselves. However, if the majority agrees, everyone is forced to join, which was seen with the housing corporation in, for example, Kerschoten. Owner-occupants do not have experienced forcing yet; they keep having their freedom of choice over the process and can step in and out any time.

The second choice type is the choice for a specific technological solution. By being involved in the choice-making process, residents can control the measures implemented in the neighbourhood, resulting in the decision for a measure matching their wishes and demands, which increases mental ownership. Essential aspects in the choice for a technological solution are the reliability, tangibility and feasibility of a technological measure. What was seen in multiple cases is that residents often question the reliability and feasibility of different technological measures. There are many uncertainties about techniques and the way these will be implemented. The tangibility of the measure is another aspect important in the decision for a technological measure, as noted in Kerschoten. Right now, the transition is seen as a non-tangible transition. The results and benefits and the effects on the living comfort are often not precise for the residents. Thus, a solution chosen must be researched on the reliability and feasibility for the neighbourhood, and the tangibility has to be shown.

These were more the context aspects around the implementation of the measure; there are also aspects related to the measure itself. The type of measure implemented is one of them. The type of measure exists out of insulation and installation measures. As seen in Ermelo, Kerschoten and Spijkerkwartier, the transition is divided into an insulation phase and installation phase. For the insulation measures that deal with changes in the houses, the energy label and house quality determine the needed measures. These measures differ for all residents as each house is different. As described in the physical aspects paragraph, the number of insulation measures needed can change the mental ownership. Installation measures can either be individual or collective; this choice is determined by the spatial characteristics in a neighbourhood and by the residents' personal preferences as seen in Spijkerkwartier where the residents rejected the idea of a heat grid. The wish for a collective or individual measure and the actual choosing of the measure matching these wishes influences the mental ownership.

Another aspect of the choice for a technological solution is the finances related to the measures. The finances are first about the costs of a measure, specified in investment made by residents, and possible subsidies. If there is much investment asked from the residents, the mental ownership might decrease, but if there are subsidies available, the mental ownership can increase as seen in Ermelo. Related to the costs are also the revenues of the measures, focusing on the pay-off and payback period of the measures. The final aspect of importance in choosing a technological solution is the choice for a heat deliverer, heat partner and source. This decision is the final choice before implementation, but an important one as is now seen in Benedenbuurt and Kerschoten. With this decision, the heat delivery price, the source of heat and its sustainability, and heat partner are chosen. The decision should match the residents' ideas, and they need to trust the heat partner in delivering the heat for the best price. If this is not trusted the mental ownership can again decrease. However,

this is also the decision where a new group of residents will join the process as this means the final offer can be made.

This was the choice aspect of the involvement, the second aspect where residents' involvement can increase mental ownership is the involvement in research. A big part of the transition is researching the possibilities, the measures, and heat partners. With involvement in the research phase residents can gain control over the outcomes and the choice possibilities as described in the previous part on choices and seen in the cases with the involvement of the working groups in the processes. Residents gain more insight and information on the transition and its possibilities and constraints, giving them higher mental ownership in the process. The downside for research involvement is that it requires some knowledge on the transition, which not all residents have as seen in Kerschoten where the working group struggled with understanding the technical side of the transition.

The third aspect of involvement is involvement by staying informed. By staying informed on the process, the residents are kept up to date on what is happening. This is no active involvement in the process but does allow to keep being involved in the process even if it is in the background. All researched cases kept the residents involved during the process by keeping them informed over what was going on. By knowing what is going on in the process and neighbourhood, residents can gain some mental ownership over the process.

### *Initiative*

Next to involvement, control is also achieved when residents take the initiative. When residents take the initiative in the process, the control over the process increases, as seen in Heveadorp and Benedenbuurt, leading to increased mental ownership in the process. However, there are also examples of the initiative being in the municipality's hands and the residents still having mental ownership over the process as seen in Spijkerkwartier and Ermelo. It should be kept in mind that not all residents or resident groups involved in the process want the initiative and the control over the process.

### *Group formation*

Influence thus comes from control over the process. The other aspect related to influence is group formation. Group formation relates to the way residents are institutionalised in the neighbourhood. There are two ways of group formation; formal groups and non-formal groups. Formal groups such as in Heveadorp and Benedenbuurt, are formalised groups of residents. With the formalisation, they become a formal and recognised actor in the process. They gain legal decision rights, and as a legal actor, they have more possibilities for subsidies and financing of the process. Non-formal groups, as in the other cases, have fewer formal possibilities. Within each neighbourhood, the choice is with the residents to become a formalised actor or stay non-formal. As seen in the cases, there is something to say for every option. The group formation in the neighbourhood can influence residents' mental ownership; it can give them more responsibility for the process, and as a formal group, there is more legal room for the representation of the ideas and wishes from the residents. However, this is legal room. With the non-formal groups, there is, as an advisory group of residents or working group, enough room to influence the process as seen in Ermelo or Spijkerkwartier, there is just a bit more dependence on the other actors.

### Role other actors

The final aspect of influence is the role other actors take in the process. As seen in the part on the degree of involvement of other actors, actors' involvement is essential as a foundation of mental ownership. The role other actors take affects the influence of residents on the process. Different roles actors can take in the process are facilitating, initiating, advising, awaiting, e.g. Residents need other actors in the process to make is succeed and respond to the involvement of other actors. If for example, the municipality is strongly supporting and facilitating the process such as in Benedenbuurt, residents' influence increases. They are supported in their role and plan of approach by the municipality; this support results in more influence and mental ownership. Another example is when the housing corporation decides to facilitate the process for its tenants. The tenants might feel more influence over the process, thus gaining mental ownership, as seen in Ermelo, where the tenants became an example for the owner-occupants.

### 5.2.2. Engagement

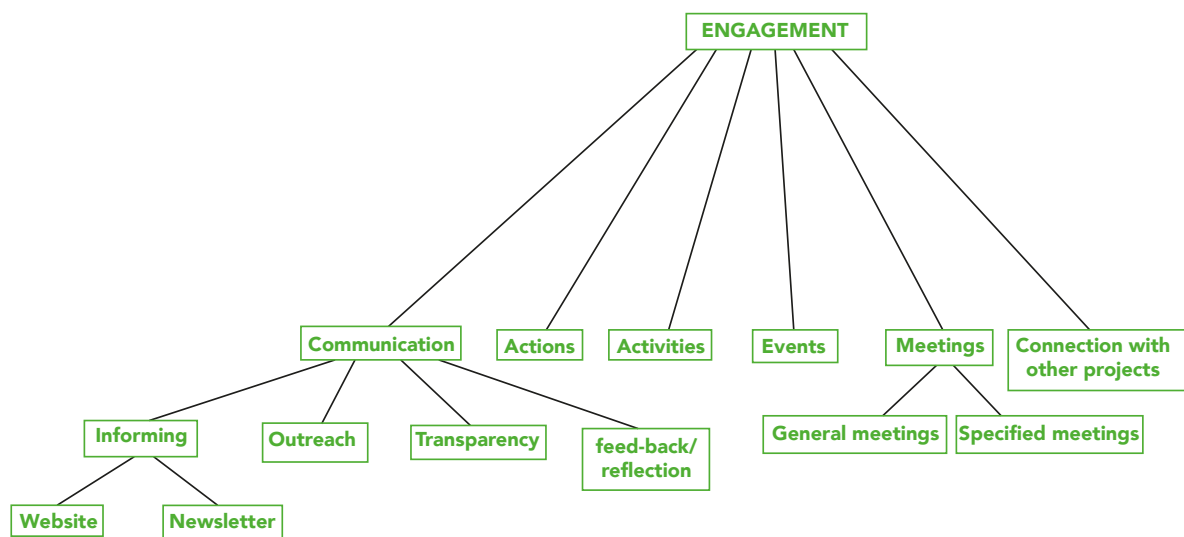


Figure 17: concept-indicator model; engagement (own illustration)

The second concept of the process is engagement. During the process engagement in the process is an essential aspect in increasing the mental ownership. Multiple aspects can support the achievement of engagement of residents in the process (see figure 17).

### Communication

The first aspect is communication. Communication to and from residents is vital in informing residents about the process in the neighbourhood. Within communication, the following criteria are found. First, there is the informing of residents. If residents are not informed about the process, the mental ownership will not grow either. In the cases, the informing happens through the use of a website or platform and via newsletters. Important in this is the outreach of communication. With the newsletters, in particular, being distributed among every house in the neighbourhood, the outreach

of the communication is high. Every resident should be reached in the neighbourhood to gain the highest possible engagement and more mental ownership. Another aspect of communication is the transparency of communication. By communicating every step of the process in detail and reasoning behind choices, the communication becomes transparent as Ermelo does. With less transparent communication as was seen in Kerschoten and Spijkerkwartier, the residents might question why certain decisions are made. The more transparent and complete communication is, the more engagement by the residents. The final aspect of communication is feedback and reflection. By asking feedback and reflect on decisions made or communication done, the residents become more involved in the process. Reflection on communication is, for example, done in Ermelo where the resident working group got to review the newsletters before it was sent to the neighbourhood. Another example of reflection and feedback is also visible within Heveadorp, where all residents could comment on the technological choice document.

### Physical engagement

While communication is mostly on paper, the next four aspects of engagement are physical. Actions, events, activities, and meetings are a physical form of engagement. These four types of engagement all have their characteristics. With actions, such as the action of Kerschoten to put the central heating on 70 degrees, to test the insulation, the goal is to let the residents experience the upcoming changes; this is also done with the test home multiple neighbourhoods had. Activities and events are planned to get the residents connected to the transition. Examples are workshops on cooking without gas, a neighbourhood safari such as in Benedenbuurt, or a climate street fest. In this way, the residents can join the events to get to know the transition in an interactive way. The final one is meetings, in every neighbourhood, there are held resident meetings. Within the resident meetings, the state of play is shared with the whole neighbourhood, and the residents have the opportunity to ask questions and give remarks on what is going on. Through the cases two types of meetings can be found, general meetings, where the focus is on the whole process and transition, and specific meetings focusing on smaller aspects of the transition such as the insulation of a specific type of home. The general meetings are for all the residents to join, where the specific meetings often address one group of residents. This differentiation between meetings can result in the engagement of a specific group which was previously not engaged.

### Connection with other projects

The final aspect of engagement is the combination and connection of the transition with other neighbourhood projects. Not every resident is interested in the heat transition; they thus will not have much mental ownership in the process to start with. To increase this engagement, the transition could be connected to other projects in the neighbourhood where residents are more interested in. This is seen in Benedenbuurt where they try to involve more residents by connecting the transition to, for example, renovating green spaces and Spijkerkwartier where the heat transition is connected to the blue-neighbourhood economy project. If other projects where residents feel the interest for are connected to the transition, they might start to gain more interest in the heat transition and become engaged in the heat transition via this other project.

The aspects described in this chapter are the empirically found aspects influencing the development of mental ownership in the cases researched.



## CHAPTER 6: CONCLUSION

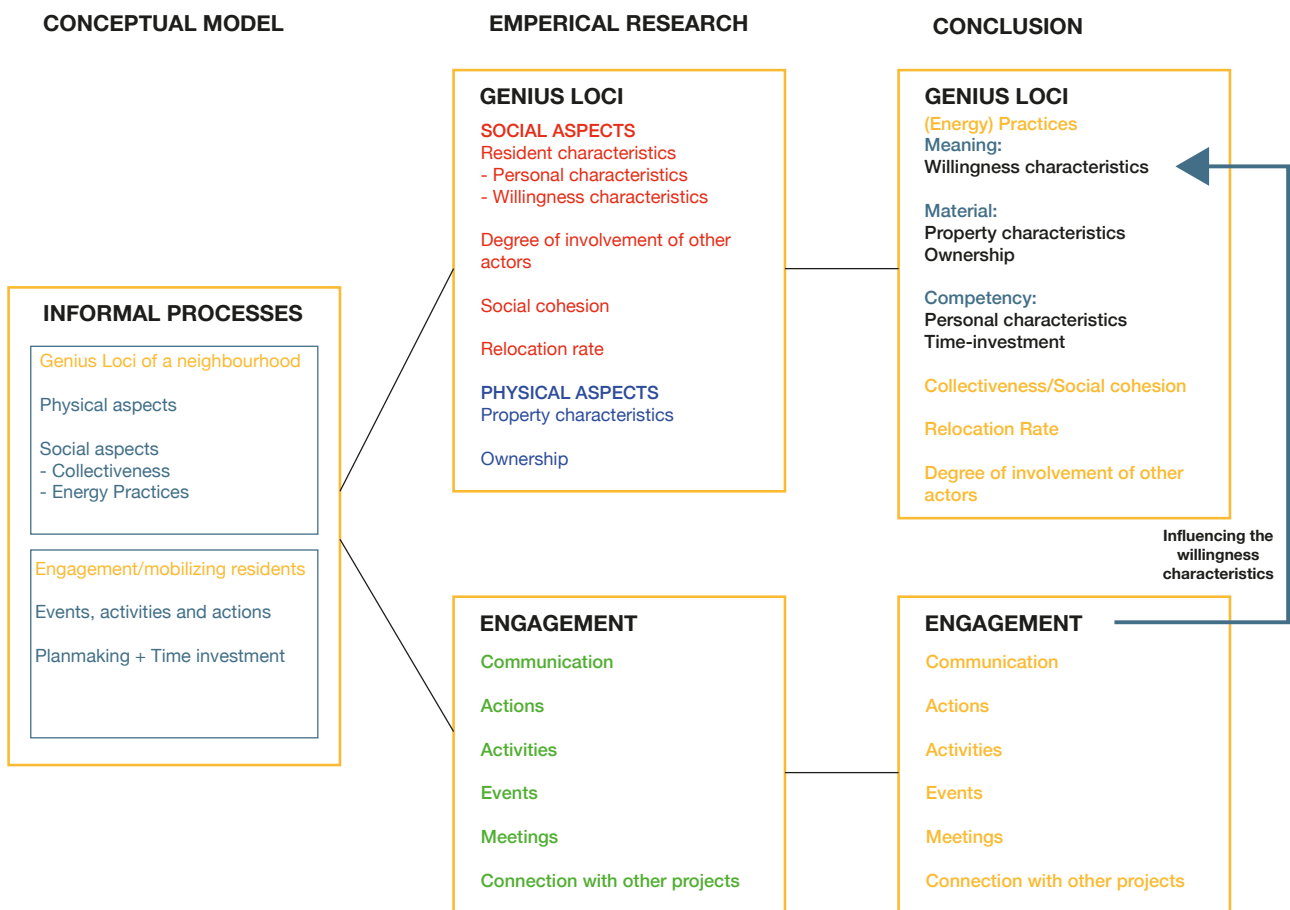
In chapter two, a conceptual model was formed to research the mental ownership in the local heat transition cases. To test this conceptual model in practice, the concept-indicator model of the analysis was formed, which shows the aspects that play a role in the development of residents' mental ownership in the selected cases. Within this chapter, the conceptual model from chapter 2 (figure 1) is compared to the concept-indicator model (appendix 3) to determine the development of mental ownership in theory and practice and answer the main research question:

*"How is the mental ownership of residents formed by (a) the informal process, (b), control and (c) the collaborative institutional process in the neighbourhood of the future local heat transition process?"*

The importance of ownership over the process of the local heat transition was already set by one of the interviewees who stated that; "No one is going to invest if they do not feel that they are the owners of the change" (J. Maocuhe, personal communication, October 1, 2020). The conclusion on the formation of mental ownership is formed by comparing the conceptual model elements in chapter 2 (figure 1) and the concepts from the concept-indicator model (see appendix 3) on each of the theoretically defined pillars answering the sub-research questions. Furthermore, there will be explained how new concepts fit into the existing conceptual model. Finally, a final combined framework for mental ownership formation is presented, answering the main research question.

### 6.1. INFORMAL PROCESSES

Table 6: Conclusion informal processes (own table)



To start with the informal processes, as shown in Table 6, the conceptual model from chapter 2 shaped informal processes as existing out of the genius loci of a neighbourhood and the engagement and mobilisation of residents.

Genius loci is coming from the theories and conceptual model as formed in chapter 2, with physical and social aspects. The empirical case study research confirms the importance of the social and physical aspects in the development of mental ownership and adds the relocation rate aspect to this. Diving further into the empirical case study results, it showed that the physical and social aspects of a neighbourhood are the core of the current situation (see appendix three or image 14 and 15). They provide the neighbourhood context and are the starting point of the mental ownership formation of residents. The social and physical aspects define the (energy) practice of residents regarding the local heat transition. The in the conceptual model defined elements of a practice are; meaning, material and competency. Meaning reflects on the social characteristics, precisely the resident's willingness characteristics as these characteristics determine the norms and values residents have regarding the gas-transition. It thus shows the interest, urgency and intrinsic motivation of residents for the transition process. Material reflects on the physical aspects of the availability of technological measures and the neighbourhood's context existing out of the spatial character, housing types and quality, energy labels and ownership, together defining the possibilities for technological implementations. Competency is again reflecting on the social characteristics. Personal characteristics such as income and education level and the willingness characteristics such as time investment determine whether or not a resident has the competency to join the process. Practice theory is thus strongly present in the concept-indicator model and provides the context and situation of the neighbourhood.

Next to the practices, the genius loci also involves the collectiveness/social cohesion, as found in both the theories and empirical research. Added to the conclusion framework are the relocation rate and the degree of involvement from other actors which were found in the empirical data. The degree of involvement from the other actors was in the conceptual model included in the collaborative institutional process pillar (see table 7). However, as the empirical data showed in the concept-indicator model, it turns out that the degree of involvement of other actors is better seen as a social aspect where residents determine their involvement in the process on. If certain actors are missing in the process residents can decide not to join the process either as seen, for example, with the housing corporations and their tenants. Final, the relocation rate is an added aspect found in a couple of cases, where it showed that people who tend to move soon, or know beforehand that they will move soon, are less likely to join the process, it is thus seen as a social aspect influencing the genius loci.

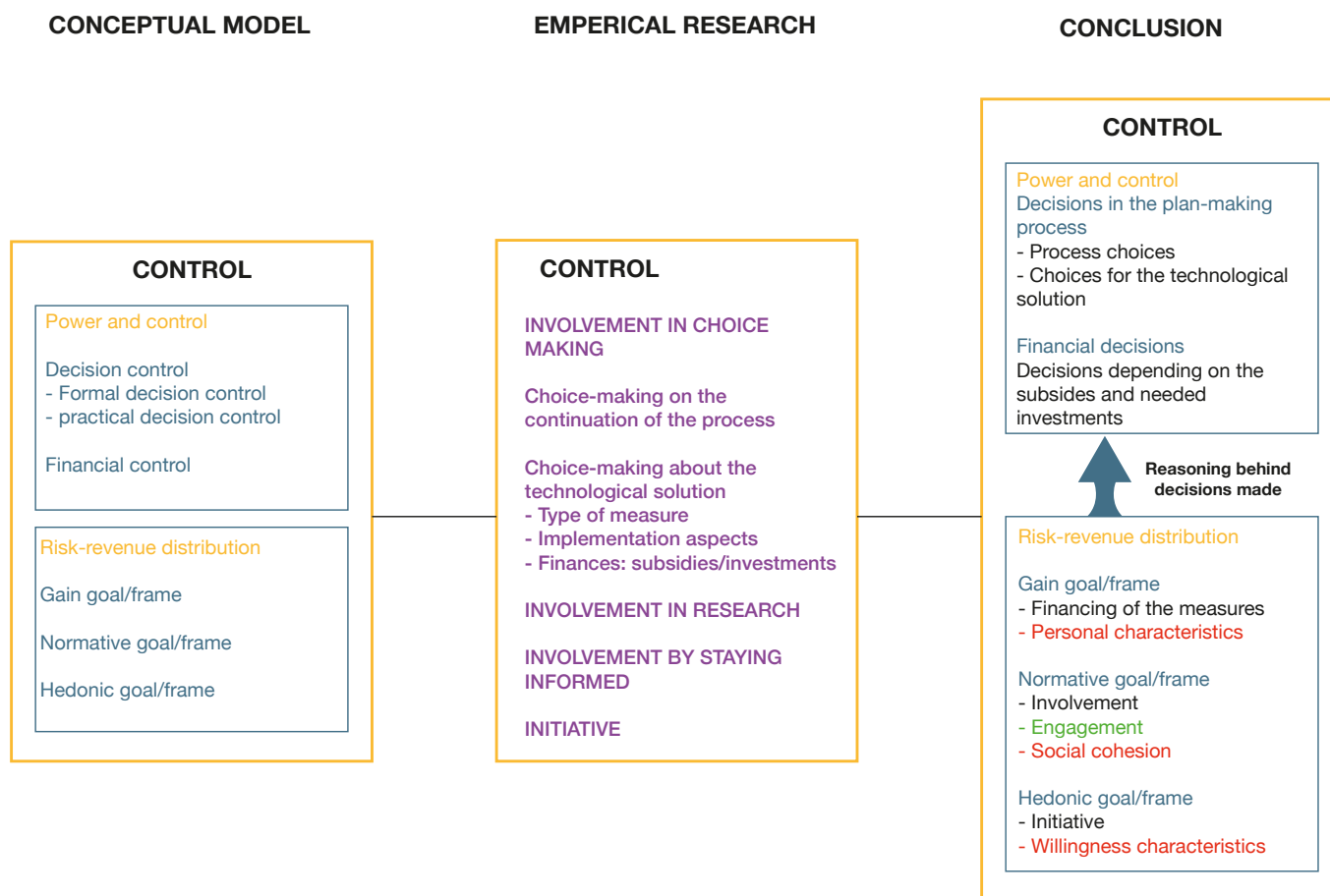
The other aspect of the informal processes is the engagement process. Within the conceptual framework of chapter 2, the engagement processes were coupled to the neighbourhood's genius loci as informal process. However, the empirical data showed that the engagement processes could better be seen as a separate pillar in forming mental ownership where it increases or decreases mental ownership as set by the neighbourhood's genius loci. Within the conceptual model activities, actions and events and the plan-making and time-investment were seen as aspects of the engagement processes. The activities, actions and events are confirmed by the empirical data and

the concept-indicator model as important engagement aspects in mental ownership development. The engagement process is how residents are brought in contact with the transition process in their neighbourhood, which makes it essential in the formation of mental ownership. Without communication and activities and events, the neighbourhoods' residents would be less involved in the process. The engagement process is because of this still related to the genius loci even though they are not in the same pillar any more. The engagement process is influencing the willingness characteristics of the genius loci because it can influence the interest and urgency. The aspect of engagement; plan-making and time-investment as found in the conceptual framework are not found in the engagement pillar in the concept-indicator model but in other pillars. The time-investment is found in the social characteristics of residents and thus part of the genius loci pillar. The plan-making process is better suited within the control pillar as will be described in the following paragraph.

