

# The influence of coalitions in the Dutch heat transition

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## Preface

Before you lay the master's thesis "The influence of coalitions in the Dutch heat transition". This thesis was written as a graduation assignment for the master's programme in Environment and Energy management at the University of Twente at campus Friesland. I spent from March to August 2023 doing research and drafting my thesis.

During the study, I noticed that sustainable heating of buildings and houses interested me a lot. This made it easy to pick a thesis topic related to this. During the research period, I also learned a lot about the Advocacy Coalition Framework. This was still difficult and vague for me in the beginning but going down the road it became more and more familiar, and I was eventually able to use it well. Lastly, I found out that finding people who are open to interviewing can be very difficult.

I would like to thank my supervisors Ewert Aukes and Lisa Sanderink for the feedback they gave me during the process. Especially Ewert because he always kept pointing out the positive side even when I was not sure about the whole process of researching and writing the report. I would also like to thank Hans van Gils and Anne Brekoo for reading my papers and helping me improve my writing skills in English. Finally, I would like to thank my family and friends because otherwise, it would have been a boring period of sitting behind my laptop most of the time.

I wish you much reading pleasure.

Mart Muskens

Heesbeen, 24 August 2023

## Abstract

Alternative heating sources for fossil fuels are getting more attention. This is also the case in the Netherlands, especially after signing the Paris Agreement back in 2015 and the increase in earthquakes in the north of the Netherlands due to the extraction of natural gas. To make a transition from fossil fuel gas heating to sustainable heating sources the Dutch government has created 30 Regional Energy Strategy (RES) regions that must create a strategy for their region.

This study examines the influence of coalitions in the Dutch heat transition process in four RES regions. The following research question is formulated: What is the influence of coalitions in the process of creating heat transition strategies for the Dutch regional heat transitions?

The Advocacy Coalition Framework is used to find out which stakeholders work together in a coalition. The data is collected via interviews with people who work inside the heat transition of one of the four RES regions. The interviews have shown that three out of the four RES regions have a cooperative view of the heat transition and try to work together on every possible occasion. The other RES region showed that a non-cooperative work environment slowed down the process and created that every municipal stakeholder must reinvent the wheel by itself. Furthermore, the interviews have shown that Enexis is the most important non-municipal stakeholder that is involved in the heat transition process.

Based on the results it is recommended to include concrete agreements on collaborations and creating a strategy that is understandable to all members. Further, it is suggested to redo this research in other RES regions.

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## 1. Introduction

4,03 trillion cubic metres of natural gas were produced worldwide in 2021. This was the latest natural gas production all-time high (*Statista*, 2023). The use of natural gas is still growing, and it is the most popular fossil fuel worldwide. Natural gas is responsible for 35% of the CO<sub>2</sub> emission growth between 2009 and 2022 (Brauers, 2022). The number of natural gas users is still growing worldwide (Peters, 2020). However, the Netherlands is trying to reduce the use of natural gas. After the discovery of the Slochteren gas field in 1959, the use of natural gas increased in the Netherlands. In 2020, 90% of all Dutch households were connected to the natural gas grid (Jansma et al., 2020). After signing the Paris Agreement, the Dutch government is forming plans to orchestrate the energy transition (the heat transition is a smaller part of the energy transition) in the Netherlands.

The Paris Agreement that was adopted in 2015 states that the increase of the global average temperature needs to stay well within 2 degrees Celsius and if possible, within 1,5 degrees Celsius (*The Paris Agreement*, 2015). The Dutch government has translated the goals of the Paris Agreement to the Dutch perspective: the Dutch climate accord. The Dutch climate agreement states that CO<sub>2</sub> emissions should be reduced by 49% in 2050, with 1990 as a reference year (*Klimaatakkoord*, 2019). The Paris Agreement goals are not the only reason the Dutch government is willing to switch to an alternative for natural gas. The region around the Slochteren gas field is suffering from earthquakes. The earthquakes are the result of gas extraction. The first earthquake was reported in 1986 (Ensie, n.d.). To stop the increasing impact of the earthquakes in the Slochteren region the Dutch government has decided to slowly extract less natural gas since 2018 and to stop natural gas extraction in October 2023 (Ministerie van Algemene Zaken, 2023).

The Dutch energy transition is delegated to 30 regions in the Netherlands. Each region must come up with their own Regional Energy Strategy (RES). Which should specify how the energy transition in the region will be coordinated. This strategy is made with the help of regional stakeholders. These stakeholders are municipalities, waterboards, companies, community initiatives, provinces etc. The RES focuses on the production of sustainable energy, the heat transition in urban areas and the energy infrastructure (*Klimaatakkoord*, 2019). The heat transition in the urban area is often called the “regionale structuur warmte” (RSW) (regional heat structure). For a part of the RES regions, RSW is only a chapter of the strategy but in the other RES regions, RSW is a committee that helps the municipalities in the region to collaborate and work out the RES collaboration (Regionale Energie Strategie (RES): Wat Kun Je Ermee, n.d.-b).

The heat transition in the Netherlands is complex because the Netherlands heavily depends on using natural gas for heating. Due to the availability of natural gas, the Netherlands has created a nationwide natural gas infrastructure. It is safe to say that the Netherlands is locked in by using natural gas. This means that natural gas is integrated so deep in our society that it is difficult to switch to an alternative.

(Riemersma et al., 2020). It will be a task for the RES regions to provide a sustainable alternative to gas heating. Furthermore, homeowners also need to be convinced that they must change their heating system and better insulate their houses better (Guerrero et al., 2021).

Stakeholder coalitions have a key role in the heat transition. They can promote the transition and accelerate the process, or they can hinder it (Lindberg & Kammermann, 2021). Stakeholder coalition are alliances of individuals or institutes that share the same beliefs (Baum et al., 2007). To find out which coalitions are formed in the regional heat transition, the advocacy coalition framework will be used to find out what their effect is on the process. According to Jacobsson and Lauber (2006), stakeholders with a similar set of beliefs work together to compete with other coalitions to get policy influence. The advocacy coalition framework was initially developed for studies on the national level but is also used in EU-level studies in the past two decades (Nedergaard, 2008; Von Malmborg, 2023). This study focuses on regional sustainable energy policy, and the advocacy coalition framework is chosen to find out which coalitions exist in the heat transition and what their influence is in RES regions in the province of North Brabant.

This research will focus on the heat transition of RES regions Hart van Brabant (HVB), Noordoost Brabant (NOB), Metropoolregio Eindhoven (MRE), and West Brabant (WB). RES regions HVB, MRE and WB have an RSW committee and NOB does not have an RSW committee. Within the field of heat transition, the focus will be the interactions between the stakeholders in a RES region to find out how they affect the heat transition. This subject is chosen because heat transition is a relatively new subject. In the Netherlands the focus has been on solutions, the participation of citizens or the implementation of data-driven policies. The goal of this research is to compare the process and outputs of four RES regions with each other. Furthermore, the goal is to analyse which RES stakeholders are working together in a coalition to see their shared beliefs reflected in the RES of their region.

This has resulted in the following research question:

What is the influence of coalitions in the process of creating heat transition strategies for the Dutch regional heat transitions?

