



Navigating Conflicting Priorities: Analysing the Institutional Capacities of Dutch Municipalities and the Gas-Free Environment Agenda

A case study on Proeftuinen Aardgasvrije Wijken

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16-6-2023

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Abstract

This research paper examines the institutional capacities of Dutch municipalities in relation to national goals regarding gas-free environments and the implementation of heat networks. Given the rapid progress of the heating transition and the crucial role of municipalities as regulators in this process, it is essential to gain a clear understanding of their institutional capacities. Drawing on theories of government layers and available capacities in sustainable transitions, this study focuses on three specific institutional capacities: policies and regulations, financial resources, and technical expertise. Through an analysis of the case study *Proeftuinen Aardgasvrije Wijken (PAW)*, the research shows that improvements are necessary in terms of municipalities' legislative capabilities, as well as the allocation of financial and technical resources in a horizontal and vertical manner.

Research question: How do current institutional capacities of Dutch municipalities align and conflict with national goals regarding gas-free environments since the existence of the Regional Energy Strategies: Case study Proeftuinen Aardgasvrije Wijken?

Keywords: institutional capacities, government layers, gas-free environments, heat networks, Regional Energy Strategies (RES), Proeftuinen Aardgasvrije Wijken (PAW)

Word count: 6562 words

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Chapter 1. Introduction

“The energy transition is an especially impactful challenge and presents a compelling opportunity to pursue integration, as it requires changes to space, landscape, infrastructure and organizations at different levels.”

(Warbroek et al. 2023)

The energy transition has emerged as a pressing global urgency in response to the challenges created by climate change. The imperative to restrict gas emissions and transition towards sustainable energy systems was highlighted by the adoption of the Paris Agreement in 2015 (Dröge, 2016). The agreement, signed in 2015, commits nations to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with the aim of pursuing efforts to limit the temperature increase to 1.5 degrees Celsius. By signing this agreement, the Netherlands reaffirmed its commitment to reducing its greenhouse emissions and transitioning towards a sustainable, low-carbon economy. In reaction to the Paris Agreement, the Netherlands enacted the Dutch Climate Law in 2019 (Rijksoverheid, 2019). This national legislation sets legally binding targets for reducing greenhouse gas emissions and achieving a climate-neutral economy by 2050.

Besides national plans, the Dutch government recognizes the need for local approaches and therefore initiated the development of Regional Energy Strategies (RES). These strategies give the opportunity for regional collaboration and implementation of sustainable energy projects, including heat networks, adjusted to the unique characteristics and resources of each region. The RES acts as a crucial link between national climate goals and local implementation. Implementing heat networks often occurs on a regional or local scale, since transporting heat over extended distances lacks viability due to the rapid decrease in heat level. Replacing the natural gas supply with renewable alternatives is challenging because decision-making and policymaking in this so-called ‘heating transition’ are far from simple, since actors, technology and institutions all interact (Henrich et al., 2021). To facilitate this transition, each municipality is required to develop a *Transitievisie Warmte* (Rutten, 2019) and an implementation plan within their local government plans. The national government expects municipalities to take a leading role in the process of transitioning heating systems. However, it is questionable if all municipalities have enough institutional capacities to act on this role. This responsibility is new for most municipalities and requires them to collect “new knowledge, expertise, and competences” (Henrich et al., 2021, p. 2). Because of this, the Dutch government has initiated a learning program consisting of multiple pilot projects, called *Proeftuinen Aardgasvrije Wijken* (PAW).

Given the recent shift towards gas-free environments, municipalities are facing numerous challenges. On the one hand, implementing heat networks have a significant effect on our building environment. On the other hand, as Spaans and Resink (2019) indicate, there exists a conflict between the capacities available and the goals we aim to achieve. There is currently no well-established precedent to follow, as the transition has only recently started. Therefore, this research focuses on the case study of PAW to explore the underlying obstacles. By doing so, it enables municipalities at the initial stages of similar projects to better prepare for forthcoming challenges and make necessary adjustments or additions to their institutional capacities. In this manner, the research adds in both institutional and spatial context value to the already existing academic literature.

I have observed a disparity between the objectives our country aspires to accomplish and the practical capabilities of our local municipalities in the heating transition. Consequently, my aim with

this research is to shed light on the precise nature of this conflict and provide a clearer understanding of the current situation. To do so, this research examines the following main research question:

How do current institutional capacities of Dutch municipalities align and conflict with national goals regarding gas-free environments since the existence of the Regional Energy Strategies: Case study Proeftuinen Aardgasvrije Wijken?

To facilitate the study of the main research question, the following sub-questions will be examined:

- *What are the specific institutional capacities of Dutch municipalities that are relevant for the progress towards gas-free environments?*
- *How can the theoretical framework be integrated into a research study to investigate the PAW monitor?*
- *What are the main challenges faced by Dutch municipalities in their efforts to create gas-free environments in the Proeftuinen Aardgasvrije Wijken case study?*
- *How does the case study of Proeftuinen Aardgasvrije Wijken highlight the conflicts between institutional capacities of Dutch municipalities and national goals?*

The structure of this research is as follows: Chapter 2 focuses on the theoretical framework, reviewing relevant literature and theoretical concepts related to the research topic. It explores key concepts, existing studies and presents the conceptual model. Chapter 3 presents the methodology; the research approach is explained, followed by a description of how the literature review is executed and the analysis. Chapter 4 analyses the findings and interprets the results of the case study PAW in relation to the research questions. Chapter 5 delves into the discussion of the findings, contextualizing them with the literature and theory discussed before. It critically analyses the results and examines any limitations. Chapter 6 concludes by summarizing the key findings and discussing any recommendations for future research. Lastly, a personal reflection on the process will be presented.