Concluding for the first sub-question of this research; What role do informal processes play in the development of mental ownership of residents in the local heat transition? There can be said that Informal processes form two pillars in the development of mental ownership; the genius loci and the informal engagement processes. The genius loci is the context and basis of mental ownership development; with the definition of the practice in the neighbourhood and the further elaborated physical and social aspects. In contrast, engagement is an influencer of mental ownership decreasing or increasing mental ownership, thus forming a separate pillar in the development of mental ownership.

## 6.2. CONTROL

Table 7: Conclusion control (own table)



As can be seen in table 7, the conceptual model from chapter two defined control as power and control with the elements of decision control and financial control, and the risk revenue distribution. The empirical data shows that an essential aspect of gaining influence on the process is choice-making and thus decision control. Choice-making could be divided into process choices and choices for the technological solution. The more the residents are involved in the choice-making process on both the process and the technological solution, the more control residents have over the process resulting in more mental ownership. The choices made on both the process and the technological solution are influencing the plan-making process. Within the conceptual model, the plan-making process was seen as engagement aspect (as seen in the previous paragraph 6.1). However, the cases suggest that the plan-making process is an aspect where if control is found over the choices in the process and the technological solution, mental ownership can increase. Thus, plan-making processes are part of the decision control over the process, increasing or decreasing the residents' mental ownership. The empirical data do not confirm the distinction made in the conceptual model between the formal decision power and practical decision power. Decision control turned out to be better distinguished as decisions over the process and decisions over the technological solution.

Another aspect of control, as described in the conceptual model, is financial control over the process. In the cases, the focus is mostly on financing the technological measure. In here the differentiation is made between investments done by residents and subsidies. The most significant financial remark made in the cases is that the process would not continue without subsidies. So, there is financial control but depending on whether or not there are subsidies granted to the neighbourhood. If subsidies are provided, the effect can be that mental ownership grows. If subsidies are not provided to the neighbourhood, the pressure on the residents' personal investments increases, which might lower residents' mental ownership. Thus, the financial question also plays a role in the choice-making process, as different choices might be made when different financial possibilities are connected to this.

Within the process, a considerable control aspect is thus the involvement of residents in the choice-making processes as seen in the conclusion column of table 7; the power and control. The reasoning behind the choice's residents make, can come from different frames. In the conceptual model, the difference was made between the gain, normative and hedonic risk-revenue choices. All three choice possibilities are seen in the cases and are thus frames from which residents make decisions in the transition process. Noted here is that the choice-possibilities are not necessary found in the control aspect of the empirical data. It turned out that the different pillars of the concept-indicator model shape the gain, normative and hedonic risk-revenue decisions as can be seen in table 7 through the different text colours in the third column equalling the colours of the pillars in the concept-indicator model (black texts are control aspects, which the risk-revenue distribution is a part of). The risk-revenue distribution is still situated in the control pillar because the risk-revenue distribution outcomes determine residents' decisions, which is decision control.

The first goal, the gain goal and frame, focusses on resources. Within the cases, the gain goal can be connected to the control aspect of financing of the technological measures; thus, the investments asked from the residents and subsidies, and the genius loci aspect of personal characteristics, where income determines the importance of subsidies and the financial possibilities for residents to invest

in the process. Within these aspects and the gain goal, two ways of decision making from the gain goal are noted. First is the decision of residents to not join because the investments asked are too high. Second, are the cases where there is little to no investment asked from the residents, which results in the gain goal being used, in the sense that the changes do not affect the resources of residents lowering the threshold to join the process.

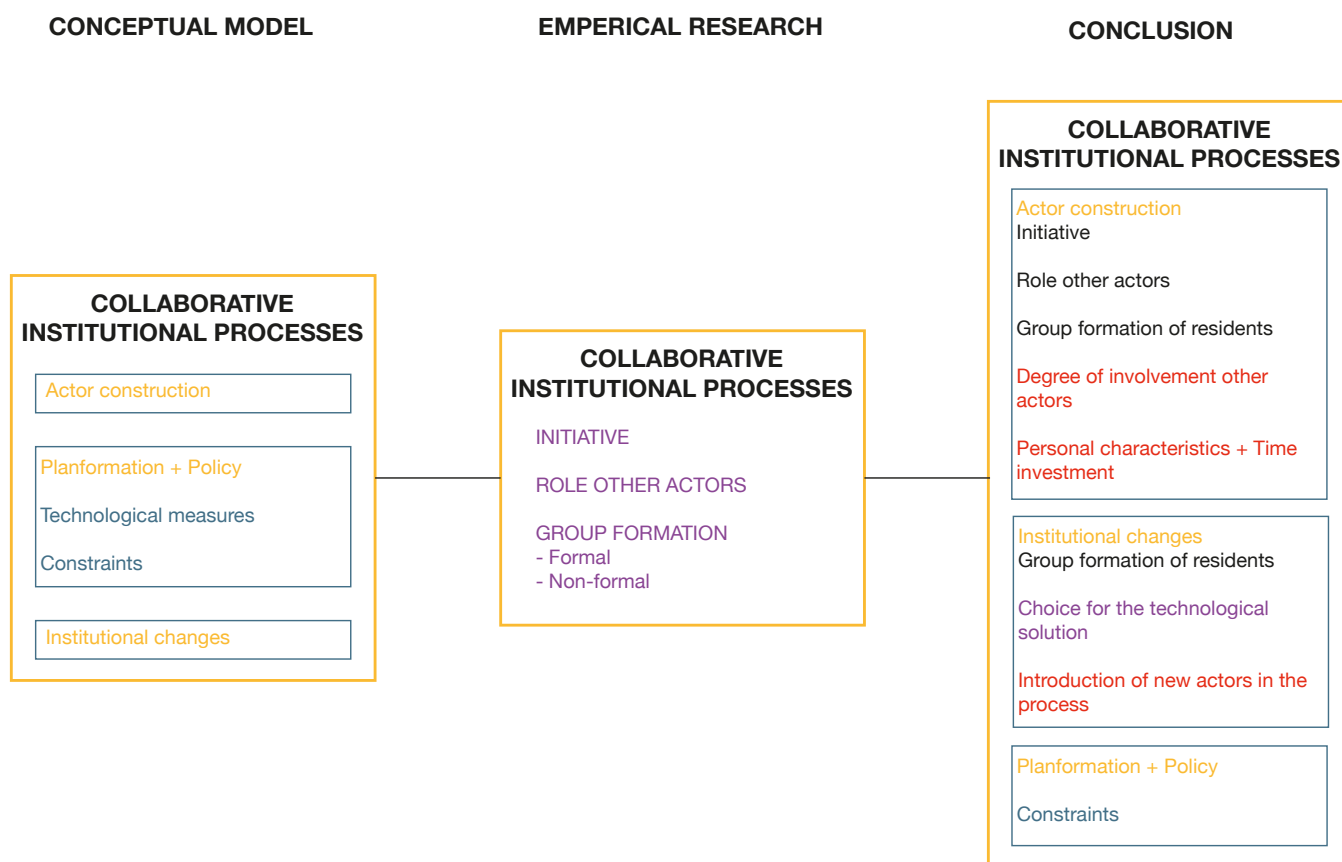
The second goal, the normative goal, derives from the engagement pillar, the genius loci aspect; social cohesion, and the control aspect of residents' involvement in the process. When a neighbourhood has a strong social cohesion, the residents tend to learn more from each other or follow each other's actions. One neighbour does something which might influence others to do the same. The engagement process also influences the normative goal; the engagement process is often connected to learning from each other and finding solutions together. Both the social cohesion and the engagement can influence the normative risk-revenue by focusing on the example of a best practice to get other residents involved, which connects directly to residents' involvement in the process as control aspect. The normative goal works in two ways. It could be that because someone sees their neighbour join the process, they also decide to join the process. Alternatively, on the other hand, someone could see their neighbour not join or reject the process and decide not to join either.

The third and final goal is the hedonic goal. What is seen in the cases is that the hedonic goal is reflected in a couple of aspects. First of all, the genius loci aspect of resident characteristics and precisely the willingness to join the process. Once the residents are willing to join the process, it reflects on them having the ability and willingness to change their current way of living regarding the transition. This willingness to change is also seen in the control aspect of initiative; once the residents take on the initiative, their hedonic frame to change becomes stronger. Nevertheless, the hedonic goal can also work the other way around, when the residents do not feel the need to change; which was also visible in the cases where people did not see the urgency of the transition.

The paragraphs above answer the second sub-question; What role does control play in the development of mental ownership of residents in the local heat transition process? The main aspect of control over the process is the decision control. Decisions can be made over the process, and technological solutions and together form the decisions made in the plan-making process. Next to the decisions made over the plan-making process, there is also the financial decision in a process determined by the ratio between investments made by the residents and subsidies. Connected to choice-making is the reasoning behind choices made. The reasoning behind choices derives from many aspects distributed along the different defined pillars but combined in the risk-revenue distribution on choices. Control is thus about controlling the choices made in the process and the reasoning behind choices made.

### 6.3. COLLABORATIVE INSTITUTIONAL PROCESS

Table 8: Conclusion collaborative institutional processes (own table)



As can be seen in table 8, the collaborative institutional process was defined by the conceptual model as existing out of the actor construction, the plan formation and policy with the technological measures and constraints, and institutional changes.

Within the cases, it became clear that the actor construction; thus, the role actors take in the process, is essential for the influence residents have over the process; which influences the mental ownership. The role actors take in the process varies from facilitating to awaiting to leading, influencing the actor construction and the ways of cooperation in the process. The development of the actor construction can be seen as a combination of elements from the different pillars (see table 8, third column). The actor construction is determined by the influence aspects of the concept-indicator model being the initiative and whether or not the residents take the initiative in the process, the role other actors take in the process, and the group formation of residents. The actor construction is also determined by the genius loci aspects of the concept-indicator model: the degree of involvement of other actors and the personal characteristics and time investment. These five aspects shape the complete actor construction and form the basis of the determination of the role residents take in the transition process and affects their influence on the process and the choice-making in the process. Next to influencing the role of residents in the actor construction, the role of other actors in the process also says something about the future institutional set-up and the residents' group formation in the future.

The future institutional set-up depends on the technological measure chosen in a neighbourhood that is a control pillar aspect (as shown in the third column of Table 8); this determines what and if new actors become involved in the process. As seen in the concept-indicator model, the social aspect

of the degree of involvement of other actors introduces the option of the introduction of new actors, dependent on the measure taken. These new actors need to be included in the actor-network, which might shift or change the network. The future institutional set-up is also dependent on the possible institutionalisation of the residents' group and thus the group formation of residents. Within the institutionalisation of resident groups, the difference between formal and non-formal groups is found in the cases. With two of the cases (e.g., Heveadorp and Benedenbuurt) having a formalised group of residents, the differences between formalised and non-formalised groups arose. In the cases, the formalised resident groups technically have more influence on the process; they lead and initiate the process. When asked about the reasons to become a legal entity, this leadership and initiating role is named as positive effect wished in the neighbourhood. Nevertheless, this does not mean that a non-formalised group does not influence the process. What is seen in the case of Spijkerkwartier, is that Spijkerenergie is taking the lead, but is backed by the municipality. In Kerschoten and Ermelo's cases, the residents are heard through the working groups, meaning they still have influence without being formalised. Finally, what is seen in the cases where the residents are not formalised is that this is not wished. Being a formalised group gives much responsibility to the residents, which is not always wished. The formation of the resident groups determines the influence residents have over the process and how cooperation between residents and the other actors occurs.

Final, the technological measures and constraints. For the technological measures, the focus is on choosing a measure and the context co-deciding this. What does arise is how technological measures are decided on, which is again related to the actor-network and actors' role in the process, directly influencing the control residents have over the process and the choice-making for the technological solution aspect of the control pillar and is thus not part of the collaborative institutional process pillar. The constraints and limitations to the process such as the path dependency and the current gas delivering structure and role of the municipality are, crucial to the process but form a context to the process as a whole and not specifically the neighbourhoods' processes as researched in this thesis. All constraints are seen in the cases as reasons for residents not to join the process or be reluctant to the process, affecting the genius loci. Because these aspects cannot be forgotten and do play a role in the mental ownership development but not as direct changeable and influenceable aspects individually in a neighbourhood and more as general contextual aspects, these aspects are brought back in the discussion chapter of this research.

With this paragraph, the third sub-question is answered; What role does the collaborative institutional process of the local heat transition play in the development of mental ownership of residents, specifically the institutionalisation of resident groups? The main conclusion for the role of the collaborative institutional processes is that the actor construction and institutional set-up determine the role of the residents in the process in relation to the other actors involved in the process. Next to that the way the residents are involved in the network now and in the future is of influence on the control over the process, the control residents have in the process, which as shown in the previous paragraph on control, influences the feeling of mental ownership.

#### **6.4. INTERDEPENDENCE**

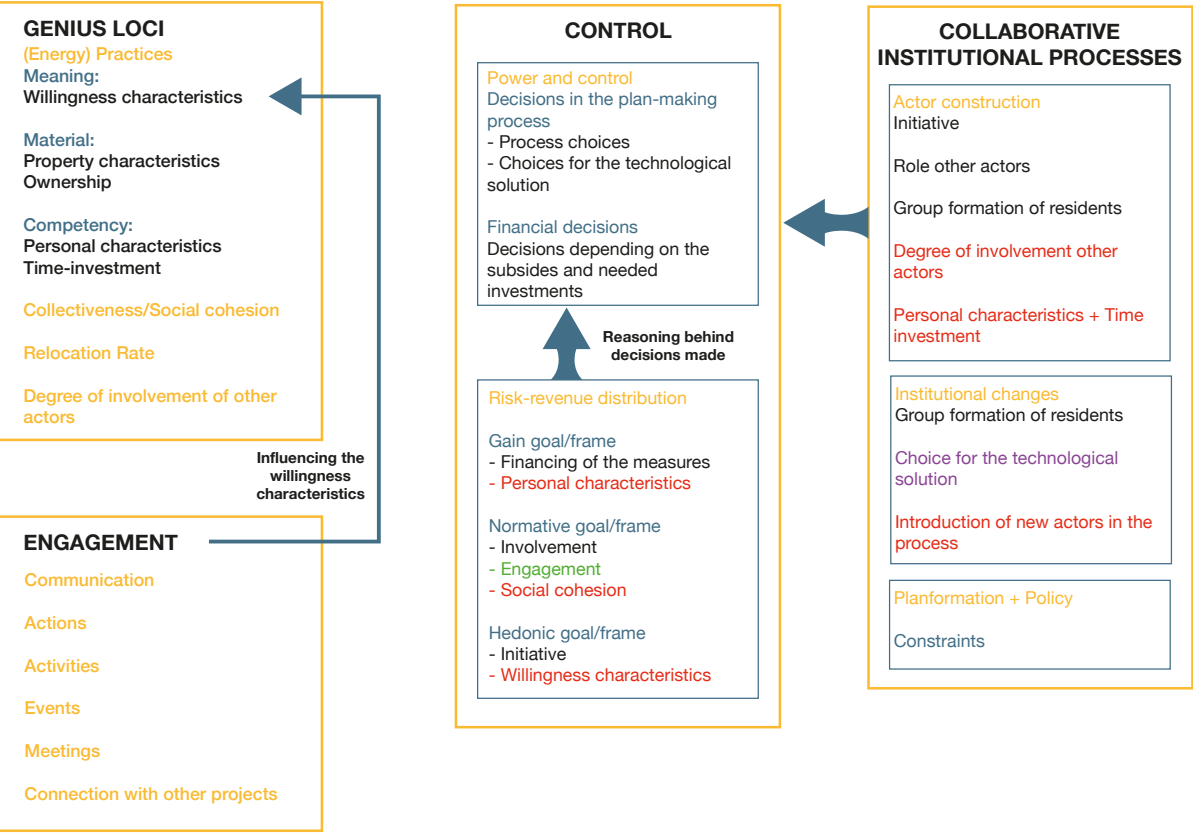
As seen in the previous paragraphs and tables 6, 7 and 8, the different formed pillars developing mental ownership are interrelated. Within this paragraph, the fourth and final sub-question; How do



the informal practices, control and the collaborative institutional process influence each other and determine the mental ownership of residents? Is answered.

Within the concept indicator model the two-sided mental ownership development is shown. The situation side and thus, the neighbourhood's genius loci are the motives for mental ownership development and determine the 'basic' feeling of mental ownership. The process side with the informal engagement processes, control and the collaborative institutional process, are the mechanisms and routes developing this 'basic' feeling of mental ownership. This already shows the interrelation between the different pillars. They extend each other in the formation and development of mental ownership which was also suggested in the conceptual framework.

Table 9: Interrelations between the different pillars (own table)



The second aspect where the relations between the different pillars is visible is the risk-revenue distribution. The risk-revenue distribution is situated in the control pillar, which makes sense because the outcomes of the risk-revenue distribution form the reasoning behind the choices made, which is decision control. The input for these decisions and thus the frames come from other pillars in the model, such as the gain goal, being influenced by the personal characteristics, the normative by the social cohesion in a neighbourhood and engagement processes and the hedonic by the willingness characteristics of residents.

Another relation between the different pillars is seen in the actor construction. The actor construction is determined by having the initiative in the process, the role of other actors and the group formation of residents all aspects from the influence pillar of the concept-indicator model matching the collaborative institutional process aspects as formed in chapter 2. However, the actor construction is also determined by the degree of involvement of other actors in the process and the personal characteristics of residents determining the role residents take in the process, which are genius loci aspects. As described in paragraph 6.3, these aspects influence and shape the actor construction, and thus interrelates the collaborative institutional processes with the genius loci. The actor construction is also of influence on the control pillar, as the actor construction and thus the way of cooperation from the different actors determines how, and by whom decisions on the planning process are made, thus determining the control of residents over these decisions.

A final relation between the different pillars is seen within the institutional changes and is focussed on the future institutional set-up. Institutional changes are as seen in paragraph 6.3 determined first of all by the group formation of residents which is a collaborative institutional process pillar aspect. The other aspects influencing the institutional changes are the choice for a technological solution which is a control pillar aspect and the introduction of new actors in the process which is part of the degree of involvement of other actors in the process and thus a genius loci aspect. Combining these three aspects from three different pillars together determines the future institutional set-up and thus forms an interrelation between the different pillars.

In conclusion, the four pillars are all interrelated and connected and form residents' mental ownership in the local heat transition process.

## **6.5. CONCLUSION**

The outcomes of previous paragraphs on the separate elements of mental ownership formation are combined to answer the main research question of this thesis;

*How is the mental ownership of residents formed by (a) the informal process, (b), control and (c) the collaborative institutional process in the neighbourhood of the future local heat transition process?*

Visualised as a new and revised theoretical framework based on the previous paragraphs and the tables 6, 7 and 8 the residential mental ownership formation is shown in figure 18.

This figure is essentially based on the conceptual model of chapter 2 (figure 1) and extended with found empirical data shaped into a framework showing the deriving of mental ownership for

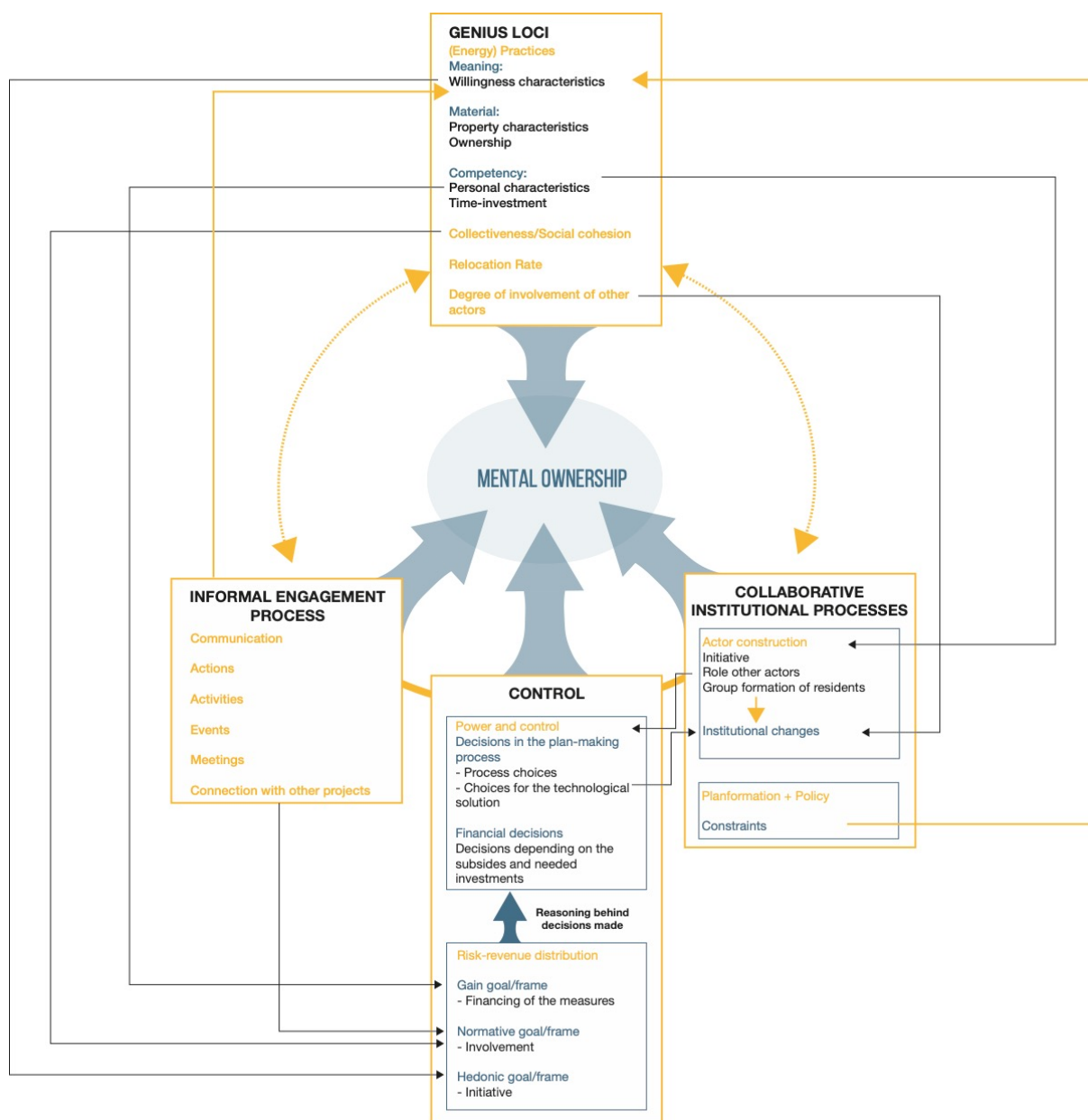


Figure 18: concluded conceptual model

residents in the heat transition practice. The framework exists out of the four pillars described in this chapter and starts on top with the genius loci pillar. The genius loci pillar is focussed on the current energy practice in a neighbourhood. It determines the social and physical context of the neighbourhood without the influence of the process already. Thus, genius loci forms the basic mental ownership residents have before the process started; making it the start of mental ownership development. As can be seen in the figure the genius loci has much influence on the other elements in the framework and forms the starting point of mental ownership development. With the genius loci shaping residents' basic mental ownership in the local heat transition process and thus forming the motives for mental ownership development, the other three pillars situated in the framework are the mechanisms developing mental ownership.

The first mechanism is the informal engagement processes. The focus of the informal engagement processes is on the development of residents' engagement through the use of the named engagement processes. The processes such as communication, activities, actions, events, meetings

and the connection of the heat transition process to other projects and processes in the neighbourhood all stimulate the engagement of residents in the process and thus stimulates the interest for the transition and the involvement of the residents in the transition. This is a direct connection from the engagement pillar to the control pillar, saying that the more engaged residents are, the more they might get involved in the process, influencing the control over the process. Another influence of the engagement process worth mentioning is the influence of engagement processes on the meaning the residents give to the transition (Yellow arrow, figure 18). The willingness characteristics of residents determine the meaning of the transition. With engagement processes being focussed on providing information to the residents on the process and involving them in the process the engagement processes also can change the urgency, interest and motivation of residents for the process, changing the meaning of the process and thus changing the genius loci.

The second mechanism pillar is the control pillar. The control pillar contains a crucial aspect for the development of mental ownership of residents; power and control. Power and control is focussed on the decision-making process which in the case of the local heat transition exists out of decisions for the plan-making process with process choices, choices for the technological solution and the financial decision. The bases on which these decisions are made come from the different risk-revenue frames. Different aspects of the different pillars shape the different risk-revenue frames. The connection and influence of the genius loci on the control of residents over the process and specifically the reasoning behind choices as described in paragraph 6.2 is strongly present here (the black arrows). With the genius loci determining the reasoning behind choices for a more significant part, it thus determines the most critical decisions residents make. The more decisions residents make, the more control is felt over the process.

The final mechanism collaborative institutional process has the most distinct focus on the role residents take in the process. The pillar's primary focus is the actor construction and the possible institutional changes, changing this actor construction. The actor construction focusses on which actor has the initiative in the process, the role of other actors in the process and the formation of the residents as a group in the actor construction. These three aspects determine the role of residents in the process together with the residents' competency, and thus the personal characteristics and the time-investment residents are willing to put in the process. The genius loci is thus again of influence on a pillar. The role of residents determines their influence on the process and decisions made in the process and influences the control pillar. The actor construction can change during the process, and result in an institutional change. This institutional change is dependent on the decisions made on the technological solution adding possible new actors to the process and thus changing the actor construction. The final aspect of the collaborative institutional process pillar is the plan formation and policy with the constraints to the process. These aspects are named in the final model because they form a general context to the transition worth to mention and affect the genius loci.

In conclusion, residents' mental ownership develops from the genius loci of a neighbourhood forming the 'basic' mental ownership before the process started. This basic mental ownership is developed by the informal engagement processes, control and collaborative institutional process pillars increasing or decreasing the 'basic' mental ownership as set by the genius loci. Wherein the process of mental ownership formation, all four pillars are one way or another interrelated to each other.

## CHAPTER 7: DISCUSSION

Within this chapter, three different discussions will be held. In these discussions, the research will be evaluated on different aspects. The three discussions are; (1) the contribution to theory building, (2) the recommendations for practice and (3) reflection on the research.

### 7.1. CONTRIBUTION TO THEORY BUILDING.

The main concept of this thesis; mental ownership is in the field of urban planning often connected to tenants of housing corporations and the research on whether or not tenants can feel mental ownership over houses which are not theirs (Rieuwerts, 2014; de Ruijter, 2013; van de Giessen & Janssen, 2015). The object of this study; the local heat transition in the neighbourhoods of the future, is a new field of research where mental ownership is applied to. This thesis took the definition of mental ownership and psychological ownership to create one definition applicable to the local heat transition.

The definition used in this theory derived from multiple theories and documents. The set-up of the definition started with the thesis from Rieuwerts (2014) from the technological university of Delft. In Rieuwerts' (2014) thesis, psychological ownership is used to give the concept of mental ownership an operationalisation. This operationalisation comes from Pierce et al. (2003) theory where psychological ownership is explained and made tangible based on; motives, mechanisms, additional factors, and outcomes. Within this thesis, these elements of Pierce et al. (2003) are used and applied to research mental ownership development in the local heat transition.

From Pierce et al. (2003)'s theory, the motives, mechanisms, and additional factors are used in the research. This thesis focuses on the development of mental ownership in the first place, hence the inclusion of motives, mechanisms and additional factors and the exclusion of the outcomes. The theory on psychological ownership of Pierce et al. (2003) was extended with the theories of Breiting (2008); van Luin et al. (2012) and van Luin (2011).

The combination of these theories led to the created definition of mental ownership;

*"A concept formed by the combination of affective and cognitive domains, where the origination of the concept lays with the involvement of an individual and the investment of an individuals' mental energy in an activity. The determination of mental ownership comes from a combination of the roots, routes, and additional factors determining the development and occurrence of mental ownership." (Based on; Pierce et al., 2003; Van Luin et al., 2011; Breiting, 2008; and Pierce et al., 2013).*

To make this definition applicable to the local heat transition, three pillars were initially formed, which turned out to be four pillars. These pillars; genius loci of the neighbourhood, informal engagement processes, control and collaborative institutional process, all connect to the definition and aspects of mental ownership as formed by the theories, but make it specific and applicable for the heat transition. Making the concept specifically for the local heat transition is also for the greater part, this research' contribution to the theory building and academic discussion. This research shows that the concept of mental ownership, which is a broad and extended not tangible concept, can be made tangible for a whole new field of research being; transition research.

Final, this research shows the application of mental ownership in practice. The concept-indicator model that derived from the empirical research shows the essential aspects of the heat transition and the development of a certain type and level of mental ownership in this practice. As an emergent model of the empirical data from the cross-case analysis, the concept-indicator model can be seen as a checklist for the development of mental ownership. The situation side from the concept-indicator model can be used to estimate the mental ownership at the beginning of the process and shows the willingness of residents to join the process (see figure 19)

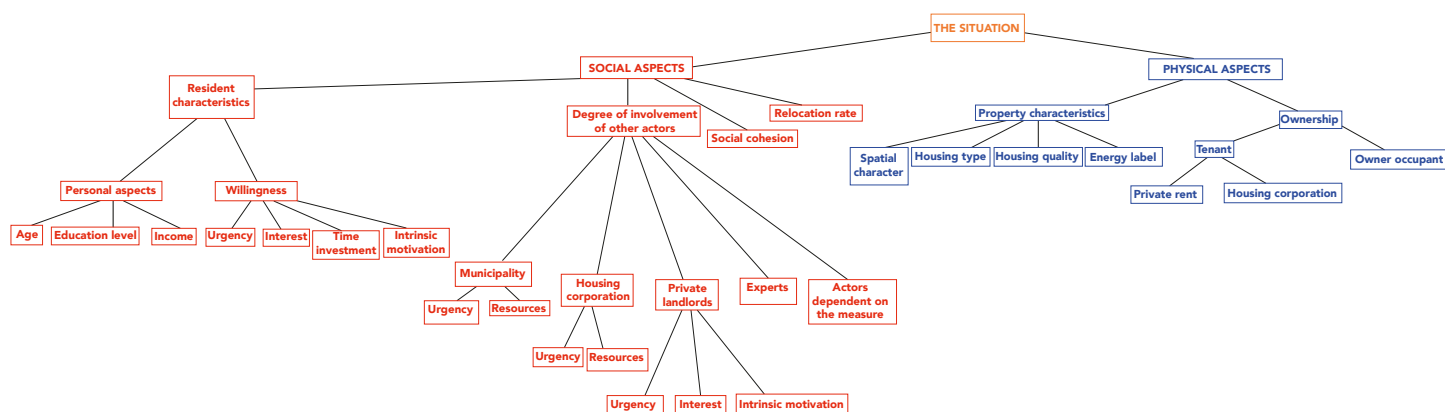


Figure 19: Concepts of the situation, indicating an influence on the mental ownership at the start of the planning process for the heat transition

The process side of mental ownership development shows different points of attention for increasing mental ownership. It provides an example list with what to do to increase the chances of developing mental ownership and were the focus needs to be in the neighbourhood (see figure 20).

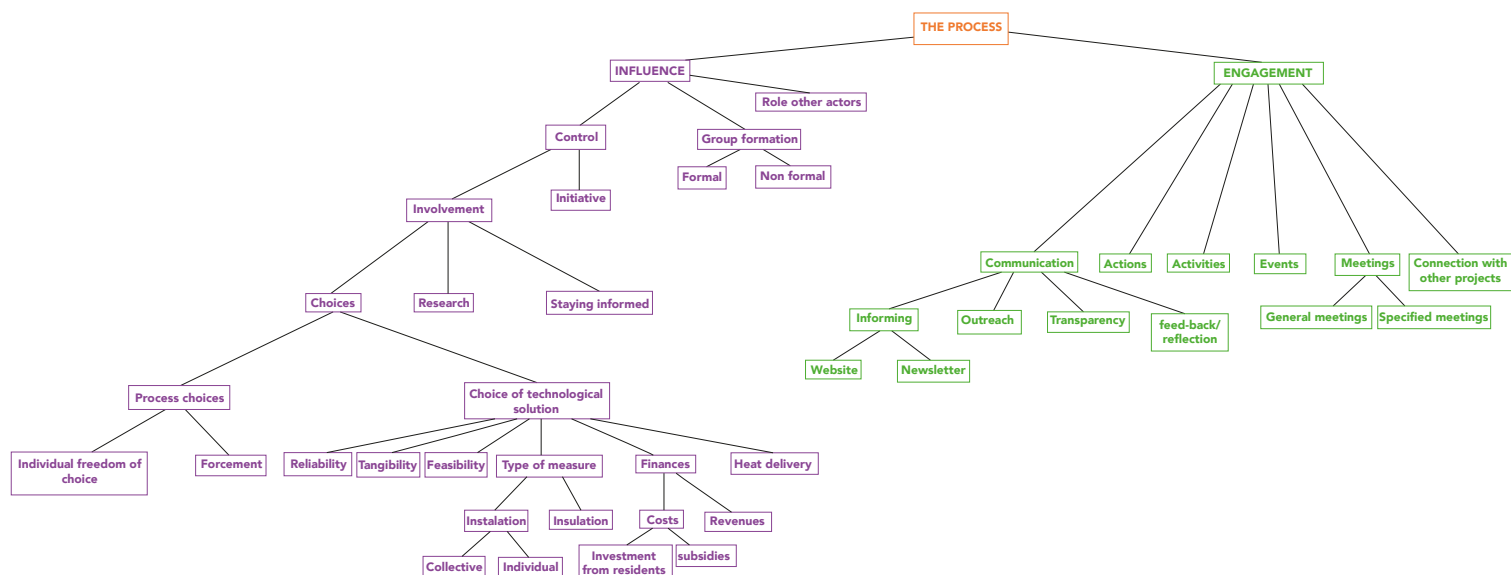


Figure 20: Concepts of the process, indicating an influence on the mental ownership during the planning process for the heat transition.

The concept-indicator model can be translated into a checklist like the one in table 10. This checklist provides neighbourhoods with guidance for the development of mental ownership and connects to the concept-indicator model where the aspects are further visualised. The checklist also shows the

practical use and implementation of the concept-indicator model and the concluded conceptual model of image 18.

Table 10: Possible checklist of the concept-indicator model

	Phase 1: Aspects present before the process starts (can't be changed)	Phase 2: Situation aspects that can be changed by the process aspects	Phase 3: Choice making process	Phase 4: Process aspects	Phase 5: Risk-revenue distribution
Situation	Physical aspects Social aspects - Personal aspects - Relocation rate - Degree of involvement of other actors	Social aspects - Willingness characteristics	-	-	Social aspects
Process	-	Engagement processes	Involvement of the residents in the process choices	Determination of the role of the actors in the actor construction  - Focus on the formalisation and role of the residents	Figure out the risk-revenue distribution viewpoints of the residents

	Phase 6: Evaluation of process	Phase 7: Choice making process	Phase 8: Choice making process	Phase 9: Results of the choice making process	Phase 10: The possible change in the institutional set-up
Situation	Social aspects - Willingness characteristics	-	-		- New involved actors in the process
Process	Anticipating on the risk-revenue distribution where needed with engagement processes	Involvement of the residents in the choice for a technological solution	Finding out the possible technological measures and connected financial decision	Finding the best solution - Risk-Revenue distribution and decision  If stuck here the process can be run again from phase 6	- Possible changes in the actor network with the chosen solution resulting in a changing role of the involved actors

The concept-indicator model is a great addition for applying the research in practice, making the concept-indicator model also beneficial for practice-relevant research in the future.

The reflection done in the conclusion where the theoretical framework from chapter 2 is compared to the empirical analysis shows that the empirical outcomes match the theories and elements from Pierce et al. (2003), Van Luin et al. (2011) and Breiting, (2008) and the translation to the elements and theories matching the heat transition. The new formed conceptual model (image 18) combines the concept-indicator model and thus the empirical data with the theories from chapter 2; making the concept-indicator model relevant for the theory building. The extension and usage of the combination of theories are confirmed in the concept-indicator model and shown in the final conceptual model (image 18) which can be further researched and tested in neighbourhoods, as is done in this thesis with five neighbourhoods, contributing to the academic field of research.

## 7.2. DISCUSSION ON THE RECOMMENDATIONS FOR PRACTICE.

A few practical limitations and discussion points arose while researching the local heat transition from the viewpoint of residents' involvement and mental ownership in the transition. The heat transition is a much mentioned urban planning theme nowadays, resulting in a continuous flow of new



information and new viewpoints on the transition during the continuation of this research. In this paragraph, some of the discussion points found during the research will be discussed as recommendations for practice and thought points for the future development of the local heat transition.

During the research, the focus of researching mental ownership was on having mental ownership over the process, meaning involvement in the process and having a connection to the process. Although the analysis also shows this, there can be suggested that mental ownership over the process might not be the end goal of the heat transition. The national government emphasises residents' involvement in the heat transition process, which seems logical because the residents will experience most of the changes that come with the heat transition. Nevertheless, while looking at the cases, it appeared that it is an unrealistic goal to get all residents involved in the process. Not everyone has the time or willingness to join in such a large, extended and challenging process.

Nuancing this involvement of the residents in the process, the thing that matters is that the residents agree with the final offer brought to the table. The moment there is a final offer is when residents need to decide on accepting the offer and become natural-gas free or not to accept the offer. The process beforehand, of course, helps define an offer matching the residents' wishes and demands. However, the final decision made by residents individually is what matters for the continuation of the process. The focus of neighbourhoods to get everyone involved is still a logical focus, and it will help with the execution of the heat transition. Nevertheless, it should be kept in mind that it is not a significant loss if not everyone is willing to be involved in the process per se, as they could become involved when the process is over. Related to this is that mental ownership can be felt over different aspects of the transition process. Residents tend to join the process in different stages, and over these different stages, mental ownership can be formed. This results in the possibility of mental ownership over the research process, mental ownership over choices made, mental ownership for one sort of solution and mental ownership for the end solution where mental ownership over the end solution is the most important one for the success of the heat transition.

Agreement with an end solution is a risky situation for the neighbourhoods. It is this decision where the success of the transition is dependent on. Decisions in this transition are in case of the owner-occupants always based on freedom of choice, meaning that every owner-occupant can choose what they want in the transition. At the moment, there are a lot of critical pieces on the implementation of the heat transition measures and the financial possibilities of residents and the granted subsidies for the neighbourhoods. According to some critics, the implementation of the heat transition measures is causing issues, because residents do not have the financial capacity to join the process (Shöne, 2020; Slootweg & Theeuwen, 2020). The lack of financial capacity and with this willingness to join the process results in a situation where residents do not join the process and do not accept the final offer made, which results in the lack of implementation of natural gas-free measures. Neighbourhoods are for a greater part dependent on the subsidies granted from the national government, province or municipality for the transition process to succeed, which contradicts strongly with the statement of the 'Rekenkamer' that the plans of the municipalities would also have continued without the subsidies from the national government (Ridder, Rooijen & Wildeman, 2019). By speaking to the multiple neighbourhoods, each person said that it is not feasible at this moment without financial support.

The expenses asked from the residents are way too high for a greater part of the Dutch residents. Continuing, the currently available technological measures are questioned for their applicability and feasibility. More time and research are needed to investigate and prepare other types of measures (Slootweg en Theeuwen, 2020). With the residents being the most important actor in the implementation phase, this causes trouble in achieving the goals as set by the national government. As a suggestion for researching the heat transition and the implementation of measures, the option of forcing people to join the process but also the investigation of different, more affordable technological measures are interesting research points.

Residents who are in a completely different situation are tenants. There can be two types of tenants within a neighbourhood, renting from the housing corporation and private rental tenants. This research showed the lack of attention for the tenants, especially the private rental tenants. In the cases researched, housing corporations are already involved in the process or starting to get involved in the process. Although they might be hesitant to join the process, it was visible in the cases that they tried, with the best intentions. The private rent landlords are a more difficult actor to approach and involve in the process. The different researched neighbourhoods showed that this group of actors is hard to reach, and involvement is not accomplished in the cases. The result of these struggles is that tenants of these houses are less engaged in the process; they are dependent on their homeowners' involvement or decide to invest themselves which is less likely in a rental property. This struggle with the involvement of tenants deserves more attention in the heat transition, as these houses also need to be natural gas-free in the end.

Within the transition, there is a lot of pressure on the municipalities to organise the transition bottom-up, which seems like a reasonable demand, concerning the type of transition. However, the resources and capacity for municipalities to live up to these demands are lacking. Multiple municipalities do not have the capacity to invest in the processes the expected way and need to compromise. What was visible in the cases researched is that the municipalities struggle with what role to take in the transition; to what level can they support and facilitate the process and where should someone else take over. The municipalities' resources count for a process where residents are actively involved and take over some of the work. In cases such as the case of Wageningen, the facilitating role of the municipality is highly appreciated. However, this is not the case in every neighbourhood, and in some neighbourhoods, the demand for a stronger role of the municipality is wished. It could be said that the municipalities are experiencing pressure from the national government with the set 2050 goals. With the municipalities lacking resources to carry the process, the focus often shifts to the residents as most important in the transition; these are the owner-occupants who have the freedom of choice and not the tenants. It could be interesting to research how exactly the process could be carried and what is needed in the future. Nevertheless, it should be noted that this is not the case in every municipality; there are some municipalities with a strong sustainability programme resulting in more resources for the heat transition.

One final remark on the heat transition process is changing attention for the heat transition. The heat transition's social image is shifting; there is way less positive attention for the heat transition now than in 2017 and 2018. Critical viewpoints on the heat transition are increasing in the media landscape. Simultaneously, neighbourhoods experience more backlash and notes from residents that they do

not see the urgency anymore, which is critical for the transition as it is still in its starting years. The process of the heat transition is also experiencing troubles with the covid-19 virus., Due to this pandemic, many participation processes are moved to online meetings, which increases the bargain to join the process. Within this phase of the processes where meetings and communication with residents are critical to keeping them involved, the covid-19 virus slows it down. It could be interesting to see the impact of the covid-19 virus on the already lowering interest for the heat transition.

### **7.3. REFLECTION ON RESEARCH**

This reflection looks back to the methodology chapter and the validity and reliability of the research. Because this research is qualitative, the data is always biased to the researcher's interpretation, limiting the research in this sense.

The internal validity that focusses on if the research done answers the main research question is partly protected in this research. The concept of mental ownership is a broad and extended concept with no specific definition or research perspective. With the pillars chosen in this research, the concept is delimited for the local heat transition. The research that followed is focussed on answering the main research question and thus valid. Nevertheless, there should be said that the research is never complete and that there is always more to research on the concept of mental ownership. Internal validity also has to do with the usage of different sources within the research. In this research, multiple sources are used to define the mental ownership and the pillars of the research. By doing this, triangulation is achieved, which makes the outcomes more reliable and internal valid as they come from different sources. Where the internal validity could have been better is with the information gained for the cases. The case information now derives for a greater part from desk research on documentation of the cases and one or in the case of Heveadorp two interviews. The validity of desk research is, as described in chapter three decent, but in an ideal situation, to guarantee the internal validity of this case information, more interviews were wished. Due to the Covid-19 virus, it was more difficult to arrange interviews and all interviews had to be conducted online, resulting in the limiting interviews. However, because there was extended access to desk research on the case studies, triangulation between the desk-research and the interviews was achieved, securing the research's internal validity for some bit.

External validity focusses on the generalisability of the research and thus the applicability of the research to other cases. With the choice for five different cases, this research uses a broad range of cases in the local heat transition, which results in external validity. However, it should still be noted that this research only examined a few cases on a topic where much more neighbourhoods are involved in. Besides this, the local heat transition is highly context-specific making it rather hard to create one working scheme of reference and thus a completely generalisable study, but this is also not the primary goal of a qualitative study. The fact that the cases are combined in a concept-indicator model did progress the external validity and showed that there could be formed a research model for this transition. For further inquiry, it could be fascinating to research other cases in other provinces, not connected to a program such as the neighbourhood of the future and test the found model in these cases. In this way, the research can be extended towards the whole of the Netherlands to see if mental ownership shows the same concepts of attention.

The research's reliability has to do with the repeatability of the research. Thus, the documentation of steps taken and the guarantee that the outcomes will be the same when someone else examines this research. Where the reliability of the research is strong, is in the conducted case studies. All cases are reviewed in the same way, by the same step-approach. Using this step-approach of case study research, resulted in a comparable case description where the analysis could be conducted. This case description and analysis approach applies to any case in the heat transition process where the outcomes, of course, could be different, as said in the paragraph on external validity.

Finally, as already mentioned in this chapter, further research is needed on this topic with the decided pillars in more cases, with different backgrounds and different support projects. The outcomes of this kind of research can be used to test and extend the created concept-indicator model of this research. The concept of mental ownership, being broad and extended, can be researched further using the concept-indicator model as derived from this thesis. This kind of research will help with the search for mental ownership in the process. Another research that could be done is time-consuming research where a process in one neighbourhood is followed throughout the years of it being in transition, showing the complete image of the local heat transition process and the development of residents' mental ownership. A final suggestion to test the concept-indicator model and the revised framework of researching mental ownership in the local heat transition is to research the subject in a quantitative survey study. A quantitative study could test the formed theory and make the done research generalisable. Finally, the topic of becoming natural gas-free is also one that needs to be continuously researched in practice, as it is a current topic strongly changing over time.

Final, some personal reflection on the research. In the end, the research that derived is one which I think is understandable and of significant usage for the heat transition processes in the Netherlands. The concept-indicator model and the reflection on the theory from this model shows that mental ownership is something to continue researching in combination with the heat transition. It is a new research in this field, and it is just the start of researching mental ownership in this way. The research is thus ready for extension and further research.

## REFERENCES

- Ansell, C., & Gash, A. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 18(4), 543-571.  
<https://doi.org/10.1093/jopart/mum032>
- Arnhem Aan. (2020, August 23). *Wijkgerichte aanpak*. Arnhem Aan Met Nieuwe Energie.  
<https://www.arnhemaan.nl/nieuws/wijkgerichte-aanpak/>
- Arthur, B. (2011). *The nature of Technology: What it is and how it evolves*. Free Press (reprint edition)
- Avey, J.B., B.J. Avolio, G.D. Crossley & F. Luthans (2009), Psychological Ownership: Theoretical Extensions, Measurement and Relation to Work Outcomes. *Journal of Organizational Behaviour* 30(2), pp. 173 – 191.
- Becker, S., Bryman, A., & Ferguson, H. (Eds.). (2012). *Understanding research for social policy and social work: themes, methods and approaches*. Policy Press.
- Breiting, S. (2008), Mental Ownership and Participation for Innovation in Environmental Education and Education for Sustainable Development. In: A. Reid, B. Jensen, J. Nikel & V. Simovska, red., *Participation and Learning: Perspectives on Education*
- Brown, K. (2003). Three challenges for a real people-centred conservation. *Global Ecology & Biogeography* 12:89-92.
- Bryson, J.M., Crosby, B.C., Stone M.M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. *Public Administration Review* 66:44-55.
- Centraal bureau voor statistiek. (2020, November 13). *Kerncijfers Wijken en buurten 2020* (Version 2020) [Dataset]. Centraal bureau voor statistiek.  
<https://opendata.cbs.nl/statline#/CBS/nl/dataset/84799NED/table?ts=1609329997919>
- Chrislip, D. and Larson, C. (1994). *Collaborative leadership: How citizens and civic leaders can make a difference*. San Francisco, CA: Jossey-Bass
- College van burgemeester en wethouders van Ermelo. (2020, April). *Subsidieregeling proeftuin aardgasvrij wonen Wijk van de Toekomst Ermelo 2020 tot en met 2025*.  
<https://www.ermelo.nl/document.php?m=34&fileid=48712&f=b5cc8f66f85ceea52dd322c970f1dff0&attachment=0&c=55321>
- Cooperatie WOW. (2019a, April). *Cooperatie Warmtenet Oost-Wageningen U.A. (WOW) jaarverslag 2018*. <https://cooperatiewow.nl/wp-content/uploads/2020/05/Jaarverslag-2018.pdf>
- Cooperatie WOW. (2019b, April). *Kernwaarden voor het realiseren van het warmtenet in de Benedenbuurt*. <https://cooperatiewow.nl/wp-content/uploads/2019/09/Kernwaarden.pdf>

- Cooperatie WOW. (2020a, March 24). *Veel gestelde vragen*. Cooperatie WARMTENET. <https://cooperatiewow.nl/veel-gestelde-vragen/>
- Cooperatie WOW. (2020b, May). *Communicatieplan*. <https://cooperatiewow.nl/wp-content/uploads/2020/06/Communicatieplan-definitief-en-goedgekeurd-door-bestuur-versie-mei-2020.pdf>
- Cooperatie WOW. (2020c, May). *Cooperatie Warmtenet Oost-Wageningen U.A. (WOW) Jaarverslag 2019*. <https://cooperatiewow.nl/wp-content/uploads/2020/05/Jaarverslag-2019.pdf>
- Cooperatie WOW. (2020d, July 6). *Home*. Cooperatie WARMTENET. <https://cooperatiewow.nl>
- Cooperatie WOW. (2020e, December 3). *Warmtepartner*. Cooperatie WARMTENET. <https://cooperatiewow.nl/warmtepartner/>
- Correlje, A. (2011). *Aardgas; een verleden en vele toekomstscenario's*. Clingendaelenergy. [https://www.clingendaelenergy.com/inc/upload/files/Aardgas\\_1.pdf](https://www.clingendaelenergy.com/inc/upload/files/Aardgas_1.pdf)
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.
- Dawes, R. M., & Messick, D. M. (2000). Social dilemmas. *International Journal of Psychology*, 35, 111–116.
- Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology*, 31, 169–193.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, 53, 1024–1037.
- de Koning, N., TNO, Kooger, R., Hermans, L., & Tigchelaar, C. (2020, January). *Aardgasvrij wonen: drijfveren en barrières van bewoners*. <https://publications.tno.nl>
- de Ruijter, J. (2013, November 12). *Mentaal eigenaarschap bij woonconsumenten*. Gebiedsontwikkeling.Nu. <https://www.gebiedsontwikkeling.nu/artikelen/mentaal-eigenaarschap-bij-woonconsumenten/>
- Diener, E., & Crandall, R. (1978). *Ethics in social and behavioral research*. U Chicago Press.
- Egmond, C., Schoonderbeek, W., & Hevea initiatief. (2020, March). *Bewoners enquête Heveadorp wijk van de toekomst*. [https://heveainitiatief.nl/wp-content/uploads/2020/03/Rapportage-onderzoek-Heveainitiatief-Def\\_2020-03-08.pdf](https://heveainitiatief.nl/wp-content/uploads/2020/03/Rapportage-onderzoek-Heveainitiatief-Def_2020-03-08.pdf)
- Emerson, K., Nabatchi, T., & Balogh, S. (2011). *An Integrative Framework for Collaborative*

Governance. *Journal of Public Administration Research and Theory*, 22(1), 1-29.  
<https://doi.org/10.1093/jopart/mur011>

Energiewijzer.nl. (2016, December 2). *Nutsbedrijf*.

<https://energiewijzer.nl/energiebegrippen/nutsbedrijf/>

Furby, L. (1978a). Possessions: Toward a theory of their meaning and function throughout the life cycle. In P. B. Baltes (Ed.), *Life span development and behavior* (pp. 297-336). New York: Academic Press.

Furby, L. (1978b). Possession in humans: An exploratory study of its meaning and motivation. *Social Behavior and Personality*, 6, 49-65.

Gelders energie akkoord. (n.d.). *Gebouwde omgeving*. Retrieved 1 September 2020, from <https://www.geldersenergieakkoord.nl/gebouwde-omgeving/>

Gelders Energie Akkoord. (n.d.-a). *Renkum - Heveadorp*. Retrieved 5 June 2020, from <https://www.wijkvandetoekomst.nu/wijken/renkum-heveadorp/>

Gelders Energie Akkoord. (n.d.-b). *Wijk van de toekomst*. Retrieved 18 June 2020, from <https://www.wijkvandetoekomst.nu>

Gemeente Ermelo. (n.d.-a). *Procedure en planning Wijk van de Toekomst*. Retrieved 27 August 2020, from [https://www.ermelo.nl/projecten/procedure-en-planning-wijk-van-de-toekomst\\_43067/](https://www.ermelo.nl/projecten/procedure-en-planning-wijk-van-de-toekomst_43067/)

Gemeente Ermelo. (n.d.-b). *Wijk van de Toekomst*. Projecten - Gemeente Ermelo. Retrieved 13 August 2020, from [https://www.ermelo.nl/projecten/wijk-van-de-toekomst\\_42854/](https://www.ermelo.nl/projecten/wijk-van-de-toekomst_42854/)

Gemeente Ermelo. (2019a). *Communicatie plan Wijk van de Toekomst*.

Gemeente Ermelo. (2019b, March). *Van voorlopers tot laatbloeiers: Samen en in eigen tempo naar een aardgasvrije wijk*.

Gemeente Ermelo. (2020, March) Programma van Eisen en Wensen zoals opgesteld door bewoners. <https://www.ermelo.nl/document.php?m=34&fileid=44759&f=425e8a2b8c6209c13866943a95657bb9&attachment=0&c=55321>

Gemeente Ermelo. (2020b, May 18). *Webinar Wijk van de Toekomst Ermelo* [Slides]. Gemeente Ermelo.  
<https://www.ermelo.nl/document.php?m=44&fileid=48976&f=b6942464e51ab76b0833d29c57d2b320&attachment=0>

Giddens, A. (1990). *The consequences of modernity*. Cambridge: polity.

Gray, B. (1989). *Collaborating: Finding common ground for multi-party problems*. San Francisco, CA: Jossey-Bass.



- Greener, I. (2019). Path dependency. *Britannica*, 1. <https://www.britannica.com/topic/path-dependence>
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, 2(163-194), 105.
- Gubrium, J.F., & Holstein, J.A. (Eds.). (2001). *The Handbook of Interview Research*. London: SAGE.
- Harries, S. (2012). Innovation and change: ideas, networks and communities. *Records Management and Knowledge Mobilisation*, 115-141. <https://doi.org/10.1016/b978-1-84334-653-1.50006-8>
- Heidegger, M. (1967). *Being and time* (J. Macquarrie & E. Robinson, Trans.). Oxford, England: Basil Blackwell. (Original work published 1927)
- Herriott, R. E., & Firestone, W. A. (1983). Multisite qualitative policy research: Optimizing description and generalizability. *Educational researcher*, 12(2), 14-19.
- Hevea initiatief. (2018a, December 18). *Initiatief*. <https://heveainitiatief.nl/initiatief/>
- Hevea initiatief. (2018b, December 29). *Nieuws*. <https://heveainitiatief.nl/nieuws/>
- Hevea initiatief. (2018c, December 29). *Over ons*. <https://heveainitiatief.nl/over-ons/>
- Hevea initiatief. (2019a, January 27). *Projecten*. <https://heveainitiatief.nl/projecten/>
- Hevea Initiatief. (2019, March 15). *Op weg naar de toekomst*. <https://heveainitiatief.nl/nieuws/voorstel-deelname-wijk-van-de-toekomst-geaccepteerd/>
- Hevea initiatief. (2019b, December). *Nieuwsbrief december 2019*. <https://heveainitiatief.nl/wp-content/uploads/2019/12/Nieuwsbrief-december.pdf>
- Hevea initiatief. (2020a, February). *VERSLAG Bewonersbijeenkomst*. <https://heveainitiatief.nl/wp-content/uploads/2020/03/Verslag-bewonersbijeenkomst-2020-02-17.pdf>
- Hevea initiatief. (2020b, February 9). *Home*. <https://heveainitiatief.nl>
- Hevea initiatief. (2020c, June). *Stichting Hevea Initiatief*. <https://heveainitiatief.nl/wp-content/uploads/2020/06/1-Stichting-HeveaInitiatief.pdf>
- Hevea Initiatief. (2020a, June 25). *Verslag webinar Bewonersbijeenkomst*. <https://heveainitiatief.nl/nieuws/verslag-webinar-bewonersbijeenkomst/>
- Hevea initiatief. (2020d, September 27). *Nieuwsbrief nr. 1 - September 2020*. <https://heveainitiatief.nl/nieuws/nieuwsbrief-nr-1-september-2020/>

- Hevea initiatief. (2020e, October). *Notitie - Wijk van de Toekomst - Varianten*.  
<https://heveainitiatief.nl/wp-content/uploads/2020/10/HI-Notitie-WvdT-voorkeursvarianten-20201020.pdf>
- Hevea initiatief. (2020f, October). *Notulen van de 3e bewonersbijeenkomst*.  
<https://heveainitiatief.nl/wp-content/uploads/2020/10/3de-bewonerssbijeenkomst-NOTULEN-05-10-2020.pdf>
- Hevea initiatief. (2020g, October 4). *Nieuwsbrief nr. 2 - Oktober 2020*.  
<https://heveainitiatief.nl/nieuws/nieuwsbrief-nr-2-oktober-2020/>
- Hevea Initiatief. (2020b, November 5). *Wijk van de toekomst*. <https://heveainitiatief.nl/wijk-van-de-toekomst/>
- Hevea Initiatief, Vivare, Gelders Energieakkoord, & Gemeente Renkum. (2018, December). *Notulen Bewonersavond Heveadorp Wijk van de Toekomst*. <https://heveainitiatief.nl/wp-content/uploads/2019/01/Verslag-bewonersbijeenkomst-Heveadorp-Wijk-van-de-Toekomst.pdf>
- Holton, J. A. (2007). The coding process and its challenges. In A. Bryant, & K. Charmaz (Eds.), *The Sage handbook of grounded theory*. (pp. 265-289). Thousand Oaks, CA: Sage.
- Huxham, C., and Vangen S. (2005). *Managing to collaborate: The theory and practice of collaborative advantage*. New York, NY: Routledge.
- Inglis, D., & Thorpe, C. (2012). *An Invitation to Social Theory* (1st ed.). Amsterdam University Press.
- Jonkers, J. (2012). De zeven kenmerken van Nieuwe Business Modellen. Een onderzoek naar veranderende transacties die meervoudige waarde creëren. *Sigma*, 4(4), 34-37.  
<https://hdl.handle.net/2066/11224>
- Kerschoten Energie Neutraal. (n.d.). *Kerschoten Energie Neutraal*. Retrieved 12 August 2020, from <https://www.kerschotenenergieneutraal.nl>
- Kerschoten Energie Neutraal. (n.d.-a). *Nieuws - Kerschoten Energie Neutraal*. Retrieved 30 December 2020, from <https://www.kerschotenenergieneutraal.nl/nieuws/>
- Kerschoten Energie Neutraal. (n.d.-b). *Over ons - Kerschoten Energie Neutraal*. Retrieved 30 December 2020, from <https://www.kerschotenenergieneutraal.nl/over-ons/>
- Kerschoten Energie Neutraal. (n.d.-c). *warmtenet - veel gestelde vragen - Kerschoten Energie Neutraal*. Retrieved 30 December 2020, from <https://www.kerschotenenergieneutraal.nl/warmtenet-veel-gestelde-vragen/#1581696372897-0ad51115-9cdf>

- Kerschoten Energie Neutraal. (n.d.-d). *Werkgroep warmte – Kerschoten Energie Neutraal*. Retrieved 24 August 2020, from <https://www.kerschotenenergieneutraal.nl/werkgroep-warmte/>
- Kerschoten Energie Neutraal. (2013, October). *KEN ontwikkelplan*.  
[https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2018/08/20131010-KEN-  
Ontwikkelplan-Versie-4-Kleine-versie.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2018/08/20131010-KEN-Ontwikkelplan-Versie-4-Kleine-versie.pdf)
- Kerschoten Energie Neutraal. (2018a, March). *Nieuwsbrief maart 2018*.  
[https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2018/05/Nieuwsbrief-  
maart-2017-ken-web.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2018/05/Nieuwsbrief-maart-2017-ken-web.pdf)
- Kerschoten Energie Neutraal. (2018b, October). *Nieuwsbrief december 2018*.  
[https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2018/12/Nieuwsbrief-  
december-2018-ken.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2018/12/Nieuwsbrief-december-2018-ken.pdf)
- Kerschoten Energie Neutraal. (2019, September). *Nieuwsbrief September 2019*.  
[https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2019/09/Nieuwsbrief-  
september-2019-ken-web.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2019/09/Nieuwsbrief-september-2019-ken-web.pdf)
- Kerschoten Energie Neutraal. (2020a, February). *Nieuwsbrief Februari 2020*.  
[https://www.kerschotenenergieneutraal.nl/wp-  
content/uploads/2020/02/190220\\_Nieuwsbrief-Februari-2020-ken-web.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2020/02/190220_Nieuwsbrief-Februari-2020-ken-web.pdf)
- Kerschoten Energie Neutraal. (2020b, April). *Nieuwsbrief april 2020*.  
[https://www.kerschotenenergieneutraal.nl/wp-  
content/uploads/2020/04/050420\\_Nieuwsbrief-April-2020-KEN-web.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2020/04/050420_Nieuwsbrief-April-2020-KEN-web.pdf)
- Kerschoten Energie Neutraal. (2020c, June). *Nieuwsbrief juni 2020*.  
[https://www.kerschotenenergieneutraal.nl/wp-  
content/uploads/2020/06/180620\\_Nieuwsbrief-Juni-2020-ken.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2020/06/180620_Nieuwsbrief-Juni-2020-ken.pdf)
- Kerschoten Energie Neutraal. (2020d, October). *Zet 'm op 70*.  
[https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2020/10/300920\\_Flyer-  
zetmop70-KEN\\_01-defintief.pdf](https://www.kerschotenenergieneutraal.nl/wp-content/uploads/2020/10/300920_Flyer-zetmop70-KEN_01-defintief.pdf)
- Kolkman, M. J., A. V. D. Veen, and P. A. T. M. Geurts. (2007). Controversies in water management: frames and mental models. *Environmental Impact Assessment Review* 27:685–706
- Kupers, R., Faber, A., & Idenburg, A. (2015, November). *Wie is de Wolf?* [https://www.rolandkupers.com/wp/wp-content/uploads/2015/11/Wie-is-de-  
Wolf\\_final.pdf](https://www.rolandkupers.com/wp/wp-content/uploads/2015/11/Wie-is-de-Wolf_final.pdf)
- Leung, L. (2015). Validity, reliability, and generalizability in qualitative research. *Journal of Family Medicine and Primary Care*, 4(3), 324. <https://doi.org/10.4103/2249-4863.161306>

- Lindenberg, S., & Steg, L. (2007). Normative, Gain and Hedonic Goal Frames Guiding Environmental Behavior. *Journal of Social Issues*, 63(1), 117-137.  
<https://doi.org/10.1111/j.1540-4560.2007.00499.x>
- McClelland, D. (1951). *Personality*. New York: Holt, Rinehart & Winston.
- mijnspijkerkwartier.nl. (n.d.). *Spijkerenergie op MijnSpijkerkwartier.nl*. Retrieved 12 August 2020, from <https://mijnspijkerkwartier.nl/pagina/spijkerenergie/>
- Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2019, June). *Klimaatakkoord gebouwde omgeving in het kort*. <https://www.klimaatakkoord.nl/gebouwde-omgeving/documenten/publicaties/2019/06/28/klimaatakkoord-gebouwde-omgeving-in-het-kort>
- Ministerie van Economische Zaken en Klimaat. (2019, November 12). *Gebouwde omgeving*. Klimaatakkoord. <https://www.klimaatakkoord.nl/gebouwde-omgeving>
- Moon, K., & Blackman, D. (2014). A Guide to Understanding Social Science Research for Natural Scientists. *Conservation Biology*, 00(0), 1-11. Retrieved on 05-11-2019 from [https://www.idahoecosystems.org/sites/default/files/literature\\_resource/moon\\_and\\_blackman\\_2014\\_guide\\_to\\_social\\_science\\_research\\_0.pdf](https://www.idahoecosystems.org/sites/default/files/literature_resource/moon_and_blackman_2014_guide_to_social_science_research_0.pdf)
- Neusink, M. (2020, October 26). *Aanleg warmtenet in Kerschoten en Kerschoten-West stap dichterbij - Kerschoten Energie Neutraal*. Kerschoten Energie Neutraal.  
<https://www.kerschotenenergieneutraal.nl/aanleg-warmtenet-in-kerschoten-en-kerschoten-west-stap-dichterbij/>
- Nieuwbruut. (n.d.). *Bouwstenen Leefbare Wijken (BLW), eindrapport*. Methodiek, Actorenkaart. Retrieved 30 June 2020, from <http://blw.nieuwbruut.nl/blw-rapport/methodiek.php?page=pages/mth/M03-1%20Werkwijze.md>
- Organ, D. W. (1988). *Organizational citizenship behavior: The good soldier syndrome*. Lexington Books/DC Heath and Com.
- Oxenaar, S., Wittmayer, J., & De Geus, T. (2019, July 26). Meer dan alleen technologie: Drie bestuurlijke spanningen in de warmtetransitie. Retrieved 27 April 2020, from <https://drift.eur.nl/nl/publicaties/drie-bestuurlijke-spanningen-in-de-warmtetransitie/>
- Programma van Eisen en Wensen zoals opgesteld door bewoners*. (2020, March).  
<https://www.ermelo.nl/document.php?m=34&fileid=44759&f=425e8a2b8c6209c13866943a95657bb9&attachment=0&c=55321>
- Pelham, B. (1995). Self-investment and self-esteem: Evidence for a Jamesian model of self-worth. *Journal of Personality and Social Psychology*, 69, 1141-1150.
- Pierce, J. L., T. Kostova & K.T. Dirks (2003), The State of Psychological Ownership: Integrating and Extending a Century of Research. *Review of General Psychology* 7(1), pp. 84-107.

- Reilly, T. (1998). Communities in conflict: Resolving differences through collaborative efforts in environmental planning and human service delivery. *Journal of Sociology and Welfare* 25:115-42.
- Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European journal of social theory*, 5(2), 243-263.
- Ridder, J., Rc, C. N. C. D. R. A., Rooijen, D. L., MSc, R. V. D. M., & Wildeman, I. (2019, March 7). *Het onderzoek van de Rekenkamer Amsterdam naar Verduurzaming warmtevoorziening met warmtenetten: Bestuurlijk rapport*. Rekenkamer Metropool Amsterdam.  
<https://publicaties.rekenkamer.amsterdam.nl/verduurzaming-warmtevoorziening-met-warmtenetten-bestuurlijk-rapport/index.html>
- Rieuwerts, S. (2014). *Mentaal eigenaarschap bij huurders van woning corporaties* (thesis). TU Delft.  
<https://repository.tudelft.nl/islandora/object/uuid%3Ae6d7dc59-7a2f-4f6b-9e4b-4a12874628ab>
- Robertson, D., McIntosh, I., & Smyth, J. (2010). Neighbourhood Identity: The Path Dependency of Class and Place. *Housing, Theory and Society*, 27(3), 258-273.  
<https://doi.org/10.1080/14036090903326429>
- Rochberg-Halton, E. (1980). Cultural signs and urban adaptation: The meaning of cherished household possessions (Doctoral dissertation, University of Chicago). *Dissertation Abstracts International*, 40 (08), 4754A-4755A.
- Rooijers, F., & Schöne, S. (2020, March 10). *Duo: Zo wordt Nederland gasvrij*. EnergiePodium.  
<https://www.energiepodium.nl/artikel/hoe-krijgen-we-iedereen-van-het-aardgas-af>
- RTV Nunspeet. (2019, July 5). *Wijk van de Toekomst krijgt 4,4 miljoen subsidie*. Omroep Gelderland. <https://www.omroep gelderland.nl/nieuws/2414337/Wijk-van-de-Toekomst-krijgt-4-4-miljoen-subsidie>
- Rudmin, F. W., & Berry, J. W. (1987). Semantics of ownership: A free-recall study of property. *Psychological Record*, 37, 257-268
- Sartre, J.-P. (1969). *Being and nothingness: A phenomenological essay on ontology*. New York: Philosophical Library. (Original work published 1943)
- Schöne, S. (2020, June 16). *Storm in een glas water*. EnergiePodium.  
<https://www.energiepodium.nl/artikel/storm-in-een-glas-water>
- Schöne, S., & Rooijers, F. (2020, March 10). *Duo: Zo wordt Nederland gasvrij*. EnergiePodium.  
<https://www.energiepodium.nl/artikel/hoe-krijgen-we-iedereen-van-het-aardgas-af>
- Schulz, C. N. (1979). *Genius loci: paesaggio, ambiente, architettura* (Vol. 4). Electa.
- Schwandt, T. (1994). Constructivist, Interpretivist Approaches to Human Inquiry. In N. K. Denzin & Y.

- S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118-137). Thousand Oaks, CA, US: Sage Publications, Inc.
- Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and planning A*, 42(6), 1273-1285.
- Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Sage.
- Slootweg, H., & Theeuwen, M. (2020, December 22). Helemaal zonder gas kan Nederland niet. *BN de Stem*, 8-9.
- Spaans, E., & Resink, R. (2019, January). *Rol van gemeenten bij het aanleggen van wartmenetten*. <https://warmopweg.nl/wp-content/uploads/2019/01/Rol-van-Gemeenten-bij-aanleggen-warmtenetten.pdf>
- Spijkerenergie. (n.d.-a). *Over ons | Spijkerenergie | MijnSpijkerkwartier.nl*. Mijnspijkerkwartier.NL. <https://mijnspijkerkwartier.nl/pagina/spijkerenergie/menu/over-ons>
- Spijkerenergie. (n.d.-b). *Projecten en diensten*. Mijnspijkerkwartier.NL. Retrieved 5 October 2020, from <https://mijnspijkerkwartier.nl/pagina/spijkerenergie/menu/projecten-en-diensten>
- Spijkerenergie. (n.d.-c). *Wat hebben we al gedaan? | Spijkerenergie | MijnSpijkerkwartier.nl*. Mijnspijkerkwartier.NL. Retrieved 29 December 2020, from <https://mijnspijkerkwartier.nl/pagina/spijkerenergie/menu/wat-hebben-we-al-gedaan>
- Spijkerenergie. (2016, February 26). *Verslag bewonersoverleg, deel duurzame wijk*. Mijnspijkerkwartier.NL. [https://mijnspijkerkwartier.nl/berichten/verslag-bewonersoverleg-deel-duurzame-wijk?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/verslag-bewonersoverleg-deel-duurzame-wijk?view_context=group&view_context_id=4485)
- Spijkerenergie. (2018a). *Routekaart aardgasloos Spijkerkwartier*. <https://mijnspijkerkwartier.nl/files/mijnspijkerkwartier.nl/uploads/files/728471/190520%20Routekaart%20Spijkerkwartier.pdf>
- Spijkerenergie. (2018b, October 10). *Aardgasloos Spijkerkwartier*. Mijnspijkerkwartier.NL. [https://mijnspijkerkwartier.nl/berichten/aardgasloos-spijkerkwartier?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/aardgasloos-spijkerkwartier?view_context=group&view_context_id=4485)
- Spijkerenergie. (2019a, April 26). *Hoe hou je je huis warm? Hoe combineer je dat met ventileren? | in berichten op MijnSpijkerkwartier.nl*. Mijnspijkerkwartier.NL. [https://mijnspijkerkwartier.nl/berichten/hoe-hou-je-je-huis-warm-hoe-combineer-je-dat-met-ventileren?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/hoe-hou-je-je-huis-warm-hoe-combineer-je-dat-met-ventileren?view_context=group&view_context_id=4485)
- Spijkerenergie. (2019b, June 14). *Verslag Spijkerenergie avond 4 juni | in berichten op MijnSpijkerkwartier.nl*. Mijnspijkerkwartier.NL.

[https://mijnspijkerkwartier.nl/berichten/verslag-spijkerenergie-avond-4-juni?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/verslag-spijkerenergie-avond-4-juni?view_context=group&view_context_id=4485)

- Spijkerenergie. (2019c, August 21). *Zuiniger stoken en energie neutraal renoveren*. Mijnspijkerkwartier.NL. [https://mijnspijkerkwartier.nl/berichten/zuiniger-stoken-en-energie-neutraal-renoveren-1?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/zuiniger-stoken-en-energie-neutraal-renoveren-1?view_context=group&view_context_id=4485)
- Spijkerenergie. (2019d, November 17). *Verslag informatieavond van Spijkerenergie 12 nov.* Mijnspijkerkwartier.NL. [https://mijnspijkerkwartier.nl/berichten/verslag-informatieavond-van-spijkerenergie-12-nov?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/verslag-informatieavond-van-spijkerenergie-12-nov?view_context=group&view_context_id=4485)
- Spijkerkwartier. (2017, December 21). *Verslag besparen en toch warm de winterdagen door*. Mijnspijkerkwartier.NL. [https://mijnspijkerkwartier.nl/berichten/verslag-besparen-en-toch-warm-de-winterdagen-door?view\\_context=group&view\\_context\\_id=4485](https://mijnspijkerkwartier.nl/berichten/verslag-besparen-en-toch-warm-de-winterdagen-door?view_context=group&view_context_id=4485)
- Streefkerk, R. (2019, November 11). *Inductive vs. deductive reasoning*. Scribbr. <https://www.scribbr.com/methodology/inductive-deductive-reasoning/>
- Streefkerk, R. (2020, October 20). *Qualitative vs. quantitative research*. Scribbr. <https://www.scribbr.com/methodology/qualitative-quantitative-research/>
- Süsser, D., Döring, M., & Ratter, B. M. W. (2016). Harvesting energy: Place and local entrepreneurship in community-based renewable energy transition. *Energy Policy*, 101, 332-341. <https://doi.org/10.1016/j.enpol.2016.10.018>
- Telt, L., Crowther, T. & O'Hara. P. (2003). Collaborative partnerships in community education. *Journal of Education Policy*, 18:37-51
- Tigchelaar, C., Kooger, R., Lidth de Jeude, M., Niessink, R., Koning, N. d., & Paradies, G. (2019). *Alle bestaande woningen aardgasvrij in 2050. Wie moet wat, wanneer en hoe doen?* Amsterdam: TNO 2019 P10909.
- van den Giessen, I., & Janssen, I. (2015). *Huurders actief in hun buurt?* (Thesis). <https://dspace.library.uu.nl>
- van den Wijngaard, R., van Polen, S., & van Bommel, B., Planbureau voor de leefomgeving (2017). *Het Vesta Mais ruimtelijk energie model voor de gebouwde omgeving*. Retrieved from <https://www.pbl.nl/publicaties/het-vesta-mais-ruimtelijk-energiemodel-voor-de-gebouwde-omgeving-algemene-beschrijving>
- van der Velden, L. & Gemeente Ermelo. (2020, July 10). *Informatieavond subsidie voor de Wijk van de Toekomst*[Slides]. Gemeente Ermelo. <https://www.ermelo.nl/document.php?m=34&fileid=45059&f=5554265e3114108ec467624ef42ce49d&attachment=0&c=55321>

- Van der Schoor, T., & Scholtens, B. (2015). Power to the people: Local community initiatives and the transition to sustainable energy. *Renewable and Sustainable Energy Reviews*, 43, 666-675. <https://doi.org/10.1016/j.rser.2014.10.089>
- VandeWalle, D., Van Dyne, L., & Kostova, T. (1995). Psychological ownership: An empirical examination of its consequences. *Group and Organization Management*, 20, 210-226.
- Van Engelenburg, B., & Maas, N. (2018). Regional Energy Transition (RET): how to improve the connection of praxis and theory? *Techne*, (01), 62-67.
- Van Luin, A., Termeer, K., Mommaas, H., Breeman, G., & Hinssen, J. (2012). *Waardenmakerij. Cahier gebiedsontwikkeling*. Amsterdam: Calff & Meischke.
- van Luin, A. (2011). Programma gebiedsontwikkeling: Mentaal eigenaarschap van 'het goede leven'. Seminar 'De buurt verdient zich terug': burgerinitiatief als economische motor van gebiedsontwikkeling. [Presentation].
- Van Thiel, S. (2007). *Research Methods in Public Administration and Public Management: An Introduction*. Oxon: Routledge.
- Wageningen woont duurzaam. (2020, June 3). *Benedenbuurt*. <https://wageningenduurzaam.nl/wageningenwoontduurzaam/mijn-woning/benedenbuurt/>
- Werkgroep Heveadorp - Wijk van de Toekomst. (2020, November 22). *Reactie - Wijk van de Toekomst*. Hevea Initiatief. <https://heveainitiatief.nl/nieuws/notitie-wijk-van-de-toekomst-2/>
- White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66, 297-330.
- Wijk van de toekomst. (n.d.-a). *Apeldoorn - Kerschoten*. Retrieved 12 August 2020, from <https://www.wijkvandetoekomst.nu/wijken/apeldoorn-kerschoten/>
- Wijk van de toekomst. (n.d.-b). *Arnhem - Spijkerkwartier*. Wijk van de Toekomst - Spijkerkwartier Arnhem. Retrieved 12 August 2020, from <https://www.wijkvandetoekomst.nu/wijken/arnhem-spijkerkwartier/>
- Wijk van de Toekomst. (n.d.-a). *Ermelo - West midden*. Retrieved 13 August 2020, from <https://www.wijkvandetoekomst.nu/wijken/ermelo-west-midden/>
- Wijk van de Toekomst. (n.d.-b). *Hoe start je?* Gelders Energie Akkoord. Retrieved 2 September 2020, from <https://www.wijkvandetoekomst.nu/meedoen/>
- Wijk van de toekomst. (n.d.-c). *Wageningen - Benedenbuurt*. Wijk van de Toekomst - Benedenbuurt Wageningen. Retrieved 12 August 2020, from <https://www.wijkvandetoekomst.nu/wijken/wageningen-benedenbuurt/>
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.



## APPENDICES

### APPENDIX 1: THE EFFECTS OF MENTAL OWNERSHIP

Psychological ownership is not without consequences. The effects of psychological ownership can be divided into; the positive side of ownership, the negative/dark side of ownership and the mixed-effects (Pierce et al., 2003). A positive effect of ownership, as described by Pierce et al. (2003) is, first of all, citizenship and citizenship behaviour. Ownership over a target can result in behaviour that contributes to the community's wellbeing (Organ, 1988). Empirical research reported the positive correlation between ownership and citizenship behaviour; these can affect each other (van de Walle, Van Dyne, & Kostova, 1995). The second positive effect is the personal sacrifice and assumption of risk (Pierce et al., 2003). Once a person feels psychological ownership over a target a positive effect could be that this person is willing to make sacrifices or take a risk on behalf of a social entity (Pierce et al., 2003). The final positive effect is experienced responsibility and stewardship. When psychological ownership is felt over a target, feelings of responsibility and protection can arise. People might feel the need to steward the target even though it is not technically theirs (Pierce et al., 2003).

Next to the positive effects of ownership, there are, of course, adverse effects. Once ownership is felt, people tend to want exclusive control over the target as opposed to sharing this control with others (Pierce et al., 2003). Another adverse effect is 'having opposed to being', which has to do with materialism and having a consummatory orientation instead of the experiencing orientation (Pierce et al., 2003). This human strive for materialism can lead to the absence of wellbeing and psychological adjustments (Deci & Ryan, 1985; 1987). A third negative effect is deviance behaviour. If certain conditions are in place, the separation of a person and a target where psychological ownership was felt over can cause deviance behaviour such as sabotage (Pierce et al., 2003). The final negative effect is personal functioning maladies. Personal function maladies happen when an individual feels overwhelmed by the burden of responsibility that comes with psychological ownership (Pierce et al., 2003).

The final group of consequences are mixed effects. Feelings of ownership can result in positive and negative effects which are mostly visible in the subject of change (Pierce et al., 2003). Individuals are often exposed to changes and deciding on whether or not to like these changes. People tend to choose to support the change based on the change affecting their feelings of ownership (Pierce et al., 2003). Influences on the choices and perceptions towards change are based on if it is a self-made decision for change or if it is enforced. Another influence is whether the decision is evolutionary or revolutionary meaning will it enhance the identity or not. The final influence is whether or not the choice option is added to the ownership or decreasing the ownership an individual has over the target (Pierce et al., 2003).

## APPENDIX 2: CASE STUDIES – PROCESS TIME LINE EXPLANATION

In this appendix the processes of the case studies are further explained. The processes are divided into the knowledge/plan-making process and the engagement process. Within the time-lines the knowledge/plan-making process elements have the blue colour and the engagement process has the yellow colour.