## 2. Background and literature review

This Chapter consists of two parts. The first part will explain how the gas infrastructure was created in the Netherlands and how natural gas became vital for heating houses and buildings. This will also show how the Netherlands got locked in by depending on natural gas. The second part of this chapter explains how the energy transition and the heat transition were started in the Netherlands. Furthermore, the formation of the RES regions is described, and the role of the distribution grid operators is explained.

### 2.1. Discovery and use of natural gas in the Netherlands.

Natural gas as primary heating was introduced not so long ago in the Netherlands. Before the discovery of the Slochteren gas field in 1959, coal and oil were used as heating sources. However, in 1950 natural gas was already used on a small scale for cooking and lighting. Natural gas that was used before 1959 was a by-product of the oil industry or from the gasification of coal (Roberts & Sovacool, 2019). Using natural gas was more desirable than using coal because coal needed to be delivered by hand and controlling the temperature was difficult. Furthermore, natural gas was seen as a clean source of heating energy. Before natural gas could be used by everyone in the Netherlands a new gas infrastructure needed to be created. The Dutch government made a deal with Nederlandse Aardolie Maatschappij (NAM) (which is a coalition of Shell and Exxon) and the national gas company SGB in 1954 (Riemersma et al., 2020). With the combined forces of this collaboration, it was possible to connect most of the Netherlands to the natural gas infrastructure.

Arrangements over the revenue streams from the Groningen gas field were made in 1962. This was later called the “Dutch gas building”. The production of gas derived from the Groningen gas fields was coordinated by NAM. The purchases and sales of gas were coordinated by a newly created venture called Gasunie. Gasunie also operated the high-pressure transmission network. At that time, Gasunie was owned by four different parties. Dutch state mines (DSM) had a share of 40%, Shell and Exxon both had a share of 25% and the last 10% was owned by the Dutch government (Riemersma et al., 2020). Gasunie started to sell gas to everyone who needed it. From households to large companies and later other countries that could use natural gas. The gas infrastructure was spread throughout the Netherlands. The discourse was that as much gas as possible should be used because nuclear energy would become the leading energy provider around the year 2000 (Correje, 2011). Figure 1 gives an overview of which organisations were/are responsible for the different steps in the Dutch natural gas industry.

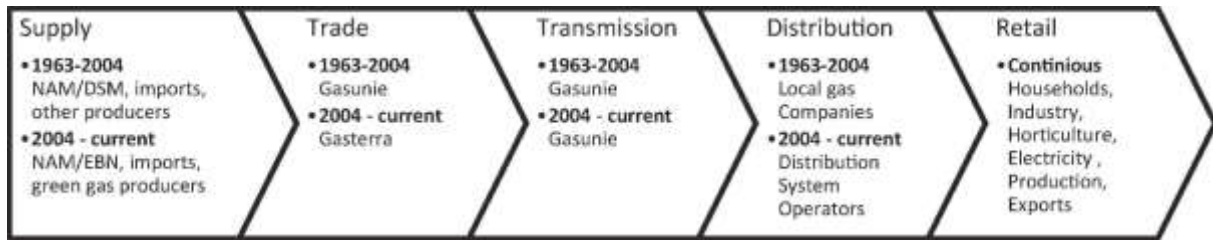


Figure 1 is an overview of the involvement of the different stakeholders in the natural gas industry of the Netherlands from 1963 till now (Riemersma et al., 2020).

The use of natural gas is deeply embedded in the social, political, and economic structures (Unruh, 2000). Due to the involvement of institutions, technological factors, and path-dependent processes natural gas has become the most important energy carrier for heating in the Netherlands (Roberts & Sovacool, 2019).

## 2.2. The Dutch energy transition.

The Dutch energy transition was publicly announced in 2013 and was developed in time. The development of the energy transition and what it meant for the heat transition is described among three important points in time. Furthermore, the formation process of the RES regions in the Netherlands is important because it can give a better understanding of the collaborations in a RES region. The last point that is described is the role of the distribution grid operator. The distribution grid operators have an important role in the energy transition due to the high amount of grid congestion.

### 2.2.1. The Energy agreement.

The start of the energy transition in the Netherlands was publicly announced in September 2013. This was done through the publication of the “energieakkoord voor duurzame groei” (energy accord for sustainable growth) (SER, 2013). The energy accord was initiated because the Netherlands was left behind in the transition to sustainable energy sources. Back then 4%, of the energy mix was sustainable. This was a lot lower than most other European countries. Further, the accord was also meant to give an impulse to the economy and create more employment opportunities (Van der Staak & Schilder, 2022). The energy accord contained five goals:

1. A reduction in the annual energy consumption of 1,5% per year;
2. An extra 100 Petajoule energy saved by 2020;
3. 14% of the energy mix needs to be produced sustainably by the year 2020;
4. 16% of the energy mix needs to be produced sustainably by the year 2023; and
5. At least 15000 extra full employment jobs per year;

The goals were also translated to the heat transition in the urban environment. The heat transition was focused on saving energy by insulating houses and making people more aware of their energy and heat



consumption. Furthermore, the transition from natural gas to sustainable alternatives was the second goal of the energy accord for the heat transition (SER, 2013). The transitions targeted individual houses and homeowners (Van der Staak & Schilder, 2022).

### 2.2.2. The climate agreement.

After the Paris Agreement in 2015, the Dutch government started with the formulation of the Dutch climate accord. The climate accord was presented on the twenty-eighth of June 2019 (Van der Staak & Schilder, 2022). The climate goals that were set for 2030 are stated in the Climate Agreement. The main goal of the climate accord is to reduce CO<sub>2</sub> emissions by 49% in 2030, compared to the emissions in the reference year 1990. To achieve this, the government has made agreements with five of the most CO<sub>2</sub>-emitting sectors, which are electricity, urban environment, industry, agriculture, and the transport and mobility sectors. The urban environment needs to realise a 3,4 megaton CO<sub>2</sub> reduction (with 1990 as the reference year) in 2030. To achieve this goal 1,5 million houses, need to become more sustainable and ultimately be heated with an alternative energy source. Further, the CO<sub>2</sub> emissions from the construction of houses need to be reduced by 1 megaton of CO<sub>2</sub> (Rijksoverheid, 2019). The big difference with the strategy for the heat transition is that it is focused on a collective approach instead of an individual one. The lead is given to the municipalities that must work out their heat transition vision. The government has chosen a local approach instead of a national one because municipalities know more about the needs and wishes of the people (Dignum et al., 2021).

### Regional energy strategy

The heat transition is mostly orchestrated by the municipalities. However, the energy transition is organised by a regional committee. These regional committees are called “Regionale Energie strategies” (regional energy strategy) or RES. All the municipalities of the Netherlands are part of one of the 30 RES regions. These regions are formed to make it easier to work together as municipalities and share ideas. Besides municipalities other parties that are important for the energy transition are part of the RES committee. Examples of other parties are waterboards, electricity producers, and electricity distribution companies (Werkwijze - Regionale Energiestrategie, n.d.).

The Dutch government carried out investigation research for the forming process of the RES regions. After the investigation, the concept was shared with the municipalities. The municipalities had then to choose whether they wanted to work in the regions that were created in the concept or whether they wanted to work together with a select group of neighbouring municipalities. After this process, the RES regions were formed and operative (Werkwijze - Regionale Energiestrategie, n.d.).

### 2.2.3. Energy crisis

The prices of electricity, gas, gasoline, etc. were rising at the end of 2021. The energy costs of a household were on average 86% higher than the year before. This situation was the result of a couple of

situations that came together. The Dutch economy was recovering from the COVID-19 pandemic. Furthermore, the winter of 2021-2022 was cold, so people needed more energy to heat their houses. The third and maybe most influential reason was the war between Russia and Ukraine. The war, in combination with a low gas reserve, made the gas price rise drastically. On top of that, Russian gas company Gazprom did not want to export gas to the Netherlands anymore because the Dutch gas trade organisation GasTerra did not want to pay for gas with the Russian valuta (Van der Staak & Schilder, 2022).

The combination of these events made the energy prices go up. The high energy prices created financial problems for many households. The number of energy-poor households was growing. This meant that the number of households that could not pay their energy bill anymore was growing. The Dutch government tried to lower the energy prices by lowering the tax and excise. Besides that, the Dutch government created a subsidy for homeowners that would insulate their houses to save energy (Ministerie van Algemene Zaken, 2022).

Besides the help for people who struggle to pay the energy costs and subsidy for house insulation, the subsidy for heat pumps increased from 20% of the investment cost to 30% (Ministerie van Economische Zaken en Klimaat, 2023). Further, using a heat pump became a cheaper alternative for heating a house than using natural gas. Heat pumps became more popular and interesting and led to a waiting list for homeowners to place one (Tebbens & Nijland, 2023). However, the number of homeowners who installed a heat pump was growing and at the same time, more and more solar panels were installed. This led to an overload of the electrical distribution grid. Because the maximum capacity of the distribution grid was reached the distribution operators got a central role in the energy transition (Tennet, 2022).

### The Role of Enexis

The information in the paragraph is based on an interview with an employee of Enexis.

Enexis has a direct interest in the heat transition. Enexis is the electrical and gas grid operator for the province of North Brabant. Enexis works together with the four RES regions and municipalities in North Brabant. Enexis needs to know which alternatives from gas heating are selected for the various neighbourhoods. If an all-electric solution is chosen, this means that the electricity grid will have to be reinforced to cope with new amounts of voltage. Due to the war between Russia and Ukraine, gas prices have risen and, as a result, Enexis saw an increase of private rooftop solar to save on energy costs. This has led to the problem that the distribution grid has reached its maximum capacity. Because the maximum capacity of the distribution grid is reached new companies cannot get a connection to the grid for now. This also means that if a municipality decides to select an all-electric solution as an alternative to gas heating this is not possible (Employee of Enexis, personal communication, 23<sup>rd</sup> of May 2023).

Enexis works closely with RES regions to get more information about the concrete plans of the RES regions and municipalities. If a municipality has decided which neighbourhoods will be switched to an alternative for natural gas it is important to give a notification to Enexis. Based on those plans, Enexis can start adapting the grid in the spots where it needs extra capacity. Enexis cannot decide on their own where they start modifying the grid at their initiative. Enexis is funded with social money which means that they have to justify why interventions are needed for every place. If a municipality decides to switch to an electric way of heating, this must be made known well in advance because Enexis needs months to years to complete the adjustments. Furthermore, it is important for Enexis that the municipality's plans become concrete soon so that Enexis can determine its strategy for the coming years. In the meantime, Enexis is trying to encourage municipalities to also focus on insulation. They do this because natural gas can be used for high-temperature heating, which means you don't have to insulate well to still have a comfortable temperature in your home. With low and medium-temperature heating, it is needed to insulate a house or building properly to reach the same level of comfortable heating (Employee of Enexis, personal communication, 23<sup>rd</sup> of May 2023).

Enexis also advises and facilitates municipalities when they come up with new plans. Enexis tries to see what the plans are and tries to give advice and an idea of how well it can facilitate these plans in the future. Finally, Enexis tries to deploy generated energy as close as possible to the place where it is generated. This simply saves costs (Employee of Enexis, personal communication, 23<sup>rd</sup> of May 2023).

### 3. Advocacy coalition framework

The advocacy coalition framework (ACF) was developed by Sabatier and Jenkins-Smith in 1988 to explain the complex environment of policymaking. ACF describes how policies are formulated and how they change over time due to the interactions of various policy actors. ACF assumes that policy actors with shared beliefs and values form coalitions and try to become the dominant coalition in the political subsystem and see their beliefs back in new or adjusted policies. ACF consists of three main components which are policy subsystems, policy change, and advocacy coalitions (Sabatier, 1998). These three components are explained below.

A policy subsystem is an issue-specific network. In the case of this research, the heat transition is the subsystem in which the Dutch government has created the heat transition strategies and actors from different institutions have an interest. Coalitions compete to dominate the subsystem and put their beliefs into practice (Sabatier, 1988). According to Sabatier (2019), policy change does not happen through a governmental institution in modern industrial society. Instead, policy changes happen when a variety of actors from public and private organisations work together to change a specific policy problem that concerns them. When policy actors have shared beliefs about a policy problem they can work together as an advocacy coalition. Sabatier and Weible (2007) describe three levels of beliefs. The first level of belief is deep core beliefs. Deep core beliefs consist of the norms, values and assumptions that make a person or institution. Deep core beliefs are almost impossible to change. The second level is the policy core. The policy core is a set of strategies and standpoints that are used to pursue the values in the deep core beliefs. The policy core is slightly easier to change than the deep core beliefs. The third and last levels are the secondary aspects. The secondary aspects cover just a part of the subsystem. These are the easiest to change or give up if this is better to reach the values of the deep core belief. Advocacy coalitions can consist of policymakers, interest groups, and experts. The mix of people and levels of the profession in an advocacy coalition differs a lot. The people who form an advocacy coalition need to have the same deep core beliefs. A deep core belief is the only level of belief that is stable enough over a long period. Although deep core beliefs are hardly changing it is possible. Advocacy coalitions are not fixed and can change over time when existing actors change their beliefs or when new actors enter the subsystem (Weible et al., 2009). Another way that can lead to a change of deep core beliefs is shock. A shock or external event is an event that moves public opinion away from or towards the deep core beliefs of a coalition (Weible et al., 2005). An external event that has changed public opinion on the heat transition is the war in Ukraine which is described in paragraph 2.2.3 Energy crisis.

Figure 2 presents an ACF overview. On the left, there are two sets of variables. The first set of variables is stable and the second is more dynamic. External factors influence the opportunities that actors of the subsystem have (Sabatier, 1988). Heat transition policies are not sufficient for municipalities due to a lack of information that is protected by privacy legislation (Van Schie et al., 2022). Other dynamic

factors are a change in public opinion or the fluctuation of the gas price. According to Sabatier (1998), it is assumed that in a subsystem, actors are divided into several groups with the same narratives and beliefs. Most subsystems have two advocacy coalitions. There can be more coalition in a subsystem but more than four is rare (Sabatier, 1988). After the establishment of an advocacy coalition, the coalition starts to form or adopt a strategy that includes institutional innovations that suit the beliefs of the coalition. An advocacy coalition needs resources in order to reach its goals over the other coalition. According to Weible (2006), the ACF has six categories of resources that can be used:

1. "Access to legal authority to make policy decisions".
2. "Public opinion"
3. "Information"
4. "Mobilizable troops"
5. "Financial resources"
6. "Skillful leadership"

When coalitions have conflicting strategies, a policy broker has the responsibility to mediate and find a fair compromise. One or more governmental programs could be the result. The governmental programs will produce policy outputs, which are mediated by some factors and result in a variety of impacts on the problem that where targeted.

This research will focus on the shared beliefs of coalitions. This part of the ACF takes place inside the policy subsystem. This decision was taken because the heat transition is slowly getting more attention and municipalities are beginning to speed up the process, but there is no local policy output yet. Because of this, the study will focus on shared beliefs and the formed coalitions inside the policy subsystem.

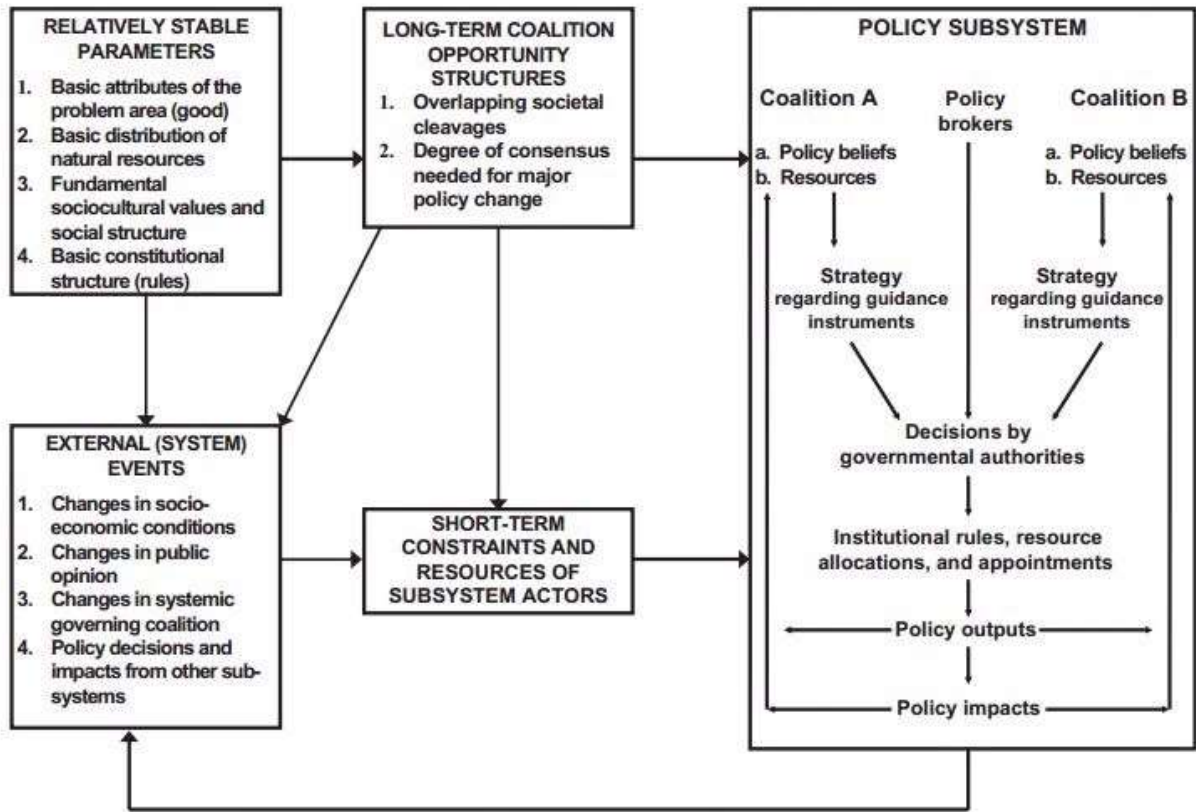


Figure 2 2007 model of policy change focusing on competing advocacy coalitions within a policy subsystem (Policy Concepts in 1000 Words: The Advocacy Coalition Framework, 2019)

### Use of advocacy coalition framework in the past.

Heat transition is a relatively new subject. Besides that, it is also a part of the bigger energy transition. There are 53 studies done and published on Scopus that have been related to the heat transition. However, none of these studies have included ACF. Although ACF is not included in heat transition studies it was part of 10 energy transition studies that have been done between 2016 and 2022. The useability of ACF in combination with heat transition will be tested in this study since this is one of the first times these two are combined.

## 4. Methodology

### 4.1. Case selection

Every RES region in the Netherlands had to create their Regional Energy Strategy Version 1.0 (RESV1). This document describes what the vision is for the energy transition in the region and how they are going to facilitate it. The heat transition is seen as a component of the energy transition. Most of the RES regions have written a separate chapter about the heat transition in the RESV1. RES regions Hart van Brabant, Noordoost Brabant, West-Brabant, and Metropoolregio Eindhoven have written a separate RSW chapter in their RESV1. RES region HVB, WB, and MRE also have multiple heat sources available in the region that can provide heat to more than one municipality. RES region Noordoost Brabant does not have a heat source that can provide heat to more than one municipality in the region. More information about the RES regions is given in Table 1.

*Table 1 general information on the RES regions.*

	HVB	MRE	WB	NOB
<b>Number of municipalities</b>	9	21	18	10
<b>local heat sources</b>	Yes	Yes	Yes	No

Furthermore, these four regions are chosen because they are in the same province. Selecting four regions in the same province will filter out the variable of difference in provincial policies. This decision is taken to make it possible to focus on the different approaches of each RES region without having to make a difference in provincial policies.

The last reason why these four regions are chosen is because the researcher has contacts within the heat transition which makes these RES regions more accessible. Due to a research time of ten weeks, it was important to use the available time as sufficient as possible.

### 4.2. Data collection

Semi-structured interviews are used to get better insight into how the RES coalitions formed the RESV1. Semi-structured interviews were selected as a data collection method in this research because it gives the interviewer the chance to dive deeper into specific subjects. This is the main reason that semi-structured interviews are chosen over surveys. The semi-structured interviews aimed to get a complete understanding of the beliefs and opinions of the interviewees. The list with preset questions can be found in Appendix 1. Interview Questions. The questions are used to introduce a subject during the conversation. Furthermore, the interviewer tried to say as little as possible to avoid sharing the opinions of the interviewer (Hackett et al., 2016). The interviews focused on the collaboration of the different

actors in the process of the heat transition. The main goal is to find out who is working together and what they want to achieve with the collaborations within the heat transition.

The seven interviews with people from different municipalities and RES directions were held between the 26<sup>th</sup> of May and the 15<sup>th</sup> of June. Each RES region has at least one interview that represents the region. Six of the seven interviews were with people who work for a municipality in one of the RES regions or with a person who works for the direction of an RES region. The role of each interviewee is given in Table 2. The interview code in Table 2 refers to the interviews and is used to indicate which part of the results is based on which interview. Some of the interviewees asked to stay anonymous and not share the transcripts of the interviews. Due to the privacy of some interviewees, the decision is made that all the representatives of the RES regions stay anonymous in this research.

*Table 2 the functions of the interviewees.*

<b>RES HVB</b>	Heat transition strategist for the municipality of Heusden.	Interview 1
<b>RES HVB</b>	Transition director for RES HVB.	Interview 2
<b>RES MRE</b>	Heat transition strategist for the municipality of Someren.	Interview 3
<b>RES NOB</b>	Heat transition strategist for the municipality of Land van Cuijk and chairman of the heat transition work group of RES NOB.	Interview 4
<b>RES NOB</b>	Heat transition employee for the municipalities of Boxtel and Sint-Michielsgesel.	Interview 5
<b>RES WB</b>	RES director.	Interview 6

The seventh interview was with a representative of distribution grid operator Enexis. Due to grid congestion problems in the province of North Brabant Enexis is an important partner in the Heat transition for the municipalities. The results of this interview are already presented in paragraph 2.2.3 Energy crisis. This is done because the role of Enexis is the same for every RES region only the way of collaborating is different.

There are no interviews with stakeholders who work in the private sector. This is the case because it was difficult to get in touch with stakeholders in the public sector and there was not enough time left to talk to stakeholders from the private sector.



### 4.3. Data analysis

The analysis was performed in the following order. Each interview was transcribed using Amberscript and was checked by the researcher. Before an interview could be coded it needed the approval of the interviewee. The transcript of each interview was then coded. Atlas.ti was used as coding software for this research. Before the coding process was started a codebook was created. However, the codebook was not set in stone and codes could be changed or added to the codebook if this was needed. The codes that were added to the codebook were returning topics in all or most of the interviews. The codebook can be found in Appendix 2. Codebook.

The first step of the coding process was to code as many parts of the transcripts that only reflect the data. The focus lies on small pieces of code in the beginning because it is easier to connect smaller pieces than separate bigger pieces later in the process. Unusable codes are deleted or combined with other codes when all transcripts are coded (Deterding & Waters, 2021). After the coding process, the codes are divided into three categories. The first category describes the situation, the second category describes the beliefs and discourses of the stakeholders, and the third category describes the outcome of the interactions that took place (Boer, 2011). After this step, the ACF was used to analyse if the municipalities of a RES region form a coalition. A coalition of all municipalities in a RES region is seen as a RES coalition. A RES coalition can only exist if all municipalities work together towards the heat transition goals. Besides a RES coalition, a RES region can have sub-coalitions that focus on specific heat transition problems inside a RES region. The names of the sub-coalitions in this research are based on the main subject that they focus on. The influence that the coalitions have on the process is analysed to find out what their influence is on the regional heat transition progress and policy (Sabatier, 1988).

### 4.4. Research Ethics & Positionality

#### 4.4.1. Research ethics

To prevent ethical issues from emerging, a few rules are determined and explained here. First of all, everyone who was contacted for this research was free to participate in this research. The persons that were contacted for the research got an introduction about the research and what the goal was. Interviewees got the predetermined questions in advance of the research to prepare themselves for the interviews. Before the start of an interview, interviewees must sign the consent approval. Interviewees were always free to leave the interview at any given moment. Further, if an interviewee does not feel comfortable with statements that he/she made it was their choice if it could be used or not in the research. The transcript of the interview was sent to the interviewee to get approval before it could be used for the data analysis. The transcripts of the RES interviewees are not shared in the appendix because the interviewees asked to keep the transcript confidential. Interviewees were not rewarded for their participation in this research. The collected data will be stored on a BMS lab tech4people server

environment that was only accessible to people involved in this research. The recordings of the interviews were destroyed directly after finalizing this research.

#### 4.4.2. Positionality

Before I started the MEEM programme, I finished an environmental sciences bachelor's at an applied science university. During my study, I focused on the technical subjects, because I was more interested in that side of the programme. After this study, most of my knowledge in environmental sciences was technical. Because I had no relevant experience on the socio-economical side of environmental sciences, I decided to apply for the Meem program. This has led to this thesis research. Due to my background, I can sometimes focus more on technical solutions. That is why I have chosen research that is almost completely focused on social interactions to get more experience in the social field of environmental sciences.

## 5. Results

Table 3 shows an overview of ACF aspects and the RES regions. Each RES region has a separate paragraph that will explain the content of Table 3. RES coalition is also mentioned in Table 3. This means that all municipalities working together in the RES region or not. The input of Enexis is woven into the different parts. The part over the sub-coalition Amernet will be explained in the paragraph of WB because just a small part of HVB is part of that sub-coalition.

Table 3 Overview of ACF topics inside the RES regions

	HVB	NOB	WB	MRE
<b>RES coalition</b>	X	-	X	X
<b>Beliefs</b>	Doing it together, Landscape system.		Action orientation, involvement	
<b>Sub coalitions</b>	Insulation, Sustainable heat production, Sustainable energy regeneration, Amernet.	Rural areas, Struggle with the heat transition	Amernet, Greenhouses Steenbergen, Green gas, Rural municipalities,	Greenhouses Someren, Smart business park,
<b>Expert team</b>			X	X

### 5.1. RES Hart van Brabant

The nine municipalities that are part of RES HVB work together as if they are one municipality. Working as one municipality means that the municipalities work out multiple municipal tasks together. These tasks can be inside or outside the heat transition. The commitment of the municipalities and the involvement of the directors of the RES make it a strong coordinated RES coalition. The RES strategy was formed by all nine municipalities. Because they have formed the strategy together, they stand for it and want to roll the strategy out together. Furthermore, they also want to work with other RES coalitions to share more knowledge. This makes the HVB coalition a collaborative coalition. The belief of RES HVB is doing it together. The municipality of Tilburg is showing this the most inside the coalition. The municipality of Tilburg is the largest municipality instrument of residents in the coalition. Besides that, it also has the most people working assigned to municipal heat transition. However, they have one problem. The municipality does not have enough space to be self-sufficient. This makes it important for the Municipality of Tilburg to work together with the other municipalities to make sure that they also can make the switch to sustainable heating sources. Instead of helping the other municipalities with

using surface areas the municipality of Tilburg helps the other municipalities by sharing knowledge and employees. This shows that the municipality of Tilburg needs the rest of the municipalities and does its best to keep the coalition together (Interview 2).

The HVB coalition has chosen to use the landscape strategy to divide all the needed measures for the heat transition. This means that solutions are placed in the right place in the landscape. For example, location x can have 5 wind turbines generating energy for 4 different cities that need more energy due to the implementation of heat pumps, but location x is chosen to place the wind turbines because it is the most optimal place. This also means that municipalities that do not have an opportunity can benefit from those that do within the RES region (Interview 2).

**Sub coalitions**

There are four sub-coalitions inside the HVB heat transition subsystem. The beliefs of these sub-coalitions are explained in this paragraph. An overview of the sub-coalition in RES HVB is given in Table 4.

*Table 4 overview of the sub-coalitions that are formed in RES HVB and which actor is connected to the sub-coalitions.*

Sub coalition	Actors
<b>Insulation</b>	The Municipality of Heusden, experts, housing corporations
<b>Sustainable heat production</b>	The municipalities of Gilze-Rijen, Hilvarenbeek, and Goirle
<b>Sustainable energy generation</b>	The municipalities of Tilburg, Dongen, Heusden, Loon op Zand, Oisterwijk, and Waalwijk

5.1.1. Insulation

Insulating a house is an important part of the heat transition. Because keeping heat better inside a house means that less heat from a heat source or electricity for a heat pump is needed. Although this sounds logical it is not always applicable immediately. Bats and birds build nests in the cavity wall of houses. Due to the nature protection law is it not allowed to kill animals or disturb them in their habitat (Ligtvoet & De Gee, 2023). This problem led the municipality of Heusden to start research to find out how they still can insulate houses without breaking the law. The municipality of Heusden has formed a coalition with experts and housing corporations. They are now working together to find out what they can do to solve the problem and contribute to the goal of insulating 2 million houses in the Netherlands before 2030 (Interview 1).

5.1.2. Sustainable heat production

The municipalities of Gilze-Rijen, Hilvarenbeek, and Goirle have the opportunity of using heat sources. This shared opportunity created they are now forming a coalition to create their local heat network. The

coalition exists between the three municipalities and the network operator Enexis. The goal is to use the heat source in the most optimal way so that the number of houses that need a heat pump is minimized. This is important because of the grid congestion that Enexis must deal with. So, less electrification of houses is in favour of Enexis because they can change the distribution network more gradually. Furthermore, this lowers the pressure on the energy-producing places because they need less energy (Interview 2).

### 5.1.3. Sustainable energy generation

The municipalities of Tilburg, Dongen, Heusden, Loon op Zand, Oisterwijk, and Waalwijk are focused on the generation of sustainable energy. These municipalities do not have the opportunity to use local heat sources. The municipality of Tilburg makes use of the Amernet. This is a heat network that provides heat for 5 municipalities. The municipality of Tilburg is the only municipality in RES HVB that is connected to Amernet. However, the heat that is provided by Amernet is not enough for the municipality of Tilburg to switch to natural gas. Because of this reason, the municipality of Tilburg is joining this coalition. The municipalities need sustainable energy to match the energy needed for electrification. Enexis is also part of this coalition because they have a better view of where sustainable energy measures like wind or solar energy can be placed. Furthermore, by working together with the municipalities Enexis gets to know the concrete plans of the municipalities and can help to improve them. This makes it also possible for Enexis and the municipalities to roll out the plans more fluently (Interview 2).

## 5.2. RES Noordoost Brabant

The ten municipalities of RES NOB do not form a heat transition coalition. This happened due to a non-cooperative attitude of the two urban municipalities 's-Hertogenbosch and Oss at the beginning of the process. Both municipalities did not want to solve the problems of the smaller and more rural municipalities. This attitude has led to resistance by the other municipalities that did not want to work together with 's-Hertogenbosch and Oss. Besides that, the municipalities of 's-Hertogenbosch and Oss have enough resources to be self-sufficient till 2030. However, collaboration between the other eight municipalities is also not happening. There is an initiative to invest in the relations between the municipalities. The only collaborations that happen are between neighbouring municipalities. The municipalities of Land van Cuijk and Meierijstad are trying to stimulate collaborations between the smaller rural municipalities, but they get no feedback (Interview 4).

Another problem with the heat transition in RES NOB is that the heat transition is not as important as other subjects of the energy transition. This makes it difficult to create more awareness about the heat transition and that is often not mentioned in the RES meetings. RES NOB is focussing more on the sustainable generation of electricity. Besides that, the collaborations with the workgroup energy saving are also not exciting. This makes it difficult for the people who work inside the heat transition in RES NOB to find allies (Interview 4).

Due to the absence of local heat sources is RES NOB forced to focus on electrification via heat pumps or the use of green gas. To make this a concrete plan the municipalities must work together with distribution operator Enexis. However, Enexis is not familiar with the role they have in the heat transition. They would like to get concrete plans from the municipalities so that they can start with the modifications of the distribution network if this is needed. However, municipalities are not able yet to create concrete plans which means that Enexis cannot start. Although Enexis wants to know the plans of the municipalities as soon as possible they are not represented at all RES heat transition meetings which are once every four weeks (Interview 5).

**Sub coalitions**

There are two sub-coalitions inside the NOB heat transition. The beliefs of these sub-coalitions are explained in this paragraph. An overview of the sub-coalition in RES NOB is given in Table 5.

*Table 5 overview of the sub-coalitions that are formed in RES NOB and which actor is connected to the sub-coalitions.*

Sub	
<b>Rural municipalities</b>	Municipalities of Bernheze, Boekel, and Maashorst
<b>Struggle with the heat transition</b>	Municipalities of Boxtel, Land van Cuijk, and Sint-Michielsgestel

**5.2.1. Rural municipalities**

The province of North Brabant has created a solid policy structure for the urban areas in the province. Policies for rural areas are not at the level of the urban areas. This makes those more rural municipalities feel not appreciated and do not like to work on policy themes that are initiated by urban municipalities. This makes the municipalities of Bernheze, Boekel, and Maashorst not willing to work together because they feel threatened by the urban policies and create resistance against subjects like the heat transition or making the municipality more sustainable (Interview 4).

**5.2.2. struggle with the heat transition.**

Inside RES NOB there are a couple of municipalities that struggle with the heat transition. The municipalities of Boxtel, Land van Cuijk, and Sint-Michielsgestel are struggling with the creation of concrete plans for the implementation of the heat transition. Due to the non-existing collaborations between the municipalities in RES NOB, they must reinvent the wheel all by themselves (Interviews 4 and 5).

**5.3. RES West-Brabant**

The eighteen municipalities of RES WB are forming one RES coalition. The collaboration between the municipalities is created due to incentives of the RES direction. The RES direction of RES WB tries to help the municipalities if they can or when the municipalities ask for help. The help can be in the form

of research or with the help of an expert team that can help the municipalities with the process. The help of RES direction has helped the municipalities with the start of the heat transition. The beginning was difficult for every municipality. The heat transition process is now up and running due to the help of the RES direction and the collaboration between all municipalities. The municipalities like the collaborations with each other and the RES direction because all actors believe in the action-oriented mindset and every actor feels involved in the process (Interview 6).

Enexis is one of the heat transition partners. Once every two weeks there is a meeting with all the heat transition partners. Enexis needed to adapt to the new situation in which they are now. They also need to work on their communication to create a better understanding of the grid congestion problems inside RES WB. The municipalities are not fully aware of the scale of grid congestion problems. This makes it difficult for the municipalities to create concrete plans and Enexis can start without the input of concrete plans from the municipalities. so, the communication between Enexis and the other RES actors is a weak link in the RES WB coalition (Interview 6).

### Sub coalitions

There are five sub-coalitions inside the WB heat transition. The beliefs of these sub-coalitions are explained in this paragraph. An overview of the sub-coalition in RES WB is given in Table 6.

*Table 6 overview of the sub-coalitions that are formed in RES WB and which actor is connected to the sub-coalitions.*

Sub coalitions	Actors
<b>Amernet</b>	Municipalities of Breda, Drimmelen, Geertruidenberg, Oosterhout and Tilburg, EnNatuurlijk, province of North Brabant, Enexis, housing corporations
<b>Greenhouses Made</b>	Municipality of Drimmelen, the farmers of Made,
<b>Greenhouses Steenberg</b>	The municipality of Steenberg and the farmers of Steenberg
<b>Green gas</b>	The municipalities of Alphen-Chaam, Rucphen, and Zundert
<b>Rural municipalities</b>	The rural municipalities of RES WB

#### 5.3.1. Amernet

The Amernet network is a heat network that is connected to five municipalities. The municipalities of Breda, Drimmelen, Geertruidenberg, Oosterhout and Tilburg are connected and can heat houses and companies with the help of the heat network. The five municipalities work together with operator EnNatuurlijk, the province of North Brabant, Enexis and housing corporations to use and improve the heat network now

and in the future (Gemeente Drimmelen, n.d.). The heat network is important for the region because it means that there is less energy needed to heat houses and companies (Interview 6).

#### 5.3.2. Greenhouses Made

Inside the town Made (municipality of Drimmelen) there is an area with a high density of greenhouses. Greenhouses need a constant amount of energy for the optimal growth of the crops. The farmers who cultivate the crops want to make sure that they can use their greenhouses in the future. Because of this reason, they want to make a connection to the amernetwork. It is not possible for now to make this connection because the other actors do not want to give up a part of the heat, they get from the Amernetwork. The farmers and the municipality of Drimmelen have started the initiative to search for extra heat sources that can be added to the Amernetwork. This approach has led to conversations with potential parties that can deliver extra heat to the amernetwork (Interview 6).

#### 5.3.3. Greenhouses Steenberg

Like Made, Steenberg also has an area with a high density of greenhouses. However, there is no heat network in this area. The municipality of Steenberg and the farmers are now doing an investigation into the start of a heat network. The goal of this investigation is to find out if it is possible to create a heat network that gives the farmers more certainty about their future and can be used in nearby cities. The biggest challenge of this problem is that no party is willing to invest in the project yet (Interview 6).

#### 5.3.4. Green gas

The municipalities of Alphen-Chaam, Rucphen, and Zundert are working together with farmers to find out if green gas can be an alternative to natural gas. These three municipalities are more rural and do not have the most advanced electrical infrastructure. Due to the disadvantage of the electrical infrastructure, it is easier to make use of the already existing gas infrastructure and use it for the distribution of green gas. Due to the high number of farmers, it is possible to create a local bio-digestion facility to produce green gas for the three municipalities (Interview 6).

#### 5.3.5. Rural municipalities

The Rural municipalities in RES WB have fewer people working on the heat transition than the urban municipalities as Breda example. Because of the lower work capacity and because they have similar challenges they have decided to work together and form a coalition for the RES meetings. Standing up for the rural municipalities has helped in the region because not every urban municipality is aware of the challenges and struggles of the rural areas. Working together also created a better bond between the municipalities and helped by the implementation of the heat transition for each municipality individual (Interview 6).



## 5.4. RES Metropoolregio Eindhoven

The twenty-one municipalities of RES MRE do not work directly together. There are too many municipalities inside RES MRE that this was not manageable. Because of this reason, the RES municipalities are divided into five different sub-regions. The sub-regions work closely together and have a sub-regional meeting before the RES meetings are. This has led to a pleasant collaboration inside the subregions. However, the collaborations of the subregions during the creation process of the RESV1.0 were rather slow and difficult. The collaborations between the subregions were slow and difficult because the same subjects were discussed multiple times with the same outcome as a result. This led to a bigger priority on generating sustainable energy than saving energy or the heat transition (Interview 3).

The municipalities of RES MRE wanted to work out the energy transition completely by themselves. But after one and a half years they concluded that it was too much work for the municipalities alone. A team of experts on different related subjects was created for the whole region and different tasks were delegated to consultancy agencies. This gave the municipalities some breathing room so that they could focus more on the individual heat transition (Interview 3).

There are no colliding beliefs in the area. Some actors have a pioneer function on certain subjects. These pioneers help the other municipalities and actors in the RES region in their heat transition process with new experiences and knowledge (Interview 3).

The collaboration with Enexis was new in the beginning, but the collaborations are becoming better over time. However, a bit more transparency is still needed. The municipalities are sometimes too enthusiastic about new solutions for the heat transition. Due to the slow communication of Enexis municipalities do not know if the implementation of a new measurement is possible. The collaborations with Enexis have led to more system efficiency and made the municipalities more aware of the grid congestion problems (Interview 3).

### Sub coalitions

There are two sub-coalitions inside the MRE heat transition. The beliefs of these sub-coalitions are explained in this paragraph. An overview of the sub-coalition in RES MRE is given in Table 7.

*Table 7 overview of the sub-coalitions that are formed in RES MRE and which actor is connected to the sub-coalitions.*

Sub coalitions	Actors
<b>Greenhouses Someren</b>	The municipality of Someren and Asten and the energy corporation of the United Farmers of Someren
<b>Smart business parks</b>	The municipalities of Eindhoven and Helmond and the companies on the selected business parks.

#### 5.4.1. Greenhouses Someren

An area with a high density of greenhouses is found inside the municipality of Someren. The farmers have already formed their energy corporation. The municipalities of Someren and Asten are now working together with the energy corporation to create changes for municipalities and give the farmers more certainty for the future. The municipalities and the farmers are also creating their future vision for greenhouse cultivation which will strengthen the bond of the coalition (Interview 3).

#### 5.4.2. Smart business parks

Inside RES MRE there are a couple of big business parks. Companies and the municipalities of Eindhoven and Helmond are now working together to create a more energy and heat-efficient business park. This is already done in other RES regions and the companies of the business park in RES MRE want to follow these examples. Furthermore, the business park wants to be an example for the smaller business parks that can be organised more efficiently. The business parks want to achieve this by creating a shared energy portal that can show how much energy a company needs and how much energy it is generating and distributing to the grid (Interview 3).

## 6. Discussion

### 6.1. Validation

The results of the study are based on six interviews with people who work inside the heat transition of RES regions Hart van Brabant, Noordoost Brabant, West-Brabant, and Metropoolregio Eindhoven. The interviews about the collaborations inside the RES regions have given a view of the collaborations between municipalities and other actors. Furthermore, it also showed if the municipalities of a RES region formed a RES coalition and if there were other sub-coalitions. It is possible to get a different outcome if the method of this study will be repeated. This is possible due to a different opinion of other actors in a RES region.

### 6.2. Interpretation of the results

The interviews have shown that municipalities in the RES regions HVB, WB, and MRE form a RES coalition. The three regions have different strategies for working together but the interviews have pointed out that there is a pleasant environment for working together in all three regions. The founded sub-coalitions in the RES regions are also seen as contributing initiatives to the RES strategies of the regions. The sub-coalitions are seen as a good help for the other municipalities that often struggle with the amount of work that the heat transition creates. The sub-coalitions can focus on specific parts of the heat transition. An example is the insulation sub-coalition in RES HVB. This sub-coalition is doing research about insulating houses without disturbing animals that live in the cavity wall. The results of this research are later shared with the other municipalities in the RES region in which the other sub-coalitions share the results of their research.

The representatives of RES regions HVB and WB have mentioned that working together with all the municipalities on the same governance level creates a pleasant collaboration environment. The representative of RES region MRE mentioned that the collaborations are pleasant but rather slow. This is the result of creating a sub-region within the RES region. This is done because of the large number of municipalities (21). However, this has led to more meetings in which the subjects were discussed multiple times.

The interviews of the representatives of RES region NOB showed that there is no RES coalition in that region. This is the result of a non-cooperative attitude of a couple of municipalities in the region that were not willing to collaborate with other municipalities in the RES NOB region. However, there are found two sub coalitions. But in contrast with the other three RES regions, these sub-coalitions do not contribute to the heat transition of the RES region. The first coalition is a group of rural municipalities that has resistance against new urban policies. This is not helping with the incentives to better the collaboration in the region. A second sub-coalition is a group of municipalities that are struggling with the implementation of the heat transition. This is a result of the bad collaborations in the NOB region.

The collaborations with Enexis are not fluent enough according to all interviewees. Enexis is still too busy with solving the grid congestion. This means that Enexis needs concrete transition plans for the municipalities. However, the municipalities are not so far in the process yet. This makes it difficult for the Enexis to plan their strategy and the municipalities struggle with the not sufficient communication of Enexis. This creates a bit of a barrier to moving further with the implementation of the transition plans.

An explanation of these results can be as follows. The ACF describes that advocacy coalitions with the same beliefs compete with other advocacy coalitions to see their beliefs represented in the policies of a policy subsystem (Sabatier, 1988). But RES regions HVB, WB, and MRE have one coalition of all municipalities with the shared belief that they want to tackle the heat transition together. This makes these advocacy coalitions automatically the dominant coalition in the policy subsystem according to the ACF (Sabatier and Weilbe, 2007). The sub-coalitions are not seen as a threat to the RES coalitions, because the sub-coalitions are specified to a smaller part of the shared belief of the RES coalition. This is why the sub-coalitions are seen as a good contribution to the heat transition process. Because the RES coalition of the municipalities is seen as the main coalition RES NOB does not have a main coalition in the region. There is not so much progress for the heat transition due to the lack of collaboration between all municipalities. This has even led to the formation of two sub-coalitions that have a negative influence on the collaborations and heat transition process.

This research is an addition to the use of the ACF literature because it is one of the first times that the ACF is used for a heat transition case. It has shown that it is important for the progress of the heat transition collaborations between the municipalities of a RES region is important.

### 6.3. Research limitations

This research was focused on the heat transition of four RES regions which is just a part of the RES regions in the Netherlands. It is not possible to make predictions for the other RES regions that are not included in this research. Another limitation of this research is the number of interviews. The original goal was 10 – 15 interviews. This is not achieved because it was difficult to get to speak to people who work inside of the heat transition. This shows that it is a relatively closed work field for someone who is not introduced to it. The original plan was to interview people who work inside the heat transition for the RES regions NOB and HVB. Due to no response from RES NOB, it was needed to contact the other two RES regions in the province of North Brabant to compare a minimum of two regions with each other.

After reaching out to all four regions Only RES HVB was easily accessible. The other 3 RES regions did not respond to the first emails to the general email address. Personal email addresses and name-dropping from people who work for RES HVB were needed to convince people to participate in this study. Due to the low number of respondents, it was not possible to interview two or more persons from

the same RES region. This is not ideal because, for RES WB and MRE, there is not a second interview that confirms or contradicts what the other actor said. On the other hand, the low number of reactions to the interview requests indicates that there is indeed not enough capacity for the work that must be done.

The last limitation is the research data. The research data was sometimes too focused on solutions for the Heat transition. This happened due to the personal interest of the researcher and created a distraction during the interview. Due to this, it was not always clear if there were more collaborations in a RES region.

## 7. Conclusion

This research is conducted to find an answer to the research question: ‘What is the influence of coalitions in the process of creating heat transition strategies for the Dutch regional heat transitions?’. Qualitative research about the collaborations and coalitions in four Dutch RES regions is carried out.

The results have shown that coalitions have a positive influence on the heat transition in the RES regions HVB, MRE, and WB. The RES coalitions in these regions are formed with actors who are willing to work on the same subject and want to divide the workload of the heat transition. The lack of skilled people in the sector is the main reason for most collaborations between municipalities and other regional actors. Most municipalities do not have enough employees assigned to the heat transition. Because of the high workload most of the municipalities want to share knowledge and experiences so that not every municipality has to reinvent the wheel. RES region NOB has no RES coalition due to selfish actors which is resulting in less progress of the heat transition so far and resistance against urban policies and struggles with the heat transition. Nevertheless, the municipalities of RES region NOB are struggling with the same capacity problems as the municipalities in the other RES regions.

This research has also pointed out that if a RES region has a RES coalition the sub-coalitions in the RES region also have a positive effect on the progress of the heat transition. On the other hand, there can be sub-coalitions if there is no RES coalition. In the case of this research, the sub-coalitions have a negative influence on the process of the heat transition in RES region NOB.

Out of all the collaborations that municipalities have the collaboration with Enexis is the most important. Enexis has the leading role in the progress of the heat transition due to the net congestion they must deal with. This means that municipalities must collaborate closely with Enexis to make sure that there is no miscommunication.

## 8. Recommendations

This research has given a global view of the collaborations and influence of coalitions in four RES regions in the Netherlands. This research has shown that good collaboration between the municipalities of the RES region is key for a stable heat transition process. Because of this outcome, it is suggested to make concrete agreements about the collaborations in a RES region.

For a follow-up study, it would be most optimal to focus on one RES region. If there is enough time and the actors of a RES region are willing to contribute to the research, it is possible to focus on more RES regions. Further, connecting all actors' insights to one RES region helps to create a complete view of the collaboration and will maybe show contradictions. An interesting case for a follow-up study can be the RES regions of Alblasserwaard, Goeree-overflakkee, and the Hoekse waard. These RES regions have just one or two municipalities in the area which can give a completely different view.

For the case selection of new research, it is possible to select a case on the outcome of RESV2.0. The RESV2.0 is the follow-up version of the RESV1.0 and every RES region had to present it in the third of July of 2023. The heat transition progress of 2021 and 2022 is described in this document. With the outcome of the RESV2.0, it is possible to select the RES region that booked a good process or one that is still struggling with the heat transition.

This study has shown that not all municipality members know what the goals of the heat transition are in the area and how they can make a start. Because of this, it is recommended to use more time to create a strategy that is understandable for all municipality members that are related to the heat transition. Furthermore, the heat transitions must be represented in the RES committee to create more awareness about the progression.

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## Appendix 1. Interview Questions

- Wat is uw functie in de warmte transitie van regio Hart van Brabant? En welke werkzaamheden horen daarbij?
- Welke samenwerkingen ziet u ontstaan in de regio? Met welke partijen werkt het meeste samen en waarom?
- Hoe werken de gemeente en de regio samen?
- Wat zijn de belangen van uw organisatie in de warmte transitie?
- Ziet u overeenkomende belangen in RES regio .....?
- Herkent u andere belangen die gedeelde worden door meerdere partijen binnen de regio?

## Appendix 2. Codebook

- belangen
- coalitie
- electriciteitsnet/netcongestie
- experts
- groepen
- Grote en kleine gemeente
- kar trekken
- kennis delen
- oplossingen
- policy problem
- provincie
- samenwerken
- samenwerkingstype
- warmte transitie nog niet duidelijk
- warmtebronnen koppelen
- werkgroep warmte