

Local climate change policy

*a comparative analysis of climate mitigation- and adaptation policy between
four municipalities in Twente, The Netherlands*

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Abstract

Climate change has become increasingly manifest. Local governments have shown to play an important role in the implementation of initiatives that contribute to climate change mitigation- and adaptation. In order to improve knowledge about the way local governments deal with this ill-structured policy problem 'climate change', in this study, the following research question is addressed: What problems and opportunities can be identified in local climate change policy when comparing similarities and differences in views on local climate change policy between four Twente municipalities?

The research question is studied using a comparative analysis amongst four cases, which are local governments in the region of Twente. Two rural municipalities and two urban municipalities have been selected. The research has a qualitative nature that includes a document study of mainly policy documents and twelve interviews; three for each municipality on different governmental levels. Interpretive policy analysis and CAQDAS have been used to analyse the collected research data from the interviews and policy documents.

Results from the comparative analysis show that all municipalities lack a high budget for climate change policy implementation. A general lack of balance between climate change mitigation- and adaptation has also been found. However, from comparing the four municipalities, Hengelo has the best balance.

In terms of differences it was found that urban municipality Hengelo has a relatively solid climate change policy, compared to Enschede. The same goes for rural municipality Hof van Twente that has a more solid climate change policy compared to Tubbergen. Furthermore, Hengelo and Hof van Twente have shown more commitment, which is in line with their more solid climate policy. Hengelo showed the biggest presence of catalysts, while Hof van Twente showed to have a solid position political wise. Enschede is the only municipality that gave a different meaning to the word 'sustainability' in their policy for financial-economical advantages. It has also been found that Tubbergen is the only municipality that hardly formulated climate change policy and admitted this should improve. Tubbergen was only able to commit to the bare minimum of climate change goals that have been determined on higher-levels of governance.

Though municipalities have less budgetarial control over local climate change policy implementation, they are still bound to geographical borders. Without these borders, municipalities might be more inclined to collaborate with other municipalities within the Netherlands or even within the EU, to be more uniform in their mitigation policy solutions, which might attract more investors. A condition however is to have an operational energy-grid network in place to import the outside-border generated energy accordingly, which is not realized yet.

Preface

The aim of this report is to graduate from the University of Twente and receive the degree 'Master of Science' in Public Administration. I hope my findings will further increase the knowledge of local climate policy implementation in general and particularly in the province of Overijssel.

I would like to take this opportunity to thank the people who supported me during this study. First of all I would like to thank Thomas Hoppe and Peter Stegmaier, both my supervisors from the University of Twente. Thomas steered me in the right direction where needed, which helped me improve the quality of my research. Peter was mainly involved in the latter stages of the research where he made valuable contributions as well that shaped my master-thesis to what it currently is. I also want to thank all the interviewees who made their precious time available to contribute to the results of this study.

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1. Introduction

1.1 Background

While uncertainty remains about the exact cause of climate change and what policy solutions should be implemented to deal with this “wicked” or ill-structured policy problem (Hoppe, 2008), a growing number of empirical evidence shows climate change has become increasingly manifest (IPCC 2007, KNMI 2006). As of today in 2014, a UN research report from the Nobel prize-winning IPCC (Intergovernmental Panel on Climate Change) once more confirmed the inevitable impact that climate change has and will have on the world and society as we know it today. One could think of impacts, such as: “coastal flooding and beach erosion, extreme weather events, continental drying and drought, loss of habitat and species, decreased revenue for commercial fisheries, fluctuations in crop yields, and increased spread of vector-borne diseases like malaria and encephalitis” (Hurd et al., 2004; Parry et al., 2001; Scheraga and Grambsch, 1998; Smith et al., 2003; White, 2004, Zahran et al. 2008).

In order to prevent the impacts resulting from climate change, trans-national networks, such as the UN’s “Local Agenda 21” in 1992, have recognized the need to work out local agendas for sustainable living in the 21st century with the slogan “think global, act local”, stimulating sub-national levels of government, such as provinces, regions and municipalities, to develop local climate ambitions and policies that focus on sustainable energy, climate neutrality, and energy efficiency to help reduce the impacts of climate change; also known as ‘climate change mitigation’ (Hoppe et al. 2011). While the need to deal with climate change has entered into policy rhetoric due to initiatives such as LA21 and the academic literature’s emphasis on local governance, there is little knowledge about the way local governments approach climate change and what climate change strategies are being used. In fact, recent climate policy studies on Dutch municipalities in the province of Overijssel have shown a discrepancy between departments in the perception of climate change risks, a fragmentation of local climate policy into other policy areas, and an imbalance between these different climate policy areas (Van den Berg & Coenen, 2012).

To further increase knowledge about local climate policy implementation in the province of Overijssel, this study will use a comparative case study research design to compare the local climate policy of four municipalities in the region of Twente on different factors that attempt to explain why local governments deal with climate change differently.

1.2 Research Questions

This study contributes to the body of literature on climate policy implementation in general and in particular to the variations of climate policy implementation between local governments. The main research question is:

What problems and opportunities can be identified in local climate change policy when comparing similarities and differences in views on local climate change policy between four Twente municipalities?

To answer the main research question, the following sub-questions need to be answered:

What is the current view on climate change policy for each municipality?

A description of the current views on climate change policy for the four municipalities will be given through analysis of existing policy documents and interviews, in which “meanings and sources of meanings” are identified (Yanow 2007, pg. 407).

What similarities and differences can be identified from comparing the views on local climate change policy between the four Twente municipalities?

Now the current views on climate change policy for each municipality have been identified, it is possible to compare these views, enabling the identification of similarities and differences.

Which of the found similarities and differences between the different views lead to the identification of problems and opportunities in local climate change policy?

Having compared the four municipalities on similarities and differences in viewing local climate change policy, possible problems and opportunities in local climate change policy can now be identified.

1.3 Outline of the Report

Chapter 2 will present a theoretical framework that provides a background on the theme of climate change, the concept of frames and the concept of multi-level governance. Chapter 3 will elaborate on research methodology, which contains case selection, research design, and data collection. Chapter 4 is about data the analysis and interpretation of the collected data, which contains the concept of interpretive policy analysis, CAQDAS, and the operationalization & expectations table. Chapter 5 contains the outcome of the comparative analysis and contains several indicators that will be scored afterwards in the comparative analysis table.

2. Theoretical Framework

The following chapter will present the study's theoretical framework, which describes several relevant concepts, theories and research derived from recent, authoritative literature with the aim to explain the earlier described research problem and provides a basis for the chosen research methodology (Asher, 1984).

2.1 Climate Change

Since the emergence of anthropogenic climate change on the political agenda in the mid-to-late 1980's, climate change has been subject of fierce public debate (Moser 2010; Hoppe 2014). An important reason for these ongoing debates is the high degree of uncertainty that is surrounding climate change. There is no definitive formulation of what climate change is, there is nothing to compare climate change to, it is not clear when climate change is solved, what solutions work, and there is limited opportunity by trial and error, because every attempt to solve climate change counts significantly. In terms of policy problem definition, climate change could therefore be defined as a wicked or ill-structured policy problem (Hoppe, 2008). While skeptics claim there is insufficient scientific evidence to prove climate has changed outside the scope of natural variability, a growing number of empirical evidence does indicate climate change has become increasingly manifest (IPCC 2007, KNMI 2006). As of today in 2014, a UN research report from the Nobel prize-winning IPCC (Intergovernmental Panel on Climate Change) once more confirms the inevitable impact that climate change has and will have on the world and society as we know it today (Shove, 2010). One could think of impacts, such as: "coastal flooding and beach erosion, extreme weather events, continental drying and drought, loss of habitat and species, decreased revenue for commercial fisheries, fluctuations in crop yields, and increased spread of vector-borne diseases like malaria and encephalitis" (Hurd et al., 2004; Parry et al., 2001; Scheraga and Grambsch, 1998; Smith et al., 2003; White, 2004, Zahran et al. 2008).

2.2 Frames

With 'climate change' being a complex policy problem, the use of frames becomes important, because a frame is a perspective that allows someone to make sense of a complex reality (Rein & Schön 1993). In public policy decision-making or even during day-to-day decision-making on an individual level, frames play a decisive role. Using a gain-frame or a loss-frame when confronted with a choice has proven to be of significant value (De Martino et al. 2006). From a climate perspective this means that if people receive information that provides opportunities and possible solutions to climate change, they are more likely to contribute to climate change mitigation than people who used information that highlighted the problem of climate change and its detrimental effects (de Velde et al. 2010). Also, public officials and civil servants are more likely to adopt climate policy if their municipality participates in international pro-climate change networks, where participants tend to encourage and advocate local climate change action and solutions towards their own municipality (Betsill & Bulkeley 2006).

In terms of climate policy implementation it is important that policy makers are surrounded with political institutions that encourage adequate policy adoption and implementation, but it is possible that a local government uses a frame of 'commitment to climate policy goals' to gain financial-economic advantages. This is called the 'need-based' scope of the problem (Bulkeley & Betsill, 2003). One could think of commitment to decrease GHG emissions in order to lower energy use that results in a decrease of local energy costs, enabling local governments to use the 'climate policy implementation' frame to increase their investment capacity for other policy goals. An example of this 'need-based' scope of the problem can be found in the translation of the Kyoto Protocol into a national climate policy action plan by the Dutch government in 1998, which framed the problem of climate policy implementation into a 'transition to a low energy economy' (Tweede Kamer, 1999), which is a clear and economically viable policy goal that is

focused on meeting the national Co2 emission reduction targets, which is the purpose of climate change mitigation. This frame enabled the government to fulfil multilateral agreements that had been signed with “industrial and business partners to meet climate change mitigation goals in various economic sectors” (Hoppe et al. 2014).

The implications of this climate policy strategy for Dutch local climate change policy can also be seen on a local level, where little knowledge is available about the way local governments approach climate change and what climate change strategies are being used. Dutch research that focused on the climate adaptation’s policy process indicates that local climate change policy is mainly focused on Co2 reduction, energy saving, and the detachment between rainwater- and wastewater systems. Also, climate change mitigation and climate change adaptation are approached as two separate themes and are associated with different sectors: mitigation is considered an environmental issue, while adaptation is more considered an issue for the sewage system and urban water (Van den Berg & Coenen, 2012). Because the impacts of climate change mitigation and adaptation vary on a global level, climate change adaptation usually asks for solutions on a regional or local level (VROM-raad 2007). An explanation for the local imbalance between these two policies is the polarizing way they have been framed by involved scientists and policy makers, in which a choice was advocated between mitigation or adaptation, also referred to as ‘the adaptation-mitigation dichotomy’ (Biesbroek et al. 2009, 2010), which excludes the possibility of a cooperative approach that attempts to integrate both mitigation and adaptation policy into one, consistent climate change strategy (Hoppe et al. 2014). A confirmation of this dichotomy can be found in a climate policy analysis conducted on 76 civil servants of 17 municipalities in the Dutch province of Overijssel, which showed that a lack of budget, personnel and political interest are important explanations for the lack of local climate change adaptation policy (Van den Berg 2010, 2011).

2.3 Multi-Level Governance

The concept of multi-level governance is an old phenomenon, going back from the old empires to federalist constitutions and administrative practices throughout the world. While multi-level governance has been around for some time, it was in the 1980’s that the discourse of multi-level governance gained attention, which recognized the importance of interconnecting the supra-national, national, and sub-national levels of governance into policy making (Marks et al. 1996). With climate change being a global problem that needs global solutions, it also needs to be implemented on a local level in order to have the desired impact. This interconnection between different levels of governance is why the concept of multi-level of governance has been chosen for this study. Within the concept of multi-level governance, a distinction is made between two types: a hierarchical and network approach.

The hierarchical, authoritative or technocratic approach focuses on the way authority and competencies are shared between the multiple levels of government and focuses on vertical policy implementation (Bulkeley & Betsill, 2005). In the Netherlands, acts of vertical policy integration play an important role in Dutch local climate change policy implementation, in a sense that local governments in the Netherlands are relatively dependable on intergovernmental funding (Hoppe et al. 2014). With the emergence of the EU, sub-and supra-national levels government have won authority at the expense of national governments. An example of this powershift is the UN’s initiative of “Local Agenda 21” in 1992, which recognizes the need to work out local agenda’s for sustainable living in the 21st century with the slogan “think global, act local”, which stimulates sub-national levels of government, such as provinces, regions and municipalities, to develop local climate change ambitions and policies that focus on sustainable energy, climate neutrality, and energy efficiency to help reduce the impacts of climate change; also known as ‘climate change mitigation’ (Hoppe et al. 2011). However, national governments still play an important role in realizing climate change policy implementation, because if national government is involved in the formulation and agenda setting of intergovernmental policy schemes from transnational networks, such as the LA21, the more likely these agenda’s tend to be reflected in local climate change policy (Lafferty & Coenen, 2001; Hoppe et al. 2014). On a national level, such a reflection can be found in an example where

the Dutch environmental assessment agency PBL published a report called 'the Energetic Society', which advocates sustainable energy to be organized in an adaptive and flexible way (Hajer, 2011).

The second multi-level governance type can be described as a horizontal, deliberative, or empowering network approach where, instead of relying on authority, the government facilitates collaboration and competition between a diverse set of public and private actors (Rosenau 1997; Bulkeley & Betsill 2003). An example of this horizontal multi-level governance approach is the Dutch province of Overijssel's initiative to facilitate a competition called 'Duurzaam Dorp Overijssel', in which citizens within local communities are stimulated to become the most sustainable community within the province, resulting in the development of pioneering projects and the exchange of best-practices, with the aim to learn and develop sustainability efforts (Straatman et al. 2013). In terms of local policy implementation from a bottom-up perspective, research has shown that local climate policy is more likely to be implemented with the presence of a committed public official within local government, one that is able to manifest a solid climate policy, which has power within the climate policy domain, has funds available, and is politically willing and capable to find enough support to implement its policy (Bulkeley & Betsill 2003). This person, in public management literature called a 'catalyst', usually tends to be a mayor or an alderman and makes sure certain policy's stays active in political and policy agenda's (Coenen et al. 1999). Also, municipal size plays an important role in local climate change policy implementation. Municipalities with a high number of residents usually have more climate knowledge available to them, have a more professional attitude with regards to implementing climate policy, and are more likely to employ civil servants being familiar with the adoption and implementation of climate policies (Van den Berg 2010; Bulkeley et al. 2006, 2009; Kern et al. 2004), which seems logical, knowing that big municipalities tend to be more vulnerable to impacts of climate change (Hoppe et al. 2014). These impacts of climate change are context-specific and also play an important role in explaining variations in local climate change policy implementation. A 2008 quantitative study from Zahran et al., which investigated US localities commitment to the voluntary program CCP (Cities for Climate Protection), found that the presence of climate change risk, climate stress, and civic capacity is positively related to voluntary commitment to local climate change policy implementation (Hoppe et al. 2014).

When comparing the two types of multi-level governance from a government perspective, you could say that within the hierarchical approach, supra-national government acts as a catalyst in which a pre-defined framework is given to approach a policy problem, implement solutions and provide funds and capacity to do so, while in the horizontal approach, local government acts as a facilitator that creates an environment in which genuinely involved local actors develop and implement their own context-specific policy solutions. In terms of local climate change policy implementation, it can be difficult to determine when central government should play a coordinating or a facilitating role. An analysis of climate policy in the province of Overijssel showed that while a growing consciousness of climate risk and more collaboration between local governments would improve the implementation of climate change adaptation policy, the national government is still perceived as the main actor responsible for dealing with climate change. Nevertheless, more than half of the respondents (69%) did say floods lead their municipality to conduct adaptation policy, noting that just 18% of these floods were perceived relatable to climate change (Van den Berg 2010, 2011).

Critics of multi-level governance warn for over-estimation of the concept (Bulkeley & Betsill, 2003), which is a concept that is mainly descriptive in understanding the EU and therefore has limited explanatory power. Also, giving authority to local government can still mean a reactionary role in which the sub-national level depends on opportunities created from interactions between national government and the EU (Jeffery, 2000). Another criticism is the risk of excluding the national government from the policy process (Jeffery 2000; John 2000; Jordan 2000, 2001), and at the same time emphasize the limited influence sub-national levels have in shaping EU-policy outcomes (Jordan, 2000, 2001).

2.4 Theoretical Indicators Overview

Below table offers the reader an overview of the local climate change policy implementation indicators presented earlier in this chapter. These indicators are used as a first basis for the further operationalization of the implementation indicators that have been used as a reference for the study's data analysis, which is presented in chapter 3.4.3.

Table 1: definition of implementation indicators

Theoretical indicators	Definition
Climate Change	An ill-structured policy problem with inevitable impacts, such as coastal flooding and beach erosion, extreme weather events, continental drying and drought, loss of habitat and species, decreased revenue for commercial fisheries, fluctuations in crop yields, and increased spread of vector-borne diseases like malaria and encephalitis.
Gain-frame	Information that focuses on opportunities and solutions.
Loss-frame	Information that focuses on limitations and problems.
Need-based scope	Commitment to policy to gain financial-economic advantages.
Adaptation-Mitigation dichotomy	Scientists and policy makers advocate a choice between climate change adaptation and climate change mitigation policy
Hierarchical governance	Making multiple levels of government share authority and competencies.
Network governance	Government facilitates collaboration and competition between diverse set of public and private actors.
Committed public official	Mayor or alderman that keeps policy active in political and policy agenda's.
Municipal size	Bigger size is more vulnerable to climate change impacts, so more professional, knowledgeable, employability towards climate change policy.
Climate change risk	Coastal proximity, ecosystem sensitivity, proneness to flooding. Their ecological, social, and economical impacts are not equally distributed geographically. Most vulnerable municipalities benefit most.
Climate change stress	High levels of carbon-based employment, solo commuting with low urban density, and low levels of solar energy use. Climate change emission reduction is more costly for local communities.
Civic capacity	The presence of environmental groups and the involvement of environmental causes.

3. Research Methodology

The following chapter will provide a description and explanation of the methods this research will use to find an answer to its main research question.

3.1 Case Selection

The cases that have been selected for this study are based in the Netherlands, because Dutch municipalities and provinces have proven to be relatively active in formulating local ambitious Co2 emission reduction targets and have been able to strengthen the capacity of renewable energy systems (Hoppe et al. 2011). The region of Twente is situated in the eastern part of the Netherlands and is part of the province of Overijssel, which implemented a substantial Co2 reduction policy program called 'Energiepact' (Provincie Overijssel, 2008). Within this province, the region of Twente is the most urbanized, which allows this study to use cases that greatly vary in terms of rural and urban areas. Considering municipality size, another attractive feature of Twente is the presence of Overijssel's biggest municipality Enschede, which allows for a high variation in size. The case selection involves multiple cases, which will allow each case to be described in more detail and at the same time allows for comparison and contrast between the different cases (Meyer, 2001). Due to limitations of time, it will not be possible to select all municipalities within the region of Twente. Therefore, a more feasible number of four cases have been selected. The criteria for case selection have been municipality size and representativeness. Because the region of Twente has a relatively balanced variation between urbanized and rural municipalities, and therefore a high variation in size as well, two urbanized and two rural municipalities will be chosen for this study. The two urbanized cases chosen for this study are the municipality of Hengelo and Enschede with respectively around 81.000 and 159.000 residents. The two rural cases are the municipality of Tubbergen and Hof van Twente with respectively around 21.000 and 35.000 residents (CBS, 2013). A description of the four municipalities based on the earlier described implementation indicators can be found in Appendix A, which includes detailed background information and will serve as a reference for the comparative analysis.

3.2 Research Design

This study uses concepts from qualitative research: an important style of research within social science. Qualitative research is an important way to gain an understanding of how and why a certain phenomenon occurs, allowing for the development of ideas and hypotheses that later can be used to make statistical inferences in quantitative research (Flick, 2014). The qualitative research design that will be chosen for this study is a comparative case study, because this design allows the study to use a limited number of non-randomly chosen cases to compare the current climate policy on multiple factors. While the focus on a few cases allows for a more in depth research approach in order to explore the field of local climate change policy implementation, the inevitable limitation of a comparative case study design is the relatively low generalizability of the research outcome due to the small amount of cases in which many indicators are used from one point in time (Gerring, 2007).

3.3 Data Collection

Because qualitative research mainly depends on human interpretation of data instead of hard, statistical numbers, it is important to use different sources of data to ensure all perspectives are taken into account when interpreting the collected data. To achieve this goal, this study will use the methodological concept of triangulation, which follows the strategy to use "more than one method to gather data, such as interviews, observations, questionnaires, and documents" (Denzin, 2006). The documents used in this study will primarily be policy documents from the four selected municipalities, but can be complemented with other documents or data types if new insights lead to believe these data are relevant for this study.

For each of the four municipalities, three interviews will be conducted. Each interview will be conducted on a different governmental level. It will be an interview with a local alderman, a local civil servant, and an interview with a local citizen. The total number of interviews therefore will be twelve. The interviews will be conducted using a semi-structured approach: having “a list of specific questions but leaving sufficient room for additional information” (Van Aken & Bij 2007, pg. 135).

3.4 Data analysis and interpretation

After policy documents have been collected and interviews have been conducted, an initial set of data has emerged. In order to see how the selected municipalities approach local climate change policy, based on the theoretical claims and conceptual notions that have been described earlier, it is crucial that this set of data gets critically reflected upon with repeating attempts of data analysis- and interpretation.

3.4.1 Interpretive Policy Analysis

What conclusions are derived from research depends for an important part on how the researcher interprets the collected research data. However, it is inevitable that human bias will affect the interpretation of data, because making sense of the world as a human being is a highly context-specific activity (Yanow 2007, pg. 407). There are different ways how a lack of constructive data interpretation can cause harm to a researcher’s conclusions, such as: “biased transcription and interpretation, the overemphasis of positive cases, a focus on the exotic or unusual, the ignoring of negative cases, vague definitions of concepts (or codes), inconsistent application of such concepts to the data and unwarranted generalization.” (Gibbs et al. 2002). Within policy studies, the data analysis method of interpretive policy analysis has been developed (Edelman 1964; 1971; 1977), which enables social scientists to analyze policy through the identification of frames, reasoning, and action within a certain issue arena (Yanow 2003, pg. 230). This also means that, compared to the more traditional quantitative data analysis methods, interpretive policy analysis does not need research data to be translated into numbers, because its goal is to use the originally collected written, numerical, or oral data as a way to discover the data’s “meanings and sources of meanings” (Yanow 2007, pg. 407). In this sense, interpretive policy analysis can be seen as an ethnographic activity, where an ethnographer treats collected data as symbols of meaning as a way to indirectly identify culture, which generally can be defined as “the knowledge that people have learned as members of a group”(Spradley, 1979). The need for this research to be able to identify different or similar views within or between the selected municipalities in terms of climate change policy makes interpretive policy analysis an important research method for answering this study’s main research question.

3.4.2 CAQDAS

Computer assisted qualitative data analysis (CAQDAS) is a qualitative-interpretive method that facilitates interpretive policy analysis in a sense that it is a tool for researchers to process and structure their collected data, enabling them to keep track of their analysis (Gibbs et al. 2002). The CAQDAS-software that will be used in this study is Atlas.ti, which allows users to merge large volumes of texts, images, audio, video, and geo data, which can be structured and keeping track of using notes, memos, codes, annotations, and memos¹. The numbers between brackets that are used in several sentences within the following chapter and Appendix A, are Atlas.ti codes that enable the reader to locate quotes from a document or interview report that have been used as a reference for certain statements or claims throughout this study. Quote-references are used instead of actual quotes in the study, because this was a condition for the interviewees to participate with the interview.

When the data, collected from document-study and interviews, are analyzed on meaning and interpretation, the outcomes will be linked to the implementation indicators described earlier:

¹ <http://www.atlasti.com/features.html>

3.4.3 Operationalization & Expectations

Below table offers the reader an overview of the local climate change policy implementation indicators that have been used as a reference for the data analysis throughout this research and are derived from the 'climate change', 'frame' and 'multi-level governance' theories that have been presented earlier in chapter two and summarized in table 1 (pg. 11). The purpose of the operationalization column is to give the reader an idea how each implementation indicator is defined throughout this study. The expected scores are a prologue for the upcoming comparative analysis in chapter five and will play a supportive role in the 'conclusion' section in chapter six. The given scores for each municipality in table 2 are mainly based on the researcher's normative assumptions, in contrary to table 3, which is based on empirical data.

Table 2: operationalization of implementation indicators

Implementation Indicators	Operationalization	Expected Score*
Need-based scope	Climate policy implementation motivated by financial economic advantages	E He Ho T ++ + - -
Mitigation – Adaptation Balance	Equal presence of climate mitigation and climate adaptation policy goals, plans, implementation, results, and evaluation	E He Ho T - - - -
Transnational pro-climate change networks	Participation of local municipalities in pro-climate change networks outside local area	E He Ho T ++ + - -
Top-down policy reflection	Formulation and agenda-setting of national climate policy is reflected in local climate policy	E He Ho T ++ + - -
Committed public official	Public official who is able to manifest a solid climate policy with power within policy domain, enough funds, and capability to gain support to implement policy.	E He Ho T + ++ - -
Size, knowledge, professional attitude, familiarity with climate policy implementation	Number of citizens, completeness of policy documents, internal & external consistency, history of successful climate policy implementation cases within a municipality	E He Ho T ++ ++ - -
Climate change risk	Proximity to the coast, a sensitive ecosystem, and previous casualties from hurricanes and floods	E He Ho T - - ++ ++
Climate change stress	High utility of transportation, energy, and production	E He Ho T ++ ++ + -
Civic capacity	The capacity to raise awareness towards climate issues, mobilize capacity and gain political support to eventually influence the local policymaker's agenda-setting	E He Ho T ++ ++ - -

* The four municipalities: E = Enschede He = Hengelo Ho = Hof van Twente T = Tubbergen

* ++ = very high + = high - = low -- = very low

3.4.4 Comparative Analysis Table

While table 2 consists of nine implementation indicators, table 3 contains sixteen. This decision was made during the process of this study, because it was found that the sixteen indicators are more interesting to analyse than some of the original indicators, because they weren't likely to receive output from the interviews and document study.

Except for the 'size' indicator, most of the scores are based on data from Atlas.ti. The data used during this study can be recognized with the brackets and numbers behind a sentence, which represents the location of a quote from one of the conducted interviews or from a document. While the policy indicator scores are based on documents, the remaining eleven indicator scores are based on interviews. Each score is based on the case description that is available for each municipality for each indicator and can be found at Appendix A. In chapter four, the four descriptions for each indicator are then compared, which will form the eventual basis for the scores that have been given in table 3. In some cases, the decision was made to use the '0' sign to indicate that insufficient data was available to give a score. For example, the 'catalyst' indicator shows the '0' sign two times, because there wasn't a catalyst identified for Tubbergen and Hof van Twente. Though there also wasn't a catalyst found for Enschede, they did receive a '-' score, because it was found they had some climate change policy catalysts in the past. Hengelo received a '++' score, because for both climate mitigation- and adaptation policy area's, examples of catalysts have been found.

The scores that have been given to each of the sixteen indicators for each municipality are an attempt to quantify the qualitative data results in such a way that the reader has an overview of the comparison between the municipalities for each implementation indicator. The scores are not meant to be used for statistical inference, and should therefore not be over-analyzed.

4. Results

In this chapter, the four municipality cases have been compared for each factor. The comparisons below are based on the four municipality descriptions that can be found in Appendix A, and includes a rating that has been defined for each factor separately in order to improve the meaning of each factor. At the end of this chapter, a comparative analysis table is presented, which gives the reader an overview of the differences and similarities for each factor between the selected municipality cases.

4.1 Size

Enschede	Hengelo	Hof van Twente	Tubbergen
++	++	-	-
1112 residents per km ²	1310 residents per km ²	163 residents per km ²	144 residents per km ²

++	Population density +1000 residents per km ²
+	Population density 500 - 1000 residents per km ²
0	Population density data unknown
-	Population density 100 - 500 residents per km ²
--	Population density 0 - 100 residents per km ²

* = population density is calculated with the formula: residents / area surface

Enschede has by far the most residents situated in its municipality with 158.627. Hengelo is around half the amount of residents with 80.952, while Hof van Twente and Tubbergen less than half Hengelo's resident amount with respectively 34.997 and 21.215 residents. Hof van Twente is by far the largest municipality with an area surface of 215,4 km², followed by Tubbergen and Enschede with respectively 147,41 km² and 142,72 km². Hengelo is clearly the smallest municipality in terms of surface area with 61,83 km². This makes Enschede and Hengelo the densest municipalities in terms of population, which confirms their urban status compared to the other two municipalities that are known for their rurality. In terms of residents, Hengelo is considered the most sizable municipality with a population density* of 1310 residents per km², followed with Enschede's 1112 residents per km². Hof van Twente and Tubbergen with respectively 163 residents per km² and 144 residents per km² are considered equal in terms of municipal size.

4.2 Mitigation Policy Goals

Enschede	Hengelo	Hof van Twente	Tubbergen
+	++	+	--
Vision. In general ambiguous goals. Waste most specific.	Structured agenda that includes specific sub-goals	Ambiguous goals Structured in MUD doc.	Lacks vision. General, minimal goals

++	High number of ambitious and specific mitigation policy goals
+	High number of specific mitigation policy goals
0	Moderate/unknown mitigation policy goals
-	Low number of specific mitigation policy goals
--	Low number of ambitious and specific mitigation policy goals

Enschede, Hengelo, and Hof van Twente express a general goal to mitigate climate change: an energy neutral municipality in 2020, a future-resilient, sustainable, vital city in 2030, a Co2-neutral municipality in 2030, and the goal to integrate sustainability within their municipal organization (24:5)(17:15)(22:3). In Tubbergen's 2014-2018 coalition-agreement, the ambition is expressed to formulate a future-vision policy document, which could include such a goal, but has not been found yet in their current policy documents (31:7). Tubbergen does express some climate mitigation goals though, to focus on a: C2C economy, Co2 mitigation, and a 75% residual waste decrease in 2030 without extra waste-tax (21:4). The other three municipalities formulated a more general climate policy plan. Enschede's climate policy is mainly focused on sustainability and energy and is seen as an investment to generate economic opportunities (39:1)(41:2). Hengelo's climate policy plan is more versatile with a distinction between a sustainable economy, energy & climate, and a sustainable living environment, and is based on the 3P-principle. While the name 'sustainability agenda' suggests a focus on climate mitigation, ironically it is the most overall climate policy document with two-third of their sustainability agenda dedicated to climate mitigation and one-third to climate adaptation (17:13). Hof van Twente's climate policy is the least focused with seven relatively small chapters in their environmental policy that summarizes some climate themes, but their goals are less specific and the relation between the chapters are less clear (22:4-17). However, Hof van Twente's relatively new 'MUD' implementation program in 2013 is specific and ambitious in terms of climate goals and uses the 3P-principle as well to assess each sustainability theme (23:1-10). Similar to Enschede, Hof van Twente outsourced the formulation of their sustainability policy to a third party (23:7) and has a focus on sustainability and energy, which makes Hengelo's sustainability agenda the only dominant climate policy document within these four municipalities that has been formulated by the municipality itself. While Hof van Twente's MUD-document has more council support compared to Hengelo's sustainability agenda (23:8), the MUD-goals are less measurable. Hengelo for example wants to have 30% less Co2 emission, 40% more sustainable energy use, 30% sustainable lighting, 250 self-sufficient households, and 1000 isolated houses in 2020 (17:13), while Hof van Twente mentions multiple climate theme's, but specific mitigation goals are limited to 20% energy saving for the municipality organization and 10% for households in 2017 (23:9). 'Households' also suggests that companies do not have to commit to this energy-saving goal. Another difference is that Hengelo has expressed a commitment to more climate treaties, such as the Kyoto goals, Copenhagen goals, Millennium goals, and C2C goals (27:4).

4.3 Mitigation Policy Plan of Action

Enschede	Hengelo	Hof van Twente	Tubbergen
-	++	+	-
Plan for waste infrastructure for waste goal, but general plan for Co2 reduction is less clear	Plan for Co2 reduction with 13 sus. themes and specific procurement examples. Green deals. High conditions for warmth-net	Plan for Co2 most focus on agr. sector, stimulate business area's, and sus. construction. Initiatives district energy saving	Unclear collaborative strategy. Exemplary role: sport buildings Notable differences: no investments in energy-saving and sustainable energy supply in the upcoming term

++	High likelihood to implement set policy goals
+	High likelihood to implement some set policy goals
0	Moderate / unknown likelihood to implement set policy goals
-	Low likelihood to implement some set policy goals
--	Low likelihood to implement set policy goals

In realizing climate change mitigation goals, all municipalities use a collaborative, network approach of governance as a general theme throughout their policy. While the government used to have a more steering role in terms of policy implementation, all municipalities express the need to play a more informative, exemplary, and facilitative role that stimulates the involvement of other actors, such as citizens, companies, and institutions that are eventually responsible for realizing climate change mitigation policy implementation (24:2-3)(27:7)(28:1-2)(31:9).

Hengelo mentions collaboration within a holistic approach where clear agreements amongst stakeholders will increase policy consensus that should lead to real solutions. Hengelo's formulated climate goals are followed-up with specific, feasible, measurable actions. While the goals have specific deadlines, they are minimal 2015 and the actions lack a deadline, so combined with an unclear evaluation-procedure, it seems difficult to evaluate Hengelo's plan (17:11). Enschede mentions collaboration as a way to increase centralization in order to save costs and improve innovation (24:2) and also wants to play a steering role in improving collaboration with regional businesses and educational institutions (24:3). Enschede mentions an implementation program with seven themes and with in total fifty activities to accomplish for 2020. Compared to Hengelo, Enschede's implementation program does not couple the long-term goals for each theme to specific actions, but rather presents each theme with a table with activities and expected results, but no specific, measurable actions are mentioned. Enschede's numbers look impressive, but the latter suggests Enschede's implementation program is quantity over quality (41:7). Hof van Twente mainly mentions collaboration within sustainable construction and communication, and while Hof van Twente's older environmental plan does not present an implementation plan, their more recent MUD-program shows a clear link between climate goals and acts. These acts are sometimes specific such as the 350 smart-meter project, but most acts express little actual, measurable commitment. However, most of MUD's climate theme's also include financial aspects such as profitability and funding (23:12). Tubbergen

shows the least focus on collaboration, but does mention the belief that companies should focus on waste-oriented innovations through pilot-projects. There is no climate mitigation implementation plan found for Tubbergen. Tubbergen negatively sticks out with the statement that for the 2014-2018 term, no municipal investments will be done in energy-saving and sustainable energy supply (23:12).

4.4 Adaptation Policy Goals

Enschede	Hengelo	Hof van Twente	Tubbergen
-	++	+	-
Concept water. Urban nature, water awareness, containment, and uncoupling.	Three policies. Urban nature, rural area, bio-diversity, water household, sus. agriculture, sewer, ground water, green core	Three notes. Vital and robust water system and water-chain	Sewer policy. Legal requirements for current sewer maintenance Low priority

++	High number of ambitious and specific adaptation policy goals
+	High number of specific adaptation policy goals
0	Moderate/unknown adaptation policy goals
-	Low number of specific adaptation policy goals
--	Low number of ambitious and specific adaptation policy goals

In terms of climate change adaptation goals, all four municipalities mention the goal to cope with rainwater, ground, and wastewater. There is a general focus on water compared to other climate adaptation impacts, such as urban heat-stress (43:14)(27:3)(36:7)(30:1).

In formulating water policy, Hengelo is most specific with goals that are formulated in a sewer plan, groundwater plan, a more general green plan, and is also mentioned in their sustainability agenda. Hof van Twente mentions three water notes (two sewer- and one water note) as the basis for their long term water policy, Tubbergen has a focus on urban water management using a sewer policy plan, and while Enschede mentions various water ambitions in their water vision document that are linked to Enschede's five main policy ambitions, it is the most ambiguous and is a concept document without council support. While Hof van Twente, Tubbergen and Hengelo do use flood protection as an argument for their water- and sewer policy, more common arguments are legal obligations from the water law or the need to ensure a good living- and work environment, and that the quality of nature should be preserved for recreational (economic) purposes. While Tubbergen does mention 'climate adaptation' in their newest coalition agreement and formulated a sewer plan, it is used to state that climate adaptation currently has a low priority due to a lack of urgency (8:24). The more urban municipalities Hengelo and Enschede both mention the goal to improve their urban natural area (24:10)(17:17).

4.5 Adaptation Policy Plan of Action

Enschede	Hengelo	Hof van Twente	Tubbergen
-	++	+	-
Business area's, city streams, urban agriculture for urban nature. Plan for evaluation and budget	Steering role business area's, city streams, urban nature, for water containment. Ground water contact and workshops	Business area's for water containment Balance economy ecology for vital and robust water system and water-chain. Budget, local systems, collaboration	Business area's for nature quality Balance economy ecology subsidy project and tree protection. Outsourcing

++	High likeliness to implement set policy goals
+	High likeliness to implement some set policy goals
0	Moderate / unknown likeliness to implement set policy goals
-	Low likeliness to implement some set policy goals
--	Low likeliness to implement set policy goals

In realizing their climate change adaptation policy goals, all municipalities mention collaboration with the waterboard and the stimulation of sustainable business area's. Enschede mentions to use business area's for urban agriculture (25:6), Hof van Twente and Hengelo for water containment (27:3)(22:7), and Tubbergen for nature quality (30:1). Hengelo is the only municipality that mentions a steering and informative municipal role in stimulating sustainable business area's (19:1-2), while Hof van Twente and Tubbergen are most specific about the allocation of new natural area's with a balance between economy and ecology (22:22)(31:11). While Hof van Twente focuses on provincial responsibility, Tubbergen distinguishes itself with a focus on tree-protection and a subsidy project called 'Groene Diensten.' In implementing this, Tubbergen's municipal capacity might be doubtful with their outsourcing-approach compared to their partner-municipality Dinkelland (52:11). Compared to other municipalities, Hof van Twente mentions a budget reservation for water management, the use of local waste water process systems, the integration of water goals in other policy area's, and to inform citizens, schools, and companies about climate adaptation in collaboration with other partners (36:11). In dealing with water, Enschede mentions a focus on their biggest bottlenecks, which is city stream implementation, urban citizen agriculture, and the urban fringe area (25:6). Compared to the other municipalities, Enschede is specific about the evaluation of these actions and about the ways to improve municipal budget to financially support these actions (24:10). However, Enschede stays ambiguous about what to evaluate about and what to do with this budget apart from the mentioning of pilots, projects, and rules & regulation. Similar to Enschede, Hengelo mentions the improvement of urban natural area with city streams and has the most specific plan with regards to ground water, which mentions a steering role for surface groundwater, an informative role with a groundwater point of contact, and workshops to increase their work overview (19:1-2).

4.6 Municipal Role

Enschede	Hengelo	Hof van Twente	Tubbergen
-	+	+	-
Exemplary +	Exemplary +	Exemplary +	Exemplary -
Informative -	Informative +	Informative +	Informative -
Facilitative -	Facilitative -	Facilitative +	Facilitative -
Adaptation -	Adaptation +	Adaptation -	Adaptation +

++	Municipality plays a role in climate policy implementation on all four area's
+	Municipality plays a role in climate policy implementation on three area's
0	Municipality plays a role in climate policy implementation on half of the area's
-	Municipality plays a role in climate policy implementation on one area
--	Municipality plays no role in climate policy implementation on the four area's

Similar to their policy, all municipalities mention an exemplary, informative, and facilitating municipal role in realizing climate mitigation goals. For all municipalities, an important part of the exemplary role consists of improving the sustainable quality of their municipal buildings (38:4)(34:6)(7:16)(9:13). Tubbergen sets an example with the placement of solar panels on municipal roofs that include sport-buildings (9:16). Enschede, Hengelo, and Hof van Twente are more versatile with sustainable procurement as an important way to have an exemplary role, especially for companies (37:14)(34:7)(35:21-22). All four municipalities acknowledge the importance of an informative role where citizens should be made aware of the impacts of climate change and what possibilities are available for them to mitigate climate change, mainly in terms of solar panels, isolation, and waste separation (37:4)(34:10)(7:16)(9:13). The energy-panel, which is subsidized from a provincial subsidy program, is used as a general policy instrument in realizing a more aware, and therefore more responsible citizen. Hengelo also mentioned 'the climate-adaptive city' project where citizen are kept up to date about current local climate projects (34:7), and Hof van Twente organizes various info-meetings for citizens to explain their climate policy or to inform them about local initiatives, such as the 'inspiration farm' (7:32). In terms of a facilitative role, Tubbergen mentions helping energy corporation 'Energiek Vasse' deal with smart-grid legal obstacles by involving Cogas and research institutions in the process and the 'Oans' platform is aimed to facilitate citizen participation (9:30). However, on a citizen level, citizen participation and help from the municipality is experienced as unsatisfactory due to a lack of commitment from public officials (11:12-13). While Enschede used the example of helping set up sustainable construction market 'Reimarkt' and mentions citizen participation activities, on a citizen level it is experienced that local initiatives are not facilitated in a way that stimulates implