THE JOINT REALIZATION OF HEAT TRANSITION AMBITIONS

A COMPARATIVE ANALYSIS INTO THE CONDITIONS OF COLLABORATIVE GOVERNANCE TO FACILITATE HEAT TRANSITION IN TWO SELECTED DUTCH REGIONAL CASE STUDIES

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Royal HaskoningDHV
Enhancing Society Together

TU Delft

The joint realization of heat transition ambitions

A comparative analysis into the conditions of collaborative governance to facilitate heat transition in two selected Dutch regional case studies

by

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[1] Cover photo: Groessen, Gelderland, the Netherlands (Sander, 2019)

TU Delft

Preface

”La solidarité de fait”
”De facto solidarity”
”De solidariteit van de werkelijkheid”

- Jean Monnet (1888-1979)

The statement of the founding father of the European Union Jean Monnet summarises the essence of this topic, regional collaboration to facilitate heat transition, but also points out the alignment with the context in which the research is set and the empirical study designed. In Monnets theory member states surrender a part of their sovereignty to realise an organisation that would make it possible to exploit the resources in the most social-economical way, whereby peace and happiness could be achieved throughout the world. He foresaw that this collaboration set the foundation for friendship and ultimately led to reaching joint agreements and system adaptation. This results in transformation of human behaviour. He suggests that human nature cannot be changed, but human behaviour can be transformed by setting a new context. Although we do not have devastating wars today, the citation inspires to put his perspective on a pivotal theme in the current zeitgeist, climate change. Recently, the Dutch national government decided to develop regional energy strategy regions to facilitate the sustainable energy transition through collaboration with the society. Consequently, for this master thesis, I researched the collaboration between state and non-state stakeholders at regional scale to implement the sustainable transition towards a carbon neutral built environment.

This report is the last step in completing the Master Construction and Engineering at the Delft University of Technology. For my master thesis completion, this includes an individual report on a topic of interest, as indicated before, the facilitation of heat transition in the Dutch built environment.

In truth, this research would have been impossible without the support of the graduation committee. On my behalf I would like to thank Thomas Hoppe, Erik-Jan Houwing and Daan Schraven for their inspirational suggestions, open communication, and constructive feedback. Additionally, I praise the Royal HaskoningDHV team for Smart Urban Environment for their effort and giving me the opportunity to gain insight in the field of energy transition. In particular, I would like to thank my company supervisor Thijs Boxem. Moreover, I could not have achieved these results without the assistance of all interview participants. I appreciate their time, effort, and honesty, which is put into the interviews and together you brought life into the project. At last, I would like to thank my family and friends or in other words my free therapist, who were of signal importance throughout my entire educational career.

With this report, I have attempted to broaden my horizon in construction management, embrace the value of collaboration and become aware of my responsibility to develop a sustainable environment.

With appreciation,
T.W. Albers
Rotterdam, January 2022

Executive Summary

Climate change is an urgent issue. To tackle the climate crisis, agreements have been made at global level to stop utilisation of fossil fuels before 2050. In the Netherlands, these plans have been translated into national ambitions, in which a sustainable heat system for the built environment is mentioned as one of the most fundamental steps to achieve the objective. Therefore, this research dives into the heat transition, which entails the transformation of the heat system towards a fossil free structure. To resolve this problem, a Dutch province has consulted Royal HaskoningDHV to integrate and accelerate local policies by regional collaboration.

This thesis aims attention at the disruptions in the current heat transition context where fragmentation is a key institutional challenge. As a problem that manifests across economical, technical, jurisdictional, and social boundaries, heat transition implementation is increasingly being addressed through regional networks with state and non-state actors. In the climate agreement, municipalities are selected to direct the process of the heat transition. This fact results in focus on municipalities to facilitate joint collaborative actions with regional actors from government, industry, academia, and civil society. However, in the current situation the heat transition is stagnated. Hence, in quest to solve the practical problem, literature appoints the collaborative governance theory as a governing arrangement that engages public and non-public organisations in a collective decision-making process to implement public policy to resolve social-technical problems, like heat transition. Today, however, scholarly attention towards application of collaboration governance conditions on realisation of heat transition ambitions is scarce. The aim of the study is to provide stepping-stones for municipalities to facilitate the heat transition and provide insights into the collaborative governance theory. Through two case studies of Regional Energy Transition Strategy regions (RES) in the Netherlands, this thesis investigates the answer to the following main research question:

What strategies can municipalities use in relation to regional collaborative action in a collaborative governance setting to facilitate heat transition with insights from two selected Dutch case studies?

To answer this research question, the collaborative governance theory is applied in two regional case studies to identify, compare, and address the current barriers and opportunities to facilitate heat transition. The research is subdivided into four process steps. First, a desk study was executed to develop a theoretical framework. This entails the selection of the most suitable collaborative governance framework regarding the facilitation of heat transition at the regional scale. The integrative collaborative governance framework of Emerson et al. is selected because the perspective of actors is central, step-by-step approach and definition in which state and non-state actors are on equal footing. The structural embedding of the methodology is based upon a comparative analysis. The comparative analysis is executed based upon an empirical exploratory case study to understand the phenomena behind the problem of regional collaboration concerning heat transition within its context. To establish an overview on the entire current situation, the perspectives of a heterogeneous group of regional actors in both state and non-state stakeholders are investigated. In this case, the comparative analysis of two regional case studies into the conditions of collaborative governance is applied to define commonalities and case specific conditions to facilitate heat transition. The selected case study regions have the same kind of Dutch regulatory regime, network complexity, municipal population and have small urban centres with rural hinterland. By means of semi-structured interviews and document analysis, the behaviour and experiences of actors are illustrated in two elected regional case studies. These empirical findings are compared to clarify commonalities and case specific elements. In addition, validation sessions are held to verify these empirical results. In the fourth process step, the empirical findings are discussed by reflecting on collaborative governance theory and governmental policies to provide suitable recommendations to facilitate heat transition at the regional level.

The empirical findings demonstrate that in practice limited regional collaborative action is developed to facilitate the heat transition in the researched energy regions. The organisational structures per RES region and prior failure to address heat transition differ, however, the empirical findings show a high

number of commonalities between the studied cases. The findings indicate that the stagnation of heat transition is highly dependent on a variety of barrier conditions in the system context and minimum observation of collaborative governance regime conditions. This is explicable, due to the cyclic nature.

The indicated system barriers are inadequate policies and legal framework, high amount of uncertainty, insufficient available means (e.g., capacity), bureaucratic nature, high level of conflict, which results in a low level of initial trust and lack of pre-existing agreements. In fact, heat transition is barely discussed at regional level. Municipal authorities do not feel the urge to collaborate, since local governmental authorities perceive the heat transition as a transition at local scale. Several factors influencing this statement are the lack of programmatic policy support from the Dutch national government and individual policies of municipalities are not yet set or differ. The individual perspective of municipalities is again influenced by the rural characteristics of both selected regional case studies, in which individual solutions to implement the transition are leading. This factor and the high number of owner-occupied dwellings is an important basis for the pivotal role of the civil society to implement the heat transition. The civil society also has a significant role, due to the contention (among others caused by durable generation), which has a deterrent effect on local administrative decisions. An opportunity for collaboration is the high level of network cohesion, however, the sum of system context barriers results in a lack of drivers to initiate the regional collaboration between state and non-state stakeholders at the regional scale.

Regional governmental actors are obliged to collaborate to facilitate the regional heat structure, due to the RES policy. In this collaboration, a low level of participation is present, because the collaboration is particularly between local governmental authorities and partly with the other political responsible, the water boards and provinces. The identification of shared ambitions, joint decision-making and trust are core conditions of collaborations at the regional scale; however, these collaborative governance elements are rarely observed in both cases. This set of conditions is influenced by the barriers identified in the system context. Interlinked “gears” of principled engagement and shared motivation do not turn. In line with the other components and the high amount of system barriers, capacity for joint action and collaborative actions are hardly present. This way it became understandable that the impact of the regional collaboration and adaptation of the entire system to achieve the heat transition is still low in the researched regions.

Several barriers and opportunities were discerned to facilitate the heat transition at regional scale. To provide regional actions in a collaborative governance dynamic, this study reveals that it would be worthwhile to start with strategies addressing the barriers of the system context and first components of the collaborative governance regime: principled engagement and shared motivation. It is recommended that local authorities, in special municipal authorities, recognize the added value of regional collaboration in relation to heat transition and transform their behaviour towards collaborative governance mindset. The collaborative governance mindset entails joint decision-making of regional state and non-state stakeholders to facilitate heat transition. In this respect, another encouraging condition is the appointment of a neutral ambassador (leader). The leader can initiate the discovery of individual and shared interest between state and non-state stakeholders and might restore the feeling of trust and commitment. In this way, the interacting components principled engagement and shared motivation are addressed simultaneously. When the foundation for regional collaboration is set, knowledge and skills can be bundled to provide an overview. Then, regional targets and actions can be appointed to facilitate the national heat transition ambitions. In addition, the Dutch national government can support the regional collaboration efforts by providing more guidance and clarity. For instance, the development of a legal framework and clarity on the financial arrangements are expected to influence the system context and subsequently the regional collaboration processes.

For future studies, it is proposed that studies apply and elaborate on the collaborative governance framework and findings using distinct -preferable multiple- regional case studies. In addition, regional collaboration regarding heat transition is novel practice, therefore it would be suitable to evaluate the developing regional collaborations and thereby decision-making processes again over the coming years and from other perspectives, like projects at local scale. The role of civil society is also proven to be fundamental, therefore it would be worthwhile to explore their role, perception, and behaviour concerning heat transition at the regional scale.

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Glossary

Collaborative Governance: A governing arrangement that engage people constructively across boundaries of public agencies, levels of government, and or the public, private and civil spheres in a collective decision-making process that is formal, consensus-oriented and deliberative. It aims to make or implement public policy or manage public programs or assets in order to solve multifaceted problems or situations (Emerson, 2012 p.2; Ansell and Gash, 2007, p. 544)

Condition: A requirement relating to changes in a particular part of the system necessary for the development and the implementation on large-scale of natural gas free ambitions that can contribute to accelerate the transition to an natural gas free existing built environment. (Stutvoet, 2018, p. 24)

Governance networks: More or less stable patterns of social relations between mutually dependent actors, which cluster around a policy problem, a policy programme, and/or a set of resources and which emerge, are sustained, and are changed through a series of interactions (Klijn and Kloppenjan, 2016, p.11).

Inter-municipal collaboration: A collaboration refers to involving two or more municipalities with shared decision-making and/ or the execution of task (Feiock, 2007).

Municipal administrative power: The capability of a municipality to adequately perform the aimed results of the statutory and autonomous tasks and to establish connections within the municipalities own social network (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2009; R. de Vries et al., 2019.

Neighbourhood implementation plan (Wijkuitvoeringsplan (WUP)): The concretisation of the Heat Transition Vision per district in consensus with the involved actors (e.g. municipality, housing associations and residents). The policy document states when a district will switch off from natural sources and what the energy alternatives are (Schwencke, 2021).

Regional Energy Strategy (Regionale Energie Strategie (RES)): The Regional Energy Strategy involves the regional energy transition governance, which is in the Netherlands subdivided into 30 administrative energy regions. The RES is defined in three separate ways: a policy instrument to organize spatial integration, support tool to generate long-term actor collaboration and a policy document to describe the regional agreements from the climate agreement for Electricity, Energy efficiency and the Built Environment (Hoppe, 2021, p.95).

Regional Structural Heat (Regionale Structuur Warmte (RSW)): The regional structure vision for heat is part of the RES document. The RSW provides the consideration and deployment of the heat structure per RES region. The supramunicipal vision of RES 1.0 must include the inventory in the current and future heat demand and sources. Besides, the policy paper must have a assessment framework for the use of regional sources and their allocation and planning and an explanation of the stakeholder process (Nationaal Programma Regionale Energiestrategie, n.d.).

Supra-municipal level: A region used to describe the region level in which inter-municipal expertise is combined, risk is equalized, disputes are resolved, problem discussed and coordinated (Raad voor openbaar bestuur, 2015; Hoppe, 2021)

Sustainability: Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987)

Sustainable energy transition: the structural transition from a centralized energy system based on fossil sources to an decentralised energy system based on renewable sources including CO_2 emission reductions, an increase of rate of energy saving, and a progressively changing energy system using more renewable sources while replacing fossil sources (Hoppe, 2021, p. 85).

Transition Vision Heat (Transitievisie Warmte (TVW)) The transition vision for heat is a policy document in which each municipality must indicate which alternatives will be used to establish a fossil free built environment per district. In addition, it should include the timeframe and sequence per district.This document must be submitted before the end of 2021(Schwencke, 2021).

1

Introduction

This first chapter introduces the research. First, the current context regarding the regional collaboration to facilitate the heat transition is introduced. Second, the problem statement is defined. This results in the aim and the research objective, after which the associated research questions are presented. Then, the research design and scope of the research is defined. Next, the linkage with the master study is illustrated. Finally, the research outline is defined.

1.1. Introduction: Dealing with the Heat transition

The construction of the Delta Works, the dredging of Flevoland and the heat transition may look like a remarkable combination, however, all these phenomena have in common that there is a need for transformative action. Our ancestors set the example to use the elements as opportunities and collaborate to strengthen innovations. Today, the same way of thinking is required to defend ourselves against the danger of the present time: climate change. This mindset has its foundation in the Kyoto Climate goals of the United Nations dated from 1994, where it stated that the transition towards a carbon-neutral society or, preferably, towards a carbon-negative society requires a collective effort from all of us all (Raworth, 2018). In this context, COP21 Paris Agreement (2015) almost 200 countries agreed to limit global warming, due to possible far-reaching consequences for life on earth. This resulted in the objective to be CO_2 neutral by 2050 (de Boer, 2020). In the Netherlands, these plans have been translated into the national ambitions in the Klimaatakkoord (2019), in which a sustainable built environment is mentioned as one of the most important steps to achieve this deal (Dignum et al., 2021). The goal for 2050 is to reduce CO_2 emissions from the built environment by 95 percent compared to 1990. The intermediate goal by 2030 is to have a CO_2 reduction of 49 percent, which is equivalent to 1.5 million homes per day (de Boer, 2020). Figure 1.1, visualises all these different kinds of ambitions and policy plans. Because of the fast-approaching deadlines and increasing urgency, the Netherlands will have to accelerate to a sustainable heat system. This entails the structural transition from a centralised heat system based on fossil sources to a decentralised heat system based on renewable sources including CO_2 emission reductions, an increase of rate of heat saving, and a progressively changing heat system using more renewable sources while replacing fossil sources (Hoppe, 2021). As previously described, the heat system is one of the elements whereby transformative action is needed to fulfil the climate agreements, without this sustainable transition the target becomes unattainable.

The goals of the energy transition are generally clear, but that does not apply to the way towards it. This is the crux in the current situation towards a carbon-neutral heat system, whereby the municipal and regional approach play a pivotal role. Argued by Rotmans et al. (2000, p.15), a transition is a societal transition process in which establish a structural system change, multifaceted developments on technical, economic, environmental, social and institutional level and a long-term process, which takes at least one generation. According to the research of Dignum et al. (2021), a sustainable heat transition can be described as a complex problem, due to its high impact on almost all conditions in the built environment, large diversity of involved actors and ambiguous assumptions about what relevant solution directions are. The same line of reasoning is appointed by the research of Stutvoet (2018), which emphasises the need to address the heat transition as a complex problem, whereby interfaces

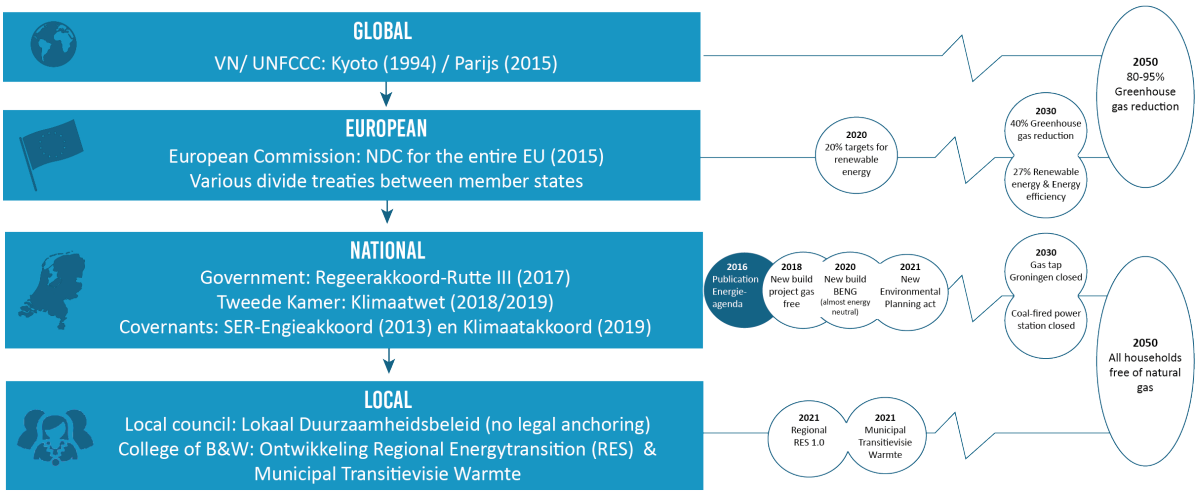


Figure 1.1: Effect of climate policy on various scales (Own illustration inspired on R. de Vries et al., 2019)

between technical, economic, legal, administrative, and social domains should not be neglected. In line with this principle, Hoppe (2021) refers to this sustainable transition as an evolution on all domains (e.g., policy, energy sources and economics).

It is not the first time the Netherlands will undergo an energy transition. In 1960, the transition from coal to gas was governed by the national government, however, in the current situation there is not one fitting technical solution for all households (Ringelberg, 2021). The Dutch national Climate Agreement (in Dutch: Klimaatakkoord) determines that municipalities have to govern the national heat transition ambitions. The local approach can be set in the context of neoliberal national political vision to delegate central governments tasks to regional or local governmental institutions. The motives behind this decentralisation of the heat transition are listed in the coalition agreement of Rutte III, which states that the energy transition must be carried out by their decentralised counterparts: municipalities. The motives include the local character of the neighbourhood-oriented solutions, preferred citizen participation during the transition and to save money in the public sector. (Hoppe et al., 2016b). Although these arguments are valid, the individual approach resulted in lack of learning from each other's threats and opportunities. The current approach is characterised by an exploration, in which municipalities, but also private parties, network operators and citizens are in the hunt for what works (Elzenga et al., 2017; R. de Vries et al., 2019). Because of this learning by doing procedures, the roll out of the heat transition resulted in major differences between approaches and the progress municipalities make within a region (Dignum et al., 2021. The study by Hoppe and Faber (2011) demonstrated that municipalities have too few instruments to stimulate and collaborate in relation to energy transition to ultimately achieve the national ambitions (R. de Vries et al., 2019). Besides, a lot of scientific knowledge has already been gained about the technical means, but these knowledge and skills are still deficient by municipalities. In addition, the transition literature of Geels (2020) does refer to the fact that pioneering efforts and gradual introduction of new systems are required to bring about social and technical change, but correspondingly alternative disciplines (e.g., private sectors) have to take action to facilitate the transformation of the old regime into new structures, as required in the heat transition.

To support municipalities with their difficult position, there is a proliferation of national, regional, and local heat transition programs, for example Programma Aardgasvrije Wijken. However, despite all current innovations and willingness of pioneering municipalities and other stakeholders, the Netherlands is not on track to achieve the reduction targets of a gas free built environment by 2050 (Ministerie van Economische Zaken en Klimaat, 2021). The studies by R. de Vries et al. (2019) and Elzenga et al. (2017) imply that there is room for development through the integration of effectives activities regarding heat transition, which goes beyond the network society: regional collaboration (R. de Vries et al., 2019; Hoppe and Miedema, 2020; Page, 2010).

To overcome fragmentation and achieve the ambitious reduction targets, there is more scholar and policy attention paid to the region as an administrative entity as it intertwines top-down policies and bottom-up initiatives. The regional policy does not form a formal administrative instrument, like

provinces or municipalities. Argued by Hoppe (2021), regional governance helps when interaction and coordination between state, municipalities and non-governmental stakeholders is required to address interlocal problems, like the heat transition. Consequently, the Dutch national government experimented with the use of a regional governance: regional energy transition (RET), which can be defined as a regional approach to entirely change the energy system. A national program was started in which thirty regional energy regions were appointed: the RES regions (Schuurs and Schwencke, 2017), as presented in figure 1.2. In this paper, the RES regions are defined as a partnership between actors within a region which collaborate to promote regional energy transition specified on heat transition. The regional structural visions for heat serve as a regional intermunicipal reference point, which have been established in the RES 1.0 completed July 2021. The RES 1.0 policy document must include per region how the regional actors contribute to the national target to become energy neutral. Plans are made about the generation of sustainable energy and, on the other hand, how a natural gas-free environment will be realised. The part of the heat transition is contained in the Regional Structure Heat (RSW), which describes the heat demand and heat supply (Nationaal Programma Regionale Energiestrategie, n.d.

The RES policy document is the political responsibility of the municipalities, provinces, and water boards. Municipal authorities are leading in the facilitation of the heat transition and pivotal for the establishment of the RES, because the Dutch Climate Agreement clarifies that the municipalities have a directing role. Given the complexity of the problem, the municipal authorities cannot transform the system on its own. In addition to the deficient capabilities, the change in the Dutch energy supply is increasingly visible. Early participation and support in the environment are crucial in this regard (Ministerie van Economische Zaken en Klimaat, 2019. Argued by Ansell and Gash (2007), the following applies to the facilitation of heat transition: strong links between state and non-state actors will initially result in a more sustainable plan to achieve long-term climate ambitions. For this reason, it is requested by the national government to also collaborate with non-state stakeholders (e.g., housing associations, civil society, companies). Regional authorities are also bound by national and legal agreements on participation, as laid down in, among others, the Dutch Climate Agreement and the Environment Act (Ministerie van Economische Zaken en Klimaat, 2019.

The regions have no constitutional value but are designated a key role in the national Program Energy Strategies (Hoppe, 2021). The regional collaboration between state and non-state actors has the advantage of increasing the effectiveness and flexibility of resources. However, the appeal of using regional collaboration including polycentric thinking is hampered by the lack of clear principles for how to operationalize it. Therefore, this thesis will address how regional collaboration can be supported to facilitate the ambitious national heat transition ambitions of a gas-free built environment by 2050.

Figure 1.2: RES regions (Own illustration)

1.2. The Problem

Transitions take place on many levels, in parallel processes and with many actors. This thesis focuses on the regional scale, because of the prescribed national government policy and beneficial opportunities. The region forms an informal network in which governments, private and social parties can fine-tune and enrich their local policy by learning from each other (Schuurs and Schwencke, 2017). Likewise, developing a strategy together requires intensive collaboration and effort. This section will provide insights in the practical relevance of collaboration in regional networks and current literature gap, which this research aims to resolve.

1.2.1. Practical Relevance: The needle not the knife

The heat transition is decentralised by the coalition agreement of Rutte III to the municipalities. The local approach causes setbacks, due to the deficient knowledge, skills, and policy instruments with the local governmental authorities. To enhance the learning capacity and scale up the heat transition, the Regional Energy Strategies are introduced by the national government. The region is a level of scale where a few explicit advantages can be gained. de Greef et al. (2015) and Hoppe and Miedema (2020) aim that solution direction of supra- and inter-municipal learning in administrative and social networks will enhance the efficiency by combining knowledge, capacity and ideas, but also retains room for local implementation (Schuurs and Schwencke, 2017). Although the energy regions are established, the facilitation of the heat transition still has to scale up, since today the Dutch national government is not on track to achieve the national heat transition targets by 2050 (Ministerie van Economische Zaken en Klimaat, 2021).

The Dutch national Climate Agreement determines the coordinating role of the municipalities in the transition towards a heat system without natural gas. This is often not realistic and does not address long-term sustainable interventions. According to the research “Warmtetransitie in de praktijk” of Dignum et al. (2021), this transition is financially, technically, politically and socially challenging in its nature. Because of these interrelated challenges, municipalities struggle with the question on how to realise national ambitions and stagnate with the current approach of individual learning along the way. The study of de Vries et al. (2019) indicates that relevant barriers to roll-out of the energy transition at local scale are the lack of concrete knowledge within the own organisation and mutual communication, too little human capital, and problems with fitting in local wishes through national policy and high dependence on the motivation of the responsible administrative board (e.g., servants). In addition, scholars confirm that the transition to renewable energy sources remains unavoidable in the long term, but this necessity on short notice is not yet noticeable in daily life (de Boer, 2020).

The heat transition goals are clear, but the implementation steps are not. There is a need for an integrated systematic approach (Hoppe, 2019). This can be recognised by the roll-out of various policy documents, such as the Regional Energy Strategy (RES), Transition vision heat (TVW) and Neighbourhood implementation plans (WUP), figure 1.3. Argued by Ansell and Gash (2007), addressing today’s problems requires more technical, analytical and financial power than is possessed with the municipalities, as the knowledge becomes increasingly specialised and fragmented. In accordance with the policy of the VNG, IPO and UvW, a regional RES policy has been drawn up to realise more collaboration in climate policy between local authorities and to realise an area-oriented approach (Hoppe, 2019). A regionally oriented approach has been selected to flourish the already existing strong connections, such as a strong regional identity or existing collaborations for economic stimulation. In this policy, municipalities prolong their political mandate from centralised government agencies, as the region is not an official constitutional body (R. de Vries et al., 2019).

The RES policy prescribes that the municipalities, water boards and provinces are politically accountable for the establishment of the regional policy. In this arrangement, the municipalities still have the guiding role, because of their close involvement with private organisations (e.g., licensing, communication with citizens). However, the heat transition requires an entire system change and therefore cannot be achieved solely by the governmental bodies. Governance structures will have to develop from a government-driven to a collaborative government, whereby responsibilities are shared among state and non-state stakeholders (Steen et al., 2020). As a result, it is strongly recommended by the RES policy to collaborate with semi-public, private and civil society organizations (de Vries et al.,2019; (Hoppe, 2019); Hoppe and Miedema, 2020; (Schuurs and Schwencke, 2017; Page, 2010). Today, however, the desired added value of the RES collaboration between state and non-state organisations

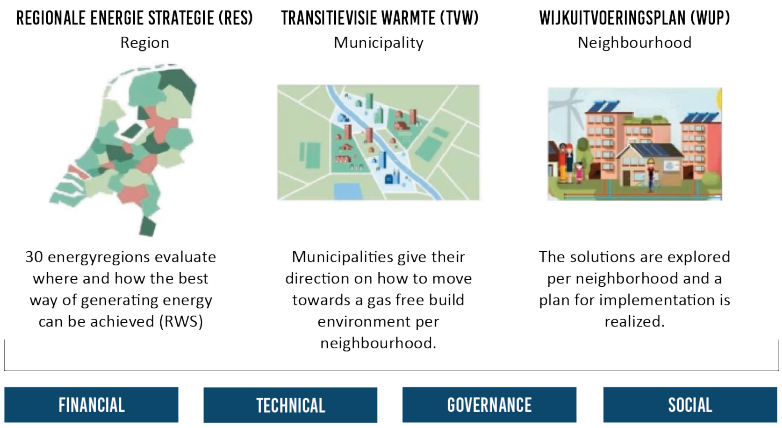


Figure 1.3: Zooming in on the policy targets & complexity at regional and local scale (Own illustration)

is not yet noticeable in practice.

Thus, this graduation thesis report taps into the practical problem on what kind of conditions influences the current stagnation and what strategies local governmental authorities can use to facilitate the heat transition with state and non-state stakeholders. In reference to this section title, recommendations have to be found to serve as the needle to combine expertise.

1.2.2. Scientific Relevance: The complexity of cooperation in heat transition

Heat transition has taken the interest of scholars, politics and citizens (Warbroek, 2019; Page, 2010). This transition is a promised transformation of the energy system to help reduce the global pressure on the existing ecosystem. The existing built environment has great potential to reduce emissions, due to its increasing impact on the ecological footprint (Stratelligence, 2020; Dignum et al., 2021). As described in the practical relevance, the heat transition is faced with multiple problems. For instance, municipalities do not have the capabilities to facilitate the entire system change needed for the heat transition (Page, 2010). With the RES collaboration, the Netherlands have developed a regional collaboration between public and private actors to develop policies and solutions to facilitate the heat transition. Notwithstanding, since the attention for this topic only limited progress has been accomplished and still requires fostering new ways of thinking (Warbroek, 2019; Raworth, 2018).

The importance of regional collaboration is acknowledged both in practice and in literature, but information on how the current disruptions can be mitigated in relation to regional heat transition is scarce. A method to evaluate the interactive collaborative processes in the current situation is by the application of the collaborative governance theory. Collaborative governance entails consensus-oriented decision making to implement or manage public programs or assets that could not be accomplished otherwise (Ansell and Gash, 2007; Emerson and Nabatchi, 2015; Molenveld et al., 2021). Where network governance literature deals with the exchange of resources based on mutual dependence, collaborative governance goes a step further. Argued by Ulibarri et al. (2020), collaborative governance differentiates itself from other governance arrangements, because of its interactive engagement of public, semi-public and private stakeholders to collectively share threats and opportunities in order to perform a public purpose (Emerson and Nabatchi, 2015). Collaborative governance approaches have been instrumental, as a governance arrangement to reduce the local knowledge problem. The local knowledge problem refers to distribution of knowledge over several sectors through which the responsible authority (in this case the municipalities) do not have all the required information to develop a deliberate decision. This strikes at the heart of the practical problem with the recognition that municipalities are not able to resolve the problem within their own organisation. The RES collaborations seek to foster a sustainable heat transition throughout a forum of state- and non-state stakeholders. Based on the collaborative governance theory, clarity can be provided which problems are encountered in regional collaboration regarding heat transition.

Today, limited scholars connect collaborative governance principles with climate policies and even less to regional heat transition (Molenveld et al., 2021). This may be connected to the relatively new nature of both the governance arrangement and the facilitation of heat transition at the regional scale.

Argued by Molenveld et al., extended research needs to be done to generate more insight into implementing collaborative governance in respect to heat transition. In addition, despite the substantial literature on the multi-level character of heat transition governance together with the challenges actors encounter during multi-decision-making fields at the regional level, surprisingly little scholarly attention is paid towards conceptual and empirical standpoint (Hoppe et al., 2016a; Hoppe and Miedema, 2020).

1.2.3. Problem statement

The heat transition ambitions determine the establishment of a gas-free built environment by 2050. The municipalities are appointed to steward the heat transition, but local authorities are nowadays unable to implement the multifaceted heat transition on their own. To support municipalities, the Regional Energy Strategies are introduced by the national government to facilitate regional collaborative action with state and non-state regional actors. Collaboration between state stakeholders and non-state stakeholders is required to achieve the entire transformative system change. Currently, the Netherlands is not on track to scale up the heat transition and the operationalization of these informal networks is still a question. The collaborative governance theory can be applied as a lens to gain insight into current collaboration efforts at regional scale, because it illustrates the desired governance approach. However, due to the relatively new nature, little scholarly attention is paid towards the implementation of collaborative governance principles on sustainability aspects. To conclude, this graduation thesis report taps into the problem of what strategies municipalities can use to facilitate regional collaborative action between state- and non-state stakeholders to facilitate the implementation of the declared national heat transition ambitions, as summarised in figure 1.4.

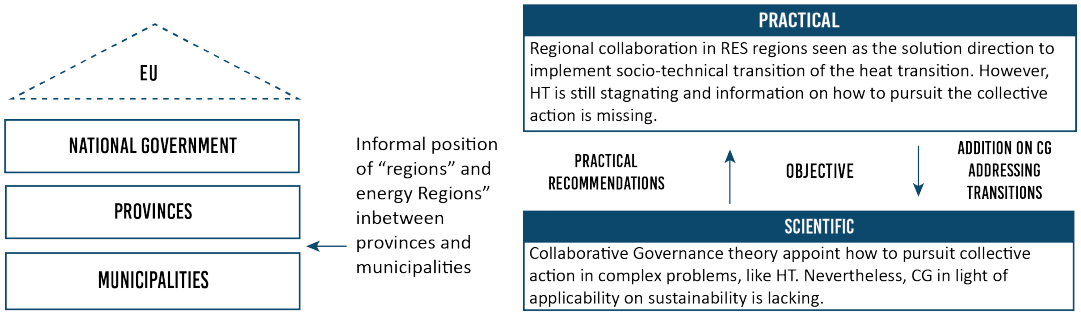


Figure 1.4: Constitutional state structure of the Netherlands appointing the research area & involving problem (Own illustration inspired on Hoppe (2021)

1.3. Research goal

The purpose of this research is to advise municipalities on what strategies they can use to facilitate the joint collaborative action to establish the agreed Dutch national heat transition ambitions. Through decentralisation, the local governmental authorities direct the heat transition, therefore, the municipalities are crucial stakeholders to address for regional collaboration. Based upon the collaborative governance theory, the study aims to evaluate the implementation of heat transition in the management of RES regions. Collaborative governance is an opportunity to completely rethink how state and non-state stakeholders collaborate in collective action, needed in the social-technical problem of heat transition. The aim of the thesis is to provide local officials with recommendations by a "stepping stones" approach to facilitate collaborative action in a regional setting. This steppingstone approach should provide insights and increase awareness in what order elements need to be addressed to collaborate in a sustainable way.

The research is executed in collaboration with Royal HaskoningDHV. Royal HaskoningDHV is an engineering firm that is active in various areas, such as the energy transition. In the energy transition, Royal HaskoningDHV is mainly concerned with supporting municipalities to translate ambitions into realisation, as for example in a provincial expertteam to integrate and scale up the heat transition. For this study, the report is written as advice for municipalities and other involved actors, like consultancy firms, entrepreneurs, and the national government.

1.4. Research questions

To achieve the objective as stated before, the following main research and four sub-questions are formulated. Figure 1.4 shows the relation between the research questions and thesis design.

What strategies can municipalities use in relation to regional collaborative action in a collaborative governance setting to facilitate heat transition with insights from two selected Dutch case studies?

1. How is collaborative governance related to heat transition networks at the regional scale?
2. How can one recognize and address the elements of collaborative governance during the implementation of heat transition via regional collaboration?
3. What insights on regional collaborative dynamics can be taken from the elements of collaborative governance regarding heat transition?
4. What do the two selected regional case studies provide as learnings for literature and the current governmental policy to facilitate collaborative action regarding heat transition?

The study provides recommendations to municipalities (and other involved regional actors) to develop regional action to facilitate the heat transition. Regional energy policies appoint the need to collaborate between state and non-state stakeholders, therefore, the collaborative governance theory is taken as a frame of reference. The main question aims to examine the essence behind the problem of the current disruptions to assist local authorities considering the implementation of national heat transition ambitions in the two Dutch energy regions as presented by the Klimaatakkoord of 2019.

1.5. Research design

In this thesis, the goal is to develop stepping stones for municipalities to facilitate heat transition at regional scale. To develop a useful approach for regional collaboration, it is necessary to explore and synthesise a broad array of literature but again test the theory. Corresponding with subsidiary questions, the research design is divided into four process steps, as shown in figure 1.5.

The first process step deals with the theoretical part of the study: what kind of influential conditions of supra- and intermunicipal collaboration affect the realisation of heat transition ambitions. This is investigated by means of an extensive desk study on collaborative governance theories and related literature, which set the criteria to elect the theoretical framework. This theoretical framework will set the input for empirical research. Besides, this information detects the relevant stakeholders to include in the interview series.

Then, the research methodology is presented. This part includes the reasoning behind the approach, case study selection, data gathering including the relevant stakeholders per case, data analysis and research criteria. To provide constructive recommendations, it is essential to obtain insight into the status of regional collaboration in heat transition networks. A comparative case study is held between two RES regions, whereby data is collected through semi-structured interviews with a heterogenous group of actors and document analysis. This data collection method supports triangulation across the modes. The operationalization of the collaborative governance framework is used to analyse the data.

Third, the research methodology is applied to two regional case studies to obtain empirical findings. The convergent data is evaluated through the collaborative governance theoretical framework. It serves as a rationale to understand the essence behind how regional collaboration operates in the context of regional heat transition networks in the two chosen cases. By means of the framework it is possible to evaluate for each element per component, where the opportunities and threats manifest. There are two distinct types of lessons that can be learned from the analysis, which depend on the case-specific scenario. On the one hand, the stakeholders apply collaborative governance without being familiar with the theory, then it is interesting to know what led to its implementation, how that worked out and how it can be further evaluated. On the other hand, it is also possible that collaborative governance is not applied, then it is about, what circumstances have led to this and how can regional collaboration be improved. Subsequently, the findings of the comparative analysis are validated by means of the collaborative governance framework.

Finally, step four, discusses the empirical findings considering collaborative governance theory and dives into the scientific and practical value for Dutch municipalities to implement heat transition through

regional collaboration. By means of this knowledge and the existing literature, recommendations are suggested.

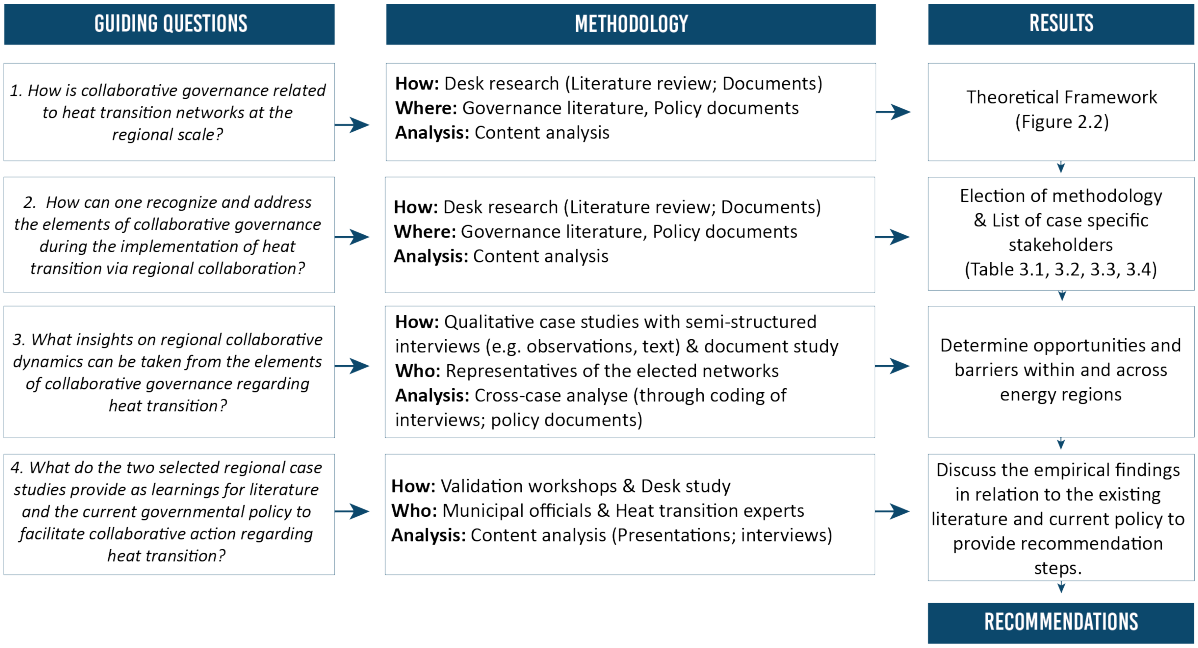


Figure 1.5: Research design (Own illustration)

1.6. Scope

In this section, the focus points of the research are elaborated. The heat transition is closely interlinked with various disciplines and can be researched from multiple angles. To design realistic research, scoping is crucial. An overview of the scope is illustrated in figure 1.6.

Primary, this research focuses on the Dutch heat transition because of its interesting step-by-step needed transformation of the governance structures to transform the energy system. The study by Kemp (2010) states that Dutch transformation of governance structures sets the example for similar approaches in other countries. As mentioned in the first sections, this approach focuses on bottom-up processes, trial and error approach and close involvement of non-state stakeholders in the process. However, the heat transition in the Netherlands is still in its infancy and focuses mainly on policy documents to ultimately take concrete steps. Since the heat transition is relatively new and the experiences of actors are central, it has been decided to focus on the initiation phase.

As described in the problem statement, collaboration between state stakeholders and non-state stakeholders is required to achieve the entire transformative system change (Geels, 2020; Schuurs and Schwencke, 2017). The principles of state and non-state stakeholders (e.g., province, Water board, entrepreneurs) are examined to obtain a multi-stakeholder perspective into the decision-making process, as indicated by the collaborative governance theory. To scope the recommendations, the main perspective is on municipalities. Municipalities are of signal importance, due to their predescribed stewardship in the Climate Act and the fact that the region does not have a constitutional administrative board. Despite the fact that municipalities are not the only involved actors, it can be assumed that the extent to which initiatives are promising is determined by the stability of the underlying governance agency (Kupers et al., 2015; R. de Vries et al., 2019).