Chapter 2. Theory

My research focuses on the institutional design of the Netherlands; therefore, it is coherent to start by studying the five paradigms of institutional planning by Salet (2018). Salet has selected five institutional approaches that he deems the most promising for planning studies: historic institutionalism, institutional-actor approaches, regime analyses, critical political economy, and cultural institutions. The five orientations define the concept of institutions, illustrate differences in institutional change and describe the divergence between formal and culturally supported social behaviour (Salet, 2018). The *Path-Dependence Analysis* as part of *Historic Institutionalism* considers other aspects being established 'prior to current action' as influential for the ongoing process of action (Salet, 2018, p. 96). Even though the five schools of institutional planning define the interdisciplinary field of urban studies properly, my research dives deeper into the institutional capacities. Therefore, this chapter will confer a thorough examination of the distinctions among layer, level, and scale, along with a definition of the Regional Energy Strategies (RES) programme and an introduction to the case study: experiment Proeftuinen Aardgasvrije Wijken (PAW). Furthermore, the chapter contains two theories to describe institutional capacities: transition management for sustainable development and transformative climate governance.

2.1 Government layers and government scales

In literature, the terms 'governmental level' and 'governmental scale' are being used alongside and sometimes interchangeably. However, I consider a crucial difference between the two terms which must therefore be defined before my research. *Government layers* refer to the hierarchical structure of a government system. In the context of this research, 'layers' can be understood as different levels of government that exist within a government system. In the Netherlands, for instance, three governance levels have been established: national government, provincial governments, and municipal governments (overheid.nl, n.d.). Each layer has its own set of responsibilities and functions, and generally they are mutually dependent. The concept of government layers describes the distribution of authority, decision-making processes, and coordination mechanisms within a governance system.

On the other hand, *government scales* can be considered, which can be divided into two different types. Firstly, the scales refer to the size of scope of a government's jurisdiction or operations. It relates to the geographical, demographic, or functional extent of the government's reach. Government scales can range from small-scale local governments, which primarily serve a specific community, to large-scale national governments, which have jurisdiction over the entire country (Loughlin & Hendriks, 2019). Additionally, government scales can refer to the scope of governmental function and policy areas, such as education, healthcare, or defence. Analysing government scales helps in understanding the capacity and resources which are required to effectively govern an area or address specific policy challenges like the energy transition.

In summary, while *government layers* focus on the vertical distribution of power and authority, and interrelationships between different levels of government, *government scales* refer to the size, jurisdiction, and functional scope of a government's operations. It is worth noting that the terms may overlap to some extent, as the size of a government often influences its hierarchical structure. However, it is important to recognize the nuanced distinctions between these terms.

2.2 Government levels and the Regional Energy Strategy (RES)

The Netherlands consists of multiple government levels, each represented by a government body. On a local scale the country exists of 342 municipalities divided over 12 provinces. In 2019, the Regional Energy Strategy (RES) program was set up by a collaboration of the Dutch national government and the subnational governments: municipalities, provinces, and water authorities. The RES is an addition to the existing government levels, not a direct replacement. The program is a component of the Dutch Climate Agreement aiming to decentralise the energy transition and create a renewable system (Van Dijk et al., 2022). All governance bodies (national, provincial, municipal) cooperate within the regions which have been established, intending to stimulate regional energy transition.

There are multiple reasons for the implementation the regional strategies. Firstly, the actors within the region possess local knowledge as highlighted by Zuidema (2016). This knowledge does not only contain geographic, demographic, and economic circumstances but also the unique problems, priorities, and stakeholder interests at each local level. Moreover, these actors maintain an awareness of national goals, enabling them to bridge the gap between local communities and the national level. Secondly, because of the supra-municipal nature of the heat sources, it is more fitting to also have a governmental layer representing the scale of the heat source. Image 1 shows how the 30 RES regions are allocated. According to Matthijsen et al. (2021) the regions have been established based on a natural heat source and its surrounded area. However, in some cases the regions follow the same border as a government layer such as the similarity between the region of Groningen and the province of Groningen. This is noteworthy since that raises the question what the difference between the two is. Furthermore, apart from the analysis mentioned above, it is worth noting that the more peripheral regions of the nation, characterized by lower population density, exhibit a higher propensity to align with provincial boundaries. This stands in contrast to the densely populated regions surrounding the Randstad metropolitan area. For instance, the provinces of Zuid-Holland which is being detached into 7 stand-alone regions. It is important to acknowledge that further research is required to comprehensively understand this phenomenon.

Image 1 - Regional Energy Strategies in The Netherlands



Source: Matthijsen et al., 2021

2.3 Introduction to Proeftuinen Aardgasvrije Wijken (PAW)

In 2018, the experiment called Proeftuinen Aardgasvrije Wijken (PAW) has been introduced by the Dutch national government. Each year multiple neighbourhoods get the opportunity to enrol in the program and start the process of becoming natural gas free. This opportunity is offered by the national government to reach the goal of having all homes natural gas free by 2050 (Rijksoverheid, 2019). The initiative aims at exploring and developing methods to make Dutch neighbourhoods free from natural gas. The objective is to learn from these pilot projects and apply the knowledge gained to facilitate the nationwide energy transition. So far, a total of three rounds (in 2018, 2020, and 2022) have been conducted, result into 66 neighbourhoods. The pilot projects have been established throughout the Netherlands, testing various technologies and approaches. The projects serve as practical examples to gain experience and determine the most effective strategies to facilitate the nationwide energy transition.