### 2.1.Heveadorp Renkum

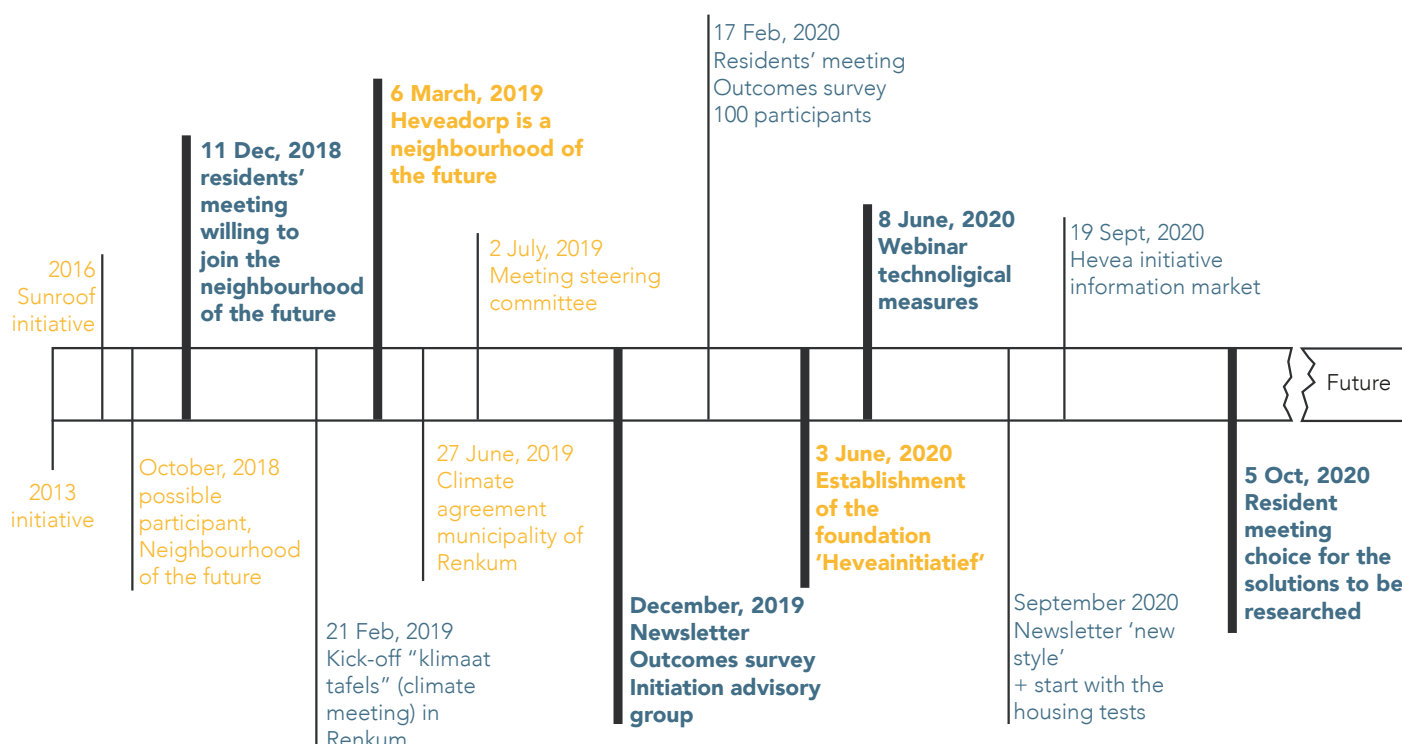


Figure 19: Process scheme Heveadorp, Blue – knowledge/plan-making Yellow – Engagement (own illustration; Hevea initiatief, 2018b)

#### Knowledge/plan-making process

The process in Heveadorp started in 2013, with one enthusiastic resident who wanted solar panels on his roof. He figured that maybe some other residents would want to join him in this process (W. Schoonderbeek, personal communication, October 13, 2020). Soon three residents were trying to implement solar panels on homes in Heveadorp collectively, and 'Hevea Initiatief' was established. From the solar panels, they continued with a wind turbine project in the dam of Driel, and they started working on a large-scale sunroof. At the end of 2018, the idea raised with the municipality of Renkum to make Heveadorp a neighbourhood of the future. This plan was tested within the neighbourhood to see what the residents thought of becoming a natural-gas free neighbourhood (Hevea Initiatief, et al., 2018). 'Hevea initiatief' leads the process in the neighbourhood, organises the communication, and started working on the plans for becoming a natural-gas free neighbourhood (Hevea initiatief, 2018c). For the plan-making in the neighbourhood, they created a steering committee. This steering committee talks about the plans and researches the technological measures to be taken in the neighbourhood (W. Schoonderbeek, personal communication, October 13, 2020). To create more legal power in the process, 'Hevea initiatief' became a foundation in June 2020 (Hevea initiatief, 2020d). At the moment, research on different technological implementations is finished, which

closed the orientation phase of the research. The neighbourhood is now going to focus on three implementations that were seen as the neighbourhood's best options (Hevea initiatief 2020e). For this investigation, 'Hevea initiatief' wants to hire an expert company external to the neighbourhood to do the research. In this way, 'Hevea initiatief' is hoping that the best solution is chosen independently of them, making it a more grounded solution for the residents. Also, the expert company is necessary for knowledge on both the technical and cost sides; since this is knowledge is far beyond the reach of residents. In the coming research process, 'Hevea initiatief' is also thinking about who will make the final decision, who is going to exploit the alternative and if someone can be forced to join the process (W. Schoonderbeek, personal communication, October 13, 2020).

### Engagement process

Through every step of the process, residents are included and consulted. The physical involvement of residents in the process is, first of all in the foundation. For the natural gas free project, there are 12 people involved in the working group; this working group is supported by an advisory committee existing out of 20 residents (W. Schoonderbeek, personal communication, October 13, 2020). From the foundation, there is a continuous line of communication towards the residents about everything happening in the neighbourhood. Communication is done with newsletters provided to every resident in the neighbourhood and the website of 'Hevea initiatief'. Next to written communication, residents' meetings are organised where all residents are welcome to join and speak up about the process, and what they think should happen in the neighbourhood (W. Schoonderbeek, personal communication, October 13, 2020). Besides speaking up in the meeting, all residents also can comment on meetings and documents, such as the latest document on the technological options, after the meeting took place. These comments are considered in the next phase of the project and communicated along with the neighbourhood (W. Schoonderbeek, personal communication, October 13, 2020). Besides the meetings and written communication, the initiative went door to door to talk about the idea of becoming a neighbourhood of the future at the beginning of the process in 2018 (Hevea initiatief, 2018b). This door-to-door approach also took place in 2019 when a large-scale survey was executed in the neighbourhood. A couple of involved residents went again door to door to execute the survey, and in this process, they thus spoke to almost every resident in the village (Egmond & Schoonderbeek, 2020). No-one is left behind, and everyone is free to join the process or not and can give their opinion on the process.

## 2.2. Benedenbuurt Wageningen

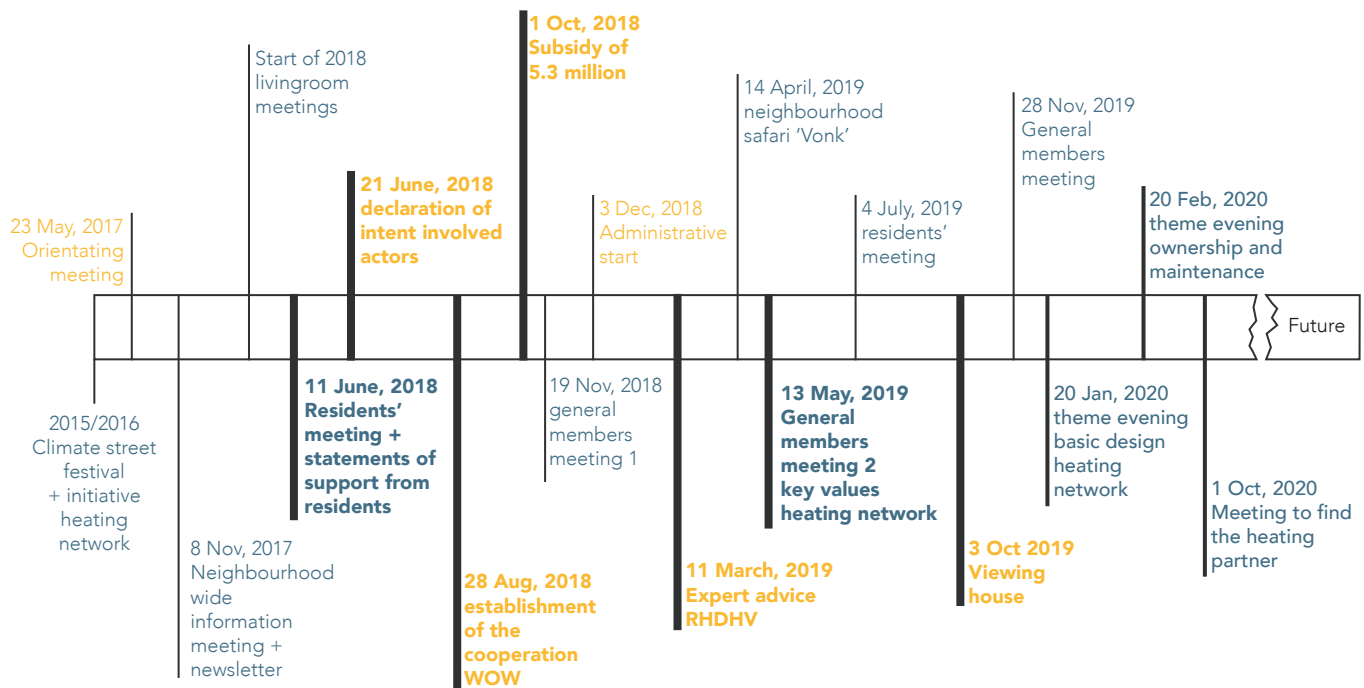


Figure 20: Process scheme Benedenbuurt, Blue – knowledge/plan-making, Yellow – Engagement (own illustration)

### Knowledge/plan-making process

The process in Benedenbuurt started in 2016 with a climate street fest. From this climate street fest arose the idea for a neighbourhood garden. Once one of the residents went to the municipality to talk about the neighbourhood garden's execution, they got told that they needed to wait a little longer because the sewage system would be renovated any time now. This news led to the idea to implement an Ecovat in the neighbourhood; this is a collective option for heat pumps and a heat grid. The idea was presented to the municipality of Wageningen, and housing corporation 'de woningstichting' and within no time, they gave their support for the initiative (W. Lelieveld, personal communication, October 19, 2020).

For the heat grid and the usage of the Ecovat, a first design and feasibility study were done by advice and plan-making agency Tauw (W. Lelieveld, personal communication, October 19, 2020). Their plan is developed further into the application for the national subsidy for natural gas-free neighbourhoods, the so-called 'proeftuinen' (testing ground). This subsidy of 5.3 million euros was granted to the neighbourhood (Cooperatie WOW, 2019a). Cooperation WOW is leading the process and has the ultimate goal of keeping the whole heat grid local (Cooperatie WOW, 2019). Next to the heat grid, the cooperation is also focussing on other projects such as the reorganisation of the public space and climate adaptation and mitigation measures (W. Lelieveld, personal communication, October 19, 2020). However, the main focus remains the heat grid. Implemented will be a 70 degrees heat grid; the implementation of this temperature grid means that 80-90% of the housing stock in the neighbourhood is already suitable and has no need for many renovations. The fewer renovations needed, the fewer money residents need to invest in the process, making the threshold lower (W. Lelieveld, personal communication, October 19, 2020).

The cooperation is currently trying to find the perfect heat partner matching their wishes and demands for the heat grid as formed together with RHDHV. The main wish is that residents do not pay more than they do now, and the cooperation between the different actors should be as optimal as possible. In the following phases, the heat partner will be chosen, and the final design and expenses will be calculated to come with an offer to the residents (Cooperatie WOW, 2019; (W. Lelieveld, personal communication, October 19, 2020; Cooperatie WOW, 2020e).

### Engagement process

The neighbourhood's engagement process started in 2016 with a selection of people interested in the idea of a heat grid. These people were found through just talking to each other and finding people who might be interested—leading to a group of around 50 to 60 people who already joined the process when Tauw was developing the first feasibility study for the heat grid (W. Lelieveld, personal communication, October 19, 2020). After this process and with the first design ready, the whole neighbourhood was invited to a residents' meeting. During this evening, the residents present gave their mandate to continue with the process (Cooperatie WOW, 2019a). Different working groups for communication, finances, technique and governance filled with residents of the neighbourhood were developed, which led to cooperation WOW. Residents can become a member of the cooperation and in this way co-decide on the plans and process (Cooperatie WOW, 2019a).

Nevertheless, there are still regular resident meetings, where everyone, member or not, can join, and provide input (W. Lelieveld, personal communication, October 19, 2020). Next to meetings there is a newsletter that is provided door to door six times a year, including everyone in the process, and specified information evenings are organised, focusing on specific subjects of the heat grid (Cooperatie WOW, 2019a & Cooperatie 2020c). Other activities organised are activities that show people what it is like to live in a natural gas-free house; for example, the test home from the housing cooperation and activities such as the neighbourhood safari where people learn about heat grids (Cooperatie WOW, 2019a & Cooperatie 2020c). The cooperation also has special attention to the engagement of people who live in the apartments and are part of an owner's association and tries to connect to people who are not interested in the heat grid (W. Lelieveld, personal communication, October 19, 2020). By making their process broader and also focus on green, climate adaptation and mitigation, they try to connect to people who do have a connection with those subjects to show them that when the green infrastructure is developed, the heat grid can be connected to this (W. Lelieveld, personal communication, October 19, 2020).

## 2.3. Kerschoten Apeldoorn

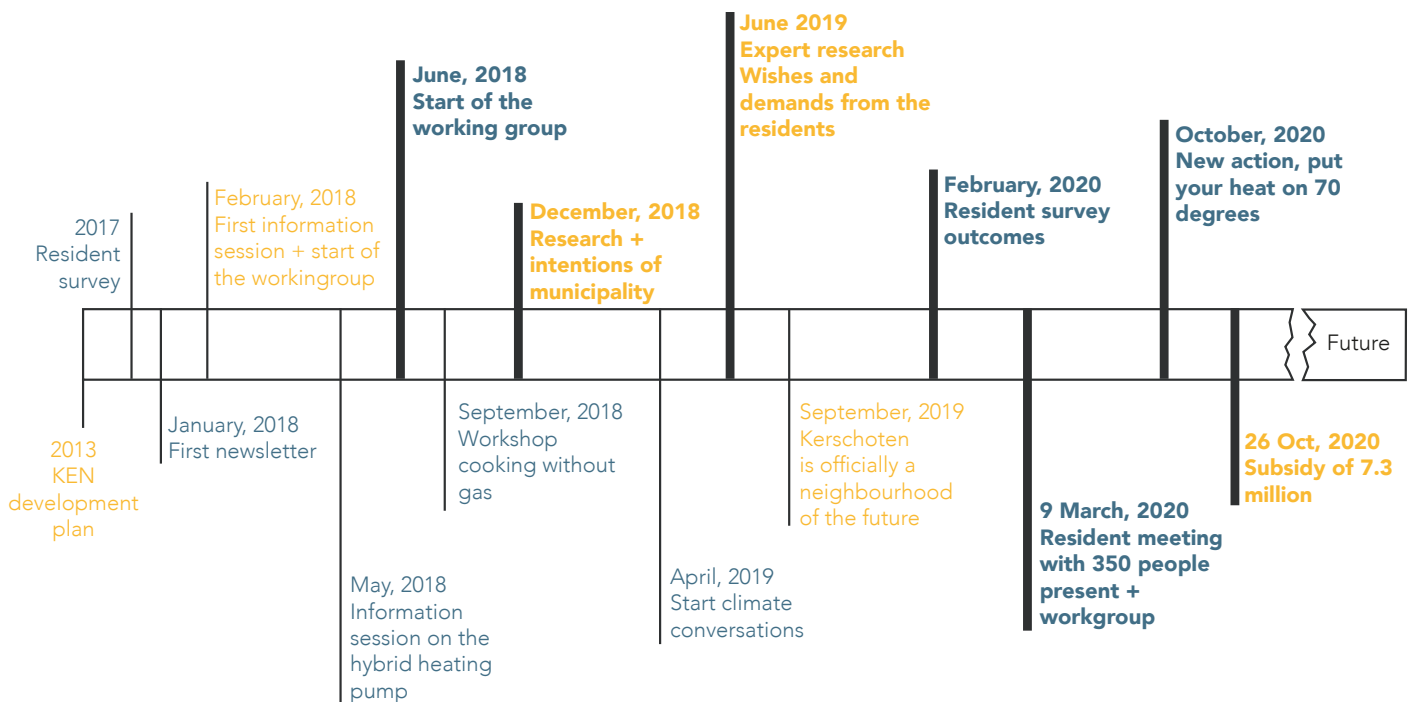


Figure 21: Process scheme Kerschoten, Blue – knowledge/plan-making Yellow – Engagement (own illustration)

### Knowledge/plan-making process

The process in Kerschoten started in 2013 when a few advisory companies created a plan showing how the neighbourhood could become energy neutral. This research resulted in the KEN development plan. Within the KEN development plan, the ideas were shared to implement a heat grid in the neighbourhood (Kerschoten Energie Neutraal, 2013). However, this idea of a heat grid never really set foot to the ground in the neighbourhood. The municipality had the idea that would come when the timing was there. In a later stage, this plan for the heat grid was brought back to live by the KEN-director to take back the initiative and no longer wait for the market to develop it themselves (M. Tillema, personal communication, September 29, 2020).

In the beginning, the neighbourhood focused on the so-called no-regret measures, thus energy-saving measures, but the KEN-director had the idea to focus more on the end goal, of a natural gas-free neighbourhood (M. Tillema, personal communication, September 29, 2020). Later on, with European subsidies, a new study for the heat grid was executed, and the outcomes were again positive. Next to that, the housing corporations also wanted the heat grid to be implemented. After this second report on the heat grid, the municipality also arranged a project leader to speed up the heat transition (M. Tillema, personal communication, September 29, 2020). Because the KEN-director kept the process going and continued to think about the end goal of a natural gas-free neighbourhood, the process is still running (M. Tillema, personal communication, September 29, 2020). The focus is now on the detailing and elaboration of the heat grid. It was soon decided that the source of the heat should be from the closeby water authority. The water authority has a sewage purification in the area, and the wastewater from sewage flows can generate heat (Kerschoten Energie Neutraal, n.d.-c). The heat grid will be 70 degrees which means that homes only need adjustments up to energy level b, resulting in restricted investments needed from residents (M. Tillema, personal communication, September 29, 2020). The idea is now further developed, and the

search has started for a heat partner. Something that will help the process in Kerschoten is that they received a subsidy of 7.3 million euros from the national government for the project natural gas-free neighbourhoods (Neusink, 2020). To form the final offer for the heat grid, a lot of expert research is required. Implementing the heat grid in the neighbourhood will happen block by block to engage first in the areas where people want to join and slowly roll-out the heat grid into the neighbourhood (M. Tillema, personal communication, September 29, 2020).

### Engagement process

The neighbourhood's engagement process started in 2018, in that year, the ideas for the heat grid were brought back to life, and a first resident meeting was held (Kerschoten Energie Neutraal, 2018a). After this meeting, the residents' working group also initiated. In this group, around 20 people advise the official project group of the municipality, the KEN-director, the housing corporations, the water authority, Liander, Firan and the local school community (Kerschoten Energie Neutraal, n.d.-b). The working group does not have a legal decision right; however, their opinions and advice are considered (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, n.d.-d). Besides the working group where residents have a strong involvement, all residents of the neighbourhood are involved in the process, by a door to door spread newsletter, information on the website of KEN and invitations to join the residents' meetings (Kerschoten Energie Neutraal, n.d.-a). Next to residents' meetings events are planned in the neighbourhood, which are sometimes quite specific on, for example, a heating pump or cooking workshop (Kerschoten Energie Neutraal, n.d.-a). Residents are continuously involved in the plan-making process by using the resident survey and expert research on the wishes and demands the residents have for the heat grid (M. Tillema, personal communication, September 29, 2020; Kerschoten Energie Neutraal, n.d.-a). Besides this, residents always have the opportunity to comment on the ideas and plans made. KEN is always communicating with the residents, during events in the neighbourhood and with the newsletters; thus, the people who have some interest in the heat grid are well informed (M. Tillema, personal communication, September 29, 2020). The critical point in this neighbourhood is to see if everyone in the neighbourhood is reached and aware of the plans and if more people want to join in on the process (M. Tillema, personal communication, September 29, 2020).

## 2.4. Spijkerkwartier Arnhem

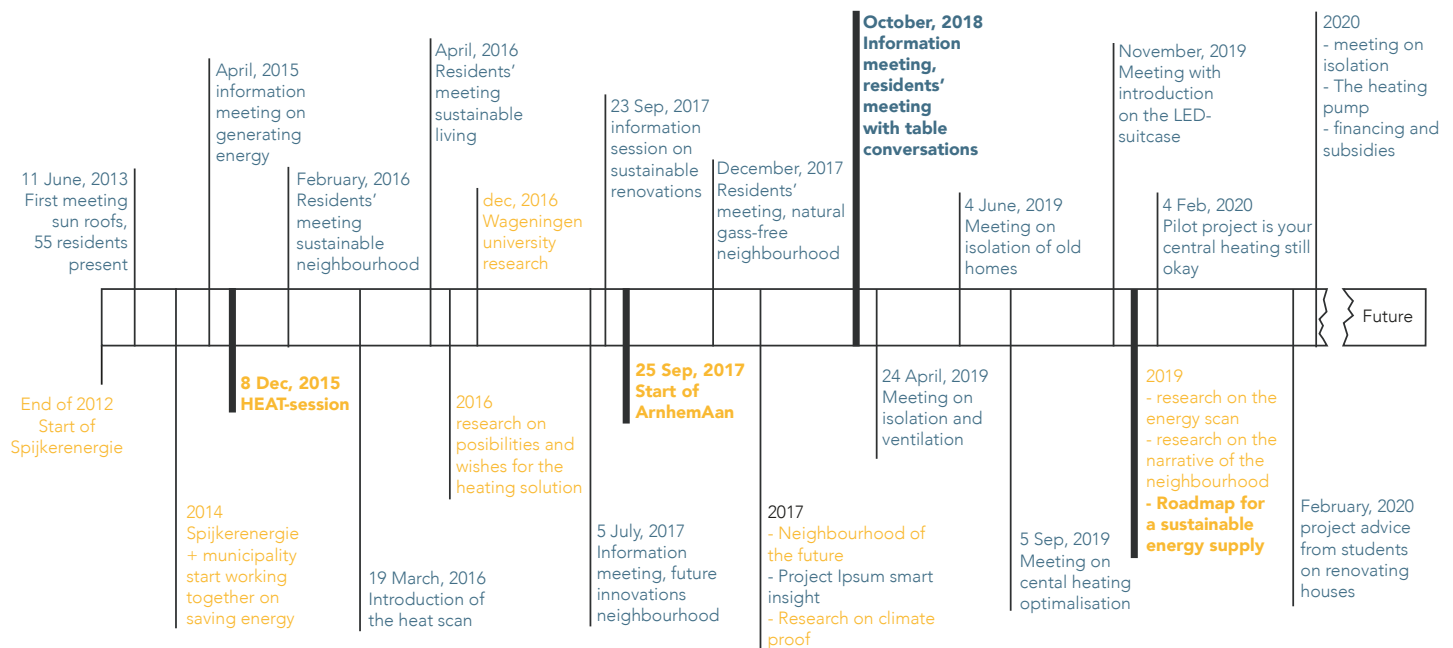


Figure 22: Process scheme Spijkerkwartier, Blue – knowledge/plan-making Yellow – Engagement (own illustration)

### Knowledge/plan-making process

The process in Spijkerkwartier started in 2013 with the start of Spijkerenergie. Spijkerenergie started as platform and resident group willing to implement solar panels in the neighbourhood (Spijkerenergie, n.d.-3). In 2014 the municipality joined the process of Spijkerenergie intending to save energy. Since 2015 Spijkerenergie is also working on becoming a natural gas-free neighbourhood (Spijkerenergie, n.d.-c). They started with a HEAT-session where they researched the possibilities of a heat grid in the neighbourhood. The heat grid seemed feasible for some of the neighbourhood areas; nevertheless, it received backlash from the residents (Spijkerenergie, 2017). Spijkerenergie started to involve the residents more in the process, and new research was done on what kind of possibilities, and heat solutions were feasible for the neighbourhood. This research concluded that a large-scale collective solution would not be feasible because of the diversity in both houses and residents; thus, is decided to research small scale collective solutions and individual solutions matching the housing types and residents (Spijkerenergie, 2017). The neighbourhood is designated by the Arnhem Aan project as a not promising neighbourhood and not in the front line to become natural gas-free; thus, the focus is mostly on energy-saving measures (Arnhem Aan, 2020; M. van der Burght, personal communication, October 8, 2020). However, there is a roadmap to sustainable energy; wherein plans are made for new ways of heating the neighbourhood, preferably connected to their blue-neighbourhood economy (Spijkerenergie, 2018).

### Engagement process

The engagement process in Spijkerkwartier is running since 2015, once the ideas for the solar panels in the neighbourhood arose. Since then, multiple resident meetings took place focussed on different topics of the energy transition (Spijkerenergie, n.d.-c). As can be seen in the process time-line above, many resident meetings happened during the last couple of years, from general meetings on energy



savings to specific meetings on the insulation of older homes (Spijkerenergie, n.d.-c). The great number of specialised meetings accounts for the neighbourhood's diversity; it is needed to attract all residents in the neighbourhood. Besides the diversity in meetings, there are also different events and actions organised to show how homes can be more sustainable (Spijkerenergie, n.d.-b). First, the LED-suitcase where people can change their lights for LED lights and see what the difference is. Second is the central heating action to check if the central heating is still okay in usage. Third are the apple pie meetings, where residents talk to each other about their energy bill, and how homes can be improved; to help and learn from each other. Fourth is the possibility of doing an energy scan to see where homes could improve insulation. Finally, Spijkerenergie provides information and actions on changing the heater to IR panels for heating and intelligent radiators (Spijkerenergie, n.d.-b). Next to the meetings and events and actions, information is spread through the Spijkerenergie platform and website (mijnspijkerkwartier.nl, n.d.). The plans for becoming natural gas-free still need much work and what is seen, in for example the heat sessions, is that the neighbourhood is quite outspoken on what they want and do not want in the neighbourhood (Spijkerenergie, 2017). So, during the new heat system's planning process, the residents will be engaged to make sure they carry the process (Spijkerenergie, 2017).

## 2.5. Midden-West Ermelo

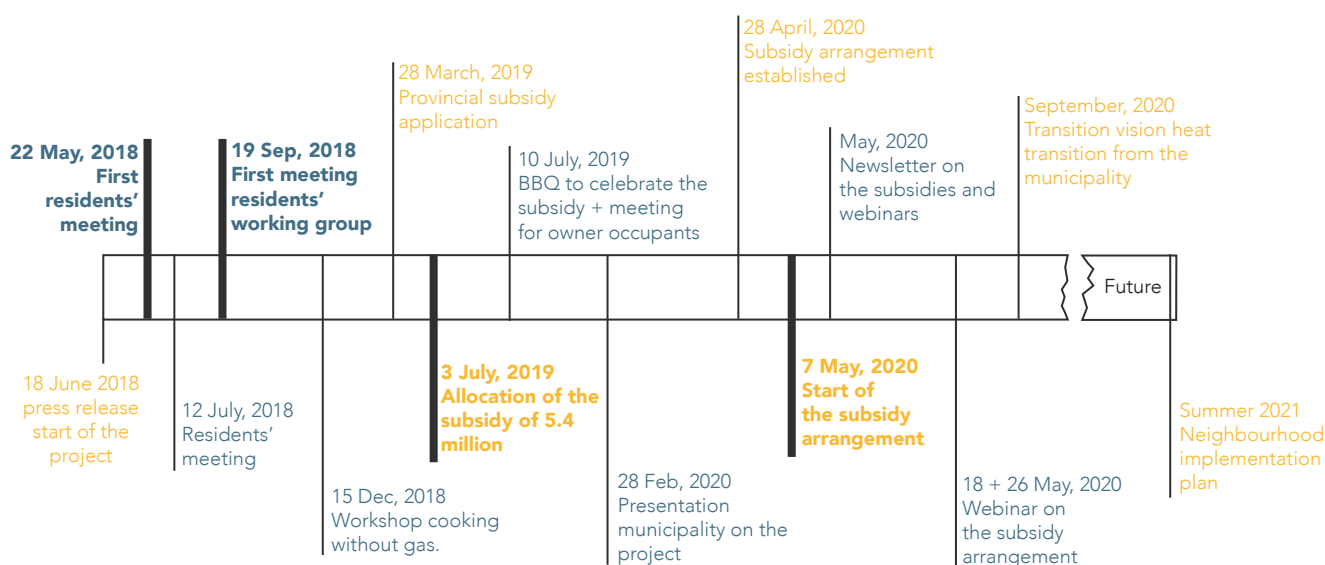


Figure 23: Process scheme Ermelo, Blue – knowledge/plan-making Yellow – Engagement (own illustration)

### Knowledge/plan-making process

The process in Ermelo is initiated by the municipality, which has a strong and ambitious sustainability program. The municipality wishes to be energy neutral in 2030. Three years ago, at the beginning of the debate on the natural gas-free neighbourhood, the municipality already started working on becoming natural gas-free (Project leader, personal communication, October 6, 2020). The municipality started with the neighbourhood of the future project in midden-west Ermelo. In this neighbourhood, they started researching the project and possible solutions; and they are currently working on the neighbourhood implementation plan (Project leader, personal communication, October 6, 2020). What is known already is that the neighbourhood is not suited for a large-scale collective solution, and the measures taken will probably be all-electric individual measures or

possible small-scale collective measures (Project leader, personal communication, October 6, 2020; Gemeente Ermelo, 2019b). To support the neighbourhood's ideas and plans, the municipality applied for a subsidy allocation from the province of Gelderland; which they got honoured (Gemeente Ermelo, 2019b). The municipality received a subsidy of 5.4 million. From this subsidy, UWOON is supported with 2.4 million, to execute their renovations in the neighbourhood. The other 3 million euros of subsidy is divided among the owner occupant households in the neighbourhood. Each household is assigned 12.000 euros, 6000 for insulation and 6000 for installation, this money is connected to the house, thus when people move the budget stays with the house (College van burgemeester en wethouders van Ermelo, 2020).

At the moment, the focus in the neighbourhood is on energy-saving measures. To support this, residents need to do an energy check-in their home, which shows them where they need to insulate and what they need to do (Project leader, personal communication, October 6, 2020). The municipality plans to start with the insulation slowly, step by step, and support the fast pacers. The rest of the neighbourhood who do not want to start straight away can start when they want to. The idea is that fast pacers also influence the people that are left behind (Project leader, personal communication, October 6, 2020; Gemeente Ermelo, 2019b). In the meantime, when the insulation phase is started, there will be worked on the neighbourhood implementation plan. For this plan, experts and advisers will help with the technological aspects and the feasibility of different measures and thus help to form the plan. The idea of the neighbourhood implementation plan is to research a broad spectrum of implementation measures. The municipality wants to make the plan as transparent as possible. The idea is that this plan is finished in the summer of 2021; which means that the people who are ready can start with the installation phase (Project leader, personal communication, October 6, 2020).

### Engagement process

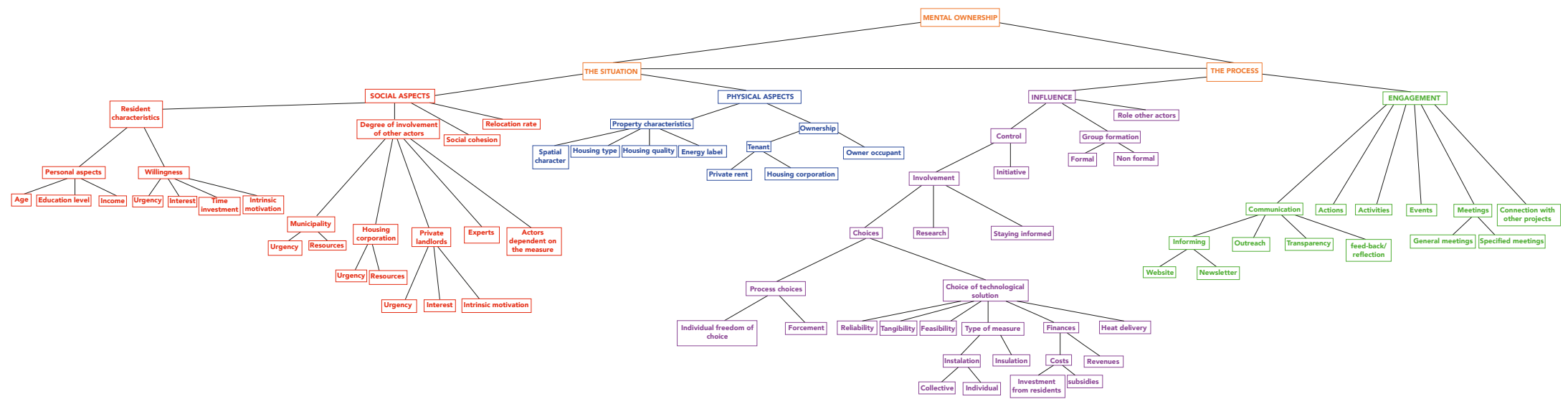
The engagement process in the neighbourhood started with a residents' meeting in May 2018. This meeting was the first-time residents heard about the municipality's plans to become a natural gas-free neighbourhood (Project leader, personal communication, October 6, 2020). In this meeting, the active participation of residents was asked to form a residential working group. The working group exists out of a variety of residents, both owner-occupant and tenant, assertive and reluctant to the plans, younger and older people, residents with a technical background and residents who are just interested in what the municipality is doing (Project leader, personal communication, October 6, 2020). The municipality created a list of wishes and demands that need to be present in the chosen measurement with the working group and residents (Gemeente Ermelo, 2020). The wishes and demands focus on costs, noise, space usage, reliability of implementation, and an alternative's sustainability. These wishes and demands from the residents form the basis for the comparison of the technological measures. In this way, the residents are represented in the neighbourhood implementation plan (Gemeente Ermelo, 2020).

Next to the residents' meetings, the municipality also organised cooking workshops where residents could learn how to cook without gas (Gemeente Ermelo, 2018). UWOON created an example home, where residents could experience what it was like to live in a natural gas-free home; and which became a meeting location for the neighbourhood association (Project leader, personal

communication, October 6, 2020). Next to physical meetings, residents are continuously informed about the project through the newsletter and information on the website (Project leader, personal communication, October 6, 2020). To optimise communication, a communication plan was made where for each type of resident, a communication strategy is written down (Gemeente Ermelo, 2019a). Currently, the engagement focus is on the subsidy arrangement, because this is such an essential aspect in the process (Project leader, personal communication, October 6, 2020). To ensure everyone is engaged, the municipality is also trying to ask people to come to meetings even though they disagree with the plans. The municipality would like to show these people that they are not pushing residents to join the process and that their opinions and concerns are heard (Project leader, personal communication, October 6, 2020). When it comes to the tenants of UWOON, they are involved in the process because UWOON is intensely working on making their housing stock more sustainable. However, they keep having different values in the process than an owner-occupant (Project leader, personal communication, October 6, 2020).

APPENDIX 3: THE CONCEPT-INDICATOR MODEL

The concept-indicator model connected to each other and mental ownership



## APPENDIX 4: INTERVIEW GUIDES

In this appendix the used interview guides are included. For each interview a separate interview guide was made. There are common questions asked but also case specific.

### 4.1. Interview Guide Joa Maouche

Welkom,

- Uitleggen waar is precies onderzoek naar doe, voor welke opleiding e.d.
- Uitleggen hoe het interview er uit ziet, de tijd die het duurt en wat er met de uitkomsten wordt gedaan.
- Vragen of ik namen mag gebruiken in mijn thesis of liever als betrokkenen genoemd wil worden.
- Toestemming vragen voor het opnemen van het interview.
- 

Eerste vraag:

Toelichting vragen over de wijk en welke rol Joa hierin speelt.

Hierop doorvragen aan de hand van de hieronder benoemde thema's

Betrokkenheid bewoners	<p>Hoe zou je de rol van de bewoners omschrijven binnen het warmte transitie proces?</p> <p>Wat is het ultieme doel van het betrekken van bewoners bij het project?</p> <p>Hoe is er draagvlak gecreëerd om bewoners mee te laten doen?</p> <p>Wat voor activiteiten zijn er georganiseerd in de wijk en wat was het effect van die activiteiten</p> <p>Waarom denk je dat bewoners bereid zijn mee te doen?</p> <p>Wat zijn tips om bewoners te betrekken bij het proces?</p> <p>Wat is het percentage van bewoners die nu "actief" meedoen met het project?</p>
Control	<p>Hoeveel macht en invloed hebben de bewoners binnen het beslissingsproces?</p>
Risk-revenue distribution	<p>Merk je dat er veel individualisme heerst bij bewoners bij het maken van de keuze om mee te doen?</p> <p>Op basis waarvan maken bewoners keuzes? Is dat doordat andere bewoners meedoen of juist niet meedoen? Of denken/kijken ze vanuit resources e.g.?</p> <p>Zit er een bepaalde wrang m.b.t. routine gedrag (bijv koken op gas) waardoor bewoners moeite hebben om achter de gekozen oplossing te gaan staan?</p> <p>Denkt u dat bewoners elkaar positief kunnen beïnvloeden in het meedoen met het proces en de wijk veranderingen. → Waarom wel of niet?</p>

Participatie bewoners	<p>Hoe wordt er om gegaan met bewoners die niet mee willen doen? Wanneer gaat het project door en wanneer niet?</p> <p>Waar denkt u dat het, het meest vanaf hangt of bewoners mee willen doen met het proces of niet?</p>
Betrokken actoren	<p>Wat is de rol van de verschillende betrokken partijen? En hoe verhouden deze zich tot elkaar?</p> <p>Wie gaat het project leiden?</p>
Financial control	<p>Wat is het belang van een subsidie zoals die van het programma aardgasvrije wijken op de betrokkenheid van bewoners?</p> <p>Hoe gaat het geheel straks gefinancierd worden? Wie gaat wat betalen?</p>
Case specifieke vragen	<p>Hoe is er besloten de stichting op te richten?</p> <p>Wat is het effect van de stichting op de betrokkenheid van de bewoners en de invloed die bewoners hebben op het proces?</p> <p>Zijn er effecten te merken van het zo vroeg mogelijk betrekken van bewoners?</p> <p>Vanaf stap een mochten de bewoners meedenken over de plannen, is dit ook te merken in de betrokkenheid?</p> <p>Hoe reageren bewoners op de enquêtes e.g.</p> <p>Wat is het belang van de gemeente bij de actieve participatie van bewoners? Neemt het stof uit handen voor hen of draag het bij aan een gedragen oplossing?</p> <p>Wie beslist er uiteindelijk welke oplossing er gaat komen? Wat heeft of kan de gemeente hier nog in zeggen? Ook voor liander en Vivare?</p> <p>Heeft u het idee dat de betrokken bewoners (zowel in de stichting, de werkgroep en de klankboordgroep) een representatief beeld geven van de gehele wijk of lijken er nog bewoners e.g. te missen?</p>

Afsluiten, bedanken en vragen of hij het eindproduct zou willen ontvangen

#### 4.2. Interview Guide Wim Schoonderbeek

Welkom,

- Uitleggen waar is precies onderzoek naar doe, voor welke opleiding e.d.
- Uitleggen hoe het interview er uit ziet, de tijd die het duurt en wat er met de uitkomsten wordt gedaan.
- Vragen of ik namen mag gebruiken in mijn thesis of liever als betrokkenen genoemd wil worden.
- Toestemming vragen voor het opnemen van het interview.
- 

Eerste vraag:

Toelichting vragen over de wijk en welke rol Wim hierin speelt.

Hierop doorvragen aan de hand van de hieronder benoemde thema's

Betrokkenheid bewoners	<ul style="list-style-type: none"><li>- Hoe zou je de rol van de bewoners omschrijven binnen het warmte transitie proces?</li><li>- Wat is het ultieme doel van het betrekken van bewoners bij het project?</li><li>- Hoe is er draagvlak gecreëerd om bewoners mee te laten doen?</li><li>- Wat voor activiteiten zijn er georganiseerd in de wijk en wat was het effect van die activiteiten</li><li>- Waarom denk je dat bewoners bereid zijn mee te doen?</li><li>- Wat zijn tips om bewoners te betrekken bij het proces?</li><li>- Wat is het percentage van bewoners die nu "actief" meedoen met het project?</li></ul>
Control	<ul style="list-style-type: none"><li>- Hoeveel macht en invloed hebben de bewoners binnen het beslissingsproces?</li></ul>
Risk-revenue distribution	<ul style="list-style-type: none"><li>- Merk je dat er veel individualisme heerst bij bewoners bij het maken van de keuze om mee te doen?</li><li>- Op basis waarvan maken bewoners keuzes? Is dat doordat andere bewoners meedoen of juist niet meedoen? Of denken/kijken ze vanuit resources e.g.?</li><li>- Zit er een bepaalde wrang m.b.t. routine gedrag (bijv koken op gas) waardoor bewoners moeite hebben om achter de gekozen oplossing te gaan staan?</li><li>- Denkt u dat bewoners elkaar positief kunnen beïnvloeden in het meedoen met het proces en de wijk veranderingen. → Waarom wel of niet?</li></ul>
Participatie bewoners	<ul style="list-style-type: none"><li>- Hoe wordt er om gegaan met bewoners die niet mee willen doen? Wanneer gaat het project door en wanneer niet?</li><li>- Waar denkt u dat het, het meest vanaf hangt of bewoners mee willen doen met het proces of niet?</li></ul>

Betrokken actoren	<ul style="list-style-type: none"> <li>- Wat is de rol van de verschillende betrokken partijen? En hoe verhouden deze zich tot elkaar?</li> <li>- Wie gaat het project leiden?</li> </ul>
Financial control	<ul style="list-style-type: none"> <li>- Wat is het belang van een subsidie zoals die van het programma aardgasvrije wijken op de betrokkenheid van bewoners?</li> <li>- Hoe gaat het geheel straks gefinancierd worden? Wie gaat wat betalen?</li> </ul>
	<ul style="list-style-type: none"> <li>- Hoe is er besloten de stichting op te richten?</li> <li>- Hoe staat het ervoor met de gemaakte plannen, is er op de recente bewonersavond een keuze gemaakt → hoe werden de drie voorkeuren ontvangen → wat verwacht u als uitkomsten?</li> <li>- Wat is het effect van de stichting op de betrokkenheid van de bewoners en de invloed die bewoners hebben op het proces?</li> <li>- Zijn er effecten te merken van het zo vroeg mogelijk betrekken van bewoners?</li> <li>- Vanaf stap een mochten de bewoners meedenken over de plannen, is dit ook te merken in de betrokkenheid?</li> <li>- Hoe reageren bewoners op de enquêtes en de persoonlijke benadering vanuit Hevea initiatief?</li> <li>- Heb je het idee dat de sociale cohesie bijdraag aan het draagvlak in de wijk?</li> <li>- Hoe is de betrokkenheid van mensen die woningen huren in Heveadorp?</li> <li>- Wat is het belang van de gemeente bij de actieve participatie van bewoners? Neemt het stof uit handen voor hen of draag het bij aan een gedragen oplossing? Hoe vind u dat de gemeente de rol draagt? Doen zij voldoende voor het dorp?</li> <li>- Wie beslist er uiteindelijk welke oplossing er gaat komen? Wat heeft of kan de gemeente hier nog in zeggen? Ook voor liander en Vivare?</li> <li>- Heeft u het idee dat de betrokken bewoners (zowel in de stichting, de werkgroep en de klankboordgroep) een representatief beeld geven van de gehele wijk of lijken er nog bewoners e.g. te missen?</li> <li>- Denkt u dat sinds hevea initiatief een stichting is geworden, dat er meer draagvlak is gekomen en meer mogelijkheden in het proces?</li> </ul>

Afsluiten, bedanken en vragen of hij het eindproduct zou willen ontvangen



### 4.3. Interview Guide Wanka Lelieveld

Welkom,

- Uitleggen waar is precies onderzoek naar doe, voor welke opleiding e.d.
- Uitleggen hoe het interview er uit ziet, de tijd die het duurt en wat er met de uitkomsten wordt gedaan.
- Vragen of ik namen mag gebruiken in mijn thesis of liever als betrokkenen genoemd wil worden.
- Toestemming vragen voor het opnemen van het interview.
- 

Eerste vraag:

Toelichting vragen over de wijk en welke rol Wanka hierin speelt.

Hierop doorvragen aan de hand van de hieronder benoemde thema's

Betrokkenheid bewoners	<ul style="list-style-type: none"><li>- Hoe zou je de rol van de bewoners omschrijven binnen het warmte transitie proces?</li><li>- Wat is het ultieme doel van het betrekken van bewoners bij het project?</li><li>- Hoe is er draagvlak gecreëerd om bewoners mee te laten doen?</li><li>- Wat voor activiteiten zijn er georganiseerd in de wijk en wat was het effect van die activiteiten</li><li>- Waarom denk je dat bewoners bereid zijn mee te doen? Of juist niet meedoen?</li><li>- Wat is het percentage van bewoners die nu "actief" meedoen met het project?</li></ul>
Control	<ul style="list-style-type: none"><li>- Hoeveel macht en invloed hebben de bewoners binnen het beslissingsproces? Hoeveel invloed heeft de coöperatie</li></ul>
Risk-revenue distribution	<ul style="list-style-type: none"><li>- Merk je dat er veel individualisme heerst bij bewoners bij het maken van de keuze om mee te doen, of doen ze dit samen?</li><li>- Op basis waarvan maken bewoners keuzes? Is dat doordat andere bewoners meedoen of juist niet meedoen? Of denken/kijken ze vanuit resources e.g.?</li><li>- Zit er een bepaalde wrang m.b.t. routine gedrag (bijv koken op gas) waardoor bewoners moeite hebben om achter de gekozen oplossing te gaan staan?</li><li>- Denkt u dat bewoners elkaar positief kunnen beïnvloeden in het meedoen met het proces en de wijk veranderingen. → Waarom wel of niet?</li></ul>
Participatie bewoners	<ul style="list-style-type: none"><li>- Hoe wordt er om gegaan met bewoners die niet mee willen doen? Wanneer gaat het project door en wanneer niet?</li></ul>

	<ul style="list-style-type: none"> <li>- Waar denkt u dat het, het meest vanaf hangt of bewoners mee willen doen met het proces of niet?</li> </ul>
Betrokken actoren	<ul style="list-style-type: none"> <li>- Wat is de rol van de verschillende betrokken partijen? En hoe verhouden deze zich tot elkaar?</li> <li>- Wie gaat het project leiden?</li> </ul>
Financial control	<ul style="list-style-type: none"> <li>- Wat is het belang van een subsidie zoals die van het programma aardgasvrije wijken op de betrokkenheid van bewoners?</li> <li>- Hoe gaat de subsidie van het rijk ingezet worden in de wijk?</li> <li>- Hoe gaat het geheel straks gefinancierd worden? Wie gaat wat betalen?</li> </ul>
	<ul style="list-style-type: none"> <li>- Welke rol gaat de coöperatie straks precies invullen als het warmtenet er is?</li> <li>- Hoe is er besloten de coöperatie op te richten?</li> <li>- Hoe bij de keuze voor een warmtenet gekomen?</li> <li>- Zijn mensen bereid om van hoog naar laag temperatuurnet te gaan als ze daar zelf nog in moeten investeren?</li> <li>- Hoe zit het met het draagvlak voor de cooperatie? Hoveel mensen zijn er aangesloten wat zijn de reacties</li> <li>- Wat vinden bewoners over het algemeen van het idee voor warmtenet?</li> <li>- Zijn de betrokken bewoners een afspiegeling voor de hele wijk?</li> <li>- Hoe is iedereen bereikt over het idee?</li> <li>- Hoe zit het met huur en koop in de wijk en de betrokkenheid van de huurders?</li> <li>- Hoe hebben jullie de VVE van de appartementen erbij betrokken lukt dit?</li> <li>- Wat voor reacties krijg je ten aanzien van het wartmenet, waar lopen mensen tegenaan? Hoeveel mensen zijn positief ten aanzien van 2018 waarin men aan kon geven wat ze wilden?</li> <li>- Is er afgesproken hoeveel mensen aan het warmtenet moeten om het door te laten gaan? Wat wordt er verwacht?</li> </ul>

Afsluiten, bedanken en vragen of hij het eindproduct zou willen ontvangen

#### 4.4. Interview Guide Marjolein Tillema

Welkom,

- Uitleggen waar is precies onderzoek naar doe, voor welke opleiding e.d.
- Uitleggen hoe het interview er uit ziet, de tijd die het duurt en wat er met de uitkomsten wordt gedaan.
- Vragen of ik namen mag gebruiken in mijn thesis of liever als betrokkenen genoemd wil worden.
- Toestemming vragen voor het opnemen van het interview.
- 

Eerste vraag:

Toelichting vragen over de wijk en welke rol Marjolein hierin speelt.

Hierop doorvragen aan de hand van de hieronder benoemde thema's

Betrokkenheid bewoners	<ul style="list-style-type: none"><li>- Hoe zou je de rol van de bewoners omschrijven binnen het warmte transitie proces?</li><li>- Wat is het ultieme doel van het betrekken van bewoners bij het project?</li><li>- Hoe is er draagvlak gecreëerd om bewoners mee te laten doen?</li><li>- Wat voor activiteiten zijn er georganiseerd in de wijk en wat was het effect van die activiteiten</li><li>- Waarom denk je dat bewoners bereid zijn mee te doen?</li><li>- Wat zijn tips om bewoners te betrekken bij het proces?</li><li>- Wat is het percentage van bewoners die nu "actief" meedoen met het project?</li></ul>
Control	<ul style="list-style-type: none"><li>- Hoeveel macht en invloed hebben de bewoners binnen het beslissingsproces?</li></ul>
Risk-revenue distribution	<ul style="list-style-type: none"><li>- Merk je dat er veel individualisme heerst bij bewoners bij het maken van de keuze om mee te doen?</li><li>- Op basis waarvan maken bewoners keuzes? Is dat doordat andere bewoners meedoen of juist niet meedoen? Of denken/kijken ze vanuit resources e.g.?</li><li>- Zit er een bepaalde wrang m.b.t. routine gedrag (bijv koken op gas) waardoor bewoners moeite hebben om achter de gekozen oplossing te gaan staan?</li><li>- Denkt u dat bewoners elkaar positief kunnen beïnvloeden in het meedoen met het proces en de wijk veranderingen. → Waarom wel of niet?</li></ul>
Participatie bewoners	<ul style="list-style-type: none"><li>- Hoe wordt er om gegaan met bewoners die niet mee willen doen? Wanneer gaat het project door en wanneer niet?</li></ul>

	<ul style="list-style-type: none"> <li>- Waar denkt u dat het, het meest vanaf hangt of bewoners mee willen doen met het proces of niet?</li> </ul>
Betrokken actoren	<ul style="list-style-type: none"> <li>- Wat is de rol van de verschillende betrokken partijen? En hoe verhouden deze zich tot elkaar?</li> <li>- Wie gaat het project leiden?</li> <li>- Hoe zit het met de interesse vanuit bewoners om een coöperatie te worden en zich dus te formaliseren? Bewoners zijn nu geen beslissingsactor,</li> </ul>
Financial control	<ul style="list-style-type: none"> <li>- Wat is het belang van een subsidie zoals die van het programma aardgasvrije wijken op de betrokkenheid van bewoners?</li> </ul>
	<ul style="list-style-type: none"> <li>- Hoe kijken de bewoners tegen de plannen aan om een 70 graden warmte net te implementeren?</li> <li>- Wat is de bereidheid gezien de financiële situatie van sommige bewoners om zelf te investeren?</li> <li>- Wat is de rol van de woningbouwcorporaties in de wijk? En hoe worden de bewoners van huurwoningen betrokken bij het proces? Wat kunnen zij doen?</li> </ul>

Afsluiten, bedanken en vragen of ze het eindproduct zou willen ontvangen

#### 4.5. Interview Guide Marc van der Burght

Welkom,

- Uitleggen waar is precies onderzoek naar doe, voor welke opleiding e.d.
- Uitleggen hoe het interview er uit ziet, de tijd die het duurt en wat er met de uitkomsten wordt gedaan.
- Vragen of ik namen mag gebruiken in mijn thesis of liever als betrokkenen genoemd wil worden.
- Toestemming vragen voor het opnemen van het interview.
- 

Eerste vraag:

Toelichting vragen over de wijk en welke rol Marc hierin speelt.

Hierop doorvragen aan de hand van de hieronder benoemde thema's

Betrokkenheid bewoners	<ul style="list-style-type: none"> <li>- Hoe zou je de rol van de bewoners omschrijven binnen het warmte transitie proces?</li> <li>- Wat is het ultieme doel van het betrekken van bewoners bij het project?</li> <li>- Hoe is er draagvlak gecreëerd om bewoners mee te laten doen?</li> <li>- Wat voor activiteiten zijn er georganiseerd in de wijk en wat was het effect van die activiteiten</li> <li>- Waarom denk je dat bewoners bereid zijn mee te doen?</li> <li>- Wat zijn tips om bewoners te betrekken bij het proces?</li> </ul>
------------------------	---

	<ul style="list-style-type: none"> <li>- Wat is het percentage van bewoners die nu “actief” meedoen met het project?</li> </ul>
Control	<ul style="list-style-type: none"> <li>- Hoeveel macht en invloed hebben de bewoners binnen het beslissingsproces?</li> </ul>
Risk-revenue distribution	<ul style="list-style-type: none"> <li>- Merk je dat er veel individualisme heerst bij bewoners bij het maken van de keuze om mee te doen?</li> <li>- Op basis waarvan maken bewoners keuzes? Is dat doordat andere bewoners meedoen of juist niet meedoen? Of denken/kijken ze vanuit resources e.g.?</li> <li>- Zit er een bepaalde wrang m.b.t. routine gedrag (bijv koken op gas) waardoor bewoners moeite hebben om achter de gekozen oplossing te gaan staan?</li> <li>- Denkt u dat bewoners elkaar positief kunnen beïnvloeden in het meedoen met het proces en de wijk veranderingen. → Waarom wel of niet?</li> </ul>
Participatie bewoners	<ul style="list-style-type: none"> <li>- Hoe wordt er om gegaan met bewoners die niet mee willen doen? Wanneer gaat het project door en wanneer niet?</li> <li>- Waar denkt u dat het, het meest vanaf hangt of bewoners mee willen doen met het proces of niet?</li> </ul>
Betrokken actoren	<ul style="list-style-type: none"> <li>- Wat is de rol van de verschillende betrokken partijen? En hoe verhouden deze zich tot elkaar?</li> <li>- Wie gaat het project leiden?</li> </ul>
Financial control	<ul style="list-style-type: none"> <li>- Wat is het belang van een subsidie zoals die van het programma aardgasvrije wijken op de betrokkenheid van bewoners?</li> <li>- Hoe gaat het geheel straks gefinancierd worden? Wie gaat wat betalen?</li> </ul>
	<ul style="list-style-type: none"> <li>- Spijkerkwartier is een wijk van de toekomst dus als doel voor 2030 aardgasvrij → maar bij Arnhem aan is het geen kansrijke wijk → na 2030 van het aardgas.</li> <li>- Hoe is het huidige draagvlak in de wijk? Hoe is het gekomen of hoe kan het vergroot worden? Waarom is het een bepaald level?</li> <li>- Wat is de rol van de woningbouwcoöperatie en de particuliere verhuurder? Hoe zijn zij betrokken in het proces?</li> <li>- Hoe zijn de huurders betrokken in het proces?</li> </ul>

	<ul style="list-style-type: none"> <li>- Zijn de betrokkenen in het proces een afspiegeling van de wijk? Is iedereen een keer bereikt of blijven er echt groepen bewoners achter en niet betrokken?</li> <li>- Hoe is de samenwerking tussen Arnhem aan en Spijkerenergie? Met de wijkgesprekken en de lijn 2030?</li> <li>- Is er een Aanjager in Spijkerkwartier of doet Spijkerenergie het zelf?</li> <li>- Draagt energie aan bij aan het draagvlak en hoe is dat te merken?</li> <li>- Er wordt veel aandacht gestoken in informatieverbreiding over de verschillende thema's → hoe is dit terug te zien in de betrokkenheid?</li> <li>- Wie maken de uiteindelijke beslissingen in de wijk, wat is de rol van de gemeente hierin?</li> <li>- Spijkerenergie is integrale dan de gastransitie, wat wordt de rol van het gasloos binnen hun aanpak?</li> <li>- Ziet u het gebeuren dat Spijkerenergie geformaliseerd gaat worden in de toekomst, waarom wel of niet?</li> <li>- Wie heeft de controle over het proces en hoe zal dit wellicht gaan veranderen zodra de gemeente het over zou nemen van Spijkerenergie?</li> <li>- Wat is het verwachte effect van het vlekkenplan op het draagvlak bij de bewoners? Wat gebeurt er als bewoners het niet eens zijn met de ideeën?</li> <li>- Wat is het effect van de hoge verhuisgraad op de betrokkenheid van bewoners?</li> <li>- Er zijn al een stadswarmte net en een aantal WKO in de wijk. Hoe zal dit zich uitbreiden</li> <li>- Wat wordt u rol in het vervolg van het project? Wat wordt de rol van de gemeente als het de vrijwilligersfunctie gaat overschrijden?</li> <li>- Hoe weerhouden blauwe wijk economie zich tot het aardgas transitie helpen die elkaar?</li> <li>- Hoe ver zijn ze met de routekaart?</li> <li>- Er stond online dat er verwacht wordt dat de gemeente met een gewenste technische oplossing gaat komen, is dit ook echt zo? En welke richting gaat het nu op?</li> </ul>
--	--

Afsluiten, bedanken en vragen of hij het eindproduct zou willen ontvangen

#### 4.6 Interview Guide Project Leader Municipality of Ermelo

Welkom,

- Uitleggen waar is precies onderzoek naar doe, voor welke opleiding e.d.
- Uitleggen hoe het interview er uit ziet, de tijd die het duurt en wat er met de uitkomsten wordt gedaan.
- Vragen of ik namen mag gebruiken in mijn thesis of liever als betrokkenen genoemd wil worden.
- Toestemming vragen voor het opnemen van het interview.
- 

Eerste vraag:

Toelichting vragen over de wijk en welke rol de projectleider hierin speelt.

Hierop doorvragen aan de hand van de hieronder benoemde thema's

Betrokkenheid bewoners	<ul style="list-style-type: none"><li>- Hoe zou je de rol van de bewoners omschrijven binnen het warmte transitie proces?</li><li>- Wat is het ultieme doel van het betrekken van bewoners bij het project?</li><li>- Hoe is er draagvlak gecreëerd om bewoners mee te laten doen?</li><li>- Wat voor activiteiten zijn er georganiseerd in de wijk en wat was het effect van die activiteiten</li><li>- Waarom denk je dat bewoners bereid zijn mee te doen?</li><li>- Wat zijn tips om bewoners te betrekken bij het proces?</li><li>- Wat is het percentage van bewoners die nu "actief" meedoen met het project?</li></ul>
Control	<ul style="list-style-type: none"><li>- Hoeveel macht en invloed hebben de bewoners binnen het beslissingsproces?</li></ul>
Risk-revenue distribution	<ul style="list-style-type: none"><li>- Merk je dat er veel individualisme heerst bij bewoners bij het maken van de keuze om mee te doen?</li><li>- Op basis waarvan maken bewoners keuzes? Is dat doordat andere bewoners meedoen of juist niet meedoen? Of denken/kijken ze vanuit resources e.g.?</li><li>- Zit er een bepaalde wrang m.b.t. routine gedrag (bijv koken op gas) waardoor bewoners moeite hebben om achter de gekozen oplossing te gaan staan?</li><li>- Denkt u dat bewoners elkaar positief kunnen beïnvloeden in het meedoen met het proces en de wijk veranderingen. → Waarom wel of niet?</li></ul>
Participatie bewoners	<ul style="list-style-type: none"><li>- Hoe wordt er om gegaan met bewoners die niet mee willen doen? Wanneer gaat het project door en wanneer niet?</li></ul>

	<ul style="list-style-type: none"> <li>- Waar denkt u dat het, het meest vanaf hangt of bewoners mee willen doen met het proces of niet?</li> </ul>
Betrokken actoren	<ul style="list-style-type: none"> <li>- Wat is de rol van de verschillende betrokken partijen? En hoe verhouden deze zich tot elkaar?</li> <li>- Wie gaat het project leiden?</li> </ul>
Financial control	<ul style="list-style-type: none"> <li>- Wat is het belang van een subsidie zoals die van het programma aardgasvrije wijken op de betrokkenheid van bewoners?</li> <li>- Hoe gaat het geheel straks gefinancierd worden? Wie gaat wat betalen?</li> </ul>
	<ul style="list-style-type: none"> <li>- Hoe kijken de bewoners aan tegen de ideeën die nu bedacht zijn?</li> <li>- Wat is het draagvlak bij de bewoners nu?</li> <li>- Hoe zijn de bewoners precies in het proces betrokken?</li> <li>- Wat voor invloed en macht heeft de opgerichte werkgroep?</li> <li>- Heeft u het idee dat de betrokken bewoners een representatief beeld geven van de gehele wijk of lijken er nog bewoners e.g. te missen?</li> <li>- Hoe gaan de bewoners om met de subsidies die hen zijn toegekend? Merkt u dat dit een positief effect heeft op het implementeren van maatregelen en de betrokkenheid van bewoners?</li> <li>- Wat is het belang van de gemeente bij de actieve participatie van bewoners? Neemt het stof uit handen voor hen of draag het bij aan een gedragen oplossing?</li> <li>- Wie beslist er uiteindelijk welke oplossing er gaat komen?</li> <li>- Wat voor vragen en of zorgen merk je dat er zijn bij bewoners?</li> <li>- Hoe zit het op het moment met het Wijk warmte plan?</li> <li>- Welke oplossingen zijn er aangedragen? Waar wordt naar gekeken?</li> <li>- Wat voor soort wijk is Ermelo? Hoe zit het met de sociale cohesie e.g. cultuur van de wijk?</li> <li>- Denkt u dat er in Ermelo nog een geformaliseerde bewonersgroep gaat ontstaan? En hoe kijkt u zelf tegen het formaliseren van bewoners in een stichting e.g. aan met betrekking tot de warmtetransitie?</li> <li>- Hoe zie je jouw rol en die van de gemeente voor je gedurende het proces?</li> <li>- Is er een verschil tussen huur en koop bewoners en de participatie in het proces?</li> </ul>

Afsluiten, bedanken en vragen of ze het eindproduct zou willen ontvangen.