The energy transition has a high impact on all levels of society, from national structures to individual households and the interdependencies between these scale levels are high. Nevertheless, focusses this research on the interaction between the region scale and local scale, because at regional scale local actors can embed innovative opportunities that are impossible on a central scale (Steen et al., 2020). According to the research of Schuurs and Schwencke (2017) a number of explicit advantages can be gained at the regional level by working together in administrative and social networks to use capacity, knowledge and ideas more efficiently. Moreover, a region is large enough for serious investments

without losing connection with companies and residents.

Lastly, the research focuses on the residential built environment, because at this place the most friction is expected to take place (R. de Vries et al., 2019).

AREA OF RESEARCH	OUTSIDE AREA OF RESEARCH
Focus on Dutch heat transition	All other aspects of the Climate goals e.g, mobility, elektricity, other countries
Focus on collaboration aspects	Niches corresponding to the subject, but no detailed description: financial incentives, technical aspects, etc
Initiation phase	All other life cycle project phases, implementation, use and end-of-life
Main perspective: municipalities	All other perspectives such as citizen participation, public private partnerships (e.g. energy cooperatives)
Interaction regional and local scale	All other scales, global, neighourhood, building
Residential buildings	All other building sectors e.g. industry, road

Figure 1.6: The research scope (Own illustration)

1.7. Link with master program

A requirement for the master thesis is that it is related with the principles of Construction Management and Engineering. For my master thesis, the primary focus is on collaboration regarding the implementation of a sustainable heat transition at regional scale. This topic captures the interplay of technology and managing the multitude of interfaces between the social, governance, economic and financial domains. The heat transition is a social-technical transition in which a technical solution must be implemented by means of a combination of project and process management. Moreover, the research dives into how public, semi-public, and private stakeholders can be managed and engaged in a collaborative governance setting at regional scale to use their assets in the most socially responsible manner. All these study areas fall under the master program and my primary focus is on a pivotal upcoming topic in the field of construction management, sustainable transitions.

1.8. Thesis structure

The remainder of the report is elaborated in multiple chapters and contains the following outline. In Chapter 2, the theoretical framework involving Collaborative Governance is set to determine the influential conditions for Collaborative Governance regarding a sustainable heat transition at regional scale, which serves as input for the experimental design. Next, Chapter 3 addresses the research methodology. The results of the empirical research and corresponding findings per collaborative governance element for both case studies are given in Chapter 4. Subsequently, Chapter 5 presents the comparative analysis to reflect upon commonalities and differences between the case studies to select the critical elements. Based on these findings of Chapter 4 and 5, Chapter 6 discusses the research findings. This is twofold. On the one hand the scientific relevance of collaborative governance theory is discussed and on the other hand the practical applicability is presented. Finally, Chapter 7 presents the conclusion with step-by-step recommendations and elaborates upon the research limitations. Moreover, implications for further research and suggestions for practice are presented.

2

Theoretical background

The Netherlands is a frontrunner with shaping and formulating regional energy strategies in thirty Energy Regions. These regional policies have the aim to form shared promises that contribute to the national climate goals (Hoppe, 2021). The region can be described as a sub-level in the constitution system of the Netherlands between the provincial and local municipal level, related to the configurations of collaboration across municipalities and other actors in a certain area (Hoppe and Miedema, 2020). These regions arise for various reasons, such as geographical location (e.g., a city-region), cultural characteristics (e.g., religious preferences) or functional terms (e.g., safety levels, energy strategies). As stated in the introduction, the Dutch national government introduced regional energy strategies to stimulate regional collaboration between state and non-state stakeholders. In line with this desired governance approach, this study aims to evaluate the regional collaboration regarding heat transition from a collaborative governance perspective to reflect upon the current situation.

Hence, this chapter reviews the literature of Collaborative Governance (CG) in relation to heat transition. To develop a theoretical framework, the next three sections aim to shine light on how collaborative governance functions and the role of the heat transition conditions therein. First, collaborative governance is defined and integrative models for this governance method are reviewed (2.1). Second, implementation benefits and constraints are given in section 2.2. In addition, from a theoretical perspective, collaborative governance is described in relation to heat transition to set the selection criteria. Finally, this chapter motivates and defines, based upon the criteria, the selection of a theoretical framework aimed to investigate supra- and intermunicipal collaboration in regional heat networks (2.3). Lastly, section 2.3 introduces the concept of the selected collaborative governance framework, the elements within the framework and how these elements relate to another.

2.1. Defining Collaborative Governance

Government, business, and civil society are faced with an increasing number of complex problems, due to the lack of resources or problem-solving capacities by the organisation itself (Klijn and Koppenjan, 2016). Today, the energy transition is typically studied as a complex social-technical process, due to the dynamic context to realise the intended end goal of a sustainable energy system (Cuppen, 2018). It mirrors the understanding that the system of public policies cannot be sectoral or isolated anymore (Borgonovi et al., 2019; Dressel et al., 2021). As a result, attempts to deal with this kind of problems are leaning on a contemporary network society and interaction between actors emerge (Hoppe and Miedema, 2020). Consequently, public governance officials and developers recognized the issue and tend to shift towards participative policy management, where a multitude of actors is involved, who have to use their resources to take individual and collective action (Hoppe; Page, 2010; Cuppen, 2018). Research by Ansell and Gash (2007) supports that outcomes are not influenced by pre-established rules, but results are influenced by the interaction between different actors in the formed network. A well-designed collaborative governance structure has been advocated as a promising paradigm to govern together to avoid high costs, democratic participation, enhance sustainability and might even restore rationality in public management (Ansell and Gash, 2007). Thus, the establishment of collaborative governance in this case can be conceptualised as the formation of social interaction to establish the

implementation of heat transition management. In the Netherlands, there is a need for a formal mandate for this joint action. This can be seen, for example, in the Act on Administrative Arrangements (Wet gemeenschappelijke regeling: Wgr). This law provides a formal foundation for strengthening collaborations (Hoppe and Miedema, 2020). Yet policy arrangements are not the only influential variable, following the social-technical process. Thereby, collaborative governance has become a suitable policy approach to investigate and practise cross institutional collaborations.

An important term in collaborative governance is "governance". Government is a jurisdiction in which authority is authorized to a body of representatives to control a state at a given time. Governance is a broader term and in general refers to the act of governing, either public or private assets. Because governance is a loosely used term it is essential to frame the term governance in the context of the research. As Ostrom (1990) points out, governance is a dimension of cooperatively determined policies, including norms and rules, designed to govern individual and group behaviour. This thesis will adopt the definition defined by Mcginnis (2011, p. 6) as: 'process by which the repertoire of rules, norms, and strategies that guide behaviour within a given realm of policy interactions are formed, applied, interpreted, and reformed'. Governance includes formal and informal networks for problem solving and decision-making (Lima, 2021). Hence, at its core, governance is a process, which can be shaped not only by formal state actors, but by a diverse array of parties including non-state stakeholders, corporations, non-profit organisations, and businesses.

As Bianchi et al. (2021) argued, a number of scholars have developed collaborative governance conceptual lenses to deal with complex problems and to pursue sustainable development. All these approaches have the common goal of addressing a complex problem that goes beyond what an organization can achieve on its own. To this end, different terms have been coined to address this change of behaviour and perspective on governance. Among them, collaborative governance (Ansell and Gash 2007), policy networks (Klijn and Koppenjan 2000), networks governance (Rhodes 2017), participatory governance (Fung and Wright 2001), and integrated governance (Hood 2005) (Bianchi et al., 2021; Borgonovi et al., 2019). These contemporary theories of civic engagement have roots in the deliberative democracy movement. This evolution stimulates the public voice and aspires to improve the responsiveness of governments with higher levels of transparency, accountability and legitimacy (Emerson and Murchie, 2010). Collaborative governance theory originates from management practises. Emerson et al. (2021) appoints that collaborative governance is developed through the recognition of the value of shared administration regarding policy implementation. Hence, intergovernmental relations and network theories helped to stimulate scholar attention on horizontal network management and collaborative public management. Within these streams of new developed theories, collaborative governance approaches have been instrumental to resolve and regulate issues in a multiple policy context, for example the collaboration between local agencies and government for forest management in India (e.g. Ebrahim 2004).

According to Sun (2017), there are four ways to distinguish collaborative governance: (1) Government as initiator, (2) a negotiation process, (3) multi-agent hybrid relations and (4) social entity in power to achieve common purpose. The earliest academic definition of collaborative governance refers to how private non-governmental stakeholders can share their resources for public good (Emerson, 2018). This definition was further developed by Gash and Ansell (2007) and expanded by Emerson et al. (2012), who put more emphasis on the pivotal role of government and non-state stakeholders. The definitions of Ansell and Gash and Emerson et al. (2012) are representatives of the first and the second way of collaborative governance. These definitions are both providing information on the interaction between state and non-state stakeholders with a pivotal role of the government. Therefore, in these streams of theory, this thesis compares the collaborative governance frameworks of Ansell and Gash (2007) and Emerson et al. (2012) to select a framework to evaluate the heat transition at regional scale.

From the narrow sense, Ansell and Gash (2007) explain collaborative governance, as governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets (Ansell and Gash, 2007, p. 544). This narrow definition implies that the public policy and decision-making process is rather formal (Sun, 2017). In the broad sense, the definition of Emerson et al. (2012) emphasises CG as the processes and structures of public policy decision making and management that engage people constructively across boundaries of public agencies, levels of government, and or the public, private and civil spheres in order to solve multi-faceted problems or situations (Emerson, 2012 p.2). According to this definition,

collaborative governance is not a single way governance agreement, but can be initiated in a two-way participation, whereby public and non-governmental agencies can share resources through informal and formal networks. The emphasis here is on non-state actors such as companies and citizen initiatives. However, it must be mentioned that this does not mean that the government does not act but represents the role to actively manage and build a good environment for cooperation. In short, the role of government agencies is in any case very essential for the process (Sun, 2017).

2.1.1. Integrative Frameworks for Collaborative Governance

The definition of collaborative governance provides the basis for the integrative frameworks of Ansell and Gash (2007) and Emerson et al. (2012). When comparing these frameworks, it is set to the attention that the optimal integral model to conceptualise collaborative governance has considerable variation per author. This is noticeable in the distinct essential elements and formulation of these elements. Nevertheless, the process components associated with advancing collaborative governance mainly overlap in their essence (Lima, 2021). The variations and generalizability of both frameworks, in part, roots in the applicability to different scales, sectors, geographics and problem mechanisms (Emerson et al., 2012). The integrative models for collaborative governance for both definitions are discussed below, figure 2.1.

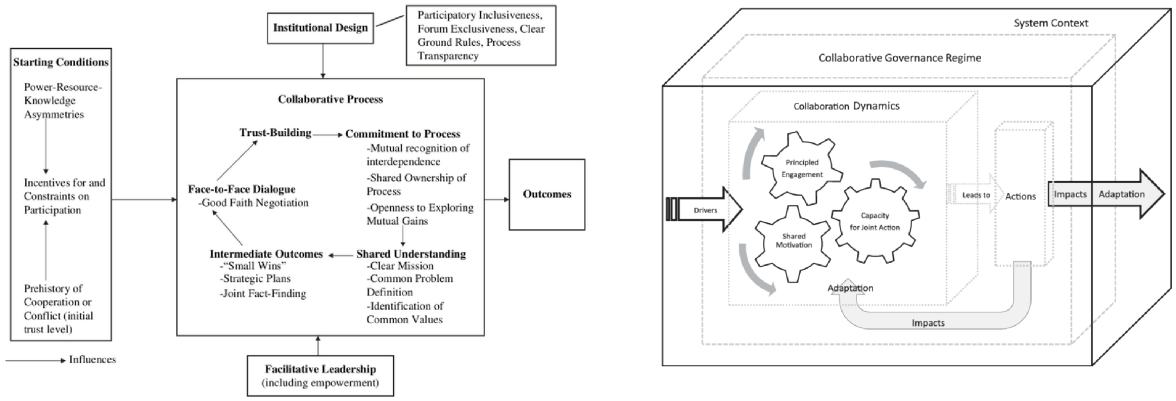


Figure 2.1: Integrative frameworks of Ansell and Gash (2007) (left) and Emerson et al. (2012) (right) (Ansell and Gash, 2007; Emerson et al., 2012)

Both integrative models composed a relatively small number of dimensions in which elements are hypothesised to jointly work together in an iterative and interactive fashion to produce collaborative action. Central to the model of Ansell and Gash (2007) are the governing arrangements that include starting conditions, institutional design and leadership role, collaborative process, and outcome. Hereby the collaborative processes refer to trust-building, commitment to process, shared understanding of strategic goals and beliefs, intermediate outcomes, and face-to-face dialogue. Moreover, leadership and institutional design affect the capacity to achieve collaborative governance.

This is in line with the aspects Emerson et al. (2012) refers to with collaborative governance structures. Emerson et al. (2012) argues collaborative governance has to be studied as an interplay between a subset of social components; including principled engagement, shared motivation and capacity for joint action to realise collective effort. Based on an extensive literature study and practical implications, the model of Emerson et al. (2012) extends the view of the conventional focus of the public sector by including the contextual factors and impact. In particular, the authors present a three-dimensional system of collaborative governance regime (CGR), wherein system context influences the dynamics during the entire collaborative process. In their framework, the collaborative action, and actions (within the dashed lines) jointly generate to which extent the collaborative governance regime is designed and effectively results in impact and then adaptation. The term regime refers to a particular mode of, or system for, public, decision making in which cross-boundary collaboration represents the prevailing pattern of behaviour and activity (Emerson et al., 2012, p.6). The influential context consists of political, socio-economic, environmental, or other influences. In addition, the authors suggest that specific drivers, leadership, uncertainty, interdependence, and consequential incentives help to initiate the collaborative regime. This system context shapes opportunities and threats for the collaborative dynamics

in each situation and constantly evolves over time.

2.2. Implementing Collaborative Governance

In the previous sections, an understanding has been developed about the definition of collaborative governance. Yet it is crucial to underscore that collaboration dynamics began in the practice, not in the lab (Emerson, 2018). As explained in Chapter 1, the purpose of this study is to learn lessons to facilitate heat transition in the two selected regional case studies, however, a specific collaboration framework for heat transition is lacking. Therefore, this section is about how to put collaborative governance into practice and gain insight into beneficial and restraining implementation factors, which should be included into the selection of the theoretical framework. Section 2.2.1 will therefore first look at the general beneficial and restraining factors for collaborative governance, after which the context of problems in the heat transition will be specifically indicated in section 2.2.2.

2.2.1. What we know from research on implementing Collaborative Governance

The main reason governmental and non-governmental actors act in accordance with collaborative governance is to address problems by parallel effort of various policy areas that individual organisations cannot easily solve on their own (Page, 2010). Lavie (2006) implies that companies can acquire value from resources which are not controlled or entirely owned within their organisation by shared risks, advocacy, positive deviance, innovation, flexibility, responsiveness. The study by Boogers et al. (2016) on the effects of regional government on municipalities underlines these results, with 75 percent of the surveyed municipalities seeing regional collaborations as necessary to achieve local goals, enhance services and municipal operations. The benefits of collaboration are twofold. First, municipalities can benefit from the collaboration on a local scale by collectively taking action to enhance capacity. These benefits will only be granted if the municipality contributes to the collaboration. On the other hand, is there a regional form of collaboration, which might entail regional infrastructure (heat structures, solar parks, business parks) or develop joint policy domains, as in this case RES. These investments influence the entire region, but do not have to be carried out in consultation with all municipalities in a region. In this fragmentation policy field full of compromises, opportunism, scepticism about collaborative governance and implementation of these factors is a risky pursuit for community and political leaders. Because collective action might result in a free ridership problem, where those who espouse collective action only use it for instrumental reasons, to cloak their individual interest in the language of collective pursuit but deliver nothing back to the process (Page, 2010). In this sense, individual interests go before collective advantages needed to address the complex problem (Klok et al., 2018). Because of this distinction, it is important to differentiate between benefits on a local and regional scale.

It is suggested that the implementation of collaborative governance in policy structures requires the interaction between a large subset of state and non-governmental stakeholders, because inter-organizational networks are pivotal mechanisms to address societal issues (Klijn and Koppenjan, 2004; Popp et al., n.d.). Thereby a distinction has to be made between formal and emergent networks. On the one hand, formal networks provide more mandate, but exclude some actors. On the other hand, emergent networks are beneficial for self-chosen assessments, but building commitment is difficult. Although networks are set up to be viewed as a particular type of network often it combines multiple functions (Lutz et al., 2017). For example, a heat transition network with the main function being the set-up of infrastructural heat systems, will likely have several other important functions such as information diffusion, knowledge exchange, learning and capacity building. Network effectiveness can in general be defined as the achievement of positive network level outcomes that cannot be attained by individual organisational participants acting alone. Yet scholars believe that this is not about the spontaneous coming together of actors, but that there is a need for management and network constitution to enhance effectiveness (Bianchi et al., 2021; Lutz et al., 2017). Where reforming the institutional system through formal factors might be considered useful in the short-term, implementation of only this set of factors might not insure resilient system change (Borgonovi et al., 2019). A twofold of the organisational factors (e.g. protocols, roles) and informal factors (e.g. trust, commitment, leadership and dependency) have to be put together to result in the intended results (Ansell and Gash, 2007; Bianchi et al., 2021 ; Page, 2010; Warbroek, 2019; Klijn and Koppenjan, 2004).

Hoppe and Miedema (2020) argue that despite the benefits of collaboration the corporations are criticised for creating administrative fuss, by opaque structures without clear responsibility. Moreover,

Peters (2018) briefly argued that a democratic structure must first be realised, otherwise the trust, commitment and decision-making become difficult to realise. This certainly does not mean that the implementation of collaborative governance networks automatically leads to the desired effects, but that a notion of leadership is required to jointly achieve the desired results (Bianchi et al., 2021, Lutz et al., 2017). Even literature well-designed corporations can in practise lead to failure, because of the iterative nature of collaboration (Ansell and Gash, 2007; Page, 2010; van Mierlo and Beers, 2020; Popp et al., n.d.). The cause of the structural deficiencies is embedded into the diversity of involved stakeholders, lack of commitment and trust, the scarcity of open dialogues, short-term wins, and sectoral view in performance management, adopted by individual institutions. This governance fragmentation can be solved by appointing a leader role to build trust, commitment and evaluate the results. Consequently, research into the implementation implies attention to leadership within a governance network.

According to Ansell and Gash (2007) can influential elements be summarised to three aspects: time, dependency, and trust. A collaborative culture is identified as beneficial to facilitate and is characterised by trust and building commitment (Lima, 2021). However, this is a time-consuming process, which is only beneficial for long-term results. Dependency seems to be the main motivation for state and non-state actors to collaborate during complex problems (here: heat transition). The systemic reforms implied by the aforementioned process implementation implies the use of outcome-oriented view to frame investigate the interventions made and desirability of the effects on the adopted policy process (Borgonovi et al., 2019).

To conclude, despite the many restraining influential factors, successful initiatives suggest that actors can set aside their guile and pursue for the common interest, when informal and formal factors of collaborative governance are well designed for the context, it is in. It emerges from the different sides of collaborative governance research that these factors are necessary to include formal factors, like protocols, policy institutions and informal factors, like commitment to the process, regional vs local interest, formal vs emergent structures, resource capacity, leadership.

2.2.2. Study context: Implementation of Heat transition

In this research, the collaborative governance lens is used as a vehicle to address the current practical problem. For this reason, it is important to define how collaborative governance contributions relate to the heat transition collaborations at regional scale. The RES defines, the supply of, the demand for, and the planned infrastructure of heat in a region (the focus of this thesis). It also includes the storage of electricity and its storage (Boogers et al., 2016). Regarding the entire system change of the heat transition these include measures, like the insulation of houses and the construction of heat infrastructure. The first is much more about a natural moment in which residents themselves also have influence, whereby the construction of heat networks carries a longer decision-making moment.

Moving from a sustainable economy is not expected to be easy. Drivers for sustainability are a multitude, such as physical-technical, socio-cultural, environmental, political or economic (Emerson and Murchie, 2010). As described in Chapter 1, a new governance form, which entails the collaboration between government and non-governmental regional actors is acquired to develop the entire requested system change. The RES policy clarifies that all regional actors (e.g., grid operators, citizens, municipalities, waterboards, housing associations) should be participating in the decision-making process to establish sustainable long-term plans (Ministerie van Economische Zaken en Klimaat, 2019). The initiative came from the government for drawing up the RES regions, but as in practice it appears that there is also interest from society (Schuurs and Schwencke, 2017. Currently, the biggest burden of heat transition is the fragmentation by individual actions. It is mentioned in many policy documents that actors want to collaborate, but the initiation of these forums for state and non-state regional actors is still missing (Schuurs and Schwencke, 2017; Gelders Energieakkoord, 2017). These issues might get resolved by introduction of collaborative governance, as it helps to tackle societal needs through social-political engagement, like commitment, decision making and joint action (Molenveld et al., 2021). According to Emerson and Murchie (2010), upfront defining of the institutional institutions and leadership role facilitates a higher change of implementation.

Molenveld et al. (2021) conducted research about the implementation of collaborative governance in fourteen urban gardens in the Netherlands. Their research showed that sometimes it takes more time to implement collaborative governance, then it takes to resolve the sustainable interventions. The authors identified drivers for collaboration, which are financial independence, strong institutional protocols, and a limited group of core initiators.

Support and mutual trust needed to tackle the heat transition (Schuurs and Schwencke, 2017). However, despite the fact that trust comes with high regional benefits, it will not influence local benefits of individual municipalities (Klok et al., 2018). The interests of various parties play a role in this, but the mutual dependencies are also considerable (Hoppe and Miedema, 2020). Therefore, it is important to be aware of traditions and negative and positive structures and formal and informal connections in a region. Several municipalities started to develop their own energy strategy or policy, but energy has traditionally not been a theme that receives attention in these government layers. Argued by Hoppe (2021), all relevant government tiers are involved in the progress, but decentralised government bodies interact less coherently and with larger variation. This involvement and interaction between RES stakeholders are mostly between public actors. This resulted in an over-representation of supply side actors and under-representation of demand-side actors. While with regional collaboration it is important to include the public, private and community sector. It is pivotal to have hybrid formal and informal relationships between the sectors and scale levels to facilitate the heat transition (Schuurs and Schwencke, 2017). Moreover, the study by Hoppe (2021) implied that it is suggested by RES goals and strategies that perceptions about objectives are shared. However, this is misleading as the national, regional, and local scales have different interests and appoint different goals. The networks of regional organisations do not have a formal framework or status, which makes decision-making difficult. It requires concretization of decision points to really act and adaptation (Hoppe and Miedema, 2020). Hoppe (2021) appoints that this fuss of the overall policy mix and the obscurity of State support leads to uncertainty and stagnation by regional actors. The study of Schuurs and Schwencke (2017) and Page (2010), suggests addressing a leader. This ensures that the process is preserved and the time for decision moments is shortened. Yet, this is misleading, because actors have no formal legal status and resource capacity of most decentralised bodies is below par (Hoppe, 2021).

The legitimacy of the RES is affected by several issues. For example, because of actors' own interests, a conversation is often not self-evident. Also, the actors with the greatest resource capacity (human capital, political support, economic support) dominate the decision-making and to save time only a selection of actors are invited to join negotiations. Study by Klok et al. (2018) aligns with this view, as it states that reduction of network complexity does not improve the functional performance of regional governance. However, in contrast Klok et al. (2018) states that a variety of cooperative partners does not have immediate effect on the effectiveness of polycentric regional governance. Fourthly, multiple control also equals shared responsibility, so that as a result there are no or hardly any consequences for actors who do not keep to agreements (Boogers et al., 2016). The research by Klok et al. (2018) indicates that structural factors how collaboration is organised does not play a role, but the level of trust does positively affect functional performance.

In conclusion, various factors are linked to the stagnation in the heat transition, a couple are summarized in figure 2.2. One determinant of stagnation within the current situation is the over-representation of public sector involvement, while private ones can also make a major contribution. In addition, other identified problems are the lacking formal structure and capacity allocation. However, these problems and associated solutions must always be seen in the dynamic context the RES manifests in, since there are large differences.

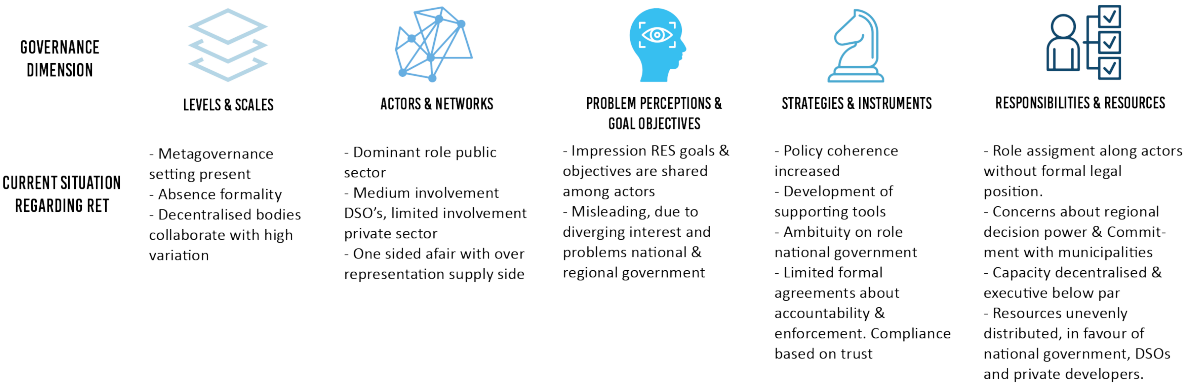
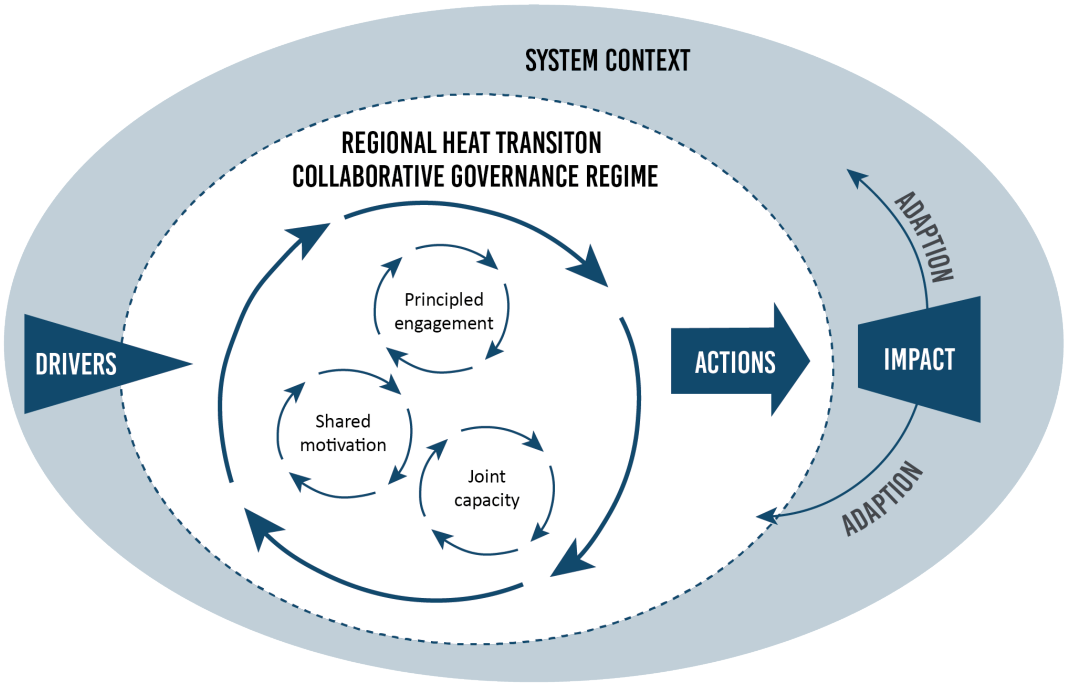


Figure 2.2: Summary of the governance assessment by Hoppe (2021) on RET (Both electricity and heat) (Own illustration based on Hoppe (2021))

2.3. The theoretical framework

This study aims to place a collaborative governance lens on the practical problem of the implementation of the heat transition. In the current literature there is no guiding unambiguous model in addition to the general commonly known integrative models that addresses the characteristics of collaborative governance processes about sustainable interventions. Moreover, research into the heat transition is completely limited in this regard. Therefore, this section illustrates the most suitable collaborative governance model to design an effective step-by-step approach. To select this perspective, first the most suitable collaborative governance framework, then the elements of this framework are presented.

As indicated by Sun (2021), many authors share the same ideas about influential factors on the collaborative process. To be the most comprehensive, the integrative framework for collaboration of Emerson et al. (2012) is chosen to be most suitable for the purpose of this study, figure 2.3. This is because of the broader definition and integrative nature of the entire cycle: the context and collaborative governance regime.



A Diagnostic or Logic Model Approach to Collaborative Governance

Dimension and Components	System Context	Drivers	The Collaborative Governance Regime: Collaborative Dynamics: Principled Engagement	Shared Motivation	Capacity for Joint Action	Outputs Collaborative Actions	Collaborative Outcomes: Impacts	Adaptation
Elements within Component	- Resource Conditions - Policy Legal Frameworks - Prior Failure to Address Issues - Political Dynamics/ Power Relations - Network Connectedness - Levels of Conflict/Trust - Socio-economic/ Cultural Health & Diversity	- Leadership - Consequential Incentives - Interdependence - Uncertainty	- Discovery - Definition - Deliberation - Determinaton	- Mutual Trust - Mutual Understanding - Internal Legitimacy - Shared Commitment	- Procedural/ Institutional Arrangements - Leadership - Knowledge - Resources	Will depend on context and charge, but might include: - Securing Endorsements - Enacting Policy, Law, or Rule - Marshalling Resources - Deploying Staff - Siting/ Permitting - Building/ Cleaning Up - Enacting New Management Practice - Monitoring Implementation - Enforcing Compliance	Will depend on context and charge, but aim is to alter pre-existing or projected conditions in System Context	- Change in System Context - Change in the CGR - Change in Collaboration Dynamics

Figure 2.3: Theoretical framework (Emerson et al., 2012; Emerson, 2018)

First, where the Ansell and Gash (2007) definition represents the current situation by solemnly state initiating arrangements, the definition of Emerson et al. (2012) symbolises the preferred future society. Emerson et al. (2012) defines a broader concept in which the sustainable transitions are accomplished by means of the hybrid interactions across multiple levels of state and non-state stakeholders. The perspective of Emerson et al. (2012) represents the theoretical needed transformative action to facilitate the social-technical transformation relating to heat transition and practical desire to involve public, semi-public, and private stakeholders on equal footing. Heat transition requires collaboration between state and non-state stakeholders to achieve the entire system change. In terms of theory and practice this is recognized, but there again the implementation of this cross-sectoral and multilevel collaboration is complicated. In terms of the regional collaboration for heat transition, the regional energy strategies, including the regional structural heat policy documents, are designed with representatives from public (e.g., municipalities, provinces), semi-public (e.g., Waterboard, housing associations) and private parties (e.g., entrepreneurs and civil parties). Therefore, it would be suitable to use this broader interpretation and model to examine the heat transition at regional scale. The tendency of collaboration with the participation of parties other than the government also has legal foundations, as it will be introduced soon by the new environmental law. As described in Chapter 1, the heat transition is a multifactorial problem, because of which the goals of the heat transition are not feasible to be addressed by governmental bodies solemnly.

Emerson et al. (2012) incorporated the conceptual model as the opportunity to set the collaboration in a dynamic context of opportunities and threats belonging to the complex problem, such as the socio-technical problem of heat transition. This is relevant for the heat transition, as the section 2.2 explains that the heat transition is a multifaceted problem. It identifies a cross-boundary system in three-dimensional space, in which outside influences such as the political system, history of the collaboration and environmental pressure have a direct influence on the collaboration (Emerson, 2018). In primary, the integrative framework does not see the system as linear, but iterative and interactive between the entire set of elements. The elements within the components have influenced action, then impact and eventually adaptation of the system. More specifically, these contextual factors are substantial to consider in the realisation of heat transition at regional scale, because it highly interferes with the current identified problems as legal entities and political tension.

Third, their model offers the opportunity to examine the case specific drivers arising from the context. In this way, it can be noticeable who collaborates with whom and why. Regional Energy Strategies are policy instruments determined by the national government. Therefore, because the municipalities, the water board and the province are held accountable for this design. Consequently, gaining insight in how non-state stakeholders are incorporated in the process and what drives them to corporate is necessary to facilitate regional collaboration. In addition, it is interesting to see whether there are other drivers in practice that can positively influence the collaborative governance regime.

Fourth, the selected collaborative governance model illustrates an iterative structure, in which interaction between components and elements within the components is pivotal. The theoretical framework provides the lens to gain insights in the current situation, through which step-by-step recommendations can be found. The iterative nature of the Emerson et al. (2012) model illustrates the gradual process. The gradual process will provide valuable insights into regional collaboration efforts, and at which point in the entire chain alterations need to be made. While the collaborative governance model of Ansell and Gash shows a limited degree of influence between elements, the model of Emerson et al. (2012) indicates the relationships between the different steps. Besides, this conceptual lens offers a look at the different elements in collaborative processes (principled engagement, shared motivation, and capacity for joint action) to understand what essential elements are to accelerate collaboration. This is a logical step because when, for example, the capacity changes trust between partners is lost, resource capacity per individual stakeholder will also be required to a large extent. The aim of the thesis is to gain insight into regional collaboration by means of the various elements to ultimately be able to take the effective steps. Due to the chosen framework, the elements can be seen as gears for turning the machine. By dividing it into different individual elements, but also gaining insight into the interaction between the elements, an overview is created of which buttons can be pushed to collaborate more effectively to implement the heat transition. Providing insight and raising awareness about these individual elements and interaction between the elements can contribute to ultimately arriving at the suitable action through regional collaboration, which in the end results in adaptation of the heat system.

Finally, the authors put the motivation, perspective and behaviour of the stakeholders at the center

of the collaborative governance regime for long-term realization of sustainable outcomes. In line with this thesis.

Consequently, the integrative collaborative governance model of Emerson et al. (2012) sets the theoretical base for this research. The framework will be used as a vehicle to understand the regional dynamics in a collaborative governance setting regarding heat transition. Figure 2.3 illustrates the components and the respective elements therein. The following subsections give a brief overview about all the definitions, see Table 2.1.

2.3.1. The integrative collaborative governance framework

This framework does not entail technical and social solutions to implement heat transition but focuses on a key element on how it might be achieved: collaboration. Figure 2.3 presents the interaction within the collaboration governance regime (dashed line) and external. The collaborative dynamics and collaborative actions shape the quality of the collaboration and to which extent the CGR is developed and effective to address the transformation of a complex situation, in this case heat transition (Emerson et al., 2012). The three gears of collaborative dynamics (principled engagement, shared motivation, capacity for joint action) work in an iterative and interactive way to produce regional collaborative actions or steps to implement transformative action regarding heat transition. These outcomes spurred by collaborative dynamics generate impact (results on the ground) and adaptation (the structural transformation of the implementation of heat transition) in the system context and within the regime itself.

2.3.2. System context

The system context encompasses a three-dimensional space influenced by a variety of factors, including political, legal, economic, environmental, social, and technical circumstances (e.g., elections, extreme weather events or newly enacted policies, like the RES). In reference to the collaborative governance model, the problems are situated in a dynamic system that is likely to include various forms of contextual condition influencing the regional collaboration (e.g., legal frameworks, political dynamics, history of conflict, power relations). The influence of the system context is twofold. The context sets the conditions in which the collaborative governance regime will be initiated by drivers, but on the other hand the actions in the collaborative governance regime can serve as a driving force to adapt the context. Based on former research regarding collaborative governance and heat transition implementation, the contextual factors that need to be included in the framework are institutional context, resource conditions, existing and former relationships within a region, political tension and social-economic factors influence success or failure (Ansell and Gash, 2007; Emerson, 2018).

According to Emerson et al. (2012), the four drivers emerging from the system context enhance the likelihood that a collaborative governance process is initiated: initial leadership, uncertainty, interdependence and consequential incentives. Hence, the likelihood of the initiation of a collaborative governance regime is increased when multiple drivers are present (Emerson and Nabatchi, 2015; Hossu et al., 2018).

In primary, *leadership* is the most crucial factor to encourage parties to collectively act. Leadership is defined as not one single leader, but rather something more organic in nature that is supported and grown across the network. At its core, collaborative governance entails a series of collective actions to facilitate the heat transition (Page, 2010). Argued by Page (2010), the integrative challenges faced during the process are to secure the assistance of the right number of regional actors to enact the policy, constant exchange of interest and needed compromises, establishment of rules, monitoring and budgeting. A leader, in this thesis, is an individual or institutional regional actor (e.g., an elected official, organizational manager, or social movement) with access to resources and a strategy to motivate other regional actors to collaborate (Page, 2010). As figure 2.3 illustrates, leadership is both present as a driver and component for capacity for joint actions. Leadership as a driver is defined by the initiation of the transition, whereby the same or another leader within the process helps to proceed the collaboration efforts. Argued by Emerson and Nabatchi (2015), leader(s) need to secure preliminary engagement among potential stakeholders and set the circumstances for collaborative dynamics elements. Furthermore, the leader must be committed to act in a collective effort and need to be perceived as trustworthy and neutral to balance the needs of all involved actors (Hossu et al., 2018). Network managers should have a good understanding of the purpose and function in the network to manage it effectively. Good network management and potentially leadership management of design include commitment, conflict accountability and legitimacy (Ansell and Gash, 2007). Argued by Thellbro et

al. (2018), leadership and presence of enthusiasts are important drivers to collaborate in sustainable resource management. These groups of initiators can set up the network and inspire other regional actors to join the collaboration.

The three other elements are mostly dependent on the undesirable current situation. *Uncertainty* is ubiquitously present in relatively new socio-technical problems, like heat transition. Uncertainty is a driving force for collective action because it established that risks can be shared, reduced, and diffused along the network (Emerson and Nabatchi, 2015). Argued by Emerson and Nabatchi (2015), the higher the presence of uncertainty, the higher the willingness of actors to cooperate in a collaborative governance regime. Uncertainty always results from a combination of the circumstances. For example, in case of low resistance (barrier) and high network cohesion (interaction) it is more likely for actors to collaborate, because strong bonds are formed, and barriers are distinguished. On the other hand, with high resistance and low connectivity the change of collaboration efforts is relatively low (Hossu et al., 2018). Scarcity of resources as well as innovative transformations regarding climate change could also drive actors to compete instead of collaborating, because of the marked advantages. Nevertheless, this could be altered from rivalry towards collaboration when interdependence is present (Hossu et al., 2018).

Collaboration frequently occurs when individuals and or organizations are unable to accomplish desired ambitions on their own (Emerson and Nabatchi, 2015). Research by Emerson et al. (2012) defines the third driver *interdependence* as the willingness of parties to act together. This is becoming more essential in a world, in which the resources are scarce, and problems are highly interconnected. In contrast, the game theory argues that solemnly interdependencies between actors is not enough to build a sustainable collaboration (Emerson and Nabatchi, 2015). This is related to the fact that when participants share knowledge and interact over time, they recognize their interdependence, they seek their way out of the collaboration. Hence, interdependence only drives collaboration when it is a necessity that is acknowledged by the key stakeholders. Lozano (2007) states that in order to achieve the optimum solution to reach sustainable interventions a decision or activity is not an independent matter, but must be seen as a tightly linked long-term strategy, which encompasses benefits for all stakeholders. An example motivator is the prior failure to address the issue in an individual effort, consequently, there is then a necessity for invention. Furthermore, a catalyst to deal with interdependencies is the presence of another driver: consequential incentives.

Consequential incentives indicate the internal and external pressures that are necessary to transform to reduce risks among the pivotal parties and the broader public (Emerson and Nabatchi, 2015). Enticements are needed to facilitate collaboration. This can be positive or negative and temporary or permanent transformations the system context. For example, a temporary incentive could be an administrative deadline that requires timely response and on the other hand permanent incentives entail proposed policies unlikely to work and threatened reforms that are appealing for a range of stakeholders (Hossu et al., 2018). Moreover, key driving force can entail the transformation in scope, intensity, or new indisputable facts (e.g., extreme weather conditions, which could be a trigger to raise awareness to commit sustainable interventions to actors and the broader public). Consequential incentives could also be positive developments or emergent opportunities in the system context (e.g. funds, positive marketing) (Emerson et al., 2012). The study by Thellbro et al. (2018) found that consequential incentives, such as funding and to address issues that otherwise not be handled are the key driving force to propose collaboration between non-state and state stakeholders. The participants of these collaboration processes recognize the added value in working together by having a voice and foresee the value increase of their own company or organisation, for example the “Regio Deal” subsidies can only be obtained if state and non-state actors collaborate. Some participants are willing to collaborate because of the added value, but to prevent the negative effects of the non-collaborative attitude, for example exclusion for sharing joint gains or negative perceptions of the public.

2.3.3. Collaborative Governance Regime

The three concepts *principled engagement, shared motivation, and capacity for joint action* define the social variables influencing the collaborative dynamics (Emerson et al., 2012Emerson). These components explore the social process and how these relate to the adoption and outcome of collaborative action (Kossmann et al., 2016). The representation of the three components is a simplification. Yet it calls attention to the point that the collaborative process is cyclical and an individual or collective component can positively or negatively influence further collaboration (Ansell and Gash, 2007).

Before diving into the three gears of collaboration it is important to discuss the representation of participants in collaborations. In terms of theory and practise, it is stated that getting the "right" people on the table is of signal importance (Ansell and Gash, 2007; Emerson et al., 2012; Thellbro et al., 2018). The actors involved depend on the problem to be solved, and these persons can represent themselves, an organisation, or an interest group. As established by Emerson et al.(2012), it is important that these partners consist of a mix of state, semi-public and private members. Emerson and Nabatchi) (2015) state that inclusion and diversity of participants are instrumental to include a broader view of perspectives, knowledge, mandates and interests, allowing the development of a sustainable decision-making process. The combined power of participants can enable or disable following actions and compliances. In contrast, Ansell and Gash (2007) state that the high diversity of participants can enhance the level of conflict, whereby principled engagements become even harder and time-consuming. In some situations, a lower diversity of stakeholders does not necessarily mean that inferior actions result. In the context of heat transition implementation through regional collaborations, it is important to at least include the main responsible, municipalities, water boards and provinces, but it will also be mandatory from July 2022 that public decisions must be taken through the participation of private parties such as interest groups and entrepreneurs (Ministerie van Infrastructuur en Waterstaat, 2021). Hence, it is of signal importance that studies about the evolution of collaboration argue a decline of participation (drop out of parties) and engagement of stakeholders (external communication becomes prominent) when collaboration evolves over time (Ulibarri et al., 2020).

Principled engagement The first component, *principled engagements*, involves the way how actors work together across their institutional boundaries to achieve their common ambitions. In this case the integration and acceleration of the heat transition through regional collaboration. This is an essential primary element, as when actors are engaged in a purposeful manner, people collaborate. Principled engagement develops through a circle of the following aspects: *discovery, definition, deliberation and determination*, Table 2.1. *Discovery* entails the revealing of mutual interest, concerns and values, thereby it again investigates relevant and significant information and applications of shared interest, concerns and values. Next, in the *definition* process participants agree on a shared language to describe and discuss threats and opportunities and regulate the division of tasks and expectations. The third component *deliberation* is about the ability of having reasoned discussion to examine threats and opportunities, and design a mutual vision on what demonstrates the common good (Emerson et al., 2012). It is fundamental to note, as argued by Emerson et al. (2012, p.12), that deliberation is not "the aggregation of interest". In relation to the topic of this thesis, it presents the shared vision to facilitate heat transition implementation for the region without consideration of other administrative entities. Finally, *determination* refers to joint procedural decisions (e.g. setting agenda's, authorising work groups or other dialogue structures) and substantive determinations (e.g. reaching agreements on policy documents, providing recommendations on former actions) (Emerson et al., 2012). Often this is assumed to be end products of the collaboration, however, these are often constantly changed over time and must therefore be a repetitive aspect in the engagement of stakeholders (Emerson and Nabatchi, 2015). These elements can be enhanced by open communication, collective learning, conflict solving approach and in some cases consensus decision rules might help to establish durable relations.

Shared motivation The second component, *shared motivation*, refers to motivation of involved stakeholders to join the collaboration and stay engaged in the agreement. Shared motivation is important to build consensus between stakeholders and thus, a critical variable for expressing success or failure. It includes the relational elements; *trust, mutual understanding, shared internal legitimacy and commitment*. Hereby trust is a sine qua none of collaboration, whether it starts with or without trustworthy relations. Trust shapes mutual understanding. In contrast to the definition of Ansell and Gash (2007) is this not referring to a shared vision, as included in deliberation, but does it entail that participant understand and respect each other's opinions even when this might not agree with their own perspective. Next, feelings of mutual understanding contribute to internal and external legitimacy that eventually leads to individual and collective commitment for a sustainable collaboration (Emerson, 2018).

Capacity for joint action The third component, *capacity for joint action* covers the generation of governance arrangements and the sharing of resources that build the basis for collaborative action

(Emerson et al., 2012; Kossmann et al., 2016). It includes four functional elements: procedural and institutional arrangements, leadership, knowledge, and resources. As Emerson (2018) argues, procedural rules supplemented by protocols are crucial to cross-boundary governance. In long-term networks for complex topics, such as heat transition, it is not enough to only use informal agreements (e.g., operating protocols, decision rules and ground rules), but these structures must be laid down more explicitly (e.g., rules, regulations) to enable effective management. The incorporation of these procedural and institutional arrangements is twofold: intraorganizational (e.g., how an individual or organization will manage individual efforts in the cooperation) and interorganizational (e.g., how parties deal with external parties, how participants work together).

The second element is leadership. As previously described is leadership a driving force to collaborate but is again from signal importance during the collaboration dynamics. Leadership in the component capacity for joint action is characterised by the process direction of actions in respect to regional collaboration in relation to heat transition. This could be the same as the initiator(s) potentially present with the driver leadership but could also include a (hired) new process director(s). There are various leadership roles that can be considered during the collaboration, for example during a conflict in the deliberation it can be important that a neutral person takes the lead, while others focus on executing action points.

The other elements within the component capacity for joint action, knowledge, and resources, are the currencies of collaboration. Knowledge includes the sharing and generating of new information within the collaboration. The resource element entails the sharing and leveraging of scarce resources, like for example funding and capacity.

Actions The study by Emerson et al. (2012) argues that principled engagement is the initial gear that should start turning collaborative dynamics. This will shape the component of shared motivation, which eventually results in the creation of capacity for joint action. When started, the three components will reinforce in a virtuous cycle and, if successful, lead to collaborative action, figure 2.4. Notwithstanding, when components fail to align it will lead to collaborative inertia (Kossmann et al., 2016). Actions are the final component of the collaborative governance regime and are a product of the collaborative governance dynamics. These actions can include a variety of activities of the state and non-state stakeholders to in the end achieve the goal of achieving the aimed goal of the collaboration, as in this thesis the heat transition. For example, raising awareness, implementation of heat pumps, monitoring of the actions and enforcing compliance with the policies developed by the regional collaboration.

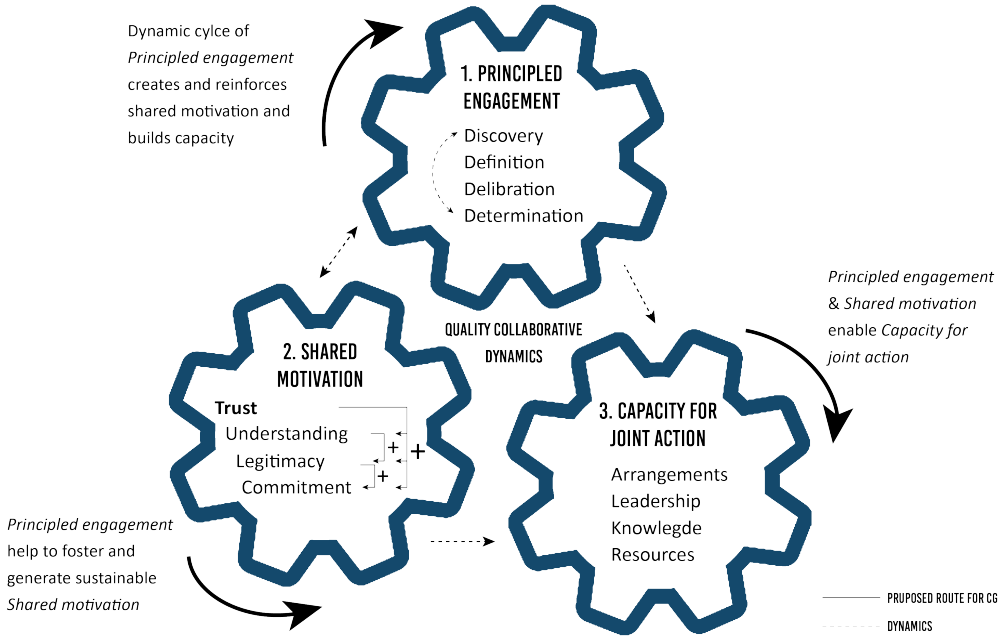


Figure 2.4: Collaborative governance dynamics (Own illustration inspired on (Emerson et al., 2012)

2.3.4. Collaborative Outcomes; Impact & Adaptation

Collaborative governance regimes have to produce public value and must be beneficial for the directly involved individual stakeholders and public in the broader sense. According to Emerson (2018), collaborative dynamics generate *actions* that lead to *impact* and ultimately turn into system *adaptation*. Hence, collaborations are dynamic entities that evolve over time, because individual organisations nor the world are static in nature (Ulibarri et al., 2020). Contingent upon the specific circumstances, purpose and type of the arrangement will the actions be arranged (e.g. providing information, changing regulation, new management practices, monitoring or enforcing compliance) (Emerson et al., 2012; Ulibarri et al., 2020). Likewise, the actions and adaptations vary based upon their temporal development over time, which includes contextual factors like the amount of support, resources and facilitation of the collaboration (Ulibarri et al., 2020).

Emerson et al. (2012, p.18) classify the impact resulting from collaborative regime as “they are the alterations in pre-existing or projected conditions that have been deemed undesirable or in need of change”. Impact can happen intentionally and unintentionally in different areas ranging from environmental to political. Emerson et al. (2012) argue that desired impacts are more likely to happen with fewer negative consequences when they are specified and derived from a mutual approach agreed upon during the collaborative dynamics. In line, many case studies note the high-quality collaboration resulted in smooth decision-making and implementation of sustainable goals that concerns a multitude of stakeholders in a network (Emerson, 2018).

Ultimately, these impacts posit a feedback mechanism, whereby transformative action is initiated. In light of the multi-stakeholder approach adaptive capacity can be defined by Pahl-Wostl et al. (2009, p.335) as the ability of the CGR to alter its internal processes or convert structural elements as a response to experienced or expected changes in the societal or natural environments. In other words, through adaptation complex issues are solved (or not) and new threats and opportunities arise, which all affect the general and internal system. These adaptations might influence the collaborative dynamics, for example directly through the system context (e.g. change of drivers) or as a response to the effectiveness and impacts of the desired outcomes (e.g. addition of new stakeholders, structural reforms of responsibility, generating new knowledge or resources or dissolution of the collaboration) (Emerson et al., 2012).

It is measured that high levels of principled engagement and joined capacity lead to increased network ties and increase in likelihood to implement successful adaptation. In line, Emerson and Gerlak (2014) present in their research on watershed four conditions that enable profitable system adaptation in CGRs: engagement of various interests which results in a broader shared commitment among participants, concentrate on internal and external legitimacy, which facilitates leverage through shared learning, which empowers cognitive flexibility, and shared access to resources, which facilitates improvement of leveraging of usable resources (Ulibarri et al., 2020). Besides, it is brought to the attention that successful collaborative governance regimes reduce transaction costs, which can again lead to stronger network ties resulting in stronger engagement.

Table 2.1: Theoretical framework Elements within component descriptions (Own table defined by Emerson et al., 2012, p.8-17)

Component	Element	Description
System context		A three-dimensional space including external conditions that influence the CGR at any time (e.g. political, environmental, social)
Drivers	Leaderschip	Taking initiative, giving direction
	Consequential incentives	Both internal (problems, resource needs, interests or opportunities) or external (situational or Institutional crises, threats and opportunities)
	Interdependence	When individuals are unable to solve a issue alone
	Uncertainty	Uncertainty that cannot be solved internal might lead to collaboration to reduce, defuse & share risk
Principled Engagement	Discovery	Identification of individual and shared interests, concerns and values
	Definition	Agreement on the concepts and terminology participant will use to describe and discuss problems and opportunities, clarify and adjust tasks and expectations
	Deliberation	Reasoned communication: hard conversations, asking and answering challenging questions, & expressing hones disagreements
	Determination	Decision-making on procedural decisions (e.g.setting agenda's) & substantive determinations (e.g. how to act and recommendations)
Shared motivation	Trust	Parties prove each other that they are reasonable, predictable and dependable
	Mutual Understanding	Ability to understand and respect others positions and interests even during disagreements
	Internal legitimacy	Collaboration process must be representative, fair, transparent, monitored and sanctioned
	Shared Commitment	Continuous engagement of all actors
Capacity for joint action	Procedural and Institutional Arrangements	The process protocols and organizational structures mandatory to manage recurrent interaction over time
	Leadership	Giving direction & bridge between stakeholders
	Knowledge	Awareness raising, shared knowledge, generating knew
	Resources	Sharing and leveraging scarce resources, like funding, time and staff
Collaborative action		New mechanisms for collaborative action (e.g. enacting policy measures (laws), build new infrastructures, monitoring implementation & deploying staff)

3

Methodology

As previously described in Chapter 1, the purpose of the research is to generate recommendations to enhance regional collaboration to facilitate the desired heat transitions ambitions that could not be accomplished separately. This will be investigated through the elected theoretical framework of Chapter 2. Subsequently, Chapter 3 Methodology elaborates on what approach is suitable to collect useful data in practice and how the elements of the theoretical framework are operationalised. This chapter is organised as follows. For start, the reasoning behind the applied research approach is highlighted in section 3.1. Subsequently, the case selection (section 3.2), data collection (section 3.3) and analysis (section 3.4) are presented. Finally, the research criteria are outlined in section 3.5.

3.1. Research approach

The selection of a research approach is an essential element of a research and sets the blueprint for the interventional strategy (Verschuren and Doorewaard, 2015). To answer the research question, the structural embedding of the methodology is based upon qualitative case study to understand the phenomena behind the problem of supra- and intermunicipal collaboration concerning heat transition within its context. As Eisenhardt (1989) argued, case study research is suitable to address problems with little empirical substantiation (in this report: heat transition), because it stimulates finding associations and causal relationships to explore novel theory and underlying mechanisms of a phenomenon. In addition, experiential knowledge gained from researching networks is used to illustrate and expand particular points in literature (Popp et al., n.d.). Again, Feiock (2007) observes that such claims about the incentives and disincentives of different governance arrangements are testable, empirical propositions. In reference to this thesis goal, it will be worthwhile to investigate what elements of disruptions are experienced by state and non-state stakeholders to generate sustainable heat transition interventions.

There are several methods of conducting qualitative case study research. In this case, the research is “orchestrated” by explorative comparative case studies (CSS) design, with cross-case analysis. According to Bartlett and Vavrus (2017) CSS concerns the examination and synthesis of similarities, contrasts and patterns between and across two or more cases that share a common goal ((Hoppe and Miedema, 2020). This method aligns with the aim of the research, as it deals with gaining insights into collaboration conditions that influence the quality of the heat transition relying on past literature and empirical observation (Eisenhardt, 1989). Moreover, the approach encourages to visualise the collaboration dynamics and context as nothing static, but review moments and key events in a spatial and relational view (Bartlett and Vavrus, 2017). In this case, the regional collaboration regarding heat transition in two RES regions is mapped against the collaborative governance theory, then compared to point out dysfunctionalities and opportunities in this regional approach.

3.2. Case selection

The selection of case study areas is an important factor in the empirical study, in this case the selection of suitable RES regions. Hence, it is important to note that, RES regions are tied to the genius loci of an area, including factors such as the landscape, economic policy and urbanity of the area (Hoppe and Miedema, 2020; Warbroek, 2019). This factor makes it difficult to compare RES regions, however, to

add fundamental information to existing literature, there is a need to identify commonalities between the implementation of heat transition. Ultimately, sufficient correlation and contrast was found between two case study areas situated in the Netherlands. In addition, another Dutch RES region with the same characteristics was elected to validate the results based on the interviews in the two regions. Due to the sensitivity of the subject, the case studies will be referred to as case study A, case study B and a validation case C.

The two regions for the comparative analysis are chosen based upon research by Klok et al. (2018). Klok et al. (2018) points out several structural factors, which influence governance arrangements. These include the population of municipalities, complexity of the governance network involving number of involved actors and the regulatory regime of collaboration. Considering the population size of the municipalities, both regions contain mostly small- and medium-sized allocations situated in rural areas with urban centers. The complexity of the network is again rather similar since the regions have both eight municipalities within the region, SMEs businesses and strong local connections with other non-state stakeholders. The regulatory regime is dependent on the National Dutch law and Provincial rules. It should be noted that RES B must report to two overarching governmental agencies, but generally overlaps with the overarching regime present in region A. The province in which both regions are situated is actively looking for a way to switch from the use of fossil energy to renewable sources and has sufficient financial resources to act in consensus with their ambitions. Moreover, the genius loci of the regions were considered to capture a fuller range of contextual characteristic, extending beyond Klok et al. (2018) focus on influential conditions of governance arrangements regarding heat transition. This is intertwined with the local character of the heat transition infrastructure. The regions must comply with the same landscape (population density, urban pattern, and environment), strong regional connections and economic resources (e.g., small-medium enterprises, agricultural). Research by Aalders et al. (2019) has shown that both regions are in the top six of the most prosperous regions. Because both areas are rural regions, they will have to make different agreements than highly urbanized areas. Fewer agreements will probably be made about the physical infrastructure, but there are crossovers on soft skills. Collaborative agreements include (among others) the position towards biogas, congestion, and precisely because there is no urban area exchange about possible individual techniques. Notwithstanding, there are differences between the regional approaches to establish heat transitions, see Chapter 4 and 5.

Case 1: RES A RES region A consists of eight municipalities, in which the number of inhabitants vary from 60.000 till 25.000 inhabitants. It is a region with a large rural area and has a business climate for mainly small and medium-sized companies. There is a strong local identity, which is indicated by recent regional research that states that inhabitants feel more regionally bounded than Dutch. To guide regional collaboration, region A has a regional administrative body, in which government, education and enterprises work together to jointly explore to foster social, economical and technical improvements. In regards to the energy transition, the regional ambitions started with a signed agreement in 2009. This agreement states that the municipalities will take joint action to achieve the ambitious goal to become an energy neutral region by 2030. In the perspective of regional energy strategies, region A collaborated with the province, waterboard and grid operator to collectively address the energy transition. These stakeholders jointly explore how the region contributes to the national generation energy target of 35TWh per region and heat transition goals of becoming a fossil gas free region.

Case 2: RES B RES B is home for around 350,000 inhabitants and situated in the middle of the Netherlands. Like region A, this region is characterized by a strong agricultural sector, business climate for medium-to-small enterprises and research institutions. The landscape is characterized by a green urbanized area with an increasing demand for a larger housing stock. In the field of regional cooperation, the cooperation dates to 2014, but this cooperation is mainly focused on economic prosperity. Considering the energy transition, the regional collaboration consists of eight municipalities, two overarching governmental bodies, two water boards, many stakeholders (network operators, representatives such as companies) and residents working together. Region B also has a regional administrative partnership, and collectively promotes regional socio-economic development in which becoming a sustainable and innovative region is the main goal. This is a body between government, business, and educational actors. The purpose of the RES collaboration is to analyse the existing regional landscape and jointly put forward and implement practical solutions to generate a sustainable environment.

Validation case: RES C The validation case is situated in the north of the Netherlands. It consists of a rural area with a few urban centres. The composition of the population is changing, because the growth in the number of young people is slowing down and the ageing population is increasing. Moreover, the broad prosperity index is like the other two regions. Similarly, the region has a strong agricultural character and in the present economic situation an upcoming service sector. However, in contrast to the two other regions, the validation case is similar to the overarching constitutional state body. Regional collaboration in the field of the heat transition is laid down in the regional heat structure and the TvWs. Various state and non-state organisations play a role in the regional heat structure, such as municipalities, provinces, the water board, network operators, companies, housing associations, energy cooperatives and residents. In addition, regional collaborations take place in other domains, like water management and medical care.

3.3. Data collection

Data collection will be done through a mix of different methods, including desk research via online available documents, thirty expert interviews (24 interviews) and validation sessions (6 interviews) with participant observation. Coherent to the different progress steps of the research, different data collection methods will be applied. Data collection took place from July 2021 to November 2021. These data collection methods tend to cover relevant ongoing problems concerning heat transition collaboration and sought to include a heterogeneous group of involved actors' representative for both RES Regions. This is essential to get a substantial overview on the problem (Baarda et al., 2018; Hoppe and Miedema, 2020) and is fundamental to cover different influences, involvement and interests (Schuurs and Schwencke, 2017).The data collection is described separately for the distinct research methods.

Desk study At first, it is essential to gain insight into the practical problem and provide current information. The literature study is necessary to set up a theoretical framework and support the empirical data. As explained in the previous chapter, literature review is the theoretical framework inspired by criteria given by collaborative governance theories, which in the end resulted in the election of the collaborative governance model of Emerson et al. (2012). The aim of this framework on collaborative governance on regional heat transition is to outline the essence of the problem. In addition, policy reports, monitors, essays, and other available text are collected. On the one hand this desk study obtained case specific documents (e.g. local newspapers, RES documents, city council minutes or regional websites), and on the other hand general information on RES collaborations was obtained (e.g., national legal laws, national or regional agreements).

The aim of the desk study is threefold. On the one hand to quantitatively determine the status of the heat transition in the areas to predict the outcome and on the other hand or the agreements made on paper involving the conditions are in accordance with the situation outlined in the expert interviews. In addition, in step 4, existing scholars on collaborative governance and implementation of sustainability goals through RES collaboration are used to discuss the findings of the comparative analysis and validation sessions.

Semi-structured expert interviews Based upon the literature study, the semi-structured interviews take place. This qualitative data is required to capture knowledge from the practical side of the problem and compare this with the literature explored collaborative governance model. Besides, practice often is ahead of academic literature and therefore may contain valuable insights (Konietzko et al., 2020). The interview protocol is based upon the concepts of the collaborative governance model and policy pears from the analysis framework, presented in Appendix B. It has been decided not to follow the exact analytical model in the interview protocol, but ask open questions based upon the collaborative governance framework to limit bias. Similarly, it was decided to give the respondents minimal information on the purpose of the study to minimise influences and avoid socially desirable answers. In this way, the interviewees could think about their vision of collaboration, but the respondent will give intuitive responses to the questions asked during the survey. The translation has been made from the collaborative governance theoretical framework to the everyday reality of the respondent itself; for example, it is not about direct questions about commitment to the process, but about what they encountered during meetings, their feelings, and their experiences. By focusing on the experience of the person involved, there is room for respondents to give their own input as well. Ultimately, the data of

Table 3.1: Overview of interviews conducted in the RES A

Type of Organisation	Function of Interviewee	Date of interview
Municipality	Sustainability official	26 July 2021
Grid operator	Regional advisor	10 August 2021
Municipality	Official and municipal program manager heat transition	12 August 2021
Housing association	Sustainability manager	13 August 2021
Municipality	Sustainability official	17 August 2021
Regional energy transition support organisation	Program manager	17 August 2021
Water Board	Account manager	30 August 2021
Employers organisations	Entrepreneur and member of executive organisation	31 August 2021
Municipality	Alderman and chair regional energy transition policy plan	1 Sept 2021
Executive organisation in local energy policy	Advisor	21 October

the expert interviews are structured by the collaborative governance model to specify the status of the collaborative governance regime in both regions.

The interviews with professionals and stakeholders were conducted by purposive sampling to acquire a multi- stakeholder view. The respondent group consisted of stakeholders from various spheres of society: government, education, and civil society including enterprises. Table 3.1 represents an overview of the interviewees in RES A, Table 3.2 in B and Table 3.3 represents representatives for both cases. In this study, this covered parties from distinct decision-layers (e.g., provincial, regional, local), various sectors such as the public political sector (e.g., Water Boards, municipalities, RES collaboration) and public expertise groups (environmental organisations), but also private parties (e.g distribution grid operator, housing associations and branch organisations) and community initiatives (e.g, energy cooperatives). For some sectors, it was decided to select several respondents to have various perspectives, for example with the different municipalities. The respondents are selected for their active role in the regional collaboration process at regional scale in relation to the heat transition. An example is the selection to interview municipal civil servants because civil servants are often active for a long period and implement the heat transition. Random sampling was used in the choice of respondents to influence the research as little as possible.

Due to the preceding COVID-19 restrictions, 24 interviews (10 RES A, 9 RES B and 5 for both cases) were held online via video connection and directed by the interview protocol (Appendix B). The researcher contacted these people individually. The right number of interviews is not easy to grasp, but due to the time constraints and limited new information. Hereby, it is also important to mention that not exclusively text is collected, but also notes about the social factors (e.g., emotions, posture).

Validation workshop To provide constructive recommendations for municipalities, and other involved stakeholders, both the desk study and validation session generate insights into which elements of collaborative governance should be transformed to facilitate heat transition ambitions at regional scale. Hence, the collaborative governance framework is used to validate the case findings based upon the semi-structured interviews. In this research, this will be done through six validation sessions with municipal representatives and experts on RES collaborations regarding heat transition, see Table 3.4. The researcher recognizes the importance of all involved stakeholders, nevertheless the research focuses on the pivotal role of the municipalities therefore the focus is on the viewpoint of local authorities. The first sessions are held with municipal officials from both case studies. Subsequently, to increase the external validity, the results are validated by an official and process manager from RES region C.

Table 3.2: Overview of interview conducted in the RES B

Type of Organisation	Function of Interviewee	Date of interview
Municipality	Official and municipal program manager heat transition	27 July 2021
Community energy cooperative	Advisor	10 August 2021
Housing association	Policy officer sustainability	17 August 2021
Executive organisation in local energy policy	Advisor and member of board	18 August 2021
Employer organisation	Entrepeneur and member of board	17 August 2021
Water Board	Senior policy officer sustainability	25 August 2021
Housing association	Senior strategy advisor	27 August 2021
Municipality	Official	27 Sept 2021
Regional housing support organisation	Program manager	28 Sept 2021

Table 3.3: Overview of interview conducted in the both cases

Type of Organisation	Function of Interviewee	Date of interview
Provincial environmental organisation	Advisor	5 August 2021
Water Board	Senior policy officer	18 August 2021
Association gardeners and farmers	Program manager spatial affairs and energy	19 August 2021
Regional heat transition support organisation	Program manager	24 August 2021
Provincial government	Senior advisors heat transition	30 Sept 2021

Table 3.4: Overview of validation interviews

Type of Organisation	Function of Interviewee	Date of interview
Municipality region A	Official heat transition	16 November 2021
Municipality region B	Official heat transition	17 November 2021
Consultancy firm (Region C)	Program manager heat transition region C	23 November 2021
Municipality region C	Official heat transition	23 November 2021
Consultancy firm	Advisor heat transition	23 November 2021
Regional support organisation	Advisor regional heat transition	26 November 2021

Furthermore, a heat transition expert with regards to the collaboration in RES regions is interviewed. These validation sessions are set to extract the specific characteristics and general terms from the derived recommendations.

The validation sessions are divided in multiple steps, as shown in Appendix C. In these validation sessions, first a presentation is given by the researcher about the collaborative governance theory and the selected frame of reference. This is a necessity to ensure that the researcher and respondent have a shared understanding about the elements and components. Moreover, the findings of the comparative analysis are presented with the operationalization of the framework, presented in Appendix D. Based on this presentation, the respondent can give their view on the present situation of regional collaboration in heat transition, if it is recognizable and declare their opinion. The aim of the thesis is to provide recommendations on how heat transition can be facilitated through regional collaboration, therefore, the next question is about what the experts recommend facilitating heat transition. In addition to the operationalization scheme, the interview is concluded with possible additional information regarding the topic to generate the best possible overview on the current situation.

3.4. Data Analysis

This section will explain how the collected data of section 3.3 is analysed. The qualitative data is structurally embedded by the elements of the collaborative governance framework, which is applied as a lens to generate relevant information for the case study reflection, comparative analysis, and validation.

Desk study & Semi-structured expert interviews The outcome will be analysed on quantitative data obtained by document study (e.g., newspapers, online monitoring tools, policy plans) and on the qualitative data of interviews. The semi-structured interviews are recorded, with the permission of the interviewees. Within three weeks the interviews were sent back to the interviewee for consent and fact checking. These recordings will be transcribed and possibly translated. The transcripts are then thoroughly read and analysed, thereafter it was classified into certain elements of the collaborative governance framework in Atlas.TI. To minimise the tunnel vision during the interviews and keep the researcher open to all arguments, it was decided to perform the coding at the end of all the interviews.[1]

The expert interviews are qualitative research, in which interpretive research is carried out and empirical data is collected, analysed and reported in a systematic manner (Baarda et al., 2018). As previously described, the collaborative governance framework is used as a frame of reference to analyse the obtained data from the expert interviews and desk study. To structure the obtained data, content analysis is guided by a directed approach. This method consists of predetermined codes, as in this case the selected collaborative governance framework. The applied strategy is to start coding with the predetermined codes. The identified important data that cannot be coded by the predetermined codes is subdivided into a new code or a subcategory for an already existing code. This interactive process using an inductive method ensures no named themes of respondents are excluded (e.g., participation).

First, the collaborative governance framework is used as a lens to evaluate the current situation per regional case study (Chapter 4). The data is analysed in the following systematic approach. The development of the coding scheme with main codes and subcategories are derived from the collaborative governance framework. In the provided example of figure 3.1, the main category is the system context, and the subcategory is the resource conditions. In the collaborative governance regime, the main categories are collaborative governance regime, subcategories principled engagement, shared motivation, capacity for joint action and collaborative action. The first three subcategories are divided into four sub-subcategory elements, for example principled engagement in discovery, definition, deliberation, and determination. The coding rules are developed by the theoretical definitions of the collaborative governance framework, as presented in Chapter 2 Table 2.1. To assemble reliable and consequent information on both case studies, the theoretical framework is converted into an operationalization scheme in relation to heat transition (Appendix D). Appendix D consists of certain signal themes to use during the data analysis of the data set. This identifies the pivotal content per element of the collaborative governance framework. In the provided example resource conditions, the pivotal content is

[1] Two exceptions were made. First, two interviews were held and analysed to test the interview protocol. Second, taking into consideration the time necessary for the analysis, an exception was made for the interview of 19 October with a local energy collective advisor.

divided into nature, capital, and labour. It is important to compare the multiple views of respondents and if applicable distinct between the various stakeholder groups. The topic of research is precarious; therefore, all data should be reported anonymously. To illustrate the data analysis for a collaborative governance element, an example in case A is provided in figure 3.1.

Sub-category	Themes	Sub-theme	Examples of quotes used for the coding
Resource conditions	Nature	No available heat sources at regional scale	"Previous research showed only very limited natural heat sources available in the region."
	Capital	Low density	"There is scattered housing stock. There are hardly any densed residential units that you need to be able to set up a regional heating network."
		Mainly owned housing stock	"We have to renovate 95% of the existing housing stock, which is again mainly owned. Therefore, individual house onwers have to be persuaded"
		Congestion problem with infrastructure	"The congenstion is very problematic for the implementation of the energy transition."
		Financial uncertainty	"The national goverment has enough money available. However, the allocation to organisations and in special property owners is vague."
	Labour	Available staff	"I can fill my week twice with the amount of work load."
		Capability of the staff	"The social and/or technical capabilities are deficient. "
Key words: heat sources, density, housing stock, infrastructure, financial resources, capabilities, staff			

Figure 3.1: An example of coding per collaborative governance element: resource conditions (Own illustration)

The study by Emerson et al. (2012) indicates that the elements of the framework work in an iterative way to produce collaborative actions, therefore, in the next step, the connections between the categories are analysed. The comparison between components and elements result in the development of a conceptual and logical alignment within the components and between components. An example is the elements within the component principled engagement. First, the elements discover, definition, deliberation and determination are analysed per element. The next step in the analysis is to analyse the relation between the four elements. Then, the connection between the components of the collaborative governance framework (system context, drivers, principled engagement, shared motivation, capacity for joint action, collaborative actions, impact adaptation) are detected.

Next, the comparative analysis will provide the researcher with all the information that it needs to be able to form as complete a picture as possible of the collaborative governance dynamics in and across cases (Chapter 5). Due to the local character of the case study areas the essential themes might differ, but all cover the regional and local point of view. The comparative analysis points out the strong presence or problem areas regarding regional heat transition. Ultimately, this analysis and collaborative governance theory indicators to assess potential success of a collaborative approach detect the pivotal elements that must be addressed and form the foundation for the validation sessions.

Validation workshop The validation sessions are analysed in a similar way as the expert interviews. The first step is to transcribe the recordings, thereafter the data is structured per element and patterns between elements, as presented in Appendix D. The focus is on the distinct opinions of the respondents and the researchers' obtained data. Hence, the key elements used to assess the potential success of a collaborative action in a decision-making process go beyond whether stakeholders think the process can work, therefore again the feedback must be waited against the collaborative governance framework. By means of these two forms of feedback, the stepping-stones for the municipalities (and other involved regional actors) are developed.

3.5. Research criteria

The thesis provides recommendations to develop a sustainable regional collaboration between state- and non-state stakeholders to realize the national heat transition ambitions. In terms of the quality of these given recommendations, several research criteria need to be taken into consideration during the research. Research of Cohen and Crabtree (2008) appointed seven research criteria.

1. **Ethical:** This implies that the research is conducted in an honest and respectful way and thereby involves matters such as empathy, collaboration and service (Cohen and Crabtree, 2008). In this thesis this should be applied during the data collection of the semi-structured interviews and validations sessions. It is a politically sensitive topic, due to the strong connection with current practice and media attention around the subject. Therefore, it is decided to present the regions and data anonymously. Furthermore, in both cases, all interviewees need to have informed consent on the collected and published data in the study.

2. **Importance of the research:** To develop suitable recommendations, the research should advance the current scientific literature gap and be valuable for the practical conflicts, in this case to obtain heat transition ambitions throughout regional collaboration. In principle, this is embodied in the problem statement and discussion, however, this should be a point of attention throughout the research. This thesis aims to add value to the scholars relating to the concept of collaborative governance, but also looks at practical stepping-stones to improve regional collaboration within RES regions to achieve the national ambitions regarding heat transition. Throughout the various stages of the research, it is examined whether the findings are sufficiently in line with the goal of enhancement of regional collaboration between state and non-state stakeholders to realize heat transition ambitions. Due to the pivotal role of municipalities, the research focuses on constructive recommendations for local government authorities.

3. **Coherence:** As described in the research of Cohen and Crabtree (2008), this entails that the research should be logically and clear. These characteristics allow the research procedure to be described in sufficient detail as a suitable base to make decisions. Besides, the research should be concise, contextual data should be adequate and interpretation between data and the given recommendations should be understandable.The coherence is increased by the systematic approach during the analysis. To repeat the research, the selection criteria of the regional case studies are provided. Moreover, an example of the analysis is featured in section 3.4 and the operationalization of the collaborative governance framework in relation to heat transition is presented in Appendix D.

4. **Use appropriate methods:** addition to coherency, should the rationale behind methodological choices be in alignment with the research objective. This has already been presented in the research proposal; however, it is inevitable that again choices must be made during the research. Therefore, it also must be considered whether the purpose aligns with the research design and methodology. In this research, an empirical comparative case study is conducted to resolve the objective presented in section 1.3. Using this strategy, literature and empirical observations provide insights into the conditions of collaborative governance to provide worthwhile recommendations.

5. **Researcher bias:** The researcher bias is managed by using distinct data gathering approaches, a transparent line of reasoning and consults with the supervisors. In this graduation project, the research is conducted by a single individual. To compensate for this shortcoming and to keep the role of the researcher as objective as possible, an interview protocol with definitions of terms is used, with the intention that mainly the interviewee has the floor to avoid direction. In addition, the interview is recorded, then transcribed and sent to the interviewee for checking. This is to ensure that no data is missed, but also to increase objectivity. A standard method of coding is also used to describe the data as unbiased as possible. Additionally, the data analysis started after all interviews of step 2 were conducted to minimise internal dynamics that lead to tunnel vision throughout the interview series. Lastly, the data is collected throughout various analysis methods, such as interviews, observed patterns and desk study.

6. **Reliability:** Hernon and Schwartz (2009) imply that reliability seeks to determine the extent to which the data is consistent and the research is standardized to reduce errors. This is accomplished by reporting sufficient information and facts (e.g. raw data, rationale behind interpretations) through which the reader can verify the data and is able to analyse and interpret the patterns (Cohen and Crabtree, 2008). Reliability is significant because the obtained data are all produced by individuals from other organisations. To enhance the transparency, the qualitative data is rated in terms of observed or absent in the cases. The reasoning behind the rating is

presented by information per element. Besides, during the validation the indicators per elements of the collaborative governance theory are presented, as such, the linguistics and interpretation are assumed to be rather similar.

7. **Validity:** The research results are evaluated by three types of validity: construct validity, internal validity and external validity. It entails to what extent the results of the research correspond with reality (Hernon and Schwartz, 2009). For instance, this investigates whether the results are generalizable for the whole population and not only applicable for the data set (Baarda et al., 2018).

    - Internal validity: The internal validity includes that the barriers and opportunities in relation to heat transition at regional scale are declared by the selected collaborative governance theory. As previously described in section 3.1, comparative analysis research is conducted to gain insight and address the phenomena behind the stagnation of the heat transition through regional collaboration and identify commonalities and case specific conditions. For this study, two internal validity factors are presented: construct validity and selection bias.
        - Construct validity: In this method, semi-structured interviews were conducted as a measuring instrument. To increase construct validity in the interviews, it is important to clearly define and communicate the research objective and the terms used in the interview protocol in advance. In this research, it was decided to inform the participants with the meaning of heat transition and the aim of gaining insight into the regional collaboration to minimize socially desirable answers. As with coherency, the validity is increased by systematically approaching the data collection and analysis. To test the relation with the collaborative governance framework and the interview protocol (Appendix C), two interviews were conducted in both selected regional case studies. The collected data from the interviews were systematically analysed with the collaborative governance framework. This test led to small adjustments in the formulation of the interview protocol to specifically address the heat transition at regional scale. An example of an adjustment is the addition of the heat transition in every question, as the practice interview series showed that the respondents often deviate to regional collaboration in relation to durable energy generation at regional scale. The content of the questions was unchanged. In addition, it is important that all relevant conditions are included in the protocol. When new conditions emerge from the interviews, these will be included in the protocol in the later interviews. This must be handled carefully to sell the negative influence on reliability. For example, the multiple regional arrangements considering heat. Regarding the analysis of the qualitative case study, the operationalisation schedule of the research is added in Appendix D. This schedule shows the components, elements per components and matching indicator to present, what each element intends to measure.
        - Selection bias: A factor to influence the selection bias of the thesis is the selection of the regional case studies. Both regional case studies and the validation case are characterised by small urban centres with rural hinterlands. As previously described in section 3.2, this selection might have an influence on the empirical findings concerning the regional collaboration in relation to heat transition. For example, the collaboration in other more densely populated regions (e.g., interdependence) is due to industrial character, possibilities of residual heat and large sales opportunities in urban areas.
    - External validity: The research is carried out within a heterogeneous group of actors related to the heat transition at regional scale. By interviewing both state- and non-state stakeholders, an attempt is made to overview the status of regional collaboration in heat transition networks in the two selected case studies. Due to the strong local character of the heat transition, caution towards the generalization of the findings to other regions or sectors is required. To recognize case specific issues and commonalities, it was decided to increase the external validity by conducting validation interviews with experts on heat transition collaborations and an additional RES region with similar characteristics, section 3.3. In addition, the obtained findings are mirrored with acquired information from other studies related to implementing energy transition through the instrumental body of the RES, such as (Hoppe and Miedema, 2020; Elzenga et al., 2017).

4

Case evaluation

"We are a team, but have disagreements about the lineup"
- Interviewee region A

In this chapter the empirical findings per case are presented. Based on the theoretical framework, the regional dynamics are examined with respect to the entire set of collaborative governance components and the element therein. The listed data in this chapter sketches an (unbiased) view on the status of heat transition at regional scale in both RES regions. Hence, the present situation is the focus, however, past, and present examples are used to illustrate the current situation. The situational pictures are derived from the interviews held in both case studies and to illustrate certain examples quotes of representatives per case are added. The explanation includes the regional collaboration considering the RES, but again the other heat transition policies in the region (e.g., municipal heat transition policies, provincial standpoints, and corporate vision).

First, the situational sketch of energy region A will be sketched, after which the collaborative governance framework will be applied in region B. To begin with, the regions are introduced to investigate the presence of contextual elements and drivers. Next the collaborative dynamics components are described, thereafter, collaborative actions, impact and adaptation are highlighted. As Emerson et al. (2012) argued, the collaborative governance framework represents an iterative and interactive process between the components, therefore the next paragraph presents how the different components align and key case elements are highlighted. Lastly, the outcomes of the case specific validation sessions are presented for both cases A and B.

4.1. Case study: RES A

This section presents the data findings for case study region A. This will be displayed by describing the elements of the collaborative governance framework, including the context, collaborative dynamics, and outcomes. Thereafter, the interaction between the collaborative governance elements in case A are illustrated. In conclusion, the data retrieved from the validation session is displayed.

4.1.1. System context

RES region A is situated in one overarching governmental body and consists of eight municipalities. The municipalities differ in size from 20,000-60,000 inhabitants. The landscape is characterized by the large rural area, with some urban centres. Argued by a regional study in 2019, most of the property stock is owned. In both the owner-occupied and rental sectors, 60 percent of the homes were built in the period 1951-1990 and the majority has an energy label below B.