2.4 Transition management and Transformative climate governance

There are multiple ways to describe the type of governance which is being used to tackle the challenge of climate change. Partly because the awareness about the importance of specific climate governance has been expanding in recent years. I will describe two types of definition of the concept: transition *management for sustainable development* and *transformative climate governance*. Even though both theories capture the same phenomena, both have set up a different type of framework.

2.4.1 Transition management for sustainable development

Loorbach (2009) has translated the challenge of climate change into a practical framework to be able to steer transition management for sustainable development. The framework is structured and defined based on aspects of complex societal transitions. Table 1 shows the three types of governance activities which are considered relevant for societal transitions: strategic, tactical, and operational (Loorbach 2004, Loorbach 2007). The framework identifies various forms of management and explains the methods and timing for their implementation. The emphasis of the model lies in a governmental paradigm shift, since sustainability ought to be approached differently from other types of transitions. According to Loorbach (2007), the current governance system is not sufficient to assist the progress of sustainable development because “in existing policy and governance frameworks traditional instruments are used” (Loorbach, 2007, p.24).

Table 1 - Transition Management Types and their focus

	Focus	Goals	Problem Scope	Time Scale	Capabilities
Strategic	Culture	Integration Giving direction Reframing	Abstract / societal system	Long term (30 years)	System thinking Creativity, guts, innovative ideas Communication and network skills, integrative capabilities
Tactical	Structures	Translating Agenda-building Networking	Institutions / regime	Mid-term (5-15 years)	Creativity, independence Thinking in terms of co-production, negotiation skills Communication and consensus building
Operational	Practices	Innovation Development	Concrete / project	Short term (0-5 years)	Learning and communication Project management

Source: Loorbach (2004) and Loorbach (2007)

2.4.2 Transformative climate governance

In present-day governance, climate change mitigation and adaptation has been reconsidered from short-term risk reductions towards long-term and sustainable transformations (Hölscher et al., 2019). Since climate change is part of “ongoing, complex and radical change processes” (Hölscher et al., 2019, p. 1), the process is defined as a transformation. Although various methods for transition governance recognize the necessity of organizing multi-actor procedures across different government levels, they do not present a complete viewpoint on the required conditions and activities to create a networked governance landscape such as the RES arrangement. However, Hölscher et al. (2019) define a framework of capacities specifically for transformative climate governance. They define transformative climate governance as: “the process of interaction and decision-making by which multiple actors seek to address climate mitigation and adaptation while purposefully steering societies towards low-carbon, resilient and sustainable objectives.” (Hölscher et al., 2019, p.792). The model distinguishes four types of capacities to address transformation dynamics: stewarding capacity, unlocking capacity, transformative capacity, and orchestrating capacity. The implementation of heat networks is a substantial aspect within climate adaptations. Besides, creating gas-free environments is a transformative process in itself. Compared to the framework by Loorbach (2007), Hölscher et al. (2019) give a more practical approach to understanding how to tackle the climate challenge.

Table 2 - Transformative climate governance capacities

	<i>Transformative climate governance capacity</i>	<i>Transformation dynamics addressed</i>
<i>Stewarding capacity</i>	Anticipating and responding to disturbances	Emergent instabilities, uncertainty, and surprise
<i>Unlocking capacity</i>	Recognising and dismantling unsustainable path dependencies	Path dependencies and erosion of unsustainable regimes
<i>Transformative capacity</i>	Creating and embedding novelties	Build-up of new and sustainable alternatives
<i>Orchestrating capacity</i>	Coordinating multi-actor processes	Multi-actor processes across scales, sector, and time; synergies and trade-offs; contestation and goal conflicts

Source: Hölscher et al., 2019

2.4.3 Orchestrating capacity

The capacities framework by Hölscher et al. (2019) identifies four capacities in relation to different types of dynamics (see table 2). Orchestrating capacity refers to the abilities to coordinate conflicts across scales, sectors, and time. The capacity is used to describe “the indirect intermediation activities [...] in aligning, enlisting and supporting state and sub-national actors and their climate actions.” (Hölscher et al., 2019, p. 796, Chan et al., 2015 & Abbott et al., 2015). By examining the orchestrating capacity of Dutch municipalities, an assessment can be made regarding their ability to coordinate and collaborate with other actors involved in the heating transition. This includes interaction processes, sharing knowledge and resources across scales and sectors. Furthermore, improved knowledge and resource sharing will lead to new formal and informal governance structures and networks. Therefore, this capacity is most relevant for my research.

According to Van Dijk et al. (2022) and Hölscher et al. (2019), orchestrating capacity is enabled by three conditions. First of all, the *strategic alignment* of governance actors. The orchestrating capacity establishes clear direction and coherence across governance levels resulting in collective steering in the transition. To create this condition, three key activities are necessary: the development of shared long-term strategies across levels and departments, the enlistment and engagement of diverse actor groups, and the integration of these strategies into processes.

The second essential condition for achieving transformative change is *mediation across scales and levels*, which enables knowledge sharing and interactions between different levels of governance. To create this condition, several activities are required, including the establishment and facilitation of networks and communication channels, integration of resources and creation of connection nodes. Examples of mediation could be processing coordinators or monthly stakeholder meetings.

A critical reflection worth mentioning is that both Van Dijk et al. (2022) and Hölscher et al. (2019) use the combination of the terms ‘scales’ and ‘levels’ to describe the second condition. Section 2.1 describes the differences between government levels and government scales. Whereas government levels pertain to the hierarchical structure of a government system and involve different levels of government within a system (national, provincial, and municipal governments), do government scales refer to the size, jurisdiction, and functional scope of a government’s operations (small-scale to large scale). In the context of mediation, the focus is primarily on mediating between different

levels of government rather than government scales, as it involves facilitating communication and decision-making among various government layers. The concept of government layers emphasises the need for effective coordination and communication among different levels of government, whereas government scales are not clearly defined within government bodies. Nevertheless, since studies (Van Dijk et al., 2022 & Hölscher et al., 2019) use the condition of *mediation across scales and levels*, this research will continue to use this condition.

The third condition is *creation of opportunity contexts*, which involves forming institutional conditions that support the implementation of strategies and enhance the ability of actors at different levels to steer towards a sustainable environment. Activities could include long-term thinking, providing institutional designs like regulations or financial encouragement, or creating action mandates and prioritizing action and fields (Van Dijk et al., 2022).

2.5 Institutional Capacities

Based on the previous discussed theories, I have distinguished three important institutional capacities of municipalities: policy and regulations, financial resources, and technical expertise. I will now briefly discuss the three capacities after which Chapter 4 discusses the importance in relation to the transition to gas-free environments in the case study of the PAW experiment.

First of all, organization, policy, and regulations. Municipalities need the capacity to develop and implement energy related policies and plans that promote sustainable energy. Besides, they also need institutional capacity to enable to integrate renewable energy in heat networks. On one hand, this involved the allocation of human resources and expertise to draft policies, streamline the permitting processes, and effectively translate energy goals into practical action. On the other hand, it requires the municipality to possess the legal authority to enforce these policies. It may be prudent to establish legislation or legally obligate individuals, companies, and other entities to specific duties or targets. Nevertheless, in the context of the Netherlands, municipal implementation of legislation is not always feasible.

Secondly, adequate financial resources are essential for municipalities to invest in renewable energy infrastructure such as a heat network and energy-efficient technologies. This capacity may include the development of funding mechanisms, accessing grants, and stimulating connections with public-private partnerships.

Furthermore, it is important to have building internal technical expertise within municipalities for effectively implementing gas-free environments. This includes having enough staff with knowledge of renewable energy technologies and the establishment of energy departments, as well as implementing training programs to equip staff with the necessary skills. By building routines and incorporating automatic processes into the mix, municipalities can streamline operations, increase efficiency, and ensure a seamless transition to gas-free environments.

2.6 Research Framework

The research framework is represented by a conceptual model (figure 1) that examines the interplay between transformative climate governance theory, institutional capacities of Dutch municipalities, and national goals concerning heat networks. The model shows that three key capacities are considered: policy and regulations, financial resources, and technical expertise. The more and stronger these capacities are within municipalities, the greater the likelihood of achieving the agreed-upon goals. In addition, the model recognizes the significance of the RES in attaining the national objectives. The RES is developed to contribute to effectively achieve the goals and therefore influences the relation between the capacities and the national goals.

Figure 1 - Conceptual model



Chapter 3. Methodology

This chapter presents the methodology employed in the qualitative research study, focusing on the institutional capacities of a municipality regarding the implementation of a heat network. The chapter includes a research approach, a description of the case study and literature review, and a research analysis.

3.1 Research approach

In this research, a qualitative research approach was chosen to address the research question: *How do current institutional capacities of Dutch municipalities align and conflict with national goals regarding gas-free environments since the existence of the Regional Energy Strategies?* The case study focuses on the Proeftuinen Aardgasvrije Wijken (PAW) program, with the aim of examining its impact as reflected in the *Voortgangsrapportage monitor PAW 2021* (Ministry of Internal Affairs, 2022). The research aims to identify and understand the specific capacities, both existing and lacking, of the municipality in effectively implementing heat networks. This will be achieved through a comprehensive examination of multiple sources, including the progress report of the PAW experiment. Furthermore, as direct interviews with representatives or employees of RES regions were not feasible, various sources sharing experiences and insights about the capabilities of RES regions and municipalities have been analysed.

3.2 Case selection and literature review

The methodology of this research involves conducting a case study utilizing the monitoring report of the PAW experiment. The case study was chosen as it provides a suitable and extensive source of information on the institutional capacities of the pilot municipalities. The evaluation presented in the monitoring report primarily focuses on the process aspects rather than the technical elements related to heat networks. This approach allows for a deeper understanding of the organizational structures, policy development capabilities, and financial and technical resources.

Furthermore, a literature review was conducted to establish a theoretical foundation for the analysis. The academic literature was explored to gain insights into the context of heat network implementation, the different government levels, and institutional capacities. By combining the literature review with the analysis of the monitoring report, this research aims to provide an understanding of the institutional capabilities of municipalities regarding heat network implementation.

3.3 Research analysis

The quality of the data obtained from the monitoring report can be evaluated on reliability, validity, and transparency. The report's inclusion of multiple experts involved in the PAW experiment, along with the cooperation of employees involved in the pilot projects, indicates a high level of reliability. In terms of validity, while the report covers various aspects of heat network implementation, it is important to acknowledge that it may not encompass the complete range of stakeholder perspectives. For instance, the report lacks direct input from inhabitants of the pilot neighbourhoods, which could impact the overall validity of the findings. Nevertheless, the report's transparency is considered high, providing in-depth insights into diverse themes, including costs considerations and municipal organizational structures.