Since 2018, regional cooperation has been anchored in a regional body. This body consists of representatives from industry (entrepreneurs of the medium to small enterprises present in the region), social organisations (e.g., care associations and nature federations) and local and provincial authorities. Seven of the eight municipalities situated in the energy region are present in this regional body. In 2019, the members of this composition established a regional vision for 2030, which is subdivided in six themes, such as health and the circular economy energy transition. The regional collaboration

functions in the same way as a municipal organisation since there is a regional board and a council. Both have representatives from the triple helix.

Heat transition is a crossover between the theme tables living and the circular economy energy transition. On the one hand, the savings targets for real estate are primarily agreed in the housing theme table (e.g., housing renovation campaign established in 2012), and the switch to sustainable energy generation is discussed in the energy transition theme. However, to develop the Regional Energy Strategy policy, it has been decided to have separate meetings for the RES, due to the time pressure and accountability for only governmental authorities. However, the heat transition is not discussed in this meeting, due to the political sensitivity and time pressure. The regional heat transition part is developed through inter-municipal collaboration sessions at official and administrative level dating from an existing collaboration from 2009 (See. prior failure to address issues). The organisation scheme is presented in figure 4.1.

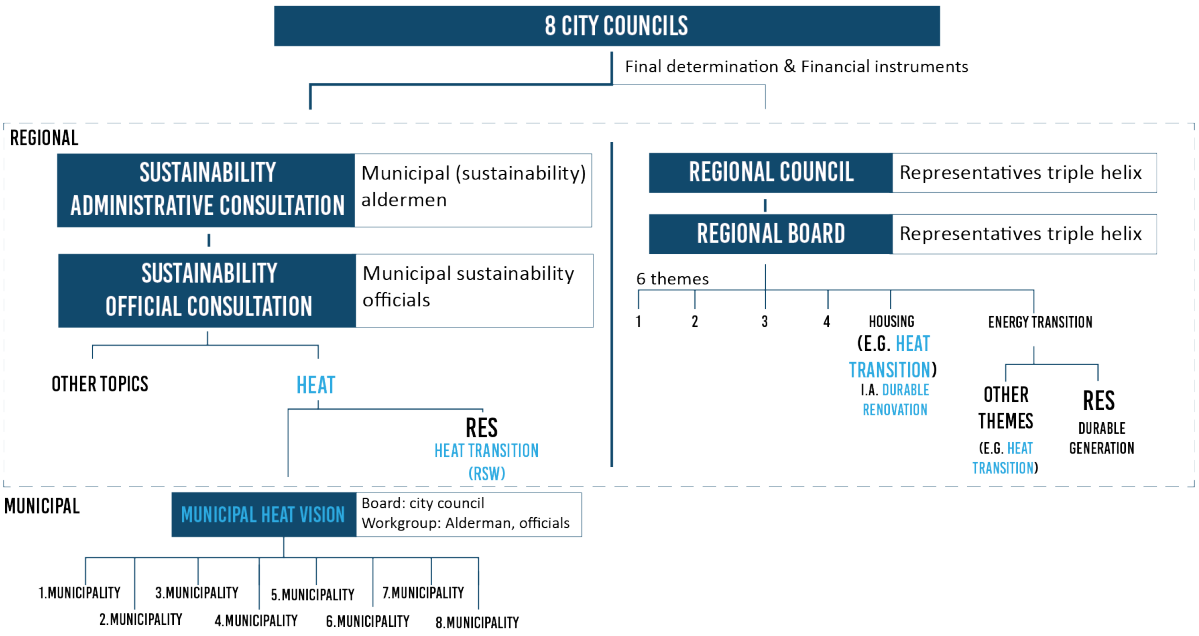


Figure 4.1: Organizational chart RES A (Own illustration)

Resource conditions Quick scans commissioned by the province shows that there are only seven potential ways to design heat structures. Two of these heat sources offer the opportunity for more than one local authority. In addition, there are three collective heat sources on the outskirts of the region. The limited natural resources and low density make it difficult to implement large-scale heat networks in region A. As a result, the RES policy implies that the heat transition must be carried out by individual solutions (e.g., electric) or not yet developed alternatives. This interferes with another issue present in the energy region, the congestion of the net. These conditions combined result in the statement in the RES to focus on energy reduction.

Another prevalent issue is the scarcity of capacity to achieve the reduction targets. The scarcity of human assets is visible in all layers from policy to implementation. In addition, skills and knowledge are lacking. In contrast, it is striking that the entire set of stakeholders said that the availability of financial means is sufficient, nevertheless, to scale up these must be enhanced. However, the availability of financial arrangements for property owners is uncertain.

Policy and legal framework According to the interviewees, the legal and policy framework are from signal importance. Beneficial fact is that the region was an already known instrument regarding the energy transition, nevertheless, this regional instrument causes ambiguities. As indicated in the RES 1.0, the TvWs and the WUP are seen as the policy documents for the implementation of the heat transition. TVWs are submitted later than the RES 1.0. As a result, the RSW has mainly become a

summary of possibilities. In addition, there are no strict frameworks that the documents had to adhere to. The regional heat transition policy plans do not have requirements in respect to the heat transition. Various interviewees from different sectors compared this lack of clear conditions to the durable generation. The policy plans concerning durable generation have concrete requirements, which could be explained by the fact that the regional collaboration in respect to durable generation is previously set up. The regional collaboration regarding heat is a non-binding arrangement, for example, in this region this is shown in the fact that not every municipality is involved with the regional energy counters or heat transition approach. In respect to the legal framework, it is stated that there is a scarcity of legal instruments to implement or enforce compliance, for example the new Warmtewet and Omgevingswet are implemented yet. In addition, the environmental legislation is implemented, but the enforcement of compliance is hard, due to the missing capacity. To conclude, the national government policy and legal framework is missing instruments, and this has a restricted effect in the current situation.

Prior failure to address the issues As explained in the introduction, the region collaborates in several areas, for example, health care and housing. These relations lead to strong connections among regional actors and that it is no longer questionable among municipalities to establish a sustainable built environment, however, it is not exclusively positive, due to disagreements on former and other topics of interest. Since 2009, the eight municipalities, business sector, and civil society organisations started to collaborate to facilitate the heat transition at regional scale, which is laid down in a regional agreement. In the agreement the target was set to become an energy neutral region by 2030. However, in 2010, it was decided to stop this collaboration, despite this occurrence, enthusiast civil servants proceeded with the collaboration efforts. In 2013, 2016 and again in 2021 the agreement is recalibrated to the current situation, in which the heat transition is an important part. Derived from the interviews, it can be stated that all sectors are very proud of this collaboration. Because of this existing agreement, both in terms of heat and energy generation, the municipalities thought that the RES document would be a copy paste of the already developed policies. However, it became clear that the agreement was mainly a sum of individual municipal efforts instead of a shared vision. For example, a distribution key had been designed for energy generation based on the energy uses, in which every municipality should generate its own needs. These examples can also be seen in the reduction targets, for example, it was agreed that every municipality needed to save several percent, but how or what had not been determined. The regional energy transition strategies had a different perspective, so the existing plans had to be revised. It was only in 2018 that the region under pressure from the province started drawing up RES documentation and the region struggled with the legacy or as they put it: “the dialects of lead”

Political dynamics and Power relations The political preferences are similar among the local authorities and all municipalities aim to contribute to the reduction targets. According to the interviewees, it is presumably that this is caused by the long term inter-municipal collaboration efforts. Regarding the heat transition policy making, it can be defined as a three-stage approach of preparing (official), verifying (law enforcement officers), and approving (municipal councils). The Council must give their political approval to the regional heat transition policies, as the region is no constitutional body. In region A, this power balance is observed in the fact that citizens protest the regional policies by addressing their responsible alderman. Due to the upcoming municipal elections in March 2022, municipal councils are more hesitant to take decisions in the field of the heat transition. In conclusion, the political dynamics are to a limited extent present in the current situation since all local authorities agreed to implement certain heat transition targets. In relation to the power relations, it is observed that the municipal councils are responsible and, therefore, the involvement of other stakeholders is absent in this region.

“The implementation of the heat transition also requires quite a bit of administrative guts because the government is actually going to say to property owners, we are going to cut you off from natural gas sources. If adopted, the new heat law offers the option of entering the house and shutting off the gas, which nowadays is only legal in criminal law. These are contrary to the Dutch DNA and possibly lead to political turmoil. However, soon there will be municipal elections and there are some municipalities that say we will move forward, but after the elections. We are not going to designate any example neighbourhoods just yet.”

Network connectedness The interviews indicated a strong network connectedness. The entire set of stakeholders is interlinked, and lines are short, so if needed, immediate action can be undertaken.

This is informal and formal, for example municipal aldermen speak to each other at formal progress meetings, but if an issue is urgent or specific aldermen call each other. Moreover, the contact with the industry, network operator, water board and housing associations are close. As an example, the network operator has a regional process director in the region, who proactively establishes contact with municipalities.

Level of conflict Currently, the RES focuses on the durable energy generation, however, there is little support among citizens for installing wind turbines and using agricultural land for solar parks. As a result, the initial level of trust regarding the energy transition in general is low, as presented in the quotation. This is observed in the high amount of petitions the municipalities retrieve. According to the interviewees, the heat transition will cause even more contention, because this problem mainly takes place inside properties. Regional research from 2021 has shown that most of the population is concerned about climate change and wants to make the home more energy efficient. Collaborations in the past and other sectors (e.g., health care, housing) have also led to tensions in the current collaboration in the field of heat.

The most important thing is public support for change. Public support is very limited. That has never been very big, but when something has little impact, it is not that difficult to gain support for something. However, when things do have an impact, what is happening now, resistance will arise. For example, the NIMBY discussion with the placement of windmills in the built environment and this will eventually also have its constraining effect on the heat transition. This discussion is present everywhere in the Netherlands and is also strongly related to the situation in Region A. The resistance also influences policy, for example several municipalities boycott windmills, that's a very simple one. It is immediately visible and that is what I call squeaking, creaking, and braking. The heat transition will even be much more drastic, but that transition has simply barely started due to the high degree of complexity."

Socio-economical In 2009 during the crises, the regional collaboration started, as a vehicle to survive. The region is strongly dependent on the agricultural sector and assistance of small to medium sized enterprises, as larger industry is absent in the region. According to a regional survey, conducted in 2021, many inhabitants want to increase the energy efficiency of their homes, nevertheless, the research also indicates the concerns about high financial investments, heating issues by heating pumps and therefore, investigation must be done in other heating sources. The research by Aalders et al. (2019) indicates that the region is one of the wealthiest in the country. Together with the small number of investments, implies that it does not really matter whether people can easily afford the measures or not, because both groups still take minimal action. Therefore, the socio-economic factors have a moderate influence on heat transition.

4.1.2. Drivers

Derived from the system context, this paragraph discusses the presence of drivers to collaborate with state and non-state stakeholders at regional scale to facilitate the heat transition in region A.

Leadership The element leadership in relation to the collaborative governance framework entails the initiators of the heat transition in region A. The current regional collaboration considering heat is present, due to the enthusiastic officials. As previously described, the regional collaboration in terms of energy transition started in 2009, but in 2010 this transition was no longer given priority. Civil servants thought it was a shame to stop the regional collaboration, because in their opinion collaboration was doing well and therefore continued. Their effort is the basis of the current regional collaboration in respect to heat. Despite these enthusiastic civil servants and several aldermen, an initiator to engage non-state stakeholders or other state stakeholders is not present.

Consequential incentives A positive consequential incentive was the "Regio Deal" subsidies that can be considered if the region cooperates. This financial incentive also resulted in the creation of the theme tables to ultimately be able to conduct a more integrated and efficient policy. The pivotal incentive to regional collaboration regarding the heat transition is the incentive of the RES program. In this negative incentive, the national Dutch government forced municipalities, water boards and provinces to present a shared regional heat transition part in the RES policy. The three governmental actors have

the political responsibility for the RES program. In the opinion of the municipal authorities, this political structure resulted in the no obligation to involve actors from other non-governmental sectors at regional scale. In the interviewee series, it was striking that the business sector was not even aware of the heat transition part in the RES policy and the civil society organisation did not interfere with this policy. The non-existence of formal requirements for the establishment of the regional policy plan in respect to heat transition is also not beneficial. In addition, the negative consequential incentive time is present in case study A. In the opinion of municipal authorities, the individual visions should be drawn up before the regional strategy can be developed. However, the deadline of the RES is earlier than the local municipal policy deadline. A beneficial effect of the factor time is the acceleration of decision-making progress, because of time pressure of the national deadline.

Interdependence The organisation chart shows that there are two different organisations where the heat transition is discussed. First, there is ”Collaborative self-interest”. This statement refers to the perspective of the civil society sector, business sector and several officials, which states that the local authorities in this region cannot live with or without each other, as presented in the provided quote. The region consists of eight small-sized rural municipalities that all face the same tasks and challenges. However, not all local authorities share the same opinion in respect to the heat transition. The largest section of the interview group perceives the heat transition as a local transition, since the heat visions must be written per municipality and the implementation should be handled at local level. Two examples for this individual mindset are that the municipal transition visions (TvWs) are put out to tender individually and the grid operator has presented the same presentation eight times.

“These are mainly choices that municipalities make about where you deploy your people. That is the case with rural municipalities like us, with three and a half horse heads you must do the work. We simply have too few people and too little money. But above all too few people to get the work done. So yes, that inter-municipal collaboration is imperative.”

Secondly, the theme table collaboration arose through the efficiency battle that companies and social organisations wanted to achieve with regard to the local government bodies. In the region there are mainly SMEs, which means that it is not possible to achieve the objectives through a company. This also led to collaboration in 2012 to make the built environment more sustainable together with governments, companies (e.g. installation technology, construction companies) and knowledge centres. This collaboration has been incorporated into the theme tables, but it should be noted that the interviewees repeat that the heat transition is now mainly seen as a political issue and that is why the heat transition is hardly discussed in the triple helix collaboration.

“We had been collaborating in the region for a couple of years, but it was not really effective. Collaboration actions mainly happened when money was available from Europe, the national government, or the province. This financial incentive often led to a wish list of 140 ideas, but yes, there was no prioritization, and the result was always disappointing. In the second place, you saw that companies, but also social institutions, were fed up with having to consult with eight municipalities, which all had their own preferences. They were like, “we just want to work with all those governments at once.”

Uncertainty There is a high degree of uncertainty in the heat transition, due to unpredictable alternatives for fossil gas. Therefore, actors are hesitant to even start with the transition, as for example illustrated with the quote. In region A, this is shown in the lack of involvement from the individual property owners, but again among governmental parties.

“The challenges of heat transition are way more complex than the durable generation and are still in their infancy. I think it was or is too early to make reliable statements about this. In addition, the capacity shortage is again not beneficial for the progress. I think it may have something to do with the complexity, that it comes a bit later than the durable generation discussion, I don’t know if there’s any logic in that. You could say that generating sustainable electricity is a relatively easy task in terms of complexity. The region just must put up some windmills and solar parks and that’s it. That is different from having to make homes more sustainable where private individuals live who have their own specific situation, requirements and have a freedom of choice.”

4.1.3. Collaborative dynamics

In this section, the collaborative governance dynamics are presented. The organisation of the heat transition is twofold. On the one hand, the municipalities have heat transition consultations on administrative and official level. Other involved participants are the water board, province, and knowledge partnership by the grid operator. Moreover, the theme table consultations with representatives for the government, industry, citizen panels and knowledge centers are present.

Principled engagement

First, the component principled engagement is presented, which includes the elements discovery, definition, deliberation, and determination.

Discovery In the element of discovery, it is about bringing individual interests together and extracting the common interests from it. Regarding heat transition, this exchange of interests hardly ever happens and all interviewees underlined that the heat transition did not play a central role at the regional scale.

"The municipality is really on its own there to implement the heat transition. Today in the RSW in the RES 1.0 an investigation is integrated, but this is not yet a plan. Transition Visions of all municipalities must be ready for RES 2.0, and then you will see more of them and read more about them."

Based on the interviews, it can be stated that the main collaboration and regional coordination regarding heat transition takes place with the inter-municipal official consultations. The municipalities have jointly drawn up the regional heat structure vision and submitted it to the water board and the province for approval. The grid operator was only consulted as a knowledge partner. However, this partner emphasizes that it cannot be stated with certainty whether the plans are realistic, because the plans are not checked on feasibility and their interests were only discovered to a limited extent. A regional discovery of interest takes place between sustainability coordinators; however, the local governmental authorities emphasize that the heat transitions are preliminary a socio-technical issue that should be addressed at local level. Therefore, even between sustainability civil servants, limited shared interests are discovered in respect to the heat transition. This can be deduced from the fact that the local heat transition documents are not tailored between municipalities. Moreover, shared interest with semi-public partners is explored at local level, therefore regional actors identify mostly local interest. In line, local consultations between housing corporations and companies do take place, but this is not explored at regional scale. Besides, it is implied by municipalities that companies are still too little involved and that they must express their interests more. In contrast, the business sector believes that their opinion is not explored enough, as the heat transition policy is primarily a political vehicle, for example, this is present in the fact that heat transition measures are hardly set on the agenda of the regional theme tables. In line with the other regional actors, citizen participation only takes place at local level. In short, the discovery is mainly between the local municipal level, but the discovery at the municipal level is also low there.

"The WACO group is developing the RSW and we have jointly made an analysis for the Heat Transition Vision. We have jointly placed an assignment for this with Consultancy Y. We all have the same basic analyzes and we use them to write Transition Vision Heat. When I look through my eyelashes now, we all come up with the same kind of strategies, but we didn't make them together. That is region A, there is one common door and behind the door we fight each other out. Doing things together is very difficult."

Definition The municipalities jointly defined the ambitious regional vision to become energy neutral by 2030. To achieve this goal the region wants to focus on "no regret" measures, which entail insulating, switching to electric cooking and solar panels. Thereafter, regional vision is focused on the implementation of hybrid heat pumps, and finally, switching to sustainable heat sources. Nevertheless, the how is uncertain, due to the ongoing investigation. Tasks are informally divided among the heat coordinators and expectations are expressed, but there are no consequences if agreements are not met. This sounds positive in terms of definition; however, this is only present in the official heat transition consultation. The common language is hard to find in the various policy tracks in the field of the heat transition. There are so many different initiatives that the policy is fragmented among regional actors, for example the water board, housing associations and companies all have their own vision.

Deliberation There is a close network connectedness, however, there is no shared common ground where the heat transition is discussed. The close links between civil servants result in formal and informal communication to discuss heat transition projects. Notwithstanding, in the heat transition, mainly individual deliberations take place with distinct organisations, such as the water board, housing corporations and the network operators. Consequently, the shared vision is an "aggregation of ideas". The interviewees address that even the overarching governmental body appointed this prevailing issue in region A. Besides, there are several policies in which the heat transition is assessed, but these plans are not aligned, for example the RES document, the already existing regional agreement or development of the TvW's. On the other hand, the regional theme tables discuss the topic of heat transition to a limited extent and are highly fragmented. This depends on the multitude of interfaces the heat transitions have, for example in the theme tables it is both observed as a pillar in the sustainability and housing track. In contrast, the interviews with civil society organisations and the business sector do state the dialogue sessions between regional actors to address their disagreements with the current situation, however, these dialogues are not with all sectors at the same time. For example, the sustainability alderman and business sector representative have dialogue sessions. To conclude, deliberation is moderately visible in the heat transition, since there are dialogue sessions between government, industry, and societal organisation, nevertheless, this happens fragmented and for local interest.

"Well, I had thought, but that was also my hope, that certain in the preparatory phase, because Consultancy firm Y was commissioned to do the preparation, I have seen the same presentation time and again at all eight municipalities. Then comes the question again which heat sources do you have, and which ones could be used. At the first three municipalities you think that it is okay, but after that you drop out because you have heard the story more than once. That was the same answer that the grid operator also gave because that is part of the general story. You could have said about that, it would have been better to combine this into a regional heat strategy, where you do the first three days for all municipalities, that saves you a lot of money, and then we look specifically at each municipality. That just didn't happen, no they just don't."

Determination In respect to the determination of heat transition policies, the municipal councils are of signal importance. As an interviewee says, "there is an imbalance between the at which level agreements have to be made and at what level decision-making is formally included". Ultimately, each municipality will work individually on how the heat transition will be worked out and this will be determined by the council. The interviewed stakeholders really see the current heat transition, as a political game. Ultimately, the decisions taken will have to be adopted only by political bodies. Progress is also discussed in other initiatives, such as at the theme tables, but ultimately this regional body does not adopt any policy either. Ultimately, everyone involved knows that the city councils set the policy, this is also reflected in the fact that people send letters to the city council instead of the regional board.

"It is bureaucratic after all. You say you are developing a plan and everyone agrees. This has all been agreed and coordinated with each other. In retrospect, however, that is often different. All eight councils then have to think about it and there is always an alert official who says oo this must be checked out, because it is not good. Then I really think oh guys please. So many people have already looked at that, can we just continue? It would be so much easier when we just were municipality A."

"You have many parties at the table with many interests, so at some point that also led to us removing the RES from the theme table discussion. We do have a certain ambition in terms of time, so we took that out then. Also, because the decision-making and determination is a typical municipal matter, although it is supported by the social institutions, from the steering committee that includes all representatives from the triple helix, but it is not determined by the regional board. The regional table should not make these decisions at all. The aim of the regional table is to gather knowledge and carry out the assessment. The more concrete it got, the harder it was to proceed. The individual organisation of the RES has also led to peace, because it put all municipal councils in a much better position."

In short, principled engagement between government, private and public organisations is hardly observed in region A. Although there are several regional organisation structures in which the stakeholders could discover each other's interest, the heat transition is not a frequently seen topic on the regional agenda. Conversely, there is an agreement between municipalities which defines the ambition of be-

coming energy neutral by 2030, however, concrete strategies stay deliberated at local scale. Besides, the determination of regional strategies is determined by the municipal councils causing the observation that local policies are more important than regional alignment considering heat transition.

Shared motivation

This paragraph demonstrates the elements of the component shared motivation, which includes shared trust, mutual understanding, internal legitimacy, and shared commitment.

Shared Trust There are strong regional connections between stakeholders, for example aldermen and representatives of industry talk regularly. There is a tendency of contradiction, on the one hand parties must collaborate to survive, but on the other hand all want to have their most beneficial situation for their own organisation among others this results in the insufficient level of transparency and trust among stakeholders. Exemplar for this region is the situation between municipalities, illustrated with the quote. In this region, an issue has arisen between municipalities by the division of a heat source, where the argument is caused by the non-collaborative attitude against the sharing of the pipeline. In this example, the involved housing associations, grid operator, water board and provinces are the mediators to resolve the conflict between these municipalities, however, they insist on the fact that ultimately the allocation is a political choice. Moreover, several municipalities have become disappointed in the way regional projects were carried out and the pace of these progress, and as a result no longer fulfil certain agreements, for example municipalities are withdrawing from the agreements of the same approach in the field of preferred neighbourhoods, the initiative to have thermal photographs and approach towards entrepreneurs. In addition, the boycott of wind energy again causes tensions between municipalities. In short, it has become a kind of cherry-picking approach, whereby the statement of distrust cannot be claimed, but inadequate fulfilment of agreement neither enhances the feeling of shared trust.

“Then you agree that we will approach policy projects in a certain way. Uhmm and then there is one municipality that will do things differently. Yes, we are going to do it differently and then you really think huh we have really agreed that we are all going to do it the same way. We agree on this in a meeting with colleagues, let’s do it that way, because then we can easily exchange it. Then a week later you get a no, we will do it differently, because we are unique, so we want to do it differently. And then you really think how?”

Mutual understanding All interviewees indicate the basis of mutual understanding between stakeholders. Everyone acknowledges the fact that all regional actors have their own interest, and that the current political situation is not supportive of achieving the reduction targets. To collaborate is a time and energy consuming process, whereby in this region it can be best described as an All-Stick-Together-Effect, whereby municipalities and other parties are also released to reunite regional projects at a later stage. This does cause frustration, but in the end every stakeholder understands the different sides of each other’s perspectives.

Internal legitimacy The regional heat transition plans do not correspond with those of individual organisations. During the interview sessions, a frequently repeated issue is that the regional agreements are dead letters, because it is mainly a theoretical policy, but the policy is not applied or endorsed by municipal councils or other regional stakeholders. All interviewees agree that the organisations establish their own individual approaches. For example, the municipalities have developed joint vision, but the implementation is managed in-house. In addition, the regional agreements also provoke tensions and political condemnation in the field of democratic interests. An example of this is that the local energy visions have not yet been delivered, but it can be stated that these have not been developed collectively or have been compared during the progress. As illustrated in the quote, not all municipalities participate in the regional energy counters. A similar kind of observation is with the housing corporations. These regional actors are not by definition dependent on the municipalities and therefore also roll out their own plans, for instance a housing association started to talk to the grid operator to seek for opportunities to sustain their own properties. This situation is typical for the entire region.

“For example, there is municipality that takes a fundamentally different approach concerning the heat transition. We have joint Energieloket, which develops guidelines and provides us with feedback our municipal and regional policy. As I have said, we are all very small municipalities with limited staff, so I am glad we outsourced this. Now

there is one municipality that says we are going to do it differently. We are and will remain a member of the regional municipal collaboration, but we are going to create our own Energieloket at a local level. Our citizen can then come to our own town, and it can be more specific for our own municipality. When they told us this during a meeting, I got really frustrated, because this means again fragmentation. On the other hand, maybe they find something valuable, and we can profit from it, but this is not yet. This is the crux in region A. We start working together in the tendency of together we are stronger and let's do it. Then, when we really get started someone says no, we just go back to working alone and produce their own plans."

Shared commitment The region has been developing policy in the field of the energy transition for a long time, but shared commitment is a precarious subject. Heat transition policies remain a political domain, due to the political set deadlines and very limited involvement of non-state actors. As a result of the high political involvement, the partners do not feel commitment to the political policies. In addition, the non-state stakeholders do not feel responsible for high political guidelines. However, it follows from the interviews that some semi-public organisations are prepared to devote financial resources into research and all regional actors are present by the theme table discussions. Nevertheless, the heat transition is not yet present on the regional agenda by these theme tables. The representatives of non-state stakeholders do indicate that they are committed to implement the heat transition and therefore must collaborate. The reasons are twofold. On the one hand, the regional actors are all relatively small and on the other hand the entire region must become future proof, which includes progress on sustainability. However, the non-state stakeholders are not yet involved with the heat transition and therefore, several sectors established their own regional organisation on sustainable renovation. In addition, regional non-state actors note that the initiation heat transition is still not prioritised by municipalities, since the RES deadlines are not prioritised and guidelines are not yet set, for example the RES is not calculated for feasibility and not aligned.

"Well, on the one hand, municipalities naturally want to distinguish themselves, but on the other hand, we all notice that their own interests do match in many places. I call it well-understood self-interest. I find it more difficult to predict by entrepreneurs. Currently, I talk with the representatives, who are very eager. Even those say we're coming out of the recession, so we don't have time right now. So, taking the steps together with them is still very difficult. Despite the corona, they have also been very busy and have continued. There is a certain risk in this, because they want to take the step with us in the coming years to really commit to it."

In short, the component shared motivation is deficient in heat transition collaboration efforts at regional scale. For region A, the regional shared motivation is characterised by disappointments, but also by the potential of mutual understanding and upcoming shared commitment. Nevertheless, the missing factor of shared trust, due to disappointments, resulted in the current situation to decrease mutual understanding and internal legitimacy between municipalities and other stakeholders. In addition, the heat transition is seen as a political vehicle, through which shared commitment is not supported.

Capacity for joint action

This section presents the component capacity for joint action, including the elements: procedural arrangements, leadership, knowledge, and leadership.

Procedural institutional arrangement The starting points for the collaboration are subsidiarity and administrative instruments (e.g., a good discussion) above legal instruments. In respect to the heat transition, progress meetings are held once per six weeks on both administrative level and official level. This ensured that aldermen and civil servants were all on the same level of information provision, but it must be recognized that the administrative consultation between aldermen must be discussed on many topics and therefore the heat transition is not discussed much. The same tendency can be seen in the collaboration in theme tables. The theme tables meet once a month, but the theme of heat transition is not always on the agenda there either. There are also no formal protocols. This corresponds to the element determination in principled engagement, in which a mismatch has been established between policy making and policy adoption.

"We simply have to collaborate with the eight municipalities, but in my opinion, this should not be forced. If you can, you should just start with the people who want to, and the truant aunts will join them later. Otherwise, you might

have to wait till the next elections. There are councils that today do not want to collaborate on certain themes, because the past disruptions or own called uniqueness. I have often experienced that if there are new elections, the new council suddenly wants to participate in the collaboration. Then they will collaborate again. We do not have a formal consultative body for this, hey, we haven't written anything down and we haven't written any protocols for if someone doesn't keep to the agreements. It is a human process."

Leadership As indicated in principled engagement, most of the heat transition topics are discussed in the consultation between civil servants. The civil servants decided to collaborate and write the policy document with an (informal selected) official chairman. An issue with this collaboration is that no formal decisions can be taken by these civil servants. In contrast, the durable energy generation division does have a (external) process director to facilitate the collaboration with all stakeholders' groups. This was on the insistence of the province. Two interviewees mentioned that this change of structure was not preferred by municipal authorities. Indicated reasons are the lack of control and the formalization of the agreement causing liabilities. In the current situation, the appointment of a leader is seen as a success factor in this collaboration by the regional administrative board including representatives from the quadruple helix and the responsible alderman, as the process director established an organisation and developed RES policy. The plan is to proceed with this organisational structure for future collaboration efforts in respect to durable generation.

Knowledge New knowledge is being gathered and shared to a limited extent. An example of new knowledge being gained is in heat analyses, but this also creates new problems such as how do you divide the sources in a socially inclusive way (e.g., waste processor placed in between three municipalities). Local governmental organisations acknowledge the interest of knowledge transfer between municipalities. An example of the exchange of knowledge between civil servants is that, for example, not every municipality was aware that a subsidy amount could be applied for external process management for the TvW's. However, all municipal stakeholders acknowledge that it was subsequently decided to roll out the TvWs themselves, so knowledge is shared to a limited extent. The crux lies in this individuality. There is a strong degree of fragmentation of knowledge due to the many policy tracks and initiatives, to which a specific group of stakeholders is involved, such as durable renovation projects, the provincial heat campaign, or webinars. Examples in which this strong dissemination is clearly visible is the recurrence of questions by the province, absence of a contact point for entrepreneurs, therefore, projects are still carried out on individual basis, or how a respondent formulated: "We are still focusing on pilots instead of prototypes from which series must arise."

"Respondent X is busy with different things than I am, but we try to coordinate that, but sometimes things don't go quite right. This morning I spoke to a colleague and then we also discussed that as the overarching body we have a lot of things. She came up with a smart and very simple idea of why not just make an electronic flyer with what the overarching body means for you, municipalities, entrepreneurs, citizens, during the energy transition. Then Respondent X sends it to his network and I send it to my network. The simpler the better."

Resources The number of resources is scarce, but resources are again inadequately shared among stakeholders, due to the high fragmentation. As a result, the projects do not stimulate each other and could potentially antagonise each other in the future if competition for resources arises. Exemplar for the current situation regarding the inefficient use of capacity is that a non-public actor held the same presentation about heat transition for every municipality and sub-stream. In contrast, the eight municipalities set up a regional implementation organisation, which invests collectively in energy supply and energy saving via energy counter. However, not all municipalities are constantly involved in all these projects. Thereby, this organisation is not seen as a neutral mediator since the organisation is financed by municipalities. In addition, the shortage of (long) term plans result in a lack of continuity and limited participation, consequently, non-state stakeholders do not desire to invest time, money, and effort. To overcome this problem and seduce citizens to implement heat transition measures, the regional energy organisation is looking at the opportunity to have a one-stop-shop in which the government authorities, industry, housing corporations and knowledge institutions develop durable contracts through which non-state stakeholders are willing to commit to facilitate human capacity. Nevertheless, this regional organisation is not yet developed and therefore questionable if this regional collaboration does ensure

integration. In short, prescribed by the following quote, the resources are highly fragmented and insufficiently used.

"Well, I think that happens too little. I have the idea that there are still a lot of opportunities there, but in practice everyone mainly looks at their own cards and keeps their cards fairly close to their chest. They all still have their own playing field and interests. Then it is a bit of an exchange between the different boards. To really say we are going to use all social resources for the common goal, that is far from it. No, in my opinion that is still very far from reality."

Summing up, the component capacity for joint action is to a certain extent present in case A. The stakeholders acknowledge the importance of sharing knowledge and resources to efficiently facilitate the heat transition, but this is not equivalent to the observed current situation. It is observed by the absence of a leader, lack of procedural arrangements and fragmentation of knowledge and skills.

4.1.4. Collaborative action

The collaborative governance regime consists of the collaborative governance dynamics and collaborative actions. In this section, collaborative actions regarding heat transition are presented.

Securing endorsement When presenting the findings on securing endorsement, it can be stated that the regional collaboration (i.a., RES, TvW, durable renovation campaign) increased the attention towards the topic of heat transition. This is again influenced by the present zeitgeist, because often mentioned examples of an increase in sense of awareness are the IPCC report, increase in gas prices and the floods in Limburg. An example of the raised awareness among municipalities is the calibration of the municipal agreement with its origin in 2009 in which the heat transition is introduced as a pivotal theme. However, it is not only positive attention. In particular, the relatively "small" group of sceptics and opponents stand up against the RES policy, mainly regarding wind and sun but this is associated with the heat transition part. Moreover, the focus in the RES was on the installation of solar fields instead of heat transition. In specific for the heat transition, the raised sense of urgency among property owners is important, as these actors have the power to decide in the current situation (e.g., no forcing legal framework, high level of purchase). However, this is still missing, for example present in the limited request for isolation checks by the regional implementation organisation. To conclude, the RES policy states that there is support of regional citizens to implement sustainable measures in the built environment, but this is not necessarily expressed in broadly supported actions among the population.

Enacting policy Both the regional RES document and local transitions visions are not yet signed by all city councils; therefore no reliable argumentation can be made about this element.

Marshalling resources In terms of marshalling resources, a lot of different products, projects and collaboration arrangements are developed in the region, for example the regional energy collective commissioned by municipalities, calculation tools to calculate the social added value or provincial heat sources scans and gas-free housing projects. The problem with this is twofold. On the one hand, the tools mainly involve individuals or sectors, and on the other hand, the alignment between these different projects between and within sectors is missing. A step has been taken in the field of joint regional deal projects, but in general the marshalling of resources from state and non-state actors is minimal and the fragmentation is high. As described in the quote, the fragmentation causes ambiguities regarding implementation measures. To remedy this, but also to entice building owners more, a one-stop-shop initiative is now being considered (see: resources, shared motivation). In this initiative, the various parties from the entire chain come together to connect parties in the long term and to provide certainty, but also to gain an overview for the consumer.

"What the biggest challenge was, is and remains is how do you ensure that in region A parties find each other and tackle things together. Many parties know each other well, but how can we establish that people do not get confused with all individual initiatives? Nowadays the initiatives do not yet compete, but I am concerned about the future. Look, there is a lot of communication. There are newsletters, films and statements published on the regional website. However, when you ask an entrepreneur now, who should you call if you want to make a more sustainable and long-term vision, then I am sure not all available means and knowledge is provided, due to the high fragmentation."

Deploying staff The element deploying staff shows major differences between organisations. According to the municipalities, housing associations and entrepreneurs, these organisations are understaffed and (some) staff have insufficient knowledge and skills to cover issues of heat transition. These groups are now actively approaching new staff members, but human resources are on the entire spectrum from policy to implementation scarce to find. On the other hand, political choices, and prioritization of resources also play an important role. An example of the administrative board decreases the number of full-time equivalents on the topic of heat transition.

Permitting The researcher could not find sufficient information to make reliable statements.

Building In the region, several projects have been established to develop a sustainable built environment, for example projects with Programma Aardgasvrije wijken. The multitude of these projects are pilot projects still in the preparation phase and very locally bounded.

Enacting new Management practises As previously described, the regional board has been established in 2018 to transform the governance mode to facilitate the complex socio-technical problems which cannot be solved by individuals. With reference to the heat transition, this form of governance is still barely visible. Ultimately, the existing situation has hardly changed, if at all. Those involved do indicate that this new way of thinking is only very recent and therefore much remains to be learned.

Monitoring implementation Region A is familiar with the expression: “what gets measured, gets done”. Monitoring tools are present to measure the process of implementation targets between municipalities. This monitoring is used as a benchmark once a year, nevertheless, respondents indicate that the monitoring is not always updated or not sufficiently used. The triple helix collaboration is partly involved with this monitoring tool. Moreover, a lot of individual organisations have their own monitoring tool, for example the water board has a tool, which measures the progress over their territory. However, the classification of the RES does not follow the same classification as the water boards and therefore this monitoring is not equal to the region.

Enforcing compliance There are hardly any existing legal regulations to enforce the heat loss target at the regional and local level (see; policy and legal framework, system barriers). Notwithstanding, there are several protocols, such as the environmental policy. As illustrated in the quotation, this issue is also difficult due to all the interests present and a shortage of capacity. An example of this is that checks were carried out by the environmental service, but this only happened at companies that had registered themselves to save energy. This created the contradiction that companies that wanted to show commitment to save on their own, could also be punished for the fact that they wanted too then. For this reason, the environmental service has now largely stopped. Regarding the inhabitants, it is also not yet possible to force people to make their homes more sustainable. Moreover, region A insists on and hopes to inspire instead of force collaboration to achieve a gas-free built environment by 2030.

“The enforcement of compliance is a difficult one. For example, the sustainability question among companies. We can enforce compliance of the existing protocols, but we do not always want to do so. Companies will not follow our targets just because an official says the owner should do that. Companies are very busy with their business operations and less busy with their energy policy. That’s a difficult thing. In addition, we also have the central government that has assignments from sector associations. For the local actions, we work closely with the environmental service department to check if companies achieve the energy standards, but because of the amount of interest this is difficult. The stakes are high in term of employment, and we cannot enforce compliance because of the limited legal framework and available staff. It runs sparsely. In our region, we talk regularly with the business associations and those representatives are willing, but it remains difficult to convince all individual organisations. In addition, if we already wanted to enforce compliance, we are not able to do so, because of the shortage of capacity and missing legal framework.”

To conclude, the overall picture is that there are hardly any joint regional collaborative actions. Although securing endorsement and marshalling resources are observed to a certain extent, it is stated that the foundations are developed, but this does not directly result in collaborative action at regional scale.

Moreover, the collaborative actions are related to the inter-municipal collaboration, which is in line with the findings of the components in collaborative dynamics.

4.1.5. Impact & Adaptation

According to the entire interview group, to facilitate the heat transition targets an essential element in the system context needs to be changed: the policy and legal framework. In the regional collaboration the ambiguous national vision of the national government and absent legal frameworks has a restrictive effect, for example concrete heat transition targets are missing, how to look at biogas or hydrogen as possible fuels and enforcement of compliance is not available. In terms of pursuing the heat transition measures, most of the interview's state that it would be preferable if the North-Korean model would be applied, with some form of regional preferences. Such measures would develop a clear mandate for a pro-active agenda executed by municipalities. As described in the quotation, the regional actors hope that these guidelines will reduce the political punishment at the regional and local scale and minimizes the negative influence of political dynamics and level of conflict.

"The national government have to become more directive to guide the regional actors. I think every municipality thinks, national government come up with a plan, take control, take us by the hand. Today, the Dutch national government just decentralized their problems, and they are you can resolve them. I believe every municipality is just asking for frameworks and guidelines. Give us a legal framework, give us money, give us manpower, give us the way to do it and we'll do it. However, the national government do not act and that just complicates things. Of course, we are all trying, and sometimes we have successes, but these are too minimum if we want to achieve the goals by 2050. We can really take steps, but there needs to be much more direction from the national government. But the national government is also not very energetic in this for the time being."

Another constraining effect is the limited resources. To adapt the system, the focus should be on sufficient manpower to implement the measures in practise and develop policy. On the one hand, people with knowledge and skill to install the energy-saving measures should be made available and on the other hand it would be worthwhile to appoint ambassadors. As described in the quote, to address the heat transition the regional actors should prioritize the transition. The appointment of ambassadors can stimulate communication between all sectors and support the integration and implementation. Moreover, the minority of interviewees claimed that there should be more financial arrangements to seduce individual property owners even if these proprietors have no interest in the climate at all.

"Money is not the problem, but the prioritization is. It is a balancing of interests. People would rather go on holiday than buy solar panels to keep it at home level for a while. This is also shown in politics. Sometimes municipal councils make choices to invest for example in youth care instead of the energy transition. That is a matter of prioritization. It is 100 percent a social transition and not a technical one. Technically and financially, I see no problems and it is just a matter of time. It is a psychological and social transition."

Considering the adjustments in the CGR, the interviewees perceive the current collaboration as a proper collaboration, but there is room for improvement, as illustrated by the quotation. First, there must be more attention on the topic of heat transition, since all interviewees address the fact that it is still a relatively new topic. It would be preferable if municipalities would focus more on the similarities than differences. In the perspective of the non-state stakeholders, it would be desired if the progress would be less politically driven, so that again non-state stakeholders can reflect their interest and preferences. Moreover, the involvement of individual property owners is still a question mark.

"It is good to say that I am not negative, but I am critical. Critical in the sense that I think we are the right track, but we could scale-up if the political input decreases. However, that is not realistic, because it are political topics."

4.1.6. Collaborative governance process

The investigation in case A shows the presence of threats and opportunities in the system context. The noticed barriers entail the scarcity and uncertainty of resource conditions in all disciplines, the lack of clarity about the policy and legal framework and the high level of contention among citizens, mainly caused by the notable measures. In case A, an opportunity for regional collaboration is the high presence of network connectedness, however, this is not only positive. Prior collaboration sup-

ported the close links, but on the other hand it resulted in a pre-existing vision from the perspective of enumeration of individual measures and disappointments from other disciplines. Another opportunity is the enthusiasm of the municipal servants, which resulted in a collaboration between municipal officials, but not with non-state stakeholders. Moreover, essential drivers are missing. There is no overall shared feeling of interdependence and high uncertainty, due to the locality of solutions, missing local visions, and lack of guidance. In the current situation, the main reason to collaborate with state and non-state stakeholders is to obtain subsidies and the national policy regarding heat transition (RSW) must be submitted by the political responsibility of state stakeholders (municipalities, water boards, and provinces). Both incentives did not result in a sustainable collaboration between state and non-state regional actors concerning heat transition. The subsidies are only for specific arrangements and the RSW is a political document without legally binding aspects.

The collaborative governance regime components show that the heat transition is not facilitated at regional scale, caused by the high number of system barriers. The components principled engagement and shared motivation are hardly observed in region A. Based on the results, it is shown that the components principled engagement and shared motivation closely interact in region A. For example, the absence of discovery of interest is influenced by commitment and vice versa. Applying the collaborative governance theory, the elements of principled engagement and shared motivation result in capacity for joint action. It is, therefore, explicable that the elements of capacity for joint action and actions were rarely observed in the collaborative governance regime of region A. To address these issues, the state and non-state interviewees address that the national government must try to adapt the legal, policy and resource prerequisites. Besides, the non-state stakeholders and non-local government authorities appoint the added value if the regional collaboration was correctly addressed. Besides, the enticement of the main target, individual property owners, is still inconclusive.

4.1.7. Validation case A

The validation of region A largely corresponds to empirical findings reflected through the collaborative governance framework, nevertheless, there are a few striking differences. In the system context, the expert does not share the opinion that political instability and power relations have an influence on regional collaboration. This is since citizens are ultimately in charge instead of the regional actors. The respondent emphasizes the difficult position in which the municipality finds itself, since local authorities must direct and temp, but it is up to the citizen to act. Moreover, the validation session made clear that regional support among the population is present, but the need and urgency is missing. This is derived from recent citizens participation sessions designed to develop the local heat visions. In the current situation, there is no question of a scarcity of resources (i.a., capacity, financial resources), but the interviewee does acknowledge the lack of resources for the future. In addition, in the region, something needs to be done in employment through training places. Deriving from the system context, the importance of leadership is emphasized, since the current official consultation structure is only established by the enthusiasm of officials. In addition, the time factor was acknowledged as the most important negative consequential incentive.

In line with the findings from the interviews, the validation indicates that civil servants play a pivotal role in the collaboration, which is emphasized by the fact that the heat transition is not even on the administrative agenda. According to the validation session, this is caused by the lack of feeling of interdependence between municipalities at regional level. Conversely, the local authorities do believe they are dependent on state (e.g., water board) and non-state stakeholders (e.g., housing corporations, grid operators), but only at local scale since the heat transition is a local transition. Besides, the regional collaboration is unbinding, and non-state stakeholders have nothing to do with the decision-making process. Together with the high uncertainty, unbinding nature, and relatively new topic of heat transition, it is reflected that the existing policies are concepts instead of strategic plans. Beyond the findings of the interviews, the validation session underlines that principled engagement, shared motivation, and capacity for joint action in terms of procedural arrangements and leadership are absent. In contrast with the current situation, the validation expert expresses that the municipalities agreed to have more extensive collaboration with the neighbourhood implementation plans, in contrast to the individually set up local heat vision. In addition, the validation session underlined the non-existing significance of the regional theme tables regarding heat transition, for example the only recent topic is the one-stop-shop. However, this project was set up by an organisation paid by municipalities and the project is financed by means from the regional deal subsidies of the national government.

To ultimately achieve impact and system adaptation, the findings from the municipal perspective are confirmed, since it is again claimed that system context must transform in terms of a clearer policy and legal framework provided by the national government and investments in sufficient capacity.

4.2. Case study: RES B

Section 4.2 presents the data findings for case B. First, the case specific data is categorized by the collaborative governance framework (system context, drivers, collaborative governance dynamics, collaborative actions, impact, and adaptation), then the alignment between the elements is illustrated. At last, the validation session and overall case evaluation are presented.

4.2.1. System context

RES region B is situated in the heart of the Netherlands, within two overarching governmental bodies subdivided into eight municipalities. Most of the ground is arranged by nature reserves and agricultural land. The urban landscape is further characterized by several highly urbanized centres surrounded by a large green urban area. The eight municipalities have a large variety of inhabitants from 4.000-75.000, whereby three municipalities are home for less than 10.000 inhabitants.

The built environment consists of a housing stock with a ratio of 70/30 purchase/rent. Research by VNG in 2016 found that most of the housing stock was built between 1975-2004 and 70 percent of the housing stock had an energy label of C or below. Nevertheless, the housing stock in this region is strongly changing caused by the fact that the region is a growth region.

The region was established in 2011 with the ambitious goal of becoming a European top region in terms of innovative food production, and this again includes an attractive work and living environment. Based on this regional vision, the organisational structure of heat transition is established, as shown in figure 4.2. The regional organisation is guided by a regional board with representatives from the triple helix. Opinions differ, but in this research the role of the board is defined by the supervision and overview of the variety of regional topics. This regional board does not have decision-power, as this is formally substituted by the city councils of the eight municipalities. The organisation is further subdivided into different policy tracks in which the pivotal themes, sustainability, and housing. In these structures, the region collaborates with stakeholders from industry, government, and civil society organisations to achieve the heat transition targets. The industry is represented by small-medium sized enterprises. Moreover, a large knowledge hub is present in the region.

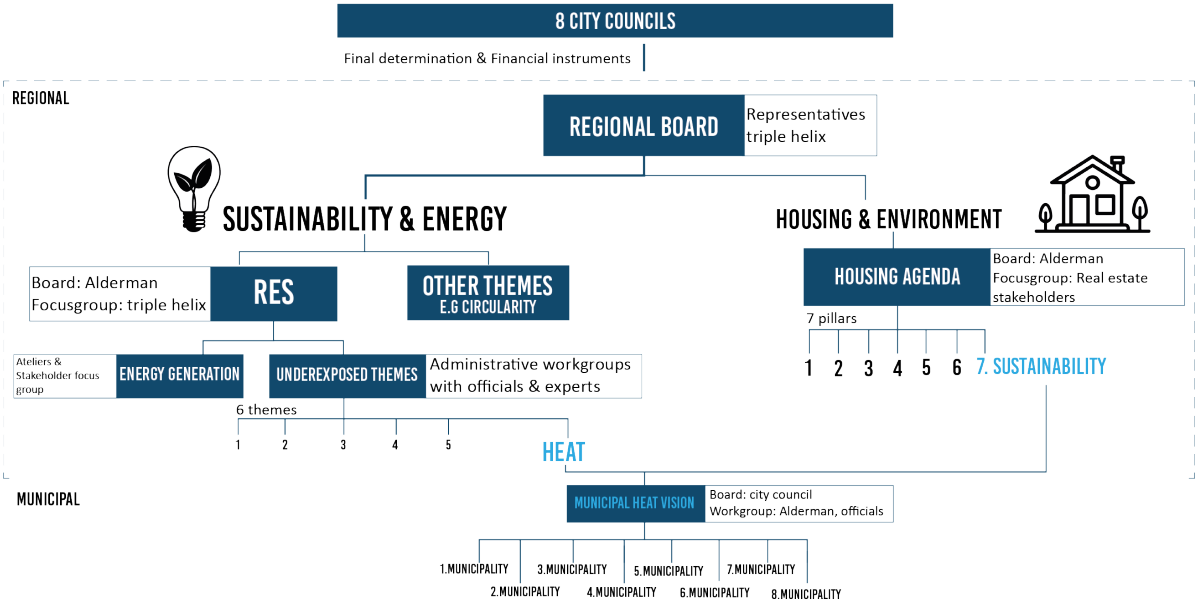


Figure 4.2: Organizational chart (Own illustration)

The primary theme in which the heat transition is discussed is sustainability and energy. This prior track

is the result of the RES policy and consists of a sounding board group with representatives from all previously called stakeholders and a steering group with aldermen. In this way a concept RES 1.0 was delivered. However, after this progress the stakeholders acknowledge some underexposed themes, like heat transition. To focus on this theme as well, it was decided to establish a heat transition working group with civil servants, which should report back to the original organisation with representatives from all stakeholders. Another sub-stream is the housing agenda, where the goal is to regionally address issues relating to housing, whereby heat transition is one of the pillars. This collaboration consists of provinces, municipalities, housing associations, builders, project developers, brokers and other parties involved in managing the real estate market.

Resource conditions Research into the supralocal heat resources indicated that there are several natural sources, and this implies that the region must make agreement on how to share these sources. Nevertheless, the RES indicates that the RES has a limited amount of supralocal sources, and because of this scarcity, the participants, mainly local governmental agencies, feel a limited need to collaborate at region scale. The stakeholders recognize the opportunities of the supralocal sources but point out that these sources are only available in certain areas. In addition, still a lot of investigation is done if these supralocal heat sources are feasible. Due to this point of view, all electricity is now mainly used as a heat source, but this has problems due to the recently received information that the network capacity will probably not be sufficient.

Another factor influencing the resource conditions is the human capital. The entire set of interviewees indicated a major shortage of capacity in the field of human assets, both in terms of policy and implementation. On the one hand civil servants are overloaded with work and can fill their agenda twice with the amount of work, but on the implementation personnel to place the insulation or to guide homeowners in the transitions is limited. For example, civil society organisations are asking municipalities to wait before sending out reports on a large scale, because otherwise they will not be able to handle the questions from residents or entrepreneurs. Furthermore, the individual organisations lack knowledge and skills, which entails that a lot of work is done through external consultancies. Moreover, financial resources are lacking. Local and regional parties indicate that there are too few financial resources and there is also a great deal of uncertainty about money from the national government. This can be seen as now only plans have been approved with the condition that the national government will financially support the plans. Nevertheless, there is a variety between authorities on the prioritisation of the heat transition, which results in differences between available means between and within stakeholder groups.

This condition also has to do with the possession, which must be made more sustainable. About twenty percent of the housing stock is owned by housing associations and the large majority is owned by private individuals. As a consequence, more time and energy will have to be invested in individuals instead of large joint agreements with housing corporations. However, there are opportunities, since the housing stock is relatively young and the region is a growth region. The new houses to be built are relatively easy to make more sustainable and are also required by legislation to be built energy neutral. In this region there is a scarcity of resources in terms of natural sources, human and financial capital. However, with relatively new housing stock, there are opportunities to transform property in a relatively easy way.

Policy and legal framework As previously described, region B is situated in two overarching governmental bodies. This fact confirms that the region is not an official government body and therefore has no independent decision-making power. Consequently, the policy must be determined by individual municipal councils. However, there is a wide variation between political preferences in the region, because of which ambition levels differ (see. policy dynamics power relations). In addition, the supralocal sources to be used for local policy are not all located in the RES region. The choice to cooperate in this region is therefore not by definition defined. Despite the political subdivision of local entities, subsidy rules often apply to all municipalities and other parties located in the region.

Another determining precondition in this region is that the RES and TvW's are political vehicles to implement heat transition. It can be deduced from the fact that all deadlines and legal responsibility is dedicated to the government. Another often mentioned negative effect on regional collaboration is that the RES policies needed to be delivered before local policies needed to be determined. In addition,

both policy documents can be made without any formal requirement, and therefore, difficult to compare within or outside the region.

The policy in the field of legislation is mostly the same as region A. The region is waiting for new legal frameworks of the national government in the field of heat transition, for instance subsidy arrangements and de Warmtewet (Heating act). As a result, the lack of legal framework and complicated policy has a major impact on the heat transition in this region.

Prior failure to address the issues Regional collaboration regarding heat transition is influenced by the former collaborations. The region was once established to enter strong regional partnerships in the field of food production, but themes such as circularity and housing, as illustrated by the quotation. In recent years there has been an increasing focus on regional collaborations, which can be deduced from the fact that new programs are being launched in the field of housing and climate. This advantage has been used by using the existing organizational structures with the triple helix as an example for the energy transition in general. In principle, this energy transition collaboration has often been about sustainable generation since concrete national goals of the government were attached to it. According to respondents, this, and the contention due to installing wind turbines contributed that the heat transition only became apparent after the concept phase. Another barrier is the large differences when local authorities started to pay attention to their local viewpoint. For example, there are municipalities that already had their entire policy ready to be implemented in 2017, and other municipalities only started with their individual vision at the end of 2021. Regarding prior attempts, the region also has a strong engagement with the provincial arrangements. The provincial support team developed already several pilot project at the local scale before regional collaboration was suggested by the national government.

"People already had a collaborative approach before the RES came, because there were already several regional collaborations in the field of housing, industry and agriculture. It is a platform for joined-up thinking. I consider this as a big plus, because it gave us an example of how we could collaborate with all stakeholders."

Political dynamics and Power relations The power relations considering the heat transition are unequal for state and non-state stakeholders. As figure 4.2 indicates, the governmental agencies in the end are responsible for the establishment of policies. The current prevailing political dynamics with the upcoming municipal elections and enduring cabinet formation are again causing tensions and even stagnation. The cabinet's formation causes tension, due to the uncertainty about available means. Moreover, the stagnation can be deduced from the fact that neighbourhoods are not yet designated, and isolation campaigns are put to hold. Hence, the effort put into heat transition is a political choice, where in this region are large differences between political preferences. Most municipalities are ruled by Christian parties except for one municipality which has a progressive left-wing council. Likewise, this municipality is a frontrunner in heat transition. Consequently, there are major differences in ambitions about the heat transition regarding state stakeholders. In addition, there is commotion in this region about the national policy that smaller municipalities should be merged to meet the challenges of the future, including heat transition ambitions. This led to discussion in the municipal councils, so that municipal executives resigned and policy regarding the heat transition lagged.

Network connectedness In line with the findings on prior failure to address issues, the network connectedness is present. This originates from the collaboration in several other fields. The stakeholders form an interlinked network, know where to find each other through the entire region and have formal and informal meetings. Despite this close relations within the region, not per definition these network ties are defined by the same municipalities and alternative region-specific stakeholders, because the network ties are again close with adjacent municipalities and associations.

Level of conflict The low level of initial trust regarding the heat transition has a high impact on the regional collaboration. In the first place, the turbulence that is part of the discussion on durable energy generation has ensured that the regional collaboration relating to heat witnessed a lot of commotion the past years. The subject receives a high amount of negative media attention, which again played a major role in the level of conflict, for example, the national, but also local media mainly report about negative stories that people cannot longer heat their homes due to transformation from gas to heating pumps.

In addition, there are so many different topics in the field of energy that the measures are getting mixed up, resulting in a decrease in support and an increase in resistance to everything that has to do with energy, for example council meetings are paralyzed, due to the high amount of unfavourable sketched situations in the form of questions and petitions that are set up. The citizens involved in the citizens' forum also say that they have not been heard at all. There is also still a lot of uncertainty, including among experts, as to why we are now switching off from natural gas. Arguments often mentioned are that the gas tap is not yet closed and why cheaper initiatives such as hydrogen and biogas are not waiting. Moreover, there are many different opinions about who should pay the costs of the transition. The social organisation and the entrepreneurs look at the government, while the government also points out the responsibility of the individual homeowners, as can be read in the policy documents. In the broader context, respondents recognised the turmoil again in other government areas (e.g., COVID-19, surcharges affair) where citizens have become angry and disappointed with the regime.

Socio-economical The region wants to be a frontrunner in the food sector, in which the agriculture sector with small-medium sized entrepreneurs play an important role. This also includes a good and sustainable living environment. The existing housing stock is and remains the most important, but on the other hand the stock increases by 25 percent. The region has the mission to immediately build these homes sustainable, but again these new properties still have an electricity demand. A substantial dilemma in this region is that the availability of the housing stock (social housing, rent and private market) must be increased, but at the same time, sustainability is a challenge. All stakeholders, primary housing associations, must prioritize because of the limited financial resources and human capacity. When the stakeholders start investing in new constructions it is easier to implement, but on the other hand the already existing properties stay the largest stock, but this is way more complex to implement. Some councils have already said that they will focus more on new construction instead. In addition, the region is becoming increasingly urbanized and should again pay attention to the vulnerable groups (e.g., available housing, energiearmoede). Interviewees appointed these issues with the socio-economical factors, but they do not perceive the factors highly influential on the regional collaboration. This is mainly caused by the limited interaction between the other policy domains (e.g., other staff, financial arrangements).

4.2.2. Drivers

This section presents the findings concerning the observed drivers in region B. The potential drivers are derived from the system context and in this study consist of the factors leadership, consequential incentives, interdependence, and uncertainty.

Leadership There are two sub-streams in the field of heat and therefore different initiators could be present. In the sustainability division in terms of the RES, an external advisor from the region has been assigned to the RES. In the field of heat, the provincial government eventually asked who became the point of contact for the heat transition. The province had made an inventory of sources, but there was no regional initiator for the heat transition, as described in the quote. Ultimately, it was decided to appoint an official leader to this position, because it has been learned from the sustainable generation side that continuity is better safeguarded in this way (See capacity for joint action; leadership). Thereby, it is shown the real initiators of today are enthusiast citizens and local officials, nevertheless, this is for individual projects and not to establish durable collaborations. Secondly, for the housing sub-stream, the municipalities and overarching governmental bodies initiated this collaboration, nevertheless, no binding agreements on heat transition are made in this regional collaboration. In conclusion, the province was the main initiator for regional collaboration in terms of heat transition, nevertheless, this stakeholder does not act and sees itself as an initiator in the regional and heat transition process.

"I also think that as a province you should be careful about getting involved in these discussions, because these are also sensitive issues from an administrative point of view. If the municipalities hit each other, then you may have a mediated role as a province, but that remains difficult. The conversation that takes place in the regions and within such a provincial heat consultation with all regional contact points. The province tries to share our knowledge there and notice that this will help more and more, but that does not alter the fact that there is still too little talk about the heat transition. We are in the process of putting the subject on the agenda more and more, for instance we try to bring up heat transitions in every meeting."

Consequential incentives First, the stakeholders indicate that they are brought to the table to discuss the RES, since the national government policy suggests this. In this region it can mainly be seen that they have started the heat transition, because the TvW's and RES had to be handed in before 2022. Both official and administrative meetings have already been held regarding the energy transition and because the RES came, an organisation was set up for this. The reduction target adopted from the provincial agreement of 55 percent CO_2 reduction was still quite abstract and only entitled estimated effects without concrete plans. Then the RES regions were set, and deadlines were set by the national government. This entailed hard requirements on how many terawatt hours, and more soft requirements about which heat structures are used in this way and how the potential for geothermal energy or biomass is handled. In addition, to be eligible for a subsidy from the central government or the province, the municipalities must collaborate to have a stronger and well-thought-out story.

Interdependence The interdependence between stakeholders is influenced by the stakeholders' individual interest. In the perspective of the municipalities, these interests are not present at regional scale. Two reasons for this are that the individual municipal polities (TvWs) are not and the perception that the solutions are unique per individual municipality. Thereby, there are major differences in the region in terms of capacity and size of municipalities. The local authorities in this region vary in ambition and experience regarding heat transition. Hence, the larger municipalities do not need the small ones to roll out the heat transition. On the other hand, local governments understand that agreements must be made about sources, but because, according to the municipalities, there are few common sources, there is little regional interest. In contrast, the respondents agreed that sharing knowledge is important to achieve the heat transition ambitions. Stakeholders do not act in correspondence at regional scale, but locally involve their housing associations and grid operators. This is again visible in the sub stream housing. The other stakeholders do recognize that they are dependent. For example, the water board in the field of soil chemistry, because if everyone starts drilling in the ground, this can have a major impact on the soil water. Another example is that entrepreneurs and housing corporations recognize that agreements must be made on a regional scale to efficiently use means and be able to make a national stand. This can be deduced from the fact that industry advocates a regional implementation organisation and housing corporations nowadays are closely involved with the housing agenda.

"It is not surprising that the heat transition, that the heat transition is getting off to such a slow start, because a different solution is needed everywhere. For example, I live in a good neighborhood that is well insulated, so it should be possible to switch to a heat network, but part of the neighborhood is only connected. The part where I live there is no heat network. The most important thing you should do as a municipality is to encourage people to prepare your home for gas-free and low temperatures. A heat network will usually work with medium temperatures instead of low temperatures, while if you do it individually you have to do it with low temperatures. You can easily do this in reasonably well-insulated homes, where you don't have to do much extra. So all those neighborhoods are different too. That means it's just not on an individual level, but sometimes in parts of a neighborhood it can also be different. That is the special thing about the heat transition and the difficult thing for municipalities as well. There is not one answer of how to do that."

Uncertainty In practise, the high level of uncertainty does not initiate collaboration; on the contrary. As has been indicated in the RES document and interview series, there is a high degree of uncertainty regarding the heat transition in region B, but this uncertainty is not reflected in regional collaboration approaches. This can be deduced from the fact that the heat transition is still in its infancy because research is still being done into available sources, local visions are not yet determined, and the national government has not yet announced their plans regarding heat transition (e.g., financial resources, legal instruments, visions). Furthermore, due to the high uncertainty, stakeholders, namely local governments, citizens, are in a split of or investing in today's measures will be beneficial, or that it will be more useful to wait till new more financially beneficial solutions come up (e.g., hydrogen and biogas).

4.2.3. Collaborative dynamics

In this section, the collaborative governance elements related to collaborative dynamics are discussed.

Principled engagement

First, the component principled engagement is discussed which exists out of discovery, definition, deliberation, and determination.

Discovery Due to the first process supervisor in the field of the RES collaboration, there has been involvement from the beginning of a diverse group of participants with representatives from the government, entrepreneurs, housing corporations, grid operators, social organisations with a citizen panel and industry. In the end, the heat transition is all on tempting the property owners to implement the heat transition, nevertheless, the citizens did not feel heard and therefore a citizen panel is incorporated in the meeting. The process supervisor believed in the mutual gains' theory, in which every organisation benefits from the fact that mutual and individual interests are aligned. However, in the RES process there was a lot of focus on the concretely set goals of sustainable generation, because of which the heat transition was hardly discussed, if at all, as indicated in the RES documentation and the interviews. That is why a working group was eventually set up in the field of the heat transition. Only official representatives are included in this working group and the other stakeholder groups are only informed, for example the citizen panel feels excluded as presented in angry emails and petitions. The same picture is visible in the housing agenda, the officials collaborate on certain topics and the other stakeholders are informed. To conclude, the respondents indicate that heat transition is an underexposed theme and, if the discovery happens, it focuses on local governments.

"Well, the RES was 98 percent about electricity, heat was really still involved. My expectation is that this will be different in the next RES: the RES 2.0."

Definition The defined objective is in line with the climate agreements. It entails that the built environment will be energy neutral by 2050, and, regional-specific, a reduction target of 1.5 percent. However, these targets are rather basic, and major differences are present between stakeholders when and how the goals should be achieved. The different language is visible in the different kinds of objectives defined by the individual organisation. For example, every municipality has its own objective differing from energy neutral, climate neutral, without natural sources, and again the deadlines vary from 2030 to 2050. The respondents also indicate that tasks and roles are unclear and that these have not been formally agreed in the RES program. In the housing program the heat transition is approached in a different way and tasks and actions have been defined. The inter-municipal collaboration approach is a system in which the specific themes are subdivided between the municipalities.

Deliberation There are several groups in which the heat transition is discussed, see figure 4.2. In both sub-streams, the administrative consultations are prepared by official consultations. In addition, there are separated ateliers with a variety of representatives from stakeholders groups. The atmosphere during these meetings is twofold. The respondents indicate that communication takes place about certain (least controversial objects), but other subjects are managed individually. In this particular region, some municipalities had already prepared their plans and did not intend to deviate from them, which hampered an open dialogue. For example, consultation on placement of wind turbines, isolation campaigns and citizen participants are not discussed. Moreover, it has been agreed to compare the TvW's, however, no joint guidelines have been established in advance, therefore it is still questionable whether this is even possible. In conclusion, limited communication takes place, and if this takes place one central dialogue is missing.

Determination The political bodies have control over the decision-making process because the heat transition is seen as a political vehicle. This can be deduced from the fact that municipal councils, province, and water boards are held responsible for drawing up visions. In contrast, this RES region decided to sign the RES 1.0 by all involved parties. Handing in regional documents on time and handing them out as a regional board is reasonable, but joint decision-making is hard. This is presented by the lack of concrete, unambiguous agreements in the field of the heat transition and many discussion points are being pushed forward to RES 2.0. For example, about potential heat sources, where several municipalities do not want to apply biomass others see it as a transition fuel. These different standpoints led to impasse in the regional collaboration causing no clear agreements on this potential

source. This lack of regional determination is visible in the various statements municipalities make in their own local policy document concerning heat. The housing agenda and the RES are also not aligned. According to the respondents, both programs are nowadays visioning instead of plans with shared agreed process agreements.

In conclusion, the component principled engagement is absent in the current situation. The heat transition has not set up the agenda of formal regional governance structures. In region B, there is a low participant involvement and frontrunner municipalities tried to fend off engagement with formal regional collaborative governance structures. Therefore, no shared interest is discovered, and the definition of tasks and targets is minimum. In addition, the heat transition dialogue sessions are mainly at local level or were scattered across the region. Furthermore, regional collaborative governance policies must be formally determined by the eight municipal councils, however, adjustments were made, and discussion points were pushed forward.

Shared motivation

This paragraph demonstrates the elements of the component shared motivation, which includes shared trust, mutual understanding, internal legitimacy, and shared commitment.

Shared trust Aldermen, civil servants, businessmen and other representatives discuss frustrations, but ultimately it is a political decision-making process in which the councils decide, causing dissatisfaction. An example for this dissatisfaction is presented in the first quotation, which illustrates that the regional collaboration is heavily influenced by the power of the city councils. In this example, a city council voted against the agreements made in the regional collaboration causing uncertainty about the future of these arrangements and reduces the level of trust. Disappointment between regional actors is also influenced by the limited communication. This limited communication is shown between different regional actors, for example the lack of communication about the placement of wind turbines around the outskirts or subdividing heat sources, as presented in the second quote. In terms of the heat transition, this high level of frustration is shown in the reluctance to designate concrete heat transition plans (e.g., a neighbourhood order). Another typical example that an interviewee gave is that there is a high level of distrust among citizens, as shown in angry messages during webinars about the RES. Tension is also noticeable between the local government institutions and the other stakeholders. In particular, the industry has a strong response with emails and angry phone calls when certain documents are slightly differently worded than initially agreed upon. To conclude, shared trust is observed to a limited extent. However, this observation is mainly based upon examples considering sustainable generation, because, as discussed in principled engagement, the heat transition is barely discussed.

“Well, the RES is an example of that. In the regional energy strategy, you can see that the municipal council of the administrative leader has not approved the proposal. Yes, I think that is an example of disappointments and wrong expectations. If you, as a municipality, know that your alderman is working on this in a very consistent and constructive way, and you then drop your own alderman. He has resigned after this voting. I think this is an example of wrong expectations among themselves and insufficient coordination upfront from the municipality. That’s opportunism. I call that political opportunism.”

“I don’t know exactly what the background is, but we have a source outside our region. There are ten-year-old agreements between municipalities and commercial parties to do something with that heat. The municipality, where that source is actually located, did not know at all what the agreements were due to turnover, retirement and enough to really fall out of the way and be overlooked. That has now been rectified with no, we will keep each other informed and of course we also realize that you may also be interested. Know that these options are also available, but apparently that contact had been diluted and there was real unrest and frustration among administrators, residents and councilors. This can still happen, but due to regional administrative consultation that we have now scheduled, the chance is smaller.”

Mutual understanding In region B, the former collaboration efforts and network connectedness result in that stakeholders understand each other’s point of views. This is present in the dialogue with different disciplines and administrative layers. For example, mutual understanding has been increased by the in 2018 published report of the House of Representatives about housing associations, which states that resources of housing associations are too scarce to pursue with sustainability and enhancement of the housing stock. In the beginning, it was mainly

thought that this organisation was very difficult, while there were sufficient resources to achieve the goal. However, there are also examples in the region that parties do not understand each other and mainly because of limited focus on heat transition and uncertainty about solutions.

Internal legitimacy As already described, the regional agreements are very basic, therefore it is even suggested by respondents that it is hard not to comply with the regional ambitions. On the one hand, some municipalities and other stakeholders invest time and energy in the alignment of individual plans and regional strategies, but the broader view shows the scarcity of internal legitimacy. Organisations vary in circumstances and ambitions regarding heat transition. A situation in which this is visible is that in some municipalities the placement of windmills was done without any contention, but measures about heat transition developed political unrest and vice versa. A fact that shows the distinct ambitions is the different deadlines and objectives at least every municipality defined (see also definition). In addition, internal legitimacy is again barely present regarding energy generation, as two research areas were not determined by city councils. Collaborative governance is not only about municipalities; however, the same picture of mutual differences is also visible in other disciplines.

"What I notice is that a number of forerunners in the beginning at least had something like we don't put any energy into that collaboration. Officials said that they don't have time or capacity to participate in the regional agenda, that just costs time. I'm not going to do that, because I can't get it sorted internally with my manager. That is very unfortunate, but it is an example of putting your money where your mouth is. You really notice that it is done at the local level, at the municipal level. Actors see the municipal, provincial and national government as scales that you can manipulate to make things possible and the region then depends a bit on it."

Shared commitment There is a sense of "healthy objectivity" in the region. This means that parties only participate if it pays off in terms of money, time, and effort. In the municipal area, the frontrunners were not interested in joint responsibility, because they had completed their plans much earlier and therefore did not participate in the action points. However, this has changed over time since they had to draw up a policy document in the form of a RES together with the province and water board. In addition, the limited extent of shared motivation is present in the withdrawal of municipalities from the regional actors considering energy counters. Moreover, some interviewees related to industry and civil society indicated that they feel involved in the process and therefore share a larger feeling of commitment, then the other RES regions they were in. However, all stakeholders, excluding the local governmental authorities, argue that the heat transition documents are mainly political vehicles, and therefore they do not feel responsible, as for example all deadlines are related to government agencies. Another point of discussion in the region is who is responsible for the financial resources, for example, if an entrepreneur must strengthen the roof construction to place solar panels or the placement of high-quality isolation.

To conclude, shared motivation to facilitate the heat transition in a collaborative governance setting is present to a very limited extent in region B.

Capacity for joint action

In line with the principled engagement and shared motivation, it is seen that capacity for joint action is not often observed.

Procedural institutional arrangement Based on the interviews, there are several procedural and institutional arrangements present in region B. An example of a procedural arrangement was the implementation of an official working group to focus more on heat transition in the RES organisation. Thereby, the other involved stakeholders stayed informed during the atelier session. However, the major problem with these agreements remains that there is no clear division of roles, other involved stakeholders are excluded, and the arrangement only entails the development of a vision instead of concrete actions. To resolve this, the industry sector argued to invest in a regional implementation organisation, which sets objectives and process agreements with all disciplines. The housing agenda also includes strategic (aldermen and representative housing corporations) and official consultations. In contrast to the RES organisation, actions and responsibility are appointed here, nevertheless, these small amounts of action regarding heat transition are not leading and do not align with the RES policy.

Leadership There is a (external) regional leader in the field of the RES, but it mainly focuses on sustainable energy generation. However, as mentioned in the section drivers, an official is the process manager regarding heat. Municipalities specifically decided to select an official contact person to maintain continuity in the process. Nevertheless, not all parties agree with this opinion, because of the governmental perspective this official takes. In this region, there are several policy tracks which have an entrepreneur as process director. Hence, this leader is in those cases able to make joint agreements and facilitate implementation steps. However, these tracks slightly differ from the heat transition circumstances, because in those disciplines no deadlines are set by the national

government.

"As far as I'm concerned, appointing an entrepreneur as a leader gives a greater chance of achieving the sustainability targets, because look, there is no entrepreneur who will work harder, because the alderman says he has to do something. In addition, it also makes it a less political game."

Knowledge All stakeholders acknowledge that sharing and generating knowledge is fundamental for the facilitation of heat transition. In region B, this is seen in the fact that an infrastructure company is set up in the field of collective heat supply to share information about the legal and technical requirements. Next, officials share letters for walk-in evenings and research into geothermal heat sources is tackled jointly. Nevertheless, not all knowledge and skills are shared in one central place. Despite these examples of collaboration, government authorities act differently, and fragmentation is present, due to the different proposals at multiple scales (e.g., provincial webinars, local projects and municipal isolation campaigns).

"Both superordinate authorities have a heat support program and in addition eight municipalities are all hiring a separate office for the transition vision heat, for a district implementation plan, for a natural gas-free district. While some things also uhm. That applies to everyone, issues about what role you have as a municipality, how you look at things, heat networks, do's and don'ts, you don't all have to hire your own agency for that, that's just a shame."

Resources In the system context it is already appointed that in all disciplines capacity is lacking and available means are missing. As a result, in some disciplines, such as the housing associations, agreements are made about who is responsible for what. Nevertheless, the sharing of resources is not observed as a common practice within and between the stakeholder groups. This can also be deduced, for example, from the fact that there is a business case for an establishment of an implementing organisation to marshal resources, however, the local governmental authorities did not react enthusiastically to this business case. This is because of the number of joint means that must be made available in an already high demanding heat transition with a scarcity of human capacity and other means, like finances. In addition, the energy offices are run partly regionally with capacity spread among the participating municipalities. On the other hand, measures are often individual, for example, individual isolation campaigns are now being rolled out and there is no joint purchasing policy. In addition, the TvW's are formulated separately by sometimes the same external process directors.

In short, it can be stated that capacity for joint action is only limited observed in region B. There are several procedural arrangements set in place, however, these focus on inter-municipal collaboration. Likewise, the process director of heat transition is a civil servant. The other region stakeholders do not perceive this leadership as a bridge between state and non-state actors. Notwithstanding, all regional actors acknowledge the importance of sharing knowledge and skills, but nowadays these means are scattered across the region without overview. Therefore, the business sector and other regional non-state actors aim for a regional implementation organisation. Nevertheless, not all regional stakeholders see the added value of this plan, due to scarcity of time and human capacity.

4.2.4. Collaborative actions

The limited degree of collaborative dynamic is reflected in the few joint actions that are taken. The joint actions are briefly explained below.

Securing endorsement According to the interviewees, the most important action that has emerged from regional collaboration efforts is the positive and negative attention for the energy transition, including the heat transition. This is deduced from the fact that the stakeholders are forced to at least discuss certain objectives, as for example presented in the quotation. This resulted in, for instance, that the water board is immediately consulted by the planning of new neighbourhoods, extended investigation in natural sources, media attention and establishment of citizen committees. In addition, the multitude of interviewees indicated that initially they searched for suitable technical solutions, however, through the years, the stakeholders started to realize that the heat transition is particularly a behavioural transformation. Despite this raised awareness, it is important to recognize that attention is still mainly focused on sustainable generation and to a lesser extent on the heat transition. In addition, the sense of urgency to make (long term) sustainable decisions is not yet present. For example, some studies suggest that it might be beneficial to wait for more effective sources and still the larger amount of the property owners in region B is not yet started with the implementation of heat transition measures.

"I think that's the advantage of the whole RES process. Everyone is forced into it. Forced may sound negative, but no matter how you get used to it, every municipality is expected to participate to a certain extent and otherwise you will be addressed. That is positive. It starts to come alive more than when all parties are working individually in

their own cubicle. You used to be able to lean back a lot more in the field of the heat transition or energy transition in general, because those plans do not have to be visible yet."

Enacting policy The RES and associated RSW have been signed by all representatives (e.g., housing corporations, citizens, water board, municipality, entrepreneurs, province) of the parties involved. However, this has happened with amendments from certain municipalities, these mainly concerned sustainable generation and the agreements for the heat transition are so basic that all parties have reached agreement.

Marshalling resources The available means are scattered across the region and not organised (see knowledge and resources, capacity for joint action). For example, there are regional energy counters, but not every municipality is present, energy reduction campaigns are developed separately. Nevertheless, there is a regional communication website set up, but hardly any information about the heat transition is shared there. Moreover, a business case is developed to check if a regional implementation organisation is feasible.

Deploying staff In the field of deploying staff, the findings cannot be generalized, because it differs greatly per organisation. For example, the safety region scales up by freeing up capacity for the heat transition, for example in the field of fire safety and insulation, but on the other hand several organisations diminish their full-time equivalents due to political choices. As described in resource conditions (system context), the interviewees are convinced that for the policy to succeed, at least individual capacity must be created in the field of implementation and policy. These people are only hard to fine. In addition, the private parties believe that joint deployment capacity should also be scaled up, so that employees become available for private parties, where the heat transition is not the core business.

Permitting Data on this topic is very limited. This can suggest that permits are absent, but it can also be suggested that the researcher was not able to collect this information. Therefore, no general findings can be observed.

Building Research conducted on the implementation of sustainable interventions in the regions shows that under 25 percent of the building stock is energy neutral. Current tendency for housing associations and municipalities to focus on making property more sustainable, but there is a conflict between adding additional properties or making the current property more sustainable. A total of 20 percent will be added, so that the individual organisation has already made the choice to focus on building additions instead of making the current property more sustainable. With the new buildings stock is easier and required to accomplish the energy neutrality, nevertheless, again focus must be set towards natural-gas-free infrastructure. Today, three (partly sustainable) heat structures are implemented in the region. Moreover, there are projects where business cases are examined, and heat providers are contracted. Hence, this project is very locally bound and supported with financial resources from the national government, the province, and the municipalities. In addition, joint regional sustainability processes have not yet been initiated and most friction can be found in the implementation of projects, such as installing a heat generating installation in a municipality other than the one that uses it.

Enacting new Management practises The presence of new management practises is limited. Hence, the region is engaged by setting up new management structures and integrating the triple helix, as shown in the organisational diagram. However, it is recognized by the interviewees that a larger system change must be made to establish impact, because nowadays the regional agreements that have been made are too basic and without consequences. In line with securing endorsement, it is acknowledged that the heat transition is merely social in its nature then technical, therefore, the management structure must connect to these findings. Hence, the interviewees see the need to unburden the property owners. Consequently, as appointed by marshalling resources, the region investigates the option for an executive organisation, where expertise and skill specific for the region are combined to serve state and non-state stakeholders. However, private parties indicate that if this executive organisation wants to be successful then municipalities should relinquish a part of their sovereignty towards this organisation. Finally, a solution is found for the deployment of social workers as a link between public and private parties, but specifically for neighbourhoods. This is a community centre principle, in which employees are a central point of contact to gain informal trust in the neighbourhood, but also to be their low-threshold knowledge portal.

"We will have municipal elections again next year, March 16. You can see that the Dutch government and Dutch politics are quite fragmented, while we are talking about in-depth investments in the future. I can't blame anyone for that because it is what it is. I think we need a more technocratic solution, in which you delegate some things to the region or province, but in this case, you are in two provinces, which can increase the decisiveness a lot. Then not everything has to become a political discussion and then you don't have to be dependent on every city council."

Monitoring implementation Today, monitoring only takes place at individual organisations, such as municipalities or water boards. In some cases, it does happen in certain sectors, such as housing corporations with the AEDES roadmap. To properly set up monitoring, the municipalities indicate that there is too little capacity to keep the monitoring tools that exist uptodate and functional. According to the housing agenda, there is an objective to develop a joint tool, but this process is still in its infancy.

Enforcing compliance In the current situation, there are hardly any legal frameworks laid down on how to deal with private parties, such as large investors, citizens, or entrepreneurs. An example is that in today's practice in some neighbourhoods a "gas grid light" must be maintained because several homeowners do not want to switch towards a heat system. In addition, grid operators cannot be forced to favour projects with a high amount of public value. Moreover, interviews underline that only the realisation of a formal legal framework will not be sufficient, because again the human capacity should increase.

4.2.5. Impact & Adaptation

Regional collaboration should lead to joint actions which lead to impact and system adaptation both in the system context and collaboration itself. As previously described, the collaborative governance dynamics are to a lesser extent present in case B. Consequently, the respondents all tend to believe that at this pace the heat transition is not going to be facilitated in 2050. This allows respondents to suggest important barriers and desired changes.

The respondents indicate two requirements that must change in the system context. First, the national government must step in to provide resources and set a clear policy and legal framework. Today, the national government does not have a common vision and too little means are available to undertake action at regional scale by local authorities. In addition, legal frameworks must also be set that stop the non-commitment of actions. It is also acknowledged that the most exciting time has yet to come in terms of implementation, because now it is mainly about policy plans. Distrust between citizens and the national and local government plays a major role in this because the level of conflict will have to be reduced. In the few projects that are now being rolled out, there is a lot of unrest in neighbourhoods, because citizens do not feel understood and heard. An example is an implementation plan in which the heat supply for one district was placed in another district and there was great resistance to the installation of heat sources, when it was about legal ownership of gardens. This too can be traced back to a clearer policy and more capacity that must be made available.

"I often think that we need 'how to deal with adolescents' books for heat transition and energy transition in general. This means encourage them, give them a lot of self-esteem, listen, and let them discover things, but set some boundaries like I don't want you to drink booze, don't be home so late or you have to brush your teeth. Set boundaries and be strict about them. So, guys in ten years' time the natural gas will simply be gone, we're going to stop it and we're going to turn off the gas tap in Groningen, you have to insulate and windmills will be installed on land. Talk and listen to each other and give change. I also strongly believe in being honest. I think we tell people nice stories instead of realistic ones. Just say sorry it's annoying and a windmill in your front yard is worthless, but we have to."

In the CGR itself, the respondents acknowledged that the heat transition needs to receive more attention at regional scale. Nevertheless, the local government doubts if far reaching agreements on a regional scale are preferable, because of the major discrepancies in the ambitions. In contrast, prior to the RES 1.0 the entire set of stakeholders decided that a leader was absent, therefore, the municipalities agreed to appoint a contact point as an official contact point. Respondents from the other stakeholder groups, including overarching government bodies, social organisations, and industry, do recognize the importance of regional agreements in the field of the heat transition. Hence, the industry sector suggests establishing a regional knowledge centre to integrate knowledge and skills. Moreover, some desire that the government parties will relinquish some sovereignty to collectively determine agreement, enhance commitment and jointly establish capacity, which results in actions. A suggestion to achieve this goal is to appoint a neutral private leader and transform the organizational structure by having representatives of all involved stakeholders in the decision-making board.

"Well, the way we are collaborating nowadays, we are not going to make it happen. The joint and individual input is not enough. There are plenty of great actions, but not enough concrete steps."

4.2.6. Collaborative governance process

There are two organisational structures in which the heat transition is discussed, however, the main determination process in terms of heat transition is shown in the collaboration derived from the RES. The goal of this government policy is to bring together state and non-state stakeholders to form a regional energy strategy. However, no requirements are set in terms of heat transition and local government visions are not yet determined. In terms of the RES collaborations, a process supervisor initially pro-

vided a triple helix structure, but the subject of heat transition remains underexposed. To resolve this, an official working group is established, in which dialogues only take place between officials. This together with limited sense of dependence between local authorities to collaborate developed the limited extent of agreements regarding heat transition. As a result, the industry and civil society organizations are only informed and consulted. Moreover, the prescribed decision-making actors, the province and water board, do not see themselves as head responsible. Furthermore, it is observed that there is a high degree of uncertainty, due to resource conditions, level of conflict and legal and policy framework. Consequently, hardly any sign of principled engagement and shared motivation is observed to be present resulting in insufficient capacity for joint action. In contrast, all interviewees recognize the signal importance of sharing knowledge, however, in the current situation the resources are not prioritized for this goal. In line with these findings, collaborative actions are hampered. This way, adaptation in the CGR and context is not observed. To conclude, it can be deduced from the interviews that there are a multitude of contextual factors that influence the collaboration at regional scale, nevertheless, the drivers to collaborate are very limited. Subsequently, the elements within the collaborative governance regimes are hardly observed regarding heat transition and system transformation is not yet observed.

4.2.7. Validation case B

The validation session confirmed the image of the current situation in region B. The interviewee mainly emphasized the fact that the missing policy and legal framework and uncertainty about resources from the central government has a very restricted affect. Another barrier is the contention on durable energy generation which requires energy and influences citizen participation in heat transition, as citizens do not see the difference between these disciplines. Moreover, the validation session confirmed that current collaboration efforts are only initiated because of the requirement of the national program. The usefulness and necessity to collaborate is missing, due to the high uncertainty, lack of leadership and missing dependence. Dependency is lacking, because the regional resources that exist are in other regions or are limited to a few municipalities. These factors, together with the already existing plans of municipalities resulted in lack of shared motivation and principled engagement. However, the respondent acknowledges that it will be more efficient to tackle certain things regionally to change the system context, such as raising awareness among citizens through regional developed webinars and joint purchasing actions. According to the interviewee, a vehicle to achieve this goal is to appoint a leader. This leader should convince stakeholders that it is attractive to regionally share targets and stop fragmentation.

5

Results of the Comparative Analysis

In this chapter the comparative analysis is presented. First, the in-depth case study information for both RES regions is compared and presented. This information is set against the desired future situation illustrated by the collaborative governance frame of reference. Lastly, the results are validated.

5.1. Comparative Analysis

The findings of the comparative analysis are illustrated in qualitative terms ranging from "++" (as strongly observed in the case) to "–" (Not observed in the case), as shown in Table 5.1 and Appendix D. The comparison shows that the regions have a relatively high number of similarities. It is remarkable that both regions come forward as progressive to achieve heat transition ambitions, nonetheless, the collective action is relatively low. This is highly influenced by the contextual setting, and, therefore, absence of two collaborative dynamics components, principled engagement, and shared motivation.

5.2. System Context

The heat transition has been typically researched as a socio-technical process where the national ambition is to realize a successful transition to a sustainable heat system. Nonetheless, the progress of the transition along with the regional collaboration are subject to a wide range of elements in the system context, as presented in Table 5.1.

In general, the system context elements show a lot of similarities between the researched regions. It is explicable that in both cases the system context elements are similar, due to the high influence of the national tendencies considering the inadequate policy and legal framework, distrust towards the entire government (level of conflict), and elections (political dynamics). Besides, the region is not a constitutional body, so the political decision-making by the eight municipalities is leading (political dynamics). The different political preferences in region B are noticeable in contrast to the rather equal political dynamics in the municipalities in region A. Moreover, the scarcity and uncertainty of sustainable heat sources has a negative influence in the researched regions (resource conditions). These equal circumstances are understandable, because one of the selection criteria for the case study regions are rural characteristics (Chapter 3: case selection). Because of the low density in both regions, the distribution of heat is mainly feasible through individual solutions, as nowadays existing solutions are not viable. By the same token, the two case studies show a lack of human capacity at all levels and disciplines. This is among other things a result of the lack of prioritization to achieve heat transition. In region B, this prioritization of available means for heat transition present, for example the ambition to become a growth region influences the subdivision of means (socio-economical element). According to the municipalities, this is mainly an issue for housing associations, because in terms of politics the issues are divided in two different policy lines. In the opinion of the civil servants, this subdivision has the consequence that the available means for the heat transition do not have to be shared with the means of the housing development. Another effect of this division is the lack of alignment between the various policy domains.

Table 5.1: Results of the comparative analysis

	RES A	RES B
System context		
Resource conditions	++	++
Policy & Legal frameworks	++	++
Prior failure to address issues	+	+
Political dynamics/ Power relations	+/-	+
Network connectedness	++	+
Levels of conflict	++	++
Socio-economical factors	+/-	+/-
Drivers		
Leadership	-	-
Consequential incentives	++	++
Interdependence	+/-	+/-
Uncertainty	-	-
Collaborative Governance Regime		
Principled Engagement		
Discovery	-	+/-
Definition	+/-	-
Deliberation	-	-
Determination	-	-
Shared motivation		
Trust	-	-
Mutual Understanding	+	+
Internal Legitimacy	-	-
Shared Commitment	-	-
Capacity for joint action		
Procedural & Institutional Arrangements	-	-
Leadership	-	+/-
Knowledge	+/-	+/-
Resources	-	-
Collaborative Actions		
Securing endorsement	+/-	+/-
Enacting policy	N/A	+/-
Marshalling resources	+/-	-
Deploying staff	N/A	N/A
Permitting	N/A	N/A
Building	-	-
Enacting new management practise	+/-	-
Monitoring implementation	+/-	-
Enforcing compliance	-	-
Collaborative Outcomes		
Impact		
Alter projected conditions in system context	N/A	N/A
Adaptation		
Transformation in the CGR system and context	N/A	N/A

An opportunity in the system context arises, because both regions already had regional partnerships in a variety of different sectors. Likewise, strong network cohesion is present in both regions, for example entrepreneurs, government and social organisations know each other well in formal and informal ways, which has a positive influence on the collaboration. However, the element of prior collaboration efforts could also have a negative influence on the regional collaboration. In respect to the empirical findings this was shown in the fact that region B started regional governance structures when the RES came into existence, which resulted in a distinct local vision. Whereas region A already established a regional agreement between municipalities before the RES came into practice. This development has the consequence that both regions should transform these individual or already existing plans in compliance with the RES. To integrate the policies, region A has the slight advantage of an existing similar vision.

5.2.1. Drivers

Regional collaboration in the field of the heat transition is mainly motivated by indirect incentives. The most frequently cited reason for parties sitting at the table is because the government indicated whether the parties felt that they should change something jointly. An example hereof is the prescribed RES collaborations, by which a certain document must be uploaded before a certain deadline set by the national government. A positive incentive for collaboration is for subsidies or for durable partnerships, in which a higher number of parties creates more mandate.

Secondly, leadership in heat transition projects are present, nevertheless these initiators are often associated with the government or enthusiast for local projects. On the one hand, this suggests that neutrality is a point of discussion, but on the other hand the regional case studies implied that enthusiasts are often active citizens or municipal representatives in a neighbourhood or street. This initiation appears to have caused controversy between the regional actors. The non-state actors feel side-lined in the facilitation of heat transition, but the municipal authorities miss the sense of commitment with other regional parties. Besides, in both cases the province insisted that local authorities collaborated, however, the overarching authority did not want to interfere heavenly with this regional progress, due to the political sensitivity.

Finally, the driver's independence and uncertainty are relatively absent for the regional collaboration in both regions. In theory, the driver's uncertainty and interdependence are assumed to be present, however, the empirical interview findings show something different. This is explicable by the lack of national clear policy plans and the mindset of regional actors, primarily local governmental authorities, that the heat transition is a transition at local scale. The local governmental authorities most often refer to this, because of the need to persuade individual property owners. Besides, municipal visions have not yet been adopted by the city councils. The driver uncertainty is present in high extent (e.g., unpredictability of sources, finances), nevertheless, because of this high level of ambiguity parties are more likely not to collude rather than to collaborate. In addition, independence and uncertainty could reinforce each other and ensure that no competition takes place. In current practice this is not yet observable, but several stakeholders' groups are concerned for future problems. The insufficient policy and regulation could for instance not prohibit developers from implementing certain measures with high impact on the landscape, for example solar fields and new neighbourhoods.

5.3. Collaborative Governance Regime

This section presents the similarities and differences between case study A and B regarding the collaborative governance regime. Moreover, the differences between the desired situation and the actual situation are investigated. First, the collaborative dynamics components are discussed, thereafter the actions are illustrated. At last, a sub-conclusion is declared.

5.3.1. Principled engagement

All interviewees recognize the lack of attention towards the topic of heat transition at regional scale. An important factor is that the RES is currently mainly focused on making agreements in the field of sustainable generation instead of electricity and heat transition. Several reasons for the lack of interrelationship between regional actors are the uniqueness of solution, the large degree of uncertainty about transition fuels, uniqueness of solutions, strong variance in organisational visions, lack of concrete national targets, municipal policies have not yet been completed and the heat transition requires a great

deal of willingness from citizens, but there is currently a lack of support due to sustainable generation, which receives a lot of media attention and the great uncertainty in terms of sources.

Nonetheless, both regions have several types of organisation structures with state and non-state stakeholders. Despite these tracks, individual and shared interests are primarily discovered between the local government authorities. Although region B started with the high involvement of state and non-state stakeholders, the heat transition policy is established by civil servants equally to region A. Consequently, there is a low involvement of representatives from non-state stakeholders. In particular, the involvement of citizens is an issue at regional scale. Although the interviewees underline the importance of the individual property owners, this assumption is not yet present at regional scale, due to the limited involvement (e.g., heard but nothing done, one-sided perspective). The municipalities represent the representation of individual owners, but the role is double, making it difficult to separate the interests. In region B, it was therefore decided to involve the citizens in a citizens' deliberation. In contrast, it was decided to only have citizen participation at local level in region A. In terms of definition, region A has an advantage, due to already established sustainable agreement by the municipalities. Nevertheless, this vision is not shared among all regional stakeholders and expectations of roles are hardly observed. Region B also does not define a shared vision by state and non-state actors, however, in region B even between municipalities a shared language is absent. In both cases, the deliberation conditions are hard, due to the broad range of initiatives. Besides, the regional visions considering heat are more aggregation of individual targets and resulted into a sum of investigations instead of a strategic implementation plan. In short, the heat transition is determined by the city councils, causing the bureaucratic nature of the regional collaboration.

5.3.2. Shared motivation

The shared motivation component shows many similarities between both RES regions. There is a lack of mutual trust due to disappointments from the past and failure to keep to agreements (partly caused by the great disagreement in society), such as the withdrawal from regional partnerships about energy counters under the heading "We can organise the transition way better by ourselves". Mutual understanding is present in both regional collaborations, because all parties know that there are different interests and that the transition is not a pleasant transition for anyone. In the area of internal legitimacy, many parties pretend that mutual coordination is important, but this has not yet been anchored in practice. This can be seen in the fact that all individual visions are made without first consulting regionally. In terms of commitment, there is a big difference in perspective between public and private parties. The public parties are held accountable for the decisions and (financial) resources. On the other hand, the public parties and civil organisations feel that its voice is not heard. Although heat transition is not their core business, due to the high political involvement they do not even get a chance to collaborate, resulting in a low feeling of commitment, for example this is shown in the argument about who should pay for the transition. In addition, many municipalities also consider themselves unique, so that there is no commitment or need to start working together at all, as again shown in the multitude of individual projects.

5.3.3. Capacity for joint action

In both cases, the capacity for joint action is not observed. The existing procedural arrangements are mainly informal, and the official working groups are established to facilitate the regional heat transition part in the RES document. Controversially, the regional structure heat is in region B tested in the atelier with the quadruple helix and in region A this does not happen. Moreover, the leadership role is in both cases a civil servant, therefore mainly non-state interviewees felt left out of the collaboration. In contrast, both cases do have an external director on the topic of sustainable generation and is a crucial factor for successful collaboration in these collaboration efforts. Therefore, it is striking that on the topic of heat transition no (external) neutral or private process director is set. The entire stakeholders set acknowledges that the main objective is the sharing and generating of knowledge, however, this is only observed to a certain extent. On the one hand in both cases the state and non-state stakeholders together generate knowledge and share knowledge, but on the other hand the various tracks (e.g., provincial policies, triple helix pillars, local projects) result in a high level of fragmentation. This tendency is again shown in the extent to which resources are shared to facilitate the collective purpose of heat transition facilitation, noticeable by the dissolution of skills, expertise, and financial means. However, in both cases certain skills and money are exchanged between disciplines, for example in

the establishment of a regional energy company at A and housing associations that subdivide tasks in region B. Besides, most interviewees appointed the need to guarantee the individual property owner a total service solution, from design to installation. However, this total service is only limited present in region A. This is striking in comparison with the high level of scarcity of human assets appointed in the system context. In short, the variety of policy tracks of government, social and private organisations cause very strong fragmentation of knowledge and resources across the region. This scattering could be mitigated if a neutral leader was present to focus the heat transition. The overview has been lost in both regions therefore, a lot of time and energy is lost.

5.3.4. Collaborative actions

Table 5.1 indicates that regional cooperation in the field of the heat transition has not yet led to many results in terms of collaborative actions. Both case studies emphasize the raising of awareness among citizens and the transition of their own mindset from a technical to social. At the beginning, the energy transition was approached very much as a technical development, but during the process it became clear that the heat transition is a social transition to establish behavioural change to facilitate a gas-free built environment or in an even broader sense how people perceive a healthy, justified world. It is about seeing a different picture of the future before us, but also about concrete projects that must be organised with a central vision that people also know where they stand and can contribute to it. In both regions, however, many cases of “greenwashing” can still be seen, and the sense of urgency is not present. This is noticeable in that regional studies show the willingness of inhabitants to become more sustainable, but they still do not act in correspondence.

In both regions the deployment of staff is a topic of discussion because it could provide a solution for the resource conditions, however, insufficient people are available with the required knowledge and skills. This is mainly present with smaller local governmental authorities. Notwithstanding, it is not possible to form an overall picture of whether more staff is being deployed, since there are large differences per organisation. The same goes for permitting. In contrast to region A, the regional structural vision has already been established in region B. The elements of building and enforcement of compliance are in both cases not present, due to limited heat transition measures and the absence of a legal framework.

In terms of marshalling resources, enacting new management strategies, the observations in region B have even less actions in contrast to region A. The two elements both must deal with a hybrid form of collaboration between top-down and bottom-up, because of the regional interference of the regional implementation organisation. In addition, interviewees from both cases imply that there must come a total service package from design to implementation to facilitate the heat transition among property owners. In region A, the regional implementation organisation started with the development of such measures. Moreover, region A joint monitoring is noticed between municipalities in comparison to the solemnly individual tools in region B.

5.4. Impact & Adaptation

Regional collaboration has only a limited impact on the facilitation of the national heat transition ambitions in the researched case region. The impact is mostly seen in the increased awareness for the topic itself and behaviour changes required for the transition. For the involved stakeholders, the transition is mainly a change of their behaviour to work in such a governance system to facilitate socio-technical problems. The relatively new organisational structure takes time to get familiar with the roles, new ways of meetings and decision-making processes. As a result, it has been decided not to make any concrete statements about the impact and adaptation regarding the goal of facilitating the heat transition. The interviewees did, however, select several elements that need to change to adjust the CGR and the system context.

In all interviews, the national government is requested to intervene and set an unambiguous legal and policy framework. This involves (among other things) the setting of concrete targets and statements about approaches (e.g., sources, approaches, reduction percentages), providence of a legal base and removing the uncertainty in financial resources.

The missing national frameworks is not usually viewed as a conferring benefit for regional stakeholders; however, municipalities (and other regional actors) should also change their own attitude against the collaborative governance regime to have collaborative advantage. To transform the attitude, it is

necessary to look at what the interviewees have said about impact and adaptation in the CGR. In this respect, particular attention is paid to the fact that the heat transition should be a topic of discussion, more knowledge and expertise should be exchanged, from the perspective of the industry it would be preferable to appoint an independent regional body and have a higher level of involvement with non-state stakeholders (e.g., property owners).

5.5. The collaboration in energy regions regarding heat transition through a collaborative governance lens

The comparison between the current situation in practice and the desired situation as shown in the collaborative governance theory highlights a high level of similarities in both case studies. The case specific elements are mainly derived from the different examples in which the same conclusion can be set, however, still these examples show overlap (e.g., regional energy counters, aiming for a regional implementation organisation, civil servants in charge). Distinctions are shown in the component's actions, since region A has made some progress in setting up joint outcomes, as can be seen in the monitoring, marshalling of resources, and enacting new management principles. In all these three solutions, the establishment of the municipal regional energy organisation plays a pivotal role, which is why the set-up of this organisation is an important turning point. This is remarkable, since in case B, the civil organisations and industry are asking for the establishment of such a body. However, it is true that the organisation in region A is still mainly regarded as very municipal and in both case studies the non-state stakeholders do indicate that there is a need for less political interference. The heat transition is subject to political sensitivity; therefore, the consultations are predominated by civil servants. The system context sets the conditions to collaborate which are in terms of legal and policy framework, resource conditions and level of conflict relatively difficult. In addition, the prior relationships again are of signal importance, as shown in both cases shown previous attempts to regionally collaborate regarding heat transition and other fields. Both regions present the setbacks provided by already existing regional visions, but on the other hand the opportunities and close interlinkages.

In the current situation, both regions collaborate with state stakeholders to obtain subsidies and to establish the prescribed heat part in the RES. An important aspect of the empirical findings is the debate if regional collaborative governance structures are suitable to facilitate heat transition, due to the local circumstances regarding heat transition (e.g., natural sources, citizen participation). This missing urge to apply regional collaborative governance is noticeable in the lack of principled engagement and shared motivation, resulting in absence of capacity for joint action. In contrast, both studies do acknowledge the added value of knowledge transfer, however, this is very fragmented and informally organised. The lack of collaborative dynamics is again visible in the collaborative actions. Together with the relative new organisation structures, it is impossible to make valid assumptions about the impact and adaptation on the target: heat transition facilitation.

To summarize, the collaborative governance lens is used as a vehicle to compare the current situation with the preferred future situation regarding the implementation of heat transition at regional scale. Both cases observations are rather similar, therefore it is possible to present several threats and opportunities to facilitate heat transition in a collaborative governance setting at regional scale. Within the collaborative governance framework, the empirical research results reveal that the barriers must largely be resolved before the limited opportunities of regional collaboration can be utilized. It is expected that without the dissolution of the significant negative influence of the barrier's regional collaboration in both regional case studies will not be facilitated. This is because of the high number of barriers and major indicated impact.

Opportunities
Both case studies revealed three variables for successful collaboration at regional scale.

- **Enthusiasm:** There is a tendency to actually realize the climate ambitions, 2030 energy neutral. In addition, parties, including entrepreneurs, voluntarily participate in the newly devised management form of the theme tables. In addition, many projects have already been established. Moreover, the RES, as well as recent events such as the IPCC report and the floods in Limburg, have mainly contributed to the major increase in awareness. In addition, in both regions a survey showed the high willingness to implement sustainable measures among citizens.

- **Strong network connectedness** Strong bonds are present between the state and non-state stakeholders. This is caused by the regional mindset present in both case studies since the relationship between actors already existed in energy transition and other disciplines.

- **Change-minded:** Interviewees from both regions stated the need for other forms of governance to facilitate the heat transition.

Barriers
The heat transition is a relatively new topic and is barely discussed at regional level because of the following identified critical variables:

- **Missing interdependence by local governmental bodies** The municipalities stress the local bounded solutions (e.g., natural sources), thus the limited need to collaborate at regional scale with other state or non-state stakeholders. On the other hand, the non-state and other state stakeholders identify the need for collaboration to raise the efficiency and align long-term strategies.

- **High uncertainty** It is unclear what measures the Dutch National government takes in respect to the heat transition. The national policy and legal framework are almost absent, and the financial arrangements are not provided. Besides, the local heat visions are still in development, undecided proposition towards transition fuels (i.a. hydrogen, biogas).

- **Absence of neutral leadership** Nor an initiator or in the process of the collaboration, a neutral or private leader is appointed to bridge the governmental and non-governmental regional actors.

- **Low Participation (by state and non-state actors)**Because policy documents relating to the heat transition are political vehicles to initiate the regional heat transition. Hence, the decision-making is dominated by political preferences. As a result, the voice of entrepreneurs, social parties and citizens in general is informed instead of managed closely. This is striking as the interviews present the main stakeholders are the individual property owners. Consequently, resulting in a minimum of shared language, targets, and dialogues.

- **Bureaucratic nature** The heat transition is a politically sensitive topic, in which the decision-making is with all individual municipal councils. Thereby, the high level of conflict resulted in the stagnation of heat transition implementation.

- **Low level of trust Commitment** The heat transition is a high political topic, therefore the non-state stakeholders do not feel involved with the progress at regional scale. Furthermore, the trust between all actors, in particular inter-municipal collaboration, is lacking, due to frustrations former collaboration effort (e.g., wind energy, pre-existing heat transition targets).

- **Fragmentation of knowledge and skills:** Everyone wants to do something, but this has created a jumble of consultation structures, projects and organisations, whereas the capacity on all levels is scarce. Thereby, no (neutral) process leader is present. In addition, the establishment of an implementation organisation has a positive influence to collaboration efforts in region A. However, this organisation is mainly involved with energy generation instead of heat transition. Moreover, the organisation is perceived as a municipal organisation.

- **Scarcity of capacity:** In all levels and disciplines, there is a limited amount of human capacity available. However, this could also depend on the fact that the heat transition is not prioritized.

5.6. External validation

To validate the results of the comparative analysis, the results are substantiated with experts from another RES region and experts who supervise the heat transition at regional level. The section will first share the findings from validation case C, after which the outcomes are verified by regional policy experts.

5.6.1. Validation case C

The validation session of region C, the importance of the system context is verified. In particular, the missing legal and policy framework, absent leadership and unavailable financial means provided by the government are of signal importance for the current situation. In addition to the case findings, the respondents share the opinion that former collaboration efforts can be neglected, because these collaboration efforts are rather sectoral. However, dissatisfaction does have a recurring effect in the collaboration on heat transition, as again presented in regions A and B. In contrast, the respondents do not recognize the image of stagnation because of political dynamics, because they believe that in the end property owners are in control. Therefore, the focus must be on citizen participation to facilitate heat transition. The focus on the citizens is again acknowledged in the fact that government agencies, representatives of industry and NGOs do not find the urge to collaborate, because the situation is too uncertain and interdependence between partners is absent. Today, the stakeholders are forced to set up a regional vision on durable energy generation, but collaboration efforts on heat transition are totally lacking. The participants also applaud the fact that there is no regional leadership, whether from government, industry, or society. This is noticeable in the fact that all stakeholders are reinventing the wheel, because of the self-proclaimed uniqueness of the organisation.

Despite the difference in administrative organisation of the RES regions, the conclusion was very similar, all three regions little or no collaborative governance elements are observed. The respondents argue that the regional collaboration efforts are not present in the validation case. In the first gear, principled engagement, it is jammed, because parties claim it lacks the necessity to pursue a common goal. For this reason, the interest of state and non-state regional actors is not discovered, and the pursuit of a common language is absent. Argued by the validation respondents of case C, a shared language also means shared responsibility, something that municipal authorities and other regional actors do not want. Consequently, there is also a lack of joint motivation, due to the low stakeholder involvement and previous attempts to talk about common goals have failed in region C. Likewise region A and B, capacity for joint action is presented by a scattering of information across the region without formal institutional arrangements or absence of a process director regarding heat. Equal to region B, the region investigates the possibility to marshal resources in a regional implementing organisation, because external experts and several officials identified the added value to facilitate heat transition. This system transformation entails that municipalities must relinquish part of their sovereignty, which is a politico-administrative sensitive issue, as again present in the researched cases.

The respondents proclaim that regional collaboration in terms of sharing a vision, knowledge and resources is inevitable soon, because of efficiency considerations (e.g., capacity, financial resources). Nevertheless, this seems inconceivable soon if without any significant contextual changes in the national context and local mindset for regional collaboration. In brief, the findings of region C verify the case interview findings in both cases.

5.6.2. Validation regional heat transition experts

Based on the validation session, the policy and legal framework, and the network connectedness are the most influential elements in the system context. The policy and legal framework have a very negative impact, due to the unclear policy and absent legal instruments. Hence, the experts doubt if regional collaboration efforts are suitable to facilitate heat transition, because stakeholders will only really participate when they have a concrete objective in mind, which will be present in the district implementation plans. However, the overall national policy is not clear, which has a restrictive influence for all collaborations at all levels. In contrast, high network cohesion between state and non-state stakeholders has a positive factor in the process. In fact, this is the only identified critical success factor noticeable in current heat transition projects. Moreover, the element prior attempts to address the issue is noticed as a positive and negative influence. In addition, the validation sessions underline the hard resource conditions and high level of conflict (e.g., NIMBY, boomerang effect). Equally to region A and B, the

opinion is shared that the sum of socio-economical features has a moderate influence on the regional collaboration, because nobody is willing to pay to get off the gas, However, the opinion on whether political dynamics and tension play a role is contradictory to the case findings. This results from the irony that currently such means are scarce, high contention and legal requirements available to municipalities to decide that it does not matter who is in charge and there again no stakeholders dare to take control.

Regarding the drivers, the findings of the study are in line with the perspectives of the experts. In current practice they see that stakeholders have been put together at a table, but they do not commit to a joint plan due to the lack of dependence, the great uncertainty that prevails and limited form of leadership.

The collaborative dynamics corresponds to the picture as outlined in the comparative analysis. There are a few notable points, which will be briefly explained. In principled engagement, it is emphasized that it is also important to include knowledge institutes, which are currently often lacking. There was also no open discussion and the parties do not want to speak the same language, because then it becomes concrete. They do not feel dependent on each other and therefore do not feel any deliberation or joint determination. The experts emphasize that the motivation is still there, but effective and logical policy is lacking. This barrier can also be seen in the capacity for joint action (e.g., fragmentation of knowledge and skills, leader not neutral).

The results of the collaborative actions are largely shared. For example, the respondents point out the increase in awareness, but also the lack or moderate other actions due to the lack of agreements and fragmentation. In contrast, the elements enforcement of compliance and permit is in the opinion of the external experts totally absent.

According to the regional experts, the impact and adaptation of regional collaboration is insufficient, due to the undefined direction considering heat transition determined by the national government. Hence, in terms of collaborative governance, first the system context should be transformed by the national government. In line with this perspective, the national government must define a clear direction on the system context relating to the policy and legal framework in which the regional stakeholders can function. In addition, the national government should create a central place for providing means (e.g., financial, knowledge, expertise) and point of contact. In seeking a common regional heat transition framework, the expert acknowledged the fact that each debate has its own regional characteristics. On the one hand this must be recognized, but on the other hand the regional stakeholders must comply to have concrete agreements on heat transition measures, for example on sharing knowledge. In addition, the sting can be removed from the regional and local discussions, when fundamental choices (e.g., use of hybrid heat pumps, Warmtewet) are established at the national level.

5.6.3. Validation

All validations sessions led to the final situational sketch, which is presented in figure 5.1. This framing of the situation should enable municipalities and other stakeholders to understand the provided recommendations to facilitate heat transition at regional scale. The validation sessions confirmed the assumptions regarding the barriers regarding joint regional action with government, industry, and civil society organisations. Agreed system context pivotal factors are the lack of clarity of policy and legal framework and missing available means (e.g., financial, human capacity) for future developments. Contrary opinions arise about the level of conflict regarding the heat transition. On the one hand the respondents agreed to the fact that everyone is of good will, but that there is a lack of support and motivation among property owners, partly due to resistance in the field of sustainable generation, political unrest, and large uncertainty. Regarding the involvement of citizens, regions also see the building owners as the most important stakeholders, but opinions also differ as to whether these should also be included in the regional agreements.

Considering the drivers, the validation sessions support the case findings in which consequential incentives are mostly present. Because of the missing catalysts of interdependence, leadership, and high uncertainty motives to collaborate are limited at the regional level. For this reason, principled engagement and shared motivation are not applied in the collaborative governance regime. The empirical findings and validations sessions have shown that the components principled engagement and shared motivation closely interact, and both have to be present before it will be beneficial to have shared capacity for joint actions. This is for example shown in the minimum presence of policy coherence in relation to heat transition, while the selected regional case studies have set up regional organisations.

These regional organisations do only limited collaboration on heat transition. In the current situation, municipal authorities act merely on their own initiative without integration of the regional policy in respect to the heat transition. To address a transboundary and long-term policy of the heat transition, it is pivotal that regional government and society organisations share motivation and work proactively to apply principled engagement. Several absent elements are the exploring of weaknesses of the current heat transition system, trust, commitment to a new governance structure and strengthening regional actors to develop domestic forces of change. With reference to the collaborative governance framework, the foundation for capacity for joint action is missing, through which the limited presence of these elements has not led to transboundary integration and a long-term policy on heat. Comparing the empirical findings and the collaborative governance framework, it is understandable that joint actions and ultimately system impact and adaptation is missing. In contrast to the limited motivation and principled engagement, several stakeholders, preliminary semi-public organisations (e.g., water boards, housing associations) and entrepreneurs, do acknowledge that regional collaboration is needed to facilitate the heat transition. These organisations argue that implementation organisations are needed to enhance efficiency and effectiveness to facilitate heat transition. In addition, the empirical findings argue that only a handful municipal representatives acknowledge the added value of collaboration. In the end, the purpose to implement the heat transition, consequently, the property owners have to be tempted to act, and therefore alterations in the system context and CGR have to be established. In general, it is stated that respondents clarify that this facilitation at regional scale only will succeed when the national government provides means and establish a clear vision legal framework. Moreover, several respondents stated that municipalities, and other regional stakeholders, should make concrete regional plans in which they relinquish a part of their sovereignty.

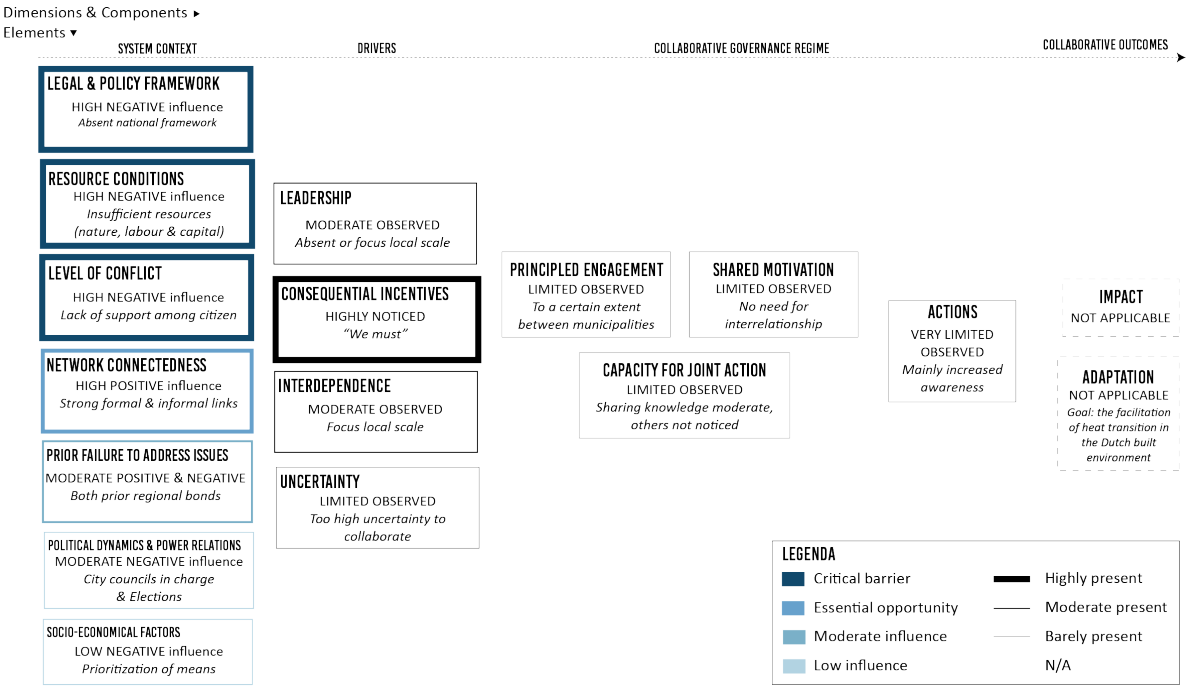


Figure 5.1: Barriers and opportunities based on the collaborative governance framework derived from the interviews and validation sessions (Own illustrations)

6

Discussion

Chapter 6 discusses the empirical findings in the light of existing literature and practical implications. Based on the research design, the empirical findings will be discussed in the light of the collaborative governance theory and the role of the state and non-state stakeholders in energy regions collaboration to facilitate heat transition.

6.1. Scientific relevance

In section 6.1, the scientific relevance is discussed with the focus on collaborative governance theory. First, the influence of the collaborative governance framework on the findings will be discussed. Next, the collaborative decision-making cycle is reviewed. Third, the election of the case studies, and lastly, the participation of regional actors is examined.

6.1.1. Collaborative governance as frame of reference for the sustainable interventions

The aim of the study was to identify collaborative governance elements that facilitate or deflect successful regional collaboration to facilitate heat transition. The selection of the collaborative governance framework determines in which way the results are interpreted. In this study, the collaborative governance model of Emerson et al. (2012) was selected.

The empirical case study demonstrates how collaborative actions were developed in a collaborative governance setting to facilitate heat transition in two rural energy regions. When reflecting on the findings of these empirical findings, the researched case studies reveal the same kind of barriers and opportunities for collaboration actions at regional scale. Regarding the opportunities, the case studies identified four factors: the increased level of awareness on sustainable interventions, enthusiasm of individuals, and high level of network connectedness. In addition, this study identified critical negative elements in regional collaboration, including the missing sense of urgency, absent leadership, and low level of participation. In consensus with Boogers (2014), these findings apply generally for regional collaboration efforts. Specifically for heat transition, it was striking to see the lack of heat transition focus in the RES regions, due to the missing interdependence (1), high amount of uncertainty (2), absence of leadership (3), low participation level (4), bureaucratic nature (5), high level of fragmentation (6), low level of trust commitment (7) and scarcity of resources (8). Compared to the study by Koebele (2015) about collaborative governance about water management, it can be stated that uncertainty factors, bureaucratic issues, and underrepresentation of certain key stakeholder groups do not stand alone for collaborative governance regarding heat transition. The study Hoppe (2021) into the quality of metagovernance in the Netherlands argues that because of the RES policy coherence is increased. However, this effect was not observed in the two selected regional case studies concerning heat transition, since the heat transition was barely discussed, and internal legitimacy is scarce. In short, the collaborative governance framework revealed barriers and opportunities for regional collaboration in the two selected case study regions. Most of these identified critical elements concerning heat transition are not unique for regional collaborations. The expected coherence between policy domains (e.g., housing, finances, social,) and levels (e.g., regional and local) is not yet visible in both studied case

studies and the validation case. This might be influenced by the case selection of rural regions instead of urbanized regions, through which the feeling of interdependence is missing, as furtherly discussed in section 6.1.3. Hence, it would be worthwhile to evaluate more energy regions to reflect and verify upon the specific heat transition case findings, such as the missing policy coherence.

6.1.2. Collaborative governance continuous cycle

Collaborative governance is a continuous cycle of decision-making processes, in which interaction between component crucial to understand (Ulibarri et al., 2020; Ansell and Gash, 2007; Emerson and Nabatchi, 2015). As stated in the previous section, the case observations and results largely correspond to former studies into regional collaboration efforts. However, this study investigates the alignment between dysfunctional and beneficial components to provide the step-by-step recommendations to achieve a gas-free built environment.

The collaborative governance theory of Emerson et al. (2012) states a gradual approach to implement collaborative governance arrangements. This study reveals that a combination of elements is needed to scale up the heat transition, for example the system context and collaborative governance elements. For instance, the study reveals that principled engagement and shared motivation closely interact, like a “chicken and egg” situation, if people do not trust each other therefore they do not want to define a shared vision and the other way around. An addition to the selected collaborative governance model concerning heat transition at the regional level is to position principled engagement and shared motivation both as the first step in the collaborative governance regime. When these two ground components are present, capacity for joint action and actions within the collaborative governance regime is likely to be most feasible in the two selected regional case studies.

Heat transition is barely discussed at regional level; therefore, it is explicable that the impact and adaptation is low. This can be explained by the high level of barriers and therefore limited observed collaborative governance elements. The reason behind these similar observations in the researched regions differs. For instance, the reason behind the low participation present in the element discovery (principled engagement). In region B, it was observed that the decision-making started with representatives of state and non-state stakeholders, nevertheless, the heat transition was underexposed during the concept phase. After the concept phase, the heat transition was placed higher on the municipal agenda (i.a. TvW’s, approaching deadlines), however, to speed up the decision-making progress the local authorities made the decision to only include municipalities to establish regional heat transition guidelines on heat transition. Resulting in the fact that regional actors do not feel involved with the heat transition ambitions. In region A, again inter-municipal collaboration played a significant role. Before the RES policy was established, all regional stakeholders developed an agreement for a gas-free built environment by 2030. The regional board decided to stop this collaboration, however, the municipal officials decided to proceed. When the national government introduced the RES, the municipalities thought their existing plans were sufficient, however, these regional agreements were an aggregation of thoughts by municipalities. During the approaching concept deadline, the province insisted on regional collaboration with other regional actors, therefore, the RES became part of the theme table approach, however, the heat transition was excluded (i.a., time, importance). In both cases, all regional actors state that collaboration in the RES 2.0 will be different, because of the available local plans. In line with Teisman (2000) rounds model, the empirical findings show a continuous decision-making process, in which decisions of actors have consequences for the entire cycle. To shift the orientation from government to governance, it is necessary to create a common ground, in which principled engagement and shared motivation should be enhanced.

In short, findings show a continuous decision-making process, in which state stakeholders are key actors. However, the regional collaboration concerning heat transition is still in its infancy and no common ground for decision-making is present. To address this issue, it is fundamental to jointly address the components principled engagement and shared motivation. It would be suitable to evaluate the decision-making process when recommendations (common area for discussion, neutral leader) have been introduced, so potential crucial decisions for success can be appointed.

6.1.3. Case study selection

For studying the regional collaboration concerning heat transition, two regional case studies are studied. The researched case studies revealed the lack of interdependence between regional actors, however, all case studies are selected on for their small urban centres with rural hinterlands (i.a., low density,

limited heat sources) and the similar characteristics defined by Klok et al. (2018) and . These characteristics include the population of municipalities, complexity of the governance network involving number of involved actors and the regulatory regime of collaboration. This might have an influence on the generalizability of the result because all areas are rural with limited urban cores causing limited availability of regional heat structures. The contextual factor resource conditions might influence the driver interdependence, as municipalities in both cases indicated that they are only willing to collaborate at regional level if this is required by a potential heat source. The system context of high-density regions is different, for example the presence of heat sources and a feasible sales market. Therefore, it is conceivable that studying collaboration in other high-density regions may offer different results.

In addition, the size of municipalities and dynamics between the rural and urban areas can influence the regional collaboration efforts (Hoppe and Miedema, 2020). When reflecting on the empirical case studies, it reveals that both regions have one urban local authority. In casus A, this municipality plays a pivotal role in the regional collaboration, as their alderman is the regional process manager for the theme table sustainability and actively engages regional governance structures with smaller localities in the rural hinterland. In contrast, case study B reveals that the more urbanized municipality tries to fend off smaller municipalities, among others due to the less ambitious agendas and limited capacities to invest in regional collaboration efforts. When reflecting on the differences, this can be explained by the former collaboration efforts. The empirical study demonstrated that regional governance processes were influenced not only by the RES policy, but again by the broader existing regional network in other disciplines (de Leeuw and Groenleer, 2018). The beneficial attempts are shown in the strong network connectedness in region A, in which municipalities and an already existing agreement where a shared vision was defined, resulting in the same starting point. In consensus with de Leeuw and Groenleer (2018), this is not exclusively positive. Both cases revealed the negative impact of former agreements in the energy transition and other policy domains. Besides, in region B several pioneering municipalities already determined their programs and therefore did not want to invest their time and energy in the regional arrangements. Therefore, commitment was lacking, which negatively influenced the further collaboration efforts. Thus, not all collaborative governance arrangements at regional level support the implementation of sustainable policies, like heat transition, and certainly not in all circumstances.

To conclude, the study indicated the absence of collaborative governance approaches regarding heat transition in the two selected case study regions. Studying other regions and in specific urbanized regions could offer opportunities to increase the validity of the advised strategies for local municipalities and collaborative governance framework concerning the heat transition.

6.1.4. Participation level

The engagement of regional actors to facilitate heat transition is relatively new. For this study, the collaboration between state and non-state stakeholders was evaluated, however, both case studies revealed that the heat transition is in the hands of local authorities. It was striking that most non-state stakeholders did not even know about the existence of the heat transition part at regional level. This phenomenon in RET does not stand alone. It is also observed in other energy regions ((Hoppe, 2021). In line, the exclusion of stakeholders is an essential reason for failure of the collaborative governance regime and stakeholders with the opportunity to participate have a higher likelihood to develop a sense of commitment (Ansell and Gash, 2007). Likewise, interviewees who participated in both regions identified a higher sense of commitment with the policy document of region B compared to region A regarding the electricity objective, due to the early involvement in the process, which was applied by the process director. However, the heat transition objective was not perceived in a similar way, due to the absence of the topic on the regional agenda.

Based on the empirical findings, it can be said that there are many different working groups where the heat transition is discussed, and different stakeholders were present in these working groups. However, at the decision-making level, only municipalities are involved. Equally to Ansell and Gash (2007), it was seen that if parties are excluded, they seek out alternatives.

Besides, interviewees and validations identified distinct participation levels of individual property owners, which are suggested as main stakeholders, due to their decision power. In casus A, the citizen participation is restricted to local level, contradicting, in casus B, a citizen panel is introduced to participate. However, the outcome in both cases is that the citizens do not feel heard, and a sense of urgency is still lacking. Recent research by Ministerie van Economische Zaken en Klimaat (2021) confirms this statement, as it identified that the implementation of heat transition among residential owners

is still too low to achieve the 2030 climate goals. Furthermore, this report shows that 72 percent of the Dutch nation is aware of the climate crisis, nevertheless, only 35 percent of those surveyed believe that they themselves play a significant role against climate change. The findings of the study indicate that the current heat transition policy has been unsuccessful in changing behaviour and technical transformation that is needed (Hoppe and De Vries, 2019; G. de Vries, 2020; Beauchampet and Walsh, 2021). In the beginning of the process, the stakeholders considered the heat transition as the technical transformation of the heat system instead of a socio-technical transition. During the process, the regional actors recognized to effectively facilitate the transition, public engagement is central to transition to a gas-free built environment by 2050.

In conclusion, the study reveals the low participation of non-state stakeholders, for example citizen participation. Collaborative governance theory does not provide guidance on how to include these organisations. Regarding participation, it would be suitable to propose to further investigate the element discovery within principled engagement to engage a diversity of interest.

6.2. Facilitation of heat transition in energy regions

Section 6.2 discusses the study outcomes considering the regional energy transition policy and the role of the government to facilitate heat transition. First, the attitude of the municipalities towards the region as a vehicle to facilitate heat transition is discussed. Next, the national and provincial government influences are considered. Then, the different perspectives on recommendations are debated. Lastly, the relative novelty of the regional collaboration is discussed.

6.2.1. Attitude of Municipalities

When reflecting on the role of local authorities, the selected cases revealed that local governmental bodies do not feel interdependent of regional collaboration to facilitate heat transition. The regional collaborative governance arrangements are relatively new. As a result, regional actors are still seeking to determine what form of regional governance forms have a positive contribution to the effectiveness and efficiency to facilitate the heat transition. This continuous process of plan, act and evaluation requires a lot of commitment, time, and attention (Hoppe, 2021; Hoppe and Miedema, 2020; Steen et al., 2020). The regional case studies and validation sessions indicate the lack of these three factors. In the current situation, it is an aggregation of thoughts instead of a collaboration. In line with Elzenga et al. (2017), this study reveals that most regional involved actors believe that the energy transition should be implemented at a decentralized local level, because the local scale is closest to the citizens and entrepreneurs or in other words the property owners. Based on the case observation, this local approach is predominantly present with the municipal authorities. Several municipal authorities state that the heat transition consists of individual solutions per household. However, the individuals are unique, but not the solutions, as shown in the same kind of individual policy plans in region A. In line with Steen et al. (2020), the selected regional case studies show that the municipal authorities remain in their known governmental policy, in which solemnly the government develops the policy from preconditions to results. An explanation for this individual mindset is that with application of collaborative governance the responsibility, control and democratic direction can be reduced to one board in which the functioning of municipal councils and other represented bodies becomes disrupted and loses decisiveness (Boogers, 2019). To achieve the facilitation of the heat transition, the governmental authorities should collaborate with regional non-state actors and especially municipal authorities must transform their mindset and navigate to the opposite direction. This starts with providing insight into where the organisations stand, what and how these parties want to achieve it and finally structuring the organisational structure in this way.

Moreover, the regional involved stakeholders in both case studies state that the RET is influenced by the proliferation of regional collaboration efforts and democratic legitimacy, for example the city councils feel side-lined in regional collaboration. The divergent perspectives of local government bodies result in basic arrangements in which lots of variation was shown in the individual heat transition policies (Hoppe, 2021). This was also observed in region B, due to the already existing policies of inter-municipal collaboration in region A. In line with Steen et al. (2020), this can be explained by the lack of formal enforcement, since the regional collaboration is based on mutual trust. The results of the study also imply that in the case of the heat transition, non-compliance with wind energy policies resulted in distrust between regional actors. However, the informal status of the region could also have the opportunity to

share knowledge and skill on an informal basis, and eventually might even solve the capacity problems ((Schuurs and Schwencke, 2017). The identified high network connectedness in both cases could have a beneficial effect, if the policymakers acknowledge the fact that there is insufficient collaboration at regional scale in the current situation.

Thus, this research appoints the relevance to policymakers and scientists to invest more time and effort in implementing regional collaboration to facilitate heat transition, since in today's practice this is not yet adequately prioritized, as illustrated in in figure 6.1.

Figure 6.1: Cartoon Volkskrant current political situation considering the climate change (Van de Schot, 2021)

6.2.2. Role of the national & provincial government

The aim of the study is to provide recommendations for municipalities (and other state and non-state regional stakeholders) to facilitate the heat transition in their energy regions. However, during the case studies and verification sessions, it became clear that regional involved actors predominantly aim for a directive national government to establish national frameworks (e.g., jurisdictional, financial, policy). In addition, the provincial government is important to set the policy in respect to heat transition at regional scale. In the researched case study areas, the provincial government insisted on regional collaboration and the provincial government set up a variety of policy tracks municipalities can use to facilitate the heat transition. For this reason, it is worthwhile to review the system barriers provided by the national and provincial government.

Equally to Hoppe (2021), the selected regional case studies indicate that a variety of network tiers were involved (e.g., regional, provincial, national scale, political or social). In the research regions, the province insisted on collaboration at regional scale, but the provincial body did not want to interfere too much at regional level and did not act like initiators. This and the high amount of fragmentation of knowledge and skills is likely to explain by the absence of formal codification. An important contrast between the researched regional case studies is the overarching governmental body, which is determined by the classification of the RES regions. Region A is situated in one, region B in two and validation case C is equal to an overarching governmental body. Despite the district provincial arrangements, the role of the provincial governments is observed to be similar in the researched regional case study areas. The role of the provincial government is mainly present in assisting and promoting regional collaboration concerning heat transition, but without playing an active role in the collaboration process itself.

In consensus with Elzenga et al. (2017), the case study participants showed that the main bottlenecks for improving collaborative action are system barriers caused by the national government, due to the fact that the regional governance processes take place in the shadow of the governance at national level (de Leeuw and Groenleer, 2018; Hoppe and Miedema, 2020). The unclear national legal and policy instruments, and future to be implemented policies, introduce a high level of uncertainty, which resulted at regional level in restrictive conditions to collaborate in RETs. The uncertainty is present in the absence of a legal framework to implement the heat transition and unfeasible national policy, for example the absence of targets, missing national vision, and undetermined financial arrangements. Within the researched case study areas, the amount of critical resources (e.g., finances and human capacity) is limited (Dignum et al., 2021;Hoppe, 2021; Elzenga et al., 2017). The examined regional

actors aim that the national government must enhance the level of these resources to enhance the number of regional actions. In addition, the empirical findings imply that the third indicated case barrier, level of conflict, can be reduced by a clearer national vision on how to achieve the reduction targets.

According to the participants, a directive government will provide the basis for actions, for example by having a legal framework to enforce compliance and a more restrictive policy, so it is not questionable what measures should be taken. In addition, the conflict between local governments, industry, civil society and citizens at regional scale could be considerably eased by the introduction of national choices, as for instance the selection of transition sources (e.g., hydrogen, biogas). These findings align with the overall opinion of the Dutch population who are dissatisfied with the approach of the Rutte III Cabinet (Ipsos, 2021). The respondents aim to have guideline by the national government for regional collaboration, but with the flexibility to tailor it to regional and local preferences (e.g., the existing regional programs, local conditions). It would be worthwhile if the national government acknowledges the distinct energy region types, but again sets other targets for regions that do not have a lot of opportunities for regional heat networks to establish interdependency.

To conclude, the focus of this study was on the strategies for municipalities, however empirical findings indicate that disruptions at the regional level are influenced by national government policies. Today, the role of the provincial government is limited, because of the indirect role in regional collaboration. To increase the applicability of the recommendations of this study, it is worthwhile to also include recommendations for the national government.

6.2.3. Prospect on step-by-step recommendations

This research provides insights into the dynamics between state and non-state actors at regional scale to facilitate a gas-free built environment by 2050. Both case studies revealed the different perspectives of the sense of urgency, participative inclusiveness and leadership with the government, business sectors and civil society organisations. An example is that the representatives of industry indicated that their constituencies are open to participate in the collaboration, due to the interdependence with the long-term planning of governmental bodies. The local governmental authorities indicate that they are suspicious if the business sector is willing to actively participate, since achieving a gas-free built environment is not their core-business. The examined regional actors invest time and energy in the collaboration, however, the heat transition is mainly a governmental topic. In line with Boogers (2014), the cases revealed that all involved regional actors, except the municipal authorities, believe that something needs to change in the collaborations (e.g., social involvement and private leadership). Within the collaborative governance framework, an important first step for regional collaboration is the discovery and merger of interest (van Hal, 2016).

Second, a private leader should be appointed, as the regional regimes need an ambassador to promote and link the already available strong network connectedness (Steen et al., 2020). From the perspectives of non-state stakeholders, it is suggested to have a captain of industry in the board of directors, because they are the best for raising capital for investments, higher influence on other non-state stakeholders. The higher influence is expected because their non-governmental background makes it easier to bridge political and private contradictions (Boogers, 2014). In the two selected regional case studies, a leader was appointed for the durable generation. All examined respondents acknowledge the fact that these process managers were crucial to scale-up the process. These both opportunities are already applied in a successful regional collaboration in region B.

In the study of Hoppe and Miedema (2020), it is assumed that in order to implement collaborative actions in energy regions a implementation organisation can help to formulate a regional vision and integrate capacity to act. However, both case studies revealed that the heat transition was not discussed in regional structures, due to the political sensitivity. Besides, the business sector in region B aims for a central implementation organisation to implement the energy transition, however, the civil servants are hesitant, due to the time-consuming process and financial requirements. In region A, an implementation organisation is already established. Based on the findings of region A, an implementation organisation could have a beneficial effect, since several actions have been implemented by this organisation. However, the collaborative actions are still limited in region A, because (among other) the implementation organisation does not focus on heat transition and not all regional stakeholders are constantly engaged in this organisation (e.g., political vehicle, because the organisation is financially dependent on the government) Therefore, it is likely to state that first a feeling of shared commitment between regional actors should be established before the implementation organisation will be benefi-

cial. Subsequently, the implementation organisation should be established by both state and non-state regional actors.

In short, for the applicability of this research, the focus of local authorities should be twofold. On the one hand, by regional actor involvement on the topic of heat transition and on the other hand on the private address private initiator to integrate these perspectives, knowledge, skills, and finances. The empirical findings clarify the recommended steps for the two selected case studies and prevents municipal authorities (and other regional actors) from spending time and effort on unfeasible steps.

6.2.4. The relative novelty of regional collaboration concerning heat transition

In this research, the regional energy strategies (RES) in respect to heat transition in two selected regional case studies is studied. In 2019, the national program was founded to facilitate a part of the Dutch Climate Agreement and is a relative novelty. Given the novelty of this structure, it is probable that the timing influenced this research on several elements, for example the inadequate national government policy and absence of a legal framework. The respondents indicated that this contextual element had a constraining effect in the current situation. However, the national Dutch government is currently working on a legal framework and guidelines (e.g., more specific requirements for the content of the RSW) to facilitate heat transition. Several respondents argued that regional collaboration in relation to durable energy generation has been a topic for a longer period, through which adjustments have been made, for example the specific national generation target per region. Another disruptive effect is the uncertainty about resources, which is largely determined by the political preferences. During the interviews, the formation of the Dutch national government was still ongoing, and municipal authorities are already preparing for the local authority elections of March 2022. This setting causes uncertainty in the decision-making process. These disruptions are specific for the current situation and might not apply for the future situation. By repeating the study in another period, the applicability of the recommendations can be increased.

7

Conclusion

This chapter presents the conclusion regarding how municipalities can develop regional action to facilitate heat transition. Besides, the research provides recommendations for the collaborative governance theory regarding the socio-technical problem of heat transition. First, the four sub-questions and the main research question are answered. Next, the research limitations are declared. Finally, the implications for further research and recommendations for practice are suggested.

7.1. Research question

This section answers the main research question: *What strategies can municipalities use in relation to regional collaborative action in a collaborative governance setting to facilitate heat transition with insights from two selected Dutch case studies?* The four sub-questions which led to this conclusion are studied with the selection of the theoretical framework (Chapter 2), the research methodology (Chapter 3), the case insights into heat transition at regional level (Chapter 5). Moreover, the learnings of collaborative governance theory and the role of the government to develop regional collaboration are discussed in Chapter 6.

1. How is collaborative governance related to heat transition networks at the regional scale?
Collaborative governance is a widely used term to describe a governing arrangement that engages public and non-public organizations in a collective decision-making process to implement public policy to resolve social-technical problems, like the topic of this thesis the heat transition. Regarding the facilitation of heat transition at the regional scale, the current literature does not appoint a guiding unambiguous collaborative governance model about sustainable interventions. To be most comprehensive, this thesis selects the integrative collaborative governance framework of Emerson et al. (2012). Several factors which influenced this decision are state and non-state regional actors collaborating on an equal footing, integrative nature, incremental approach, and central role for the perspectives of stakeholders.

The model of Emerson et al. (2012) illustrates the desired situation in energy regions, in which government, semi-public, private organizations and civil society collaborate on an equal footing to realise shared objectives, collective actions, and mutual benefits. This collaborative governance framework is developed in philosophy that collaborative governance is not limited to state-initiated arrangements, hybrid arrangements between scale levels of a sector (e.g., national, and local government authorities) and seeks to foster early engagement of participants to result in more sustainable long-term plans. Regarding the heat transition at the regional scale, these ideas align. Given the complexity of the problem, regional collaboration asks for early engagement of the political responsible (municipalities, water boards, provinces) and other regional actors (e.g., grid operators, civil society, entrepreneurs, housing associations) to transform the entire system, as laid down in, among others, the Dutch Climate Agreement and national program RES in the Netherlands. Second, the collaboration is influenced by elements within the system context (e.g., political system, former collaborations) and collaborative governance regime (e.g., trust, deliberations). The selected collaborative governance model visualizes how these components and elements within the components are connected in the collaborative governance cycle. This makes it possible to evaluate the specific collaboration elements, but also

presents an order to provide step-by-step recommendations. Lastly, for the implementation in practice, the model sets the perspectives, motivation, and behaviour of the regional actors central.

2. How can one recognize and address the elements of collaborative governance during the implementation of heat transition via regional collaboration?
For recognizing and addressing insights the elements of collaborative governance in relation to heat transition at regional scale, a comparative analysis is applied in two RES regions. The comparative analysis is embedded in a qualitative case study approach to understand the phenomena behind the problem of regional collaboration regarding heat transition within its context. The empirical study is executed in two regional case studies with the same characteristics. These include population of municipalities, complexity of the governance network involving number of involved actors and the regulatory regime of collaboration. Besides, the selected regions are both cases with small urban centres surrounded by rural hinterlands. To obtain a complete picture of the current problem, the data is obtained with 24 semi-open interviews with a heterogeneous group of respondents. This data is coded based on the operationalized collaborative governance framework. These results are validated by experts from both regions. Then, the data of both case studies is compared to recognize commonalities and case specific issues. Finally, the comparative results have been validated by experts in the field of collaborations related to the heat transition and an additional RES Region with the same characteristics.

3. What insights on regional collaborative dynamics can be taken from the elements of collaborative governance regarding heat transition?
It appears that only limited collaborative governance is applied in the researched case studies. The challenges causing this lack of regional collaborative action in a collaborative governance setting to facilitate heat transition are twofold. The first issue concerns the high level of barriers in the system context. Second, both cases indicate the lack of collaborative governance elements at regional scale to resolve the socio-technical issue with state and non-state stakeholders. As shown in the collaborative governance framework, both issues have an interrelationship, since the iterative and interactive nature of collaborative governance processes. Ultimately, a combination of factors must result in enabling the desired situation of collaborative actions to facilitate a gas-free built environment by 2050.

The inadequate policy and legal framework, high level of conflict and hard resource conditions are indicated as the contextual barriers at regional scale. In contrast, the strong network connectedness is shown to be an opportunity in the existing collaboration efforts. Prior failure to address issues is shown as a potential barrier, since frustrations from the past regional collaboration efforts on energy transition and other disciplines influence the current collaboration efforts. Conversely, the already established plans establish a foundation, which can be an opportunity or disruptive effect if these are prefabricated by certain stakeholders. The collaborative governance theory refers to the hypothesis that to develop regional actions the system context is an essential element, since it sets the foundation for drivers to collaborate. The empirical research revealed that only the consequential incentive drivers are present in terms of the jurisdictional incentive for state stakeholders to deliver the regional heat transition policy. In addition, the financial incentive is present, however, these subsidies are in practice only for certain projects. In theory, the drivers' interdependence and uncertainty are predicted, but in practice these elements are deficient in rural areas. The uncertainty is too high, since the heat transition national policies, legal framework are unclear and the large variety of possible solutions. In contrast to uncertainty, the level of interdependence is low, since the lack of concrete national targets and local characteristics of the solutions, due to the missing of large regional heat sources, involvement of citizens, and not yet determined local visions. Besides, leadership is missing, due to the high level of conflict and the political sensitivity.

Based on these drivers, it is explicable that the collaborative governance regime elements are barely present regarding heat transition. In line, the research shows that the topic of heat transition is barely discussed at regional scale. However, state stakeholders, including the municipalities, water board and province, had to deliver a regional structure, which resulted in an aggregation of research instead of a shared strategy. The lack of attention for heat transition as a mutual process has already been noted in the first part of the collaborative governance dynamics, since the "gears' principled engagement and shared motivation did not turn. From a municipal perspective, this is because of the limited usefulness and necessity no agreements must be made. Next, disappointments from the past and lack of commitment resulted in missing shared motivation. In the perspective of the other regional stakeholders, the

elements' shared motivation and principled engagements are highly influenced by the political sensitivity of the topic. The elements capacity for joint action are also barely present in the researched case studies, resulting in limited joint actions in the collaborative governance regime. The high number of threats in the system context and absence of collaborative governance regime elements resulted in limited impact and adaptation or in other words facilitation of the heat transition.

4. What do the two selected regional case studies provide as learnings for literature and the current governmental policy to facilitate collaborative action regarding heat transition?
The empirical findings of the two selected regional case studies provide both learning for literature on collaborative governance and the governmental policy regarding heat transition at the regional scale.

The empirical findings indicated some modifications of the collaborative governance framework in the light of the heat transition. In the field of the heat transition, the components principled engagement and shared motivation are so interrelated that it is important to address them simultaneously. In addition, progress can be made regarding participation. To clarify the level of participation, criteria are absent in the collaborative governance regime. The barriers and opportunities identified by means of the collaborative governance framework are not unique to the heat transition and often apply to regional collaborations in general. Previous research has shown that policy coherence is increased by the introduction of the RES, but this increase was not observed in this research into heat transition. This might be caused by the selection of researched regional case studies. The selected case study areas are characterized by rural characteristics resulting in a limited feeling of interdependence between the researched municipal authorities.

The empirical findings also provide learning for the current governmental policy to facilitate heat transition. It is fundamental to appoint the lack of collaboration between state and non-state stakeholders. Municipalities play a crucial role in this tendency, given that municipal authorities do not yet recognize the usefulness and necessity of collaboration on a regional scale. Besides, the regional governance processes are subject to the unclear national and provincial policy and legal framework. To resolve the current political deadlock, the regional state and non-state actors of the researched case studies expect the national government to provide frameworks and become directive. These ideas are derived from the high number and constraining effects of threats in the current system context caused by the national Dutch government (e.g., missing policy and legal framework, resource conditions, political unrest). These elements are subject to the relatively novel character and attention to the heat transition in the RES. To transform these elements, it requires a lot of political courage and boldness. For this reason, the national government first must consider if the RES regions are the most suitable vehicle to facilitate heat transition. When the Dutch national government decides to proceed with the regional collaboration efforts, it would be suitable if several system context elements will be transformed. For instance, a positive impact on the system context can be made if the national government develops a clearer vision (e.g., what to expect from the regional actors, national philosophy on solution directions (i.a. heat pumps)). Other adjustments of the current system context might include the establishment of legal instruments to act in correspondence with the policies, stimulate retraining of employees (e.g., oil gas sector) and clarity about financial arrangements.

The national debate can only be influenced to a certain extent; therefore, it would be worthwhile to dive into what strategies municipalities can use to transform their own behaviour at the regional scale. Stakeholders indicate adjustments have to be made in the component capacity for joint action (e.g., the implementation centre). However, guided out of the framework, this will be a waste of energy and might even result in more disappointments if there is no stable basis in the previous components that must lead to the capacity for joint action. It is therefore recommended to look at earlier process steps in the collaborative governance framework, the system context, principled engagement, and shared motivation. The system context and components within the collaborative governance regime, principled engagement, and shared motivation, interact and therefore both should be addressed.

Main question: What strategies can municipalities use in relation to regional collaborative action in a collaborative governance setting to facilitate heat transition with insights from two selected Dutch case studies?
The comparison between the selected collaborative governance framework and insights in the current situation of the two regional case studies identified what strategies municipalities could use to facilitate the heat transition in a collaborative governance arrangement.

First, it would be worthwhile that municipalities become aware of the lack of regional collaboration between state and non-state stakeholders. The first step has been taken in this study, as this thesis can serve as an eye-opener for municipalities for their current position. It is recommended that municipalities develop intrinsic motivation to prioritize the heat transition and recognize the added value of collaboration at the regional level to facilitate the heat transition. This is a difficult measure, because it concerns behavioural change, but is required to achieve a gas-free built environment. It is recognized by the author that this first step will not immediately lead to the desired result and might even slow down regional problem solving and decision making. However, collaborative governance does require engagement and shared motivation by formal and informal partnerships to regional collaboration. Thereafter, further steps could be taken, like the appointment of a leader (initiator), creating an overview of the initiatives, and setting targets. Appointing an (hired) neutral initiator can help to stimulate and integrate the different sectors in a forum. Guided by the leader, the opportunity of strong network connectedness can be exploited. Then, these various state and non-state sectors can collaborate in a collaborative governance setting to discuss the various ideas and set targets to also stimulate the shared motivation. This basis for collaboration might eventually lead to the development of joint policies and solutions (e.g., the implementation organization, subsidies for households) to facilitate heat transition in the two selected case study regions.

Finally, the heat transition is not an easy policy change, and the entire population will play a central role in the facilitation of the transition. It would be worthwhile to create concrete action plans to realize the national ambitions. The national government can help to stimulate the facilitation of the plans through regional collaboration by adjusting the system context to a more directive approach. Regional collaboration can be a vehicle to achieve national goals, but the fact remains that politicians, but also the private and community sectors sometimes have to transform their mindset. This transformation might not always be for its own interest, but for the greater good or as Winston S. Churchill articulated: *"It is not enough that we do our best; sometimes we must do what is required"*.

7.2. Research limitations

The main research question is answered; however, the research design has caused several research limitations.

- **Number of cases:** For this research, two RES regions and one validation case have been studied. This is a relatively narrowed sample to generalize the research findings on the entire set of RES regions. In addition, the geographical characteristics of these cases are merely the same. Inequalities in density, size, and landscape features may offer new insights on the regional collaborative actions regarding heat transition.

- **Election of the scale:** In this study, the researcher broadly looked at the entire set of collaborative governance elements which can influence the regional collaboration efforts to facilitate the heat transition. The outcomes indicate the local characteristics of the heat transition. It would be interesting to zoom in more on the contacts between the networks and/or individual collaboration projects with the quadruple helix, for example a "Regio Deal" project.

- **Evaluation in a specific timeframe:**The observations have been collected in the period June to November, however, collaboration efforts deal with a high level of uncertainty and dynamism. Hence, the findings could be outdated. In addition, the topic of heat transition and even further the topic of regional collaboration regarding heat transition are relatively new topics.

- **Researched stakeholders:** Many different perspectives of regional stakeholders involved. The difficult role of the municipalities is that they must represent the citizens, but the interviews and validations show that the citizens should be given a more essential role in the process. In this interview series, the perspective of the individual citizens was only included from a citizen panel

and participants, who spoke from themselves. Besides, the national government is pronounced to be pivotal to facilitate the heat transition. Both actors could as well influence the perspective on achieving the heat transition targets at regional scale.

- **Selection of the theoretical lens:** The frame of reference influences the perspective on the conclusions, in this case the collaborative governance theory. The operationalization of the collaborative governance elements is determined by the researcher based on theory, nevertheless still assumptions had to be made during the data analysis of the semi-structured interviews. To minimize this, the same linguistics and vocabulary of the analysis is used during the validation session. The case findings can be checked by distinct theories, for example the Teismann rounds model. Thereby, the collaborative governance framework shows the collaborative dynamics, but not how to involve certain participants. It is also a very large framework, which means that it was not possible to discuss all elements in detail.

7.3. Recommendations

The empirical research findings and limitations of the research design offer an agenda for future studies and practical recommendations. First, the recommendations for further study are suggested. Next, the recommendations for municipalities willing to collaborate in a collaborative governance setting to facilitate heat transition at regional scale are presented.

7.3.1. Follow up research

The research findings and limitations introduce possibilities for subsequent scientific research.

- **Additional regional case studies:** The studied case studies have the same kind of characteristics, and this might possibly influence the study outcomes. Future studies should therefore include a larger sample of regions to verify the results, and preferable regions with a higher density and higher availability of natural heat sources.
- **Distinct approaches to facilitate the heat transition:** In this study the facilitation of heat transition is studied in a regional context. However, it is questionable if RES regions are the desired approaches to facilitate the transition, due to allocation of the regions, lack of dependency and high uncertainty. Therefore, it would be desirable to dive into different governance methods to facilitate heat transition.
- **Collaborative governance dynamics at the local scale:** This research is conducted at regional scale. However, the current situation indicates the heat transition as a local transition. Hence, it would be worthwhile to investigate the collaborative governance elements at local scale and compare these findings with the findings at regional scale. Moreover, there regional existing projects of the current situation can be evaluated.
- **Longitudinal examination:** Collaborative governance dynamics is a hybrid form of collaboration characterised by constant development. During the investigation of this study, the collaboration in RES regions was relatively new, therefore, it would be worthwhile research to evaluate the development of the regional collaborations through the years. In addition, it is preferable to extent the decision-making processes by various participants through the years, for example by the Teismann rounds model.
- **Civil society engagement:** The outcomes of the empirical research indicate the importance of the involvement and educements of individual property owners (citizen participation) in respect to the heat transition. However, the collaborative governance theory does not entail how this “main” stakeholder can be involved by municipalities or other regional stakeholders. For example, research can be done into the quadruple collaboration efforts or a cross-case analysis can be made with a forerunner in the heat transition Sweden.
- **In-depth research on specific collaborative governance elements:** This research provides an overview on the current situation regarding the heat transition. Hence, the outcomes show that a high number of elements are not yet observed in the cases. Therefore, it would be worthwhile to analyse certain elements in-depth, for instance how to increase the feeling of interdependence, trust and what kind of leader would be beneficial.

7.3.2. Implications for practise

The purpose of the study is to provide recommendations for municipalities (and other stakeholders) to facilitate heat transition in a collaborative governance setting at regional scale. To map these recommendations, it was decided to visualize a step-by-step plan, as shown in figure 7.1. First, it should be recognized if the RES regions are the suitable way because collaboration is a vehicle to facilitate the target of heat transition and collaboration is not a target on itself. If the inefficiency benefits have been recognized (*Driver: interdependence, System context: level of conflict & Shared motivation; Commitment*), three other steps must be taken: appoint an external, preferably someone from the private sector, ambassador (*Driver Capacity for joint action: leadership & Shared motivation: Trust*), inventory (*Principled engagement: discovery & deliberation*), and set targets (*Principled engagement: definition*). As illustrated in figure 7.1, these four recommendation steps will not be the finish, but these four step-by-step recommendations provide essential start conditions. In addition, it is pivotal to state that heat transition and collaborative governance are both novel practices, so learning by doing is demanded. Despite the setbacks, it is essential to stay enthusiastic, get inspired and surround yourself with a broad support base.

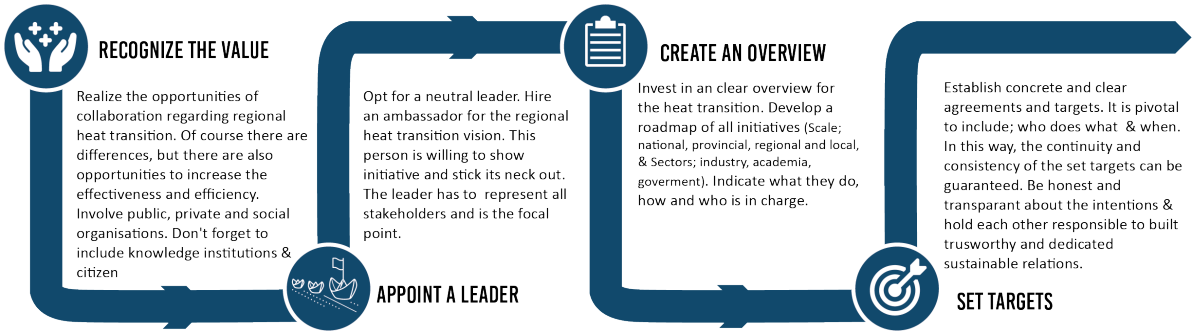


Figure 7.1: Stepping-stones to increase regional collaboration regarding facilitate the heat transition (Own illustration)

Advice for the national government: If the Netherlands really wants to focus on the heat transition to achieve the goals in 2050, it is also important to address the preconditions, so that the contextual factors for collaboration are clearer, possibly even easier. This means that there must be clear control over where large-scale heat structures should be located, financial resources are available, bundling knowledge, providing frameworks that policy documents must comply with (this can also include a distinction between the regions with suitable heat networks and without) and an initiator must be hired to prioritize the heat transition.

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A

The planning

Figure A.1 presents the planning of this research. In addition to this planning, the researcher (the student) had on regular basis meetings with one of the graduation supervisors to keep track of the progress and to discuss the research results. Important milestones are:

- Kick off: 26 May 2021
- Mid-term meeting: 29 September 2021
- Green light: 17 December 2021
- Thesis presentation: 27 January 2022

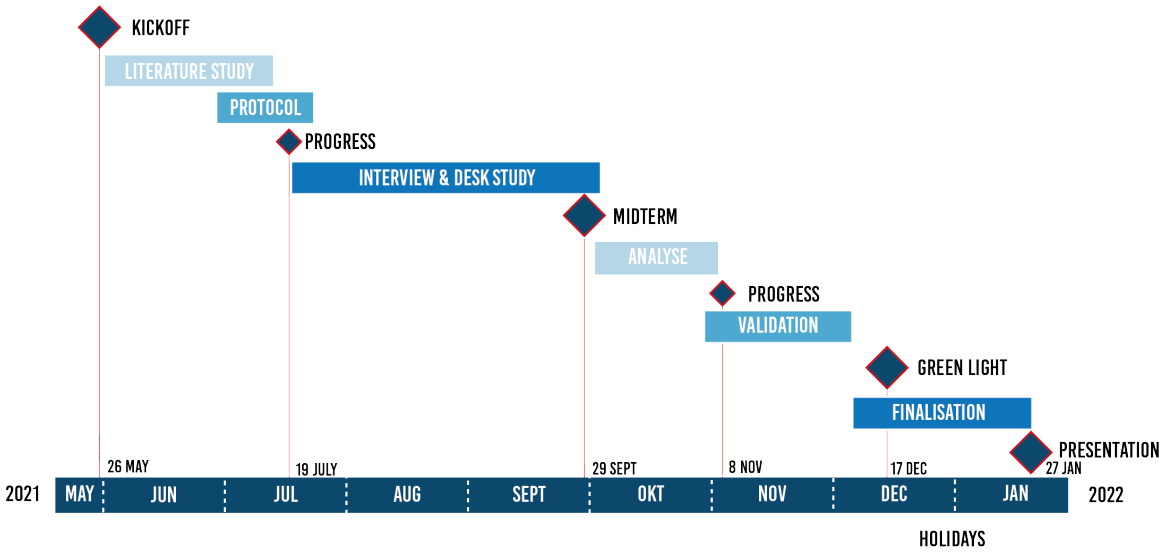

Figure A.1: Planning (Own illustration)

B

Interview protocol

This appendix concerns the interview template for the semi-structured interviews in the RES regions. The respondents gave permission in advance to record and transcribe the interviews. In addition, the respondents received the transcript within three weeks, which only could be corrected for factual inaccuracies. The interview protocol is drawn up in Dutch, because the respondents are all fluent Dutch speakers. The questions in bold are asked in the questionnaire. The black questions served as a guideline for further explanation to dive into concrete examples. By applying concrete examples per respondent, the research is put in a certain perspective and can be analyzed more objectively. The processing of the interviews is anonymous, separate permission was requested for the use of traceable quotes.

Algemeen

- Betreft RES regio:
- Respondent (Naam; organisatie; functie)
- Contactgegevens (Tel; email)
- Datum Interview
- Gesprekstijd (Aantal minuten)

Doel In literatuur wordt benoemd dat regionale samenwerkingen kunnen helpen om de Klimaatdoelen te behalen. Bij dit onderzoek wordt naar de interactie tussen de lokale en regionale schaal gekeken ten opzichte van de warmte transitie in de gebouwde omgeving. Dit is de structurele verandering van het warmtesysteem naar een systeem zonder gebruik van fossiele middelen. Hierbij verandert niet alleen de energiebron, maar ook andere domeinen zoals de organisatie. Bij dit onderzoek staan de ervaringen van betrokken centraal. De interviews vinden plaats met een diverse set van betrokkenen en geven hierbij een breed inzicht in praktijkervaringen met betrekking tot de regionale samenwerkingen ten opzichte van de warmtetransitie.

Opzet van het interview De onderzoeker interviewt verschillende partijen die op hun manier betrokken zijn bij de regionale samenwerking. Het is onafhankelijk onderzoek, waarbij de resultaten geanonimiseerd zullen worden. Gaat u hier akkoord mee?:

Het interview duurt ongeveer 60 minuten. Laten we beginnen.

(Verstreken tijd 5 minuten)

A. Organisatie van de RES
Interviewer: De RES samenwerkingen zijn relatief nieuw en ik zou graag inzicht willen verkrijgen in de dynamiek binnen de RES regio.

1. Welke rol speelt uw organisatie en uzelf in de regionale samenwerking op het gebied van de warmtetransitie?
2. Wat heeft jullie organisatie doen besluiten om regionaal te gaan samenwerken op gebied van de warmtetransitie? (Motieven achter de samenwerking; economisch, opgelegd vanuit het Rijk; capaciteit gebrek; afhankelijk)
3. Is er een geschiedenis in regionale samenwerking in de regio? (Zo ja op welke gebieden; jeugdzorg)
4. Welke stakeholders zijn cruciaal om in het warmtetransitie proces te betrekken? (Waarom; zijn deze partijen allemaal aanwezig; gemeenteraden; Leiderschap?)

(Verstreken tijd 20 minuten)

B. Het samenwerkingsproces
Interviewer: Nu komen we aan bij de vragen over de regionale warmtetransitie samenwerking inclusief RSW) en hoe u deze samenwerking ervaart.

5. Hoe verloopt de huidige regionale samenwerking in de warmtetransitie? (Wat gaat goed; niet goed; gebeurt dit de volgende keer weer; worden successen gevierd)
6. Wat zijn volgens u de doelen van de samenwerking? (Zoals het opgestelde RES-document, maar ook kennisuitwisseling)
7. Hoe is de verdeling van de rollen? (Is het duidelijk wat er moet gebeuren; Is er een duidelijke kartrekker; nemen partijen hun verantwoordelijkheid; Role ambiguity)
8. Hoeveel middelen zijn beschikbaar zoals tijd, informatie, kennis, budget en mandaat beschikbaar? (Al voldoende; Hoe verhouden lokale en regionale belangen zich tot elkaar; zijn er genoeg randvoorwaarden; regels en protocollen; voldoende gedeeld)
9. Hoe is de sfeer in de regionale samenwerking zoals bij de RES? (Waar blijkt dit uit?; wat is uw eigen gevoel daarbij?)

(Verstreken tijd 40 minuten)

C. Resultaten
Interviewer: Uiteindelijk is het einddoel dat de huizen in de gebouwde omgeving worden verduurzaamd en van het fossiele gas af gaan. Daarbij horen maatregelen zoals het opzetten van warmtestructuren, maar ook het isoleren van huizen is belangrijk.

10. Kunt u beschrijven welke de impact van de regionale samenwerking heeft op verduurzaming van de gebouwde omgeving? (Terug koppelen naar beoogde resultaten van vraag 6; Hoe worden de behaalde resultaten gemonitord?; verschil regionaal of lokaal)

(Verstreken tijd 45 minuten)

D. Reflectie
Interviewer: In het onderzoek ben ik benieuwd naar uw visie op de beoogde versnelling van de warmtetransitie en uw ervaringen met hoe de samenwerkingsverbanden daaraan bijdragen. De beoogde versnelling is de versnelling met het doel om voor 2050, 7 miljoen huizen te hebben verduurzaamd (Ambitie nationaal Klimaatakkoord).

11. Bent u gedurende het opstellen van de RES-document anders over het initiatief gaan denken? (Verandering van aanpak)
12. Hoe denkt u over de beoogde versnelling van de verduurzaming van de gebouwde omgeving? (Haalbaarheid).

(Verstreken tijd 55 minuten)

Interviewer: Dan zijn we nu bij de twee vragen van het interview gekomen.
13. Kunt u samenvatten waar het interview over ging? (Samenvatten wat is de kern van het gesprek)
14. Is er nog iets wat u terug wilt koppelen? (Niet besproken tijdens het interview; aanvulling)

(Verstreken tijd 60 minuten)

Interviewer: Bedankt voor het interview. Het transcript zal binnen drie weken worden teruggestuurd en daarbij kunnen feitelijke onjuistheden worden verbeterd.

C

Validation protocol

This appendix concerns the interview template for the RES regions. The respondents gave permission in advance to record and transcribe the validation session. In addition, the respondents received the transcript within a week, which only could be corrected for factual inaccuracies. Thereby the validation protocol is drawn up in Dutch, because the respondents are all fluent Dutch speakers. In accordance with the interviews, the duration of the validation sessions is 60 minutes and the findings are anonymised.

Algemeen

- Betreft RES regio:
- Respondent (Naam; organisatie; functie procesrol)
- Contactgegevens (Tel; email)
- Datum Interview
- Gesprekstijd (Aantal minuten)

Doel In literatuur wordt benoemd dat regionale samenwerkingen kunnen helpen om de Klimaatdoelen te behalen. Bij dit onderzoek wordt naar de interactie tussen de lokale en regionale schaal gekeken ten opzichte van de warmtetransitie in de gebouwde omgeving. Dit is de structurele verandering van het warmtesysteem naar een systeem zonder gebruik van fossiele middelen. Hierbij verandert niet alleen de energiebron, maar ook andere domeinen zoals de organisatie. Bij dit onderzoek staan de ervaringen van betrokken centraal. Door middel van diverse interviews is er een huidige schets van de situatie omtrent regionale samenwerkingen gemaakt en is deze door de onderzoeker gemapt op de collaborative governance theorie. In de validatiesessie is het doel om deze bevindingen te delen en te testen op herkenbaarheid. De validatie sessies vinden plaats met gemeentelijke actoren en specialisten op het gebied van de samenwerking in de warmtetransitie. Op deze manier kunnen er aanbevelingen worden gegeven om de huidige regionale samenwerkingen te versterken om uiteindelijk de warmtetransitie in de gebouwde omgeving op te faciliteren.

Opzet van het interview Eerst zal de onderzoeker een presentatie geven over de collaborative governance theorie en daarbij uitgekozen theoretische raamwerk. Aan de hand van dit raamwerk zullen de resultaten van de voorafgaande interviews worden gepresenteerd en heeft de respondent de mogelijkheid om op deze bevindingen te reageren. Hierbij valideren de respondenten uit RES A B op de resultaten uit deze regio. Daarnaast reflecteren respondenten uit RES regio C en experts aan de hand van de vergelijkende analyse. Het een onafhankelijk onderzoek, waarbij de resultaten geanonimiseerd zullen worden. Gaat u hier akkoord mee?:

De validatie duurt ongeveer 60 minuten. Laten we beginnen.

(Verstreken tijd 5 minuten)

A. Presentatie met betrekking tot collaborative governance
Interviewer: Ik zou graag de collaborative governance theorie willen introduceren.

(Verstreken tijd 10 minuten)

B. Case studie reflectie
Interviewer: Ik zou nu graag over willen gaan op het presenteren van mijn bevindingen omtrent de implementatie van warmtetransitie in RES regio's in a collaborative governance setting (de interviewer laat de ingevulde operationalisatie tabel zien van Table 5.1 & Bijlage D). De kwalitatieve data van de interviews is vertaald in een rating variërend van sterke aanwezigheid geobserveerd aangegeven met (++) tot (–), niet geobserveerd. Uiteindelijk dienen deze bevindingen om aanbevelingen te geven aan de betrokken partijen in de regionale samenwerking. In deze meeting wil ik de elementen van het CG bespreken en uw mening verkrijgen over de elementen. Laten we beginnen.

Vragen per element:
1. Herkent u dat dit gebeurt als we dit element van CG ernaast leggen?
2. Op welke manier zou u dit element hebben geïnterpreteerd? (Hetzelfde of anders?)
3. Gegeven wat u net vertelde. Wat is een verklaring voor uw kijk op dit element? ((Wel: verduidelijking waarom, Niet: reden waarom niet. Bijvoorbeeld; Positie van de respondent, andere perceptie op welke feiten, is dit iets wat het aspect van collaborative governance representeert of invloed op ander element.))

(Verstreken tijd 45 minuten)

C. Collaborative governance als constante cyclus
Interviewer: Collaborative governance geeft een bepaalde volgorde aan om mee te beginnen.

4. Met welk element van het raamwerk zou u beginnen om te verbeteren?
5. Waar hangt dit aspect volgens u mee samen? (Is dit element gerelateerd aan een ander element van cg))

Interviewer: Dan zijn we nu bij de laatste vraag van het interview gekomen
6. Is er nog iets wat u terug wilt koppelen? (Niet besproken tijdens het validatie; aanvulling)

(Verstreken tijd 60 minuten)

Interviewer: Bedankt voor het interview. Het transcript zal binnen een week worden teruggestuurd en daarbij kunnen feitelijke onjuistheden worden verbeterd.

D

Results of the comparative analysis

Operationalization of elements within the collaborative governance framework are shown in Appendix D. The brief explanation regarding the results of the comparative analysis is presented per case. The results of Region A are have a light blue color and Region B is medium blue. If for both regions the same condition is observed, it is marked with the darkest blue color. The scheme is presented in Dutch, as all interviewees were fluent Dutch speakers. This operationalization scheme is used during the validation sessions to use the same vocabulary on the collaborative governance elements.

Component	element	++	+	+/-	-	--	Comment
Context	**Voorwaarden voor middelen**	Er is schaarste op het gebied van middelen van natuur, arbeid en het kapitaal (e.g. duurzame bronnen, menselijke capaciteit particulier bezit, kwaliteit, geld gebrek). Alle 3 condities hebben een grote invloed op de regionale samenwerking van de publieke, private en maatschappelijke partijen organisaties om warmtetransitie te faciliteren.	Er heerst een schaarste van natuur en arbeid of kapitaal. Er zijn 2 condities met een zeer sterke invloed op de samenwerking tussen de publieke, private en maatschappelijke partijen qua warmtetransitie.	Er heerst schaarste op het gebied van natuur, arbeid of het kapitaal. Er is 1 conditie met grote invloed en de andere beperkte invloed. De regionale samenwerking tussen de publieke, private en maatschappelijke partijenwordt beperkt beïnvloed door deze conditie	Zeer geringe schaarste op het gebied van natuur, arbeid en het kapitaal. De regionale samenwerking tussen de publieke, private en maatschappelijke partijen wordt nauwelijks beïnvloed door deze conditie.	Er is geen schaarste op het gebied van natuur, arbeid en kapitaal. De voorwaarden van hulpbronnen heeft dan ook geen invloed op de facilitatie van de warmtetransitie door regionale samenwerking van de publieke, private en maatschappelijke partijen	**RES A (++):** In all three areas difficulties arise. Limited regional heat sources, low density, and property stock energy owned with a energy label B. Therefore, individual solutions are needed. In addition, scarcity in capacity (policy and implementation) is a major issue. **RES B (++):** Limitations in all three factors; nature (scarcity of regional durable sources), human capital (scarcity in all levels and sectors; lack of knowledge and skill), and capital (growth region, but biggest challenge remains the existing (owned) stock)
	Beleid en wettelijk kader	Het beleid en wettelijk kader over hoe de regionale warmtetransitie samenwerking is georganiseerd drukt een grote stempel op facilitatie van de warmtetransitie op regionale schaal (e.g. RES, TvW, schaal, verplichtingen).	Het beleid en wettelijk kader over hoe de regionale warmtetransitie samenwerking is georganiseerd heeft invloed op facilitatie van de warmtetransitie op regionale schaal (e.g. RES, TvW, schaal, verplichtingen). Niet in alle gevallen even bepalend	Het beleid en wettelijk kader over hoe de regionale warmtetransitie samenwerking is georganiseerd heeft beperkte invloed op de facilitatie van de warmtetransitie (e.g. RES, TvW, schaal, verplichtingen). Het is in sommige omstandigheden alles bepalend, maar zeker niet altijd	Het beleid en wettelijk kader over hoe de regionale warmtetransitie samenwerking is georganiseerd heeft beperkte invloed op de facilitatie van de warmtetransitie (e.g. RES, TvW, schaal, verplichtingen). Het heeft een enkele keer invloed, maar geen overduidelijke	Het beleid en wettelijk kader heeft niet of nauwelijks invloed op de regionale aanpak op het gebied van de warmtetransitie	**RES A (++):** No clear policy framework regarding heat (1) and no legal framework (2). **RES B (++):** Inadequate national vision (1), and absence legal framework (2)
	Voorafgaande regionale samenwerkingen om proberen aan te pakken	Voorafgaande samenwerkingsverbanden op het gebied van de warmtetransitie en andere regionale samenwerkingen zijn onlosmakelijk verbonden met de huidige samenwerking op het gebied van de warmtetransitie	Er bestaat een geschiedenis van regionale samenwerking in de regio. Qua energie zijn deze sterk verbonden met de huidige warmtetransitie, maar andere regionale samenwerkingsverbanden hebben weinig invloed (e.g. jeugdzorg, toerisme, economie)	Voorafgaande samenwerkingen hebben beperkte invloed op de huidige stand van zaken. Het heeft in mindere mate de huidige stand van zaken beïnvloedt.	Er zijn wel voorafgaande samenwerkingsverbanden, maar deze hebben bijna geen invloed op de huidige stand van zaken.	Oude samenwerkingsverbanden bestaan niet of nauwelijks en hebben geen invloed op de huidige stand van zaken in de warmtetransitie	**RES A (+):** Previous attempts established a common ground for local authorities regarding heat transition. Not only positive, frustrations, due to previous attempts regarding heat transition and other disciplines. **RES B (+):** Presence of provincial heat transition vision (1). Absence of prior regional collaborations in respect to heat transition, however, some individual organizations already set targets (2)
	Politieke dynamiek & Machtsverhoudingen	Politieke instabiliteit door o.a grote machtsverschillen, verschillende politieke voorkeuren en aankomende verkiezingen, heeft een sterke invloed op de regionale samenwerking op het gebied van de warmtetransitie. De publieke, semi-publieke en private partijen worden allemaal sterk beinvloedt door deze tendens.	Politieke instabiliteit door o.a grote machtsverschillen, verschillende politieke voorkeuren en verkiezingen, heeft een nauwelijks invloed op de regionale samenwerking op het gebied van de warmtetransitie. Publieke, semi-publieke of private partijen zijn zeer afhankelijk van deze tendens.	Politieke instabiliteit door o.a machtsverschillen, politieke voorkeuren en verkiezingen, heeft een gematigde invloed op de regionale samenwerking op het gebied van de warmtetransitie. Alleen in beperkte situaties geeft heeft het invloed op de regionale samenwerking met de triple helix op het gebied van warmtetransitie	Er is nauwelijks sprake van politieke instabiliteit door o.a. beperkte machtsverschillen, gedeelde politieke vorkeuren en/of aankomende verkiezingen. Alleen in zeer beperkte situaties hebben de verschillen een invloed op de samenwerking op het gebied van warmtetransitie	Politieke instabiliteit of machtsverschil heeft geen invloed op de huidige stand van zaken. De publieke, semi-publieke en private partijen hebben niks te maken met deze tendens.	**RES A (+/-):** Same political preferences (1), but due to elections stagnation(2). Disbalance in power, due to decion-power by municipalities (3). **RES B (+):** Different kind of political preferences in the region causing distinct visions for heat transition ambitions (1). In that case, the decion-power with city counils could be an issue (2). In addition, the heat transition is a politically sentive issue, and with the upcoming elections stagnations is more present (3).
	Aanwezigheid van netwerk cohesie	Er zijn sterke netwerkbanden op formele en informele sfeer. Publieke, private en maatschappelijke partijen zijn sterk met elkaar verbonden. Ze pakken elk sociaal-technische probleem gezamenlijk op	Er zijn netwerkverbanden in de regio formeel en informeel. Publieke, private en maatschappelijke partijen weten elkaar te vinden op gebied van de warmtetransitie en andere sociaal-technische problemen	Er zijn netwerkverbanden in de regio. Publieke, private en/ of maatschappelijke partijen weten elkaar op formele of informele manier te vinden om de warmtetransitie te faciliteren.	Er nauwelijks netwerkbanden op formele en informele sfeer. Publieke, private of maatschappelijke zijn sterk met elkaar verbonden.	Er geen netwerkbanden op formele en informele sfeer. Publieke, private en maatschappelijke partijen zijn een gezamenlijk orgaan.	**RES A (++):** Strong formal and informal bonds visible in the entire network including, government, civil society and business sector. **RES B (+):** Regional stakeholders are closely interlinked, due to the already existing regional collaboration efforts.
	Niveau van conflict	Het bestaande vertrouwen in de regionale samenwerking is geschonden door weerstand, gebrek aan respect naar elkaar en draagvlak dat ontbreekt in de regio. De samenwerking van publieke, private en maatschappelijke partijen op het gebied van warmtetransitie is hier onlosmakelijk mee verbonden.	Het bestaande vertrouwens level is geschonden door weerstand en beperkte mate van draagvlak. De samenwerking tussen publieke, private en maatschappelijke partijen ondervindt veel druk en daarom worden projecten beperkt uitgevoerd.	Er heerst een bepaald vertrouwens level en draagvlak in de regio. De facilitatie van de warmtetransitie op regionale schaal heeft maar in sommige gevallen te maken met de weerstand.	Er heerst een bepaald vertrouwen level en draagvlak in de regio. De warmtetransitie nauwelijks te maken met weerstand	Er is geen weerstand tegen de implementatie van de warmtetransitie, vertrouwen is sterk aanwezig en meer dan voldoende draagvlak uit de maatschappij.	**RES A (++):** High level of conflict, due to the implementation plans for wind turbines and heat transition even more precausius. **RES B (++):** Low level of initial trust, high level of contention (e.g., wind energy, negative media attention, uncertainty, different perspectives on responsibility)
	Sociaal-economische factoren	Sociaal-economische factoren (o.a woningmarkt of economie (o.a energiearmoede) zijn onlosmakelijk verbonden met de facilitatie van de warmtetransitie in de regio. Publieke, private en maatschappelijke partijen zijn hieraan onderhevig.	Sociaal-economische factoren hebben een invloed op hoe de warmtetransitie op regionale schaal wordt uitgerold. Publieke of private, maatschappelijke partijen zijn hieraan onderhevig.	Publiek, private en maatschappelijke partijen zijn zich bewust van sociaal-economische factoren, maar de impact is in deze regio niet van groot belang op de facilitatie van de warmtetransitie	Sociaal-economische factoren hebben alleen op enkele gevallen in de regio na invloed op de regionale samenwerking op het gebied van de warmtetransitie	Sociaal-economische factoren hebben geen enkele invloed op de regionale samenwerking op het gebied van de warmtetransitie	**RES A (+/-):** A wealthy region, but concerns about the financials for individual property owners. The sum of socio-economical factors results in moderate influence, because all regional actors do not implements measures. **RES B (+/-):** Growth region, causing the prioritization of means and awareness must be on vulnerable groups. However, this does not have a large influence on heat transition actions.

Drivers	**Leiderschap**	Een initiator was aanwezig om gezamenlijk de warmtetransitie aan te pakken met alle betrokken partijen. De leider helpt om de samenwerking te initiëren, is vastbesloten om gezamenlijk problemen aan te pakken en denkt daarbij ook aan de voorkeuren van alle partijen (publiek, privaat en maatschappelijk).	Een initiator was aanwezig om gezamenlijk warmtetransitie aan te pakken. De leider helpt om de samenwerking te initiëren en middelen worden voor dit gezamenlijke doel ingezet. Hierbij is deze persoon gecommitteerd om gezamenlijk het probleem op te lossen, maar wordt de neutraliteit ter discussie gesteld.	Er was een initiator aanwezig. De aanwezigheid van de leider helpt om de samenwerking te initiëren en middelen worden voor dit gezamenlijke doel ingezet. De initiator is niet uit om gezamenlijk het probleem op te lossen of om de voorkeuren van alle partijen te betrekken	Er was geen vast aanspreekpunt aanwezig. Er bestaan wel enthousiastelingen aanwezig om de warmte transitie in gang te zetten.	Er was geen leider om de warmtetransitie te initiëren.	**RES A (-):** No initiators from state and non-state actors at regional scale. Only inter-municipal collaboration through support of officals. **RES B (-):** initiator for heat transition is absent at regional scale is absent. Only enthusiasts actors at local level.
	Indirecte stimulansen	De positieve en negatieve stimulansen hebben een pivotale rol gespeeld in de regionale samenwerking omtrent warmtetransitie	Er zijn zowel meerdere positieve als negatieve stimulansen aanwezig, maar deze zijn ondergeschikt geweest aan andere aanjagers	Er zijn positieve of negatieve stimulansen aanwezig	Er is 1 negatieve of positieve stimulans	Er zijn geen positieve of negatieve stimulansen	**RES A (++):** negative; national RES policy (1), deadlines of this national policy (2). Positive; Subsidies (regio deals)(3), frontrunner position (4) **RES B (++):** negative, National np RES policy with deadlines is the main driver. Positive: regional subsidy.
	Afhankelijkheid	Publieke, private en maatschappelijke partijen zijn niet in staat om het probleem alleen aan te pakken en zoeken voor samenwerkingen met publieke en private partijen.	Niet in staat om de transitie zelf uit te voeren. Samenwerking met voornamelijk publieke partijen en in mindere mate input van private partijen nodig	Publieke, private en maatschappelijke partijen hebben het inzicht dat warmtetransitie niet alleen kan worden uitgerold, maar zien daar in beperkte mate de regionale samenwerking als toegevoegde waarde in.	De gemeenten zijn in staat de warmtetransitie in min of mindere mate zelf uit te voeren en vragen alleen ondersteuning aan andere publieke, private en maatschappelijke partijen	Betrokkenen zijn onafhankelijk en hebben niet de noodzaak om samen te werken	**RES A (+/-):** Small municipalities and businesses, which fase the same challenges, therefore need to collaborate. However, sense of uniqueness dominates among local governmental authorities. In addition, heat transition preceived as political issue. Contradiction, theme table collaboration, nevertheless, heat transition is barely set on the agenda of the theme tables. **RES B (+/-):** Local governmental authorities perceive the heat transtion as a transition at local level, therefore not dependent on other stakeholders at regional scale. Other stakeholders do see the added value.
	Onzekerheid	Informatie en oplossingen richtingen onbekend zijn en daarom is de regio begonnen met de regionale samenwerking op het gebied van de warmtetransitie	Informatie is zeer beperkt en enkele mogelijke oplossingen zijn gegeven, waardoor er in de regio is besloten om te moeten samenwerken op regionale schaal op het gebied van de warmtetransitie	Informatie is gedeeltelijk bekend over het probleem maar er is geen oplossing aanwezig. Daarom is de regionale samenwerking tussen Publieke, private en maatschappelijke partijen opgestart	Informatie en of mogelijke oplossingen zijn (onbekend. Er is daarom besloten alleen op sommige punten samen te werken	Er is voldoende informatie en de oplossing ligt voorhanden. Samenwerken is niet nodig.	**RES A (-):** Too high uncertainty to collaborate: no national govermental vision and unpredictable transition solutions. **RES B (-):** In practice, the high level of uncertainty does not initiate collaboration; on the contrary.

Component	element	++	+	+/-	-	–	Comment
Principiële betrokkenheid	**Ontdekken**	Individuele en gedeelde belangen worden ontdekt en er wordt duidelijk gemaakt waar de zorgen liggen op het gebied van de warmtetransitie. De publieke, private en maatschappelijke partijen committeren zich tot een gezamenlijk analytisch feitenonderzoek.	Individuele belangen worden duidelijk gemaakt en mindere mate worden gezamenlijke belangen ontdekt. Er is duidelijk besproken met publiek, private en maatschappelijke partijen, waar de problemen liggen op gebied van de warmtetransitie	Publieke, private en maatschappelijke partijen delen onderlinge belangen en maken duidelijk beperkt duidelijk waar problemen liggen op het gebied van de warmtetransitie	Alleen publieke, private of maatschappelijke partijen delen onderlinge belangen en maken duidelijk waar de problemen liggen op het gebied van warmtetransitie	Er worden geen individuele en gezamenlijke belangen onderling tussen publieke en private partijen duidelijk gemaakt.	**RES A (-):** Low level of participation. Only inter-municipal collaboration **RES B: (+/-):** Low participation level regarding heat transition (only inter-municipal), however ateliersessions with quadruple helix
	Definitie	De publieke, private en maatschappelijke partijen definiëren gezamenlijke de taal die wordt gesproken op het gebied mogelijkheden en problemen omtrent de warmtetransitie. Deze resulteert in gezamenlijk opstellen van doelstellingen, definiëren taken, verwachtingen en evaluatiecriteria op een formele manier. De doelen zijn in lijn met het Klimaatakkoord.	De publieke, private en maatschappelijke partijen hebben gezamenlijke taal gekozen om te spreken over de problemen en mogelijkheden. Gezamenlijke doelstellingen in lijn met het klimaatakkoord en definitie van taken en verwachtingen zijn merendeel formeel vastgelegd met een paar informele afspraken onderling. Evaluatiecriteria zijn er in beperkte maten	De publieke, private en maatschappelijke partijen hebben gezamenlijke taal gekozen om te spreken over de problemen en mogelijkheden. Gezamenlijke doelstellingen en definitie van taken en verwachtingen zijn informeel vastgelegd. Deze doelstelling is in lijn met het kliaatakkoord. Evaluatie criteria zijn in beperkte maten of nauwelijks aanwezig.	Publieke, private en maatschappelijke partijen hebben enkele een paar afspraken gemaakt over gezamenlijke doelen, taken en verwachtingen zijn niet gedefinieerd. Deze beperkte afspraken die zijn gemaakt zijn wel in lijn met het klimaatakkoord. Evaluatie criteria zijn er in beperkte mate of nauwelijks aanwezig.	Publieke, private en maatschappelijke partijen hebben geen gezamenlijke taal gedefinieerd, er zijn geen gezamenlijke doelen, taken of verwachtingen en evaluatie criteria formeel of informeel afgesproken. Hier is ook niet over gesproken.	**RES A (+/-):** Shared ambition to become energy neutral by 2030. Only how to is rather vague. Tasks are defined among municipalities. Expectations and evaluation is not defined. **RES B (-):** No shared language, limited task division and expectations. Large variety of how progressive the agenda's are.
	Beraadslaging	Publieke, private en maatschappelijke partijen hebben open dialoguen en zijn open qua communiciatie. Er is een centrale plek waar naar alle perspectieven van publieke en private partijen wordt geluisterd en onenigheden worden besproken.	Er zijn open dialoguen en open communciatie tussen beperkte stakeholdersgroepen. Wel worden de meningen van publieke, private en maatschappelijke partijen aangehoord, maar onenigheden gedeeltelijk uitgesproken.	Er is sprake van dialogen en en open communicatie tussen publieke, private en maatschappelijke deelnemers, maar dit gebeurt op veel verschillende plekken. Onenigheden gedeeltelijk besproken.	Er is beperkt van dialogen en en open communicatie tussen publieke, private en maatschappelijke deelnemers op regionale schaal. Onenigheden worden nauwelijks besproken.	Er is geen sprake van open dialogen en open communicatie tussen publieke, private en maatschappelijke partijen.	**RES A (-):** High fragmentation, but some communication between regional involved stakeholders to discuss heat transition measures. **RES B (-):** Dialogue sessions, but scattered across the region in mutiple project and discussion point limited discussed.
	Vaststelling	Er zijn collectieve proces afspraken gemaakt en besluiten worden enkel met alle publieke, private en maatschappelijke betrokken gedaan. De besluiten zijn eenduidig, eerlijk, duurzaam en effectief. De besluiten worden ook herzien mocht dat nodig zijn. Er wordt een gezamenlijke strategie ontwikkeld voor de regionale warmtetransitie.	Er zijn collectieve proces afspraken gemaakt met publieke, private en maatschappelijke partijen. De besluiten zijn in grote mate eenduidig, eerlijk, duurzaam en effectief. De besluiten worden continu geëvalueerd. Er is een gezamenlijke strategie ontwikkeld.	Er zijn collectieve proces afspraken gemaakt met alleen de publieke, private of maatschappelijke partijen. De besluiten zijn gedeeltelijk eenduidig, eerlijk, duurzaam en effectief. Besluiten worden in mindere mate geëvalueerd. Er is wel een gezamenlijke strategie met publiek, private en maatschappelijke partijen, deze is eenduidig op het gebied van de warmtetransite.	Er zijn beperkte collectieve process afpsraken gemaakt op het gebied van warmtetransitie. De afspraken tussen de partijen zijn dus niet eenduidig, duurzaam of effectief. Daarnaast zijn er enkele gezamenlijke afspraken op het gebied van de warmtetransitie vastgesteld door de individuele partijen, maar de meerderheid van de besluiten wordt genomen door individuele partijen en/ of lokale zienswijze.	Er zijn geen gezamenlijke eenduidig collectief besluit genomen op het gebied van de warmtetransitie en dus geen regionale strategie. De publieke, private partijen en maatschappelijke partijen doen dit allemaal apart.	**RES A (-):** The eight city Councils determine the regional vision and adjust them to individual needs without regional consensus. **RES B (-):** Regional collaborative governance structures are preceived as political, due to the formal decion-making by the eight city councils (1). Second, the main discussion points are forwarded to the RES 2.0 (2)
	Wederzijds vertrouwen	Publieke, private en maatschappelijke partijen tonen aan dat ze betrouwbaar zijn en afspraken nakomen. Mensen zijn bereid om problemen onderling te bespreken.	Vertrouwen is aanwezig tussen publieke, private en maatschappelijke partijen, afspraken worden grotendeels nagekomen. Frustraties worden gedeeltelijk besproken.	Publieke, private en/of maatschappelijke partijen hebben geen grote vertrouwensband, maar komen wel afspraken na als deze zijn afgesproken. Partijen delen in mindere mate hun frustratie.	Publieke, private en/of maatschappelijke partijen zijn verdeeld en is in mindere mate sprake van onderling vertrouwen. Afspraken worden nauwelijks nagekomen en partijen delen frustratie nauwelijks	Publieke, private en maatschappelijke organisaties komen over als niet betrouwbaar en komen afspraken niet of nauwelijks na.	**RES A (-):** Strong network connectedness, but lack of transparancy. Chery-picking of regional approaches and no fulfillment of regional agreements between local governmental authorities. **RES B (-):** Limited level of trust among stakeholders. A lot of dissatisfaction and regional actors, predominatly local govermental authorities, do not comply with the regional agreeements
	Wederzijds begrip	Publieke, private en maatschappelijke partijen snappen elkaars standpunten en respecteren elkaars belangen volledig	Publieke, private en maatschappelijke partijen begrijpen elkaars standpunten en respecteren die ook in grote mate	Publieke, private en/of maatschappelijke partijen snappen elkaar standpunten, maar respecteren die minder	Publieke, private en/of maatschappelijke partijen snappen elkaars argumenten nauwelijks en respecteren deze mening niet	Publieke, private en maatschappelijke partijen respecteren elkaar zienswijze niet en staan lijnrecht tegenover elkaar	**RES A (+):** All regional parties acknowledge that the heat transtion is no "easy" problem to implement and understand each others viewpoints **RES B (+):** Mutual understanding among regional actors that the heat transition should be a toppic of discussion and all parties have difficulties to comply with this.

	Interne legitimiteit	De regionale warmtetransitie doelstellingen corresponderen met de waardes van de individuele participanten. Publieke, private en maatschappelijke partijen zien dit als nuttig en belangrijk voor hun eigen stand voor hun eigen organisatie	De regionale warmtetransitie doelstellingen corresponderen grotendeels met de individuele organisaties, maar zijn op de hoofdlijn hetzelfde. De publieke, private en maatschappelijke partijen zien de samenwerking als nuttig en belangrijk voor hun eigen bedrijven.	De regionale warmtetransitie doelstellingen corresponderen min of meer met de waardes van de individuele participanten (publiek, privaat en maatschappelijke organisaties). Regionale samenwerking wordt gezien als ondergeschikt belang.	De regionale warmtetransitie doelstellingen corresponderen grotendeels met de individuele organisaties, maar verschillen zijn onderling zichtbaar tussen organisaties. Regionale samenwerking is gezien als niet heel nuttig of belangrijk voor de eigen organisatie.	De regionale warmtetransitie doelstellingen corresponderen totaal niet met de waardes van de individuele participanten. De regionale samenwerking wordt als niet belangrijk en nutteloos ervaren.	**RES A (-) :** Regional heat transition targets correspond, because rather vague target. However, no allignment between local actors. **RES B (-):** Large variety of individual goals, but the regional vision is basic so all correspond. Regional affairs are subsidiary to sectoral and local agreements
Gedeelde motivatie	**Gezamenlijke inzet**	Publieke, private en maatschappelijke partijen zijn gemotiveerd om gezamenlijk beleid uit te voeren en dragen daar ook allemaal verantwoordelijkheid voor	Publieke, private en maatschappelijke partijen trekken gezamenlijk op in de warmtetransitie, maar voelen een beperkte mate gezamenlijke verantwoordelijkheid	Publieke, private en maatschappelijke partijen zijn gemotiveerd om gezamenlijk beleid uit te voeren, maar disbalans bij gezamenlijke verantwoordelijkheid	Publieke, private en/of maatschappelijke partijen beperkt gemotiveerd om gezamenlijk beleid uit te voeren en voelen geen gezamenlijke verantwoordelijkheid	Publieke, private en maatschappelijke partijen zijn niet gemotiveerd om gezamenlijk beleid te voeren en uit te dragen. Ze dragen daar dan zeker geen gezamenlijke verantwoordelijkheid voor.	**RES A (-):** No shared responsibility and commitment observed between and within state and non-state stakeholder groups. **RES B (-):** Political vehicle, therefore non-state actors do not feel responsible or committed. Inter-municipal collaboration only when it is realized as effective, nevertheless in the current situation the local govermental authorities do not perceive this.
	Procedures en institutionele afspraken	Er zijn hoogwaardige (formele en informele) protocollen en regels aanwezig over organisatiestructuren, die bijdragen aan een geslaagde samenwerking op het gebied van regionale aanpak van de warmtetransitie.	Er bestaan in grotendeels informele afspraken en protocollen over de organisatiestructuren. Deze zijn eenduidig, echter niet alle partijen zijn onderdeel van deze structuur	Er bestaan vooral informele regels en nauwelijks formele protocollen voor de regionale samenwerking organisatie op het gebied van warmtetransitie	Er zijn uitsluitend lichte informele afspraken en protocollen zijn nauwelijk aanwezig. Door de lage kwaliteit van afspraken komt de regionale samenwerking niet goed van de grond.	Er zijn geen protocollen en regels over de organisatiestructuur aanwezig om de warmtetransitie op regionale schaal te begeleiden.	**RES A (-):** Only informal procedures and institutional arrangements **RES B (-):** The procedural and institutional arragements are present till a certain extent, but only with civil servants.
	Leiderschap	Er is iemand aanwezig (ingehuurd of vanuit de organisatie), die regionale project trekt en vertegenwoordigd alle publieke en private. Deze persoon is neutraal en wil gezamenlijk de warmtetransitie implementeren. Deze persoon komt tijdens de beraadslaging en conflicten tussen partijen en zorgt voor de facilitaties van acties.	Er is iemand aanwezig (ingehuurd of vanuit de organisatie), die het regionale project trekt en gezamenlijk de warmtetransitie wil implementeren. De leider moet de publieke en private partijen vertegenwoordigen, maar deze persoon is niet te zien als volledig neutraal. Daarom tijdens de dialogen en conflicten minder kordaat, maar faciliteert wel actie.	Er is iemand aanwezig (ingehuurd of vanuit de organisatie), die het project trekt. De persoon is niet een leider als het aankomt bij conflicten of dialoguen en heeft moeite met het facilteren van acties.	Er is in mindere mate en leider aanwezig om de warmtetransitie te begeleiden. Deze persoon is echter niet gecommitteerd om het geazamenlijk uit te voeren en bemiddeld niet bij conflicten tussen partijen. Acties zijn voornamelijk voor eigen organisatie.	De leiderspositie van de regionale samenwerking op het gebied van de warmtetransitie is afwezig.	**RES A (-):** A civil servant is the informal process director, however not preceived as regional leader by all regional involved actors. **RES B (+/-):** Presence of leadership, but civil servant. This is not identified by regional involved actors as neutral. Business sector aims for a process director from the private sector.
	Kennis	De bestaande kennis wordt gedeeld en veel nieuwe kennis wordt gegenereerd. Dit allemaal in samenspraak met publieke, private en maatschappelijke partijen, deze partijen weten de kennis te vinden en begrijpen.	De bestaande kennis wordt gedeeld en veel nieuwe kennis wordt gegenereerd. De publiek, private en maatschappelijke partijen hebben (nog) moeite met het interpreteren van de kennis, maar er is wel een collectief overzicht waar de kennis te vinden is.	Bestaande kennis wordt beperkt gedeeld en nieuwe soms gegenereerd. Dit wordt in beperkte mate door publieke, private en maatschappelijke partijen samen gedaan. Partijen vinden het lastig om de kennis te begrijpen en overzicht ontbreekt	Nauwelijks wordt bestaande kennis gedeeld of nieuwe kennis gegenereerd. Deze kennis wordt alleen gedeeld met publieke of private partijen. Overzicht en begrip ontbreekt	Geen bestaande kennis gedeeld of nieuwe kennis gegenereerd. Deze informatie wordt niet gedeeld met andere partijen. Er bestaat geen overzicht en begrip van de kennis.	**RES A (+/-):** Fragmentation of knowledge. The knowledge is limited shared and generated between regional actors. Most dominant ahring of knowledge between sustainability civil servants. **RES B (+/-):** For all regional actors sharing and gathering of knowledge is essential, however, region does not act like this. Knowledge is scattered across the region
Capaciteit voor gedeelde acties	**Middelen**	De middelen van publieke, private en maatschappelijke partijen worden gezamenlijk ingezet voor 1 collectief doel: de facilitatie van de warmtetransitie. Er bestaat geen fragmentatie	Er zijn meerdere projecten waar publiek, private en maatschappelijke partijen hun middelen verdelen. Dit is heel beperkt voor individuele projecten en is nauwelijks fragmentatie	De middelen van publieke, private en maatschappelijke partijen worden regelmatig gedeeld, maar zijn hoofdzakelijk wel voor individuele projecten. Er is sprake van beperkte fragmentatie	De middelen van publieke, private en/of maatschappelijke partijen worden nauwelijks gedeeld en zeer beperkt ingezet voor gezamenlijke projecten. Er is sprake van fragmentatie	De middelen van publieke, private en maatschappelijke partijen zijn gescheiden en worden uitsluitend ingezet voor lokale of individuele partijen. Er is in hoge mate sprake van fragmentatie	**RES A (-):** Scarse integration of means. However, municipalities did establish a regional energy organization, but not yet focust on heat transition. **RES B (-):** Equally to knowledge, to merge resources is not part of the current situation. Resources are scarce and mainly used for project at local scale. Implementation organization is requested by business sector, however, not supported in by all regional actors.

Component	Element	++	+	+/-	-	--	Comment
Gezamelijke acties	**Verandering van mindset**	Bewustzijn en het urgentiegevoel ten aanzien van de warmtetransitie zijn verhoogt en partijen ondernemen actie	Bewustzijn en het urgentiegevoel ten aanzien van de warmtetransitie zijn verhoogt, maar gezamenlijke actie is nog steeds laag	Bewustzijn over het klimaatprobleem is verhoogt, maar urgentie ontbreekt. Actie blijft uit	Bewustzijn en urgentiegevoel is gelijk gebleven.	Urgentie gevoel en bewustzijn is verlaagt	**RES A (+/-):** Awareness was raised, but is not observed in the actions or sense of urgency **RES B (+/-):** All stakeholders indicate the added value of regional "forced" collaboration considering the raised awareness, however, the correspondance with their actions stays limited
	Vaststelling politiek beleid	De regionale structuurvisie warmte (in RES 1.0) is formeel vastgesteld door alle partijen zonder amendementen. Dit document is in lijn met het Klimaatakkoord	RES is vastgesteld met een aantal amendementen door alle partijen goedgekeurd. Het is in lijn met het klimaatakkoord	RES is vastgesteld met een aantal amendementen, maar door amendementen onzekerheid over doelstelling klimaatakkoord	RES is vastgesteld, maar niet in lijn met het klimaatakkoord.	RES is (nog) niet vastgesteld	**RES A:** N/A **RES B (+/-):** All regional actors signed the RES policy, however, several local govermental authorities made adjustments
	Samenbrengen van middelen	Structureel worden individuele middelen van publieke en private partijen samengebracht tot een gezamenlijk collectief doel (e.g. energieloketten, subsidies)	Er zijn enkele projecten waar publieke en private middelen samen worden gebracht voor een collectief doel, maar dit gebeurd niet structureel	Er zijn enkele projecten waar publiek en/ of private middelen worden ingezet voor regionaal belang.	Er zijn nauwelijks projecten waar gezamenlijk middelen worden samengebracht door publieke of private partijen. Deze projecten zijn vooral voor individuele organisaties belangrijk	Individuele middelen van publieke en private partijen worden niet of nauwelijks ingezet op de regionale samenwerking op het gebied om warmtetransitie te realiseren	**RES A (+/-):** Regional implementation organization commissioned by municipalities (1). On the other hand high fragementation (2) without overview (3). **RES B (-):** No organization to guide regional available means.
	Aannemen van personeel	Sterke verhoging van het aantal fte's op het gebied van individuele en gezamenlijk regionaal beleid	Kleine verhoging van het aantal fte's op het gebied van individuele en gezamenlijk regionaal beleid	Verhoging van het aantal fte's op het gebied van individuele of gezamenlijk beleid	Het aantal fte's is gelijk gebleven	Het aantal fte's is achteruit gegaan	**RES A:** N/A **RES B:** N/A
	Vergunningen	Er worden veel vergunningen ingediend en verleend op gebied van de warmtetransitie	Er worden vergunningen ingediend en een paar ook al verleend	Er worden vergunningen ingediend en paar wel verleend	Bijna geen vergunningen ingediend, maar deze wel verleend	Niet of nauwelijk vergunningen op het gebied van de warmtetransitie	**RES A:** N/A **RES B:** N/A
	Bouwen	Alle gebouwen zijn klimaatneutraal en gebruiken geen fossiele bronnen meer.	Een meerderheid van de gebouwen zijn klimaatneutraal (<50%). De andere gebouwen volgen door middel van afspraken tussen publieke en private partijen	<25% van de gebouwde omgeving is klimaatneutraal. Er zijn wel veel projecten in de pijplijn.	Er wordt onderzoek gedaan naar nieuwe projecten via publieke en private samenwerkingen, maar de uitvoering is nauwelijks aanwezig	Er worden geen projecten onderzocht en uitgevoerd om de warmtetransitie te implementeren door publieke of private organisaties.	**RES A (-):** Limited gas-free properties, nevertheless research is done and several insulation measures are taken. **RES B (-):** Under 25% and no joint regional efforts.
	Nieuwe managementstructuren	Intern en extern worden managementstructuren aangepast op weg naar een regionaal management. Deze worden geïmplementeerd, verbeterd en zo nodig ook weer aangepast.	Bestaande individuele structuren intern en/ of extern worden veranderd naar collectieve managementstructuren. Nieuwe structuren worden geïmplementeerd, gecheckt en zo nodig weer verbeterd.	Alleen interne structuren worden bij publieke, private en/ of maatschappelijke partijen aangepast.	Bestaande situatie wordt nauwelijk veranderd	Bestaande situatie blijft	**RES A (+/-):** Regional board with theme tables, and implementation organization for sustainability. However, the heat transition is not integrated yet. **RES B (-):** Quadruple helix organisation established, but regarding heat transition not present.
	Monitoren van implementatie	Er zijn gezamenlijke (en mogelijk individuele) monitoring tools, deze zijn onderling op elkaar afgestemd. De beschikbare tool worden ook gezamenlijk besproken	Gezamenlijke en mogelijk individuele monitoring tools aanwezig, deze zijn niet onderling afgestemd. Ze worden wel besproken tijdens vergaderingen	Gezamenlijke en/of individuele monitoring tools bestaan, maar worden niet of nauwelijk gezamenlijk toegepast of besproken	Alleen individuele monitoring tools aanwezig. Deze worden niet of nauwelijks besproken onderling	Geen monitoring tools op het gebied van warmte aanwezig	**RES A (+/-):** Several joint monitoring tools, however mainly individual monitoring tools. **RES B (-):** Only individual or sectoral level (1) and not uptodate (2)
	Handhaving	Er zijn uniform vastgestelde regels en daar wordt ook op gehandhaafd als dat nodig is	Er zijn uniforme vastgestelde regels, maar die worden nauwelijks gehandhaafd	Er zijn wel uniforme regels, maar daar wordt niet op gehandhaafd	Weinig tot geen uniforme regels en geen handhaving	Er zijn geen uniforme regels omtrent de warmtetransitie en daarom kan er ook niet gehandhaafd worden	**RES A (-):** Legal framework is absent (1) and scarcity of human capacity (2), and region A insist on informal collaborative action and seducement of property owners (3). **RES B (-):** No legal framework (1) and to limited human capacity (2) to enforce compliance.