Chapter 4. Results

The progress report of the PAW program (Ministry of Internal Affairs, 2022) demonstrates valuable insights from the pilot projects conducted in the 1st and 2nd rounds. The report serves multiple purposes, including monitoring the program's progress, identifying policy obstacles, and ensuring accountability for the PAW's interim results.

For this study, a focused approach was adopted by reading the PAW report and utilizing important keywords that had been identified beforehand (see appendix I). Besides, it was found that the structure of the report was helpful, particularly in sections such as 3.1 (regie en organisatie), 3.4 (technische oplossingen), 3.5 (kosten en financiering), and 3.6 (wetgeving en juridica), as they aligned with the institutional capacities considered in my study. This chapter will provide the research findings of the study. The structure of the chapter will adhere to the three institutional capacities identified in Chapter 2. Additionally, the concept of orchestrating capacity from the concept of transformative climate governance, will be integrated across these capacities, focusing on the municipalities' abilities to coordinate conflicts, establish networks, and facilitate interactions across different levels and sectors.

4.1 Organization, Policy, and Regulations

The way of collaboration between stakeholders of a heat network is complex and time-consuming, nevertheless essential to have well-organized in advance. Various governance models can be employed, such as a heat company, a combination of public and private ownership, or concession granting to energy cooperatives or private initiatives. The most suitable form is determined based on factors such as the type of heat source, existing buildings and infrastructure, and local partnerships. As the report states:

"Municipalities invest a significant amount of time (and thus capacity) in thoroughly exploring the advantages and disadvantages of various governance models and in shaping the collaboration."

(Translated from Ministry of Internal Affairs, 2022)

Significant progress has been made by municipalities in developing policies and regulations related to creating gas-free neighbourhoods, as indicated by the report's findings. Many municipalities have established clear goals and targets, such as Transitievisie Warmte, for the deployment of heat networks, integrating them into their local energy plans. Matthijsen et al. (2021) also highlight in the RES 1.0 monitor that Regional Energy Strategies possess valuable frameworks and contextual knowledge to support municipalities in policy formulation. However, when it comes to implementing these goals and targets, uncertainty arises, leading to delays in decision-making processes and implementation. Municipalities encounter obstacles in guaranteeing that the existing regulatory environment enables the expansion of heat networks. Challenges such as grid access, pricing mechanisms, licensing, and permitting processes contribute to the complexity and time-consuming nature of these processes. To address these challenges, the report suggests simplifying procedures and enhancing coordination among departments, which would help municipalities implement projects efficiently. This is particularly important for smaller municipalities facing difficulties in maintaining a sufficient labour force (Maas, 2020).

Additionally, municipalities are requesting additional legal capacities for the establishment of heating networks, arguing that the current legislation hinders the successful implementation of new energy

projects. Currently, municipalities can only rely on voluntary contributions from residents and cannot impose any obligations on them. Granting municipalities greater legal authority would reduce complexity and stimulate the heating transition. For instance, municipalities assert the need for the power of designation (or closing authority) as part of their 'directing role' (*regierol*) (Rijksoverheid, 2019, p. 218). This would allow municipalities to mandate a neighbourhood's transition away from gas if necessary. However, if a project is at risk of not proceeding due to resistance from a few residents, the legislation can enable the municipality to continue the project. After the publication of this report in 2022, the law 'Wet gemeentelijke instrumenten warmtetransitie' (wgiw) has been implemented, granting municipalities the authority to designate neighbourhoods to switch from natural gas to a sustainable alternative. However, according to Adviescollege Toetsing Regeldruk (2022), the new legislation focuses on the idea that a neighbourhood-oriented approach yields economies of scale, while a recent evaluation of pilot projects conducted by Economisch Instituut voor de Bouw (2021) reveals minimal economies of scale. The report suggests that socio-economic studies must be conducted to research the efficiency of the collective neighbourhood approach. In case of doubts, more focus should be drawn on individual gas reduction.

Regarding the orchestrating capacity in the model of transformative climate governance capacities (Hölscher et al., 2019), coordination and collaboration among stakeholders appear to be key elements in the context of heat networks. Municipalities with strong orchestrating capacities invest significant time and resources in exploring diverse governance models, engaging with various stakeholders, and creating collaborations. By effectively employing orchestrating capacity, municipalities can align the interests of different actors, establish long-term strategies, and integrate them into existing processes. However, according to the progress report (Ministry of Internal Affairs, 2022), it seems that despite the desired outcomes, municipalities still lack institutional capacities to fully realize these objectives.

4.2 Financial Resources

The report (Ministry of Internal Affairs, 2022) highlights that while some municipalities have demonstrated strong institutional capacities in securing and allocating financial resources, others have faced challenges in this area. Orchestrating capacity (Hölscher et al., 2019) plays a role in supporting municipalities with limited financial resources. By collaborating with larger municipalities and sharing funding models, expertise, and resources, smaller municipalities can overcome financial barriers and implement gas-free areas more efficiently. Municipalities with larger budgets have generally been more successful in accessing funding. This may come from national and regional grants, European Union funds, and public-private partnerships. They have been able to leverage their financial capacities to implement plan for gas-free neighbourhoods throughout their municipality. Conversely, municipalities with limited financial resources, often smaller municipalities, have encountered difficulties in financing the necessary infrastructure improvements and implementing heat transition projects. These municipalities often struggle to attract external funding or generate enough revenue to support the transition. Orchestrating capacity could enable municipalities to advocate for additional state funding to subsidize the unprofitable portion of projects, along with guidance on strategies to transform non-profitable initiatives into viable projects. Additionally, municipalities demand increased funding from the national government to cover process costs. The new directing role of municipalities necessitates adequate resources, such as funding, to attract and retain employees.

Besides support from larger municipalities, suitable financial arrangements could support municipalities with limited financial resources. On one hand, municipalities call for de-risking

arrangements (*ontzorgingsconstructies*) for owners and residents, as well as the establishment of a guarantee fund to support energy cooperatives. Both aim to reduce financial risks and challenges associated with energy transition projects. On the other hand, programs such as ISDE and SDE++ do not fully align with the neighbourhood-based approach, leading to issues such as inadequate categorization for specific solutions and subsidy amounts.

4.3 Technical Expertise

The report recognizes the need for technical expertise within municipalities to successfully implement heat networks. To be able to look at the concept of technical expertise, it is important to be aware of the two components it consists of: technical knowledge and technical manpower. These two elements are interconnected, as one cannot be fully utilized without the other. So, on the one hand, attention is given to the extent to which technical knowledge is present in municipalities. The report identifies that some municipalities have strengthened their technical capacity through, for example, knowledge exchange with other pilot projects, training programs, and collaborations with research institutions and industry experts. However, there is still room for improvement for a lot of municipalities since they still experience a lack of technical knowledge. Of particular note is that municipalities emphasise the significance of early engagement with market parties (and thus their technical expertise). By involving the private sector such as network operators and heat suppliers early in the process, expectations can be aligned and the (physical feasibility) can be tested. The importance of early engagement with market parties to align expectations and leverage their technical expertise is in line with the concept of orchestrating capacity (Hölscher et al., 2019).

On the other hand, concerns regarding the capacity of the labour market have emerged in numerous municipalities (Ministry of Internal Affairs, 2022). This encompasses the entire process, ranging from initiating procurements to overseeing the actual construction of projects. According to a report on 'climate jobs' by UWV (2022), there is an alarming shortage of technical personnel, such as installers and contractors. Additionally, heat companies are dealing with capacity challenges. Consequently, municipalities have highlighted the limited options available in the market due to capacity issues and are pressing the national government to address these concerns. The government, having more capacities, has the ability to implement large-scale training programs and establish learning-work arrangements to attract and educate a larger number of technical professionals (UWV, 2022). Urging the national government to meet the demand for skilled labour, is adhering to the third condition of orchestrating capacities (creating opportunity contexts). According to Van Dijk et al. (2022) prioritizing actions and certain fields are part of the orchestrating capacity.

Chapter 5. Discussion

This chapter provides a concise summary of the key takeaways and potential areas for improvement based on the study's findings. Additionally, it offers a critical reflection on the study and the collected data.

The study highlights challenges faced by municipalities in translating gas-free goals into action due to regulatory uncertainties. Simplifying procedures, improving coordination, and granting more legal authority to municipalities are potential solutions. However, as mentioned in Chapter 4, the necessary capacities to act upon are lacking within municipalities. Collaboration and knowledge exchange between different municipalities, differing from big to small, can alleviate barriers. That will reduce the need for a lot of capacities in one municipality and therefore, will ensure that with fewer capacities, more can be achieved.

While the report provides a valuable view of the progress achieved in the PAW experiment within the specified time frame, it is important to acknowledge certain limitations of the data. The findings of the report may not fully capture the long-term outcomes or reflect recent developments. Looking at the PAW report itself, it is worth noting that the report emphasises the role of the PAW program in supporting municipalities, rather than exploring the initiatives taken by municipalities or RES regions themselves. This narrow focus may limit a comprehensive understanding of the overall capacities of municipalities.

Another limitation is the absence of an analysis of the Regional Energy Strategies and their potential influence on the implementation of heat networks. Although the PAW experiment began after the establishment of the RES regions and the formulation of their strategies, it would have been valuable to include a discussion on the significant role played by the RES. By exploring the collaborations between municipalities and their RES regions, a better understanding of the overall context and the differences in capacities could have been achieved.

Chapter 6. Conclusion

This study has investigated the research question: *How do current institutional capacities of Dutch municipalities align and conflict with national goals regarding gas-free environments since the existence of the Regional Energy Strategies?* By addressing the institutional capacities required for a successful transition towards gas-free neighbourhoods, the findings shed light on the challenges faced by municipalities. The theoretical framework underlying the analysis of the Voortgangsrapportage PAW monitor 2021 first discussed concepts related to governance types and how governance could be managed within the heating transition. Governance theory emphasises the importance of collaborative decision-making processes throughout the entire process. Even though, the study reveals that municipalities have made notable progress by establishing clear goals and targets for the creation of gas-free neighbourhoods, several challenges remain, including the translation of these goals into actionable strategies and ensuring alignment with national and regional policies. This is both because of uncertainty between government levels and because of a lack of human resources.

Furthermore, the research findings reveal disparities among municipalities in financial capacities, with larger municipalities having an advantage due to their greater budgets and ability to attract external funding. Smaller municipalities on the other hand, face bigger challenges in financing the implementation of heat networks and all related costs. Collaboration between municipalities or shared funding models are suggested as potential solutions to support municipalities with less financial resources. Additionally, the findings emphasise the need for technical expertise within municipalities, both in terms of technical knowledge and technical manpower. Strengthening technical capacities through knowledge exchange and collaboration with experts can enhance the successful implementation of heat networks.

Overall, this study shows that while municipalities have made considerable efforts to enhance their institutional capacities for the heating transition, challenges and unclarity still exist. The theoretical perspectives of governance theory within a sustainable transition such as the orchestrating capacity (Hölscher et al., 2019) have provided valuable insights into the complexities and interdependencies involved in implementing heat networks. By addressing the gaps between stakeholders and building upon the existing capacities, municipalities can facilitate a more effective transition towards gas-free neighbourhoods. Collaborative approaches within and between government layers, knowledge sharing, financial support, and technical capacity building seem to be essential elements for accelerating the heating transition and achieving sustainable environments.

Future research should investigate the utilization of capacities in energy transition projects among large and small municipalities. Although larger municipalities generally have greater capacities, a recent (informal) discussion with a policy advisor suggest that small municipalities may exhibit faster policy and implementation processes. This may be because of their closer collaboration with residents and local communities, allowing for quicker implementation of heat network projects. In contrast, larger municipalities could encounter delays in forming teams, engaging with stakeholders, and developing policies. To gain a deeper understanding, future research can conduct case studies, comparative analyses, and qualitative investigations to identify decision-making processes. These insights into optimizing capacities will add to this study.

Chapter 7. Process reflection

Despite initial difficulties, I am satisfied with the project's progress. Although I would have preferred to conduct interviews, time constraints prevented me. Therefore, I found another way to conduct research, and this case study has provided insights into the heating transition as well. Additionally, the guidance from the University of Groningen and supervisor F. van Kann was highly beneficial. Whenever I required feedback or guidance, I could count on his assistance. Also, the group meetings and support from other students were valuable. Thanks to the opportunity to reflect on Marg Schoenmaker's report, I gained insights into my own thesis. This allowed me to address challenges in navigating overwhelming information and theories and incorporating them effectively into the chapters. While I appreciated delving into government levels and institutional capacities in my bachelor project, I am inclined to shift towards a more practical master thesis project in the future. At times, this topic became difficult to comprehend because, for individuals like me, who have not personally encountered complexities or limitations associated with municipal capacities, it can become vague. Consequently, I am going to focus more on stakeholder engagement in a specific neighbourhood or pursuing an inclusive urban design for an area. Such studies would provide opportunities to address pressing societal challenges and yield short-term results as well.

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Appendix

I – Labels used to analyse Voortgangsrapportage PAW Monitor 2021.

Capacity		
Organization, Policy & Regulations	Financial Resources	Technical Expertise
Organisatie/Organiseren	Financieel/Financiering	Kennis
Bestuur	Begroting	Personeel
Governance	Subsidies	Mankracht
Samenwerking	Kosten	Techniek/technisch
Beleid	Budget	Expertise
Wet(geving)	Prijs	Bouwen
Regel(geving)	Winst	Training
Visie	Regelingen	Leertraject
Doelen	Betaalbaar	Capaciteit
Procedures	Investering/Investeren	
Personeel	Capaciteit	
Capaciteit		

II – List of Neighbourhoods PAW Program

Municipality	Neighbourhood	Year / Round	Phase Plan Elaboration Phase (Planuitwerkingsfase) Execution phase (Uitvoeringsfase)	Expected End Date
Amsterdam	Van Der Pekbuurt	2018 / 1	Execution phase	2030
Appingedam (now Eemsdelta)	Opwierde-Zuid	2018 / 1	Execution phase	2023
Assen	Lariks West	2018 / 1	Plan Elaboration Phase	2026
Brunssum	Brunssum-Noord	2018 / 1	Plan Elaboration Phase	Unknown
Delfzijl (now Eemsdelta)	Zandplatenbuurt Zuid	2018 / 1	Execution phase	2026
Den Haag	Bouwlust/Vrederust	2018 / 1	Execution phase	2026
Drimmelen	Terheijden	2018 / 1	Execution phase	2024
Eindhoven	't Ven-Lievendaal	2018 / 1	Plan Elaboration Phase	2025
Groningen	Paddepoel en Selwerd	2018 / 1	Execution phase	2029
Hengelo	Nijverheid	2018 / 1	Execution phase	Unknown
Katwijk	Smartpolder	2018 / 1	Plan Elaboration Phase	2028
Loppersum (nu Eemsdelta)	Loppersum dorp	2018 / 1	Execution phase	2024
Middelburg	Dauwendaele	2018 / 1	Plan Elaboration Phase	2027
Nijmegen	Dukenburg	2018 / 1	Plan Elaboration Phase	2030
Noordoostpolder	Nagele	2018 / 1	Execution phase	2030
Oldambt	Nieuwolda-Wagenborgen	2018 / 1	Execution phase	2025
Pekela	Boven Pekela and Doorsneebuurt	2018 / 1	Execution phase	2025
Purmerend	Overwhere-Zuid	2018 / 1	Execution phase	2025
Rotterdam	Pendrecht	2018 / 1	Plan Elaboration Phase	2030
Sittard-Geleen	Limbrichterveld-Noord	2018 / 1	Execution phase	Unknown
Sliedrecht	Sliedrecht-Oost	2018 / 1	Execution phase	2025
Tilburg	Quirijnstok	2018 / 1	Execution phase	2023
Tytsjerksteradiel	Garyp	2018 / 1	Execution phase	2028
Utrecht	Overvecht-Noord	2018 / 1	Plan Elaboration Phase	2030
Vlieland	Duinwijck	2018 / 1	Execution phase	2022
Wageningen	Benedenbuurt	2018 / 1	Plan Elaboration Phase	2025
Zoetermeer	Palenstein	2018 / 1	Plan Elaboration Phase	2027/2028
Amsterdam	Wilhelmina Gasthuis	2020 / 2	Plan Elaboration Phase	2028
Apeldoorn	Kerschoten and Kerschoten-West	2020 / 2	Plan Elaboration Phase	2030
Arnhem	Elderveld-Noord	2020 / 2	Plan Elaboration Phase	2028

De Wolden	Schoolkring Ansen	2020 / 2	Plan Elaboration Phase	2028
Deventer	Zandweerd	2020 / 2	Execution phase	2027
Doesburg	De Ooi	2020 / 2	Plan Elaboration Phase	2028
Goeree-Overflakkee	Stad aan 't Haringvliet	2020 / 2	Plan Elaboration Phase	2026
Groningen	De Wijert	2020 / 2	Plan Elaboration Phase	2028
Hilversum	De Hilversumse Meent	2020 / 2	Execution phase	2028
Hoogeveen	Erflanden	2020 / 2	Plan Elaboration Phase	2028
Lingewaard	Zilverkamp	2020 / 2	Plan Elaboration Phase	2026
Nijmegen	Hengstdal	2020 / 2	Plan Elaboration Phase	2030
Opsterland	Wijnjewoude	2020 / 2	Execution phase	2028
Pijnacker-Nootdorp	Klapwijk	2020 / 2	Plan Elaboration Phase	2028
Roermond	Tegelarijeveld	2020 / 2	Plan Elaboration Phase	2028
Rotterdam	Bospolder-Tussendijken	2020 / 2	Execution phase	2026
's-Hertogenbosch	Het Zand	2020 / 2	Plan Elaboration Phase	2028
Venlo	Hagerhof-Oost	2020 / 2	Plan Elaboration Phase	2028
Zwolle	Berkum	2020 / 2	Execution phase	2028
Eemsdelta	Krewerd	2020*	Plan Elaboration Phase	2028
Eemsdelta	Zonnedorpen Loppersum	2020*	Plan Elaboration Phase	2028
Het Hogeland	Zuidwolde	2020*	Plan Elaboration Phase	2028
Midden-Groningen	Steendam-Tjuchem	2020*	Execution phase	2028

*Part of the *Toekomstagenda* (Future agenda) Groningen.

Source: PAW (n.d.)



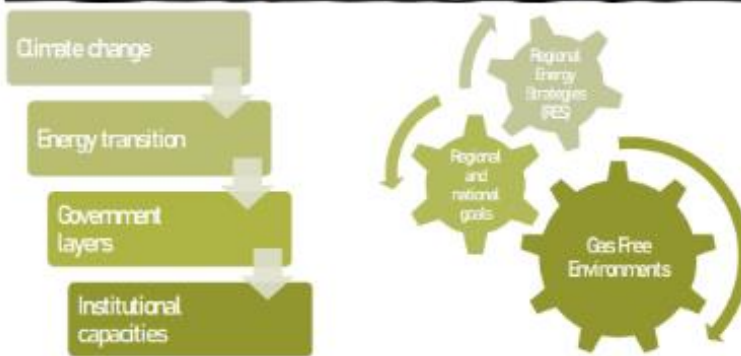
Table of Content

- Research question
- Research Design
- Data collection
- Preliminary findings
- What to do next?

Research Question

- How do current institutional capacities of Dutch municipalities align and conflict with national goals regarding gas free environments since the existence of the Regional Energy Strategies (RES) in The Netherlands Case study Proeftuinen Aardgasvrije Wijken
- How do current institutional capacities of Dutch municipalities align and conflict with national goals regarding gas free environments since the existence of the Regional Energy Strategies (RES) in The Netherlands Case study Proeftuinen Aardgasvrije Wijken

Research Design



Data Collection

Literature

- Five Schools of institutional capacities
- Transition management for sustainable development
- Transformative climate governance
- Orchestrating capacity

Own Data

- Case study: Proeftuinen Aardgasvrije Wijken (PAW)
- Monitoring report PAW/2021
- Relate to three established institutional capacities

Preliminary findings theory

- Five Paradigms of Institutional Planning
 - Historic institutionalism
 - Institutional-actor approaches
 - Regime analyses
 - Critical political economy
 - Cultural institutions

"It is difficult and unlikely that a central authority will have sufficient time-and-place information to complete these tasks" (Dixson)

Preliminary findings theory

- Transformative climate governance
 - Stewarding capacity
 - Unlocking capacity
 - Transformative capacity
 - Orchestrating capacity

Orchestrating capacity

"the indirect intermediation activities [...] in aligning, enlisting and supporting state and sub-national actors and their climate actions"

Three conditions:

1. Strategic alignment of governance actors
2. Mediation across scales and levels
3. Creation of opportunity contexts

Preliminary findings case study

- Case study Proeftuinen Aardgasvrije Wijken
- Monitoringsrapportages PAW
- Pilot municipalities show a lack of:
 - Experience
 - Knowledge
 - Manpower

What to do next?

- Continue doing desk research
- Distinguish three or four most important institutional capacities
- Review the monitoring report and relate to the capacities
- Interview/send questions to a municipal official and employees RES regions

- Start writing!



Any tips or suggestions?
Let me know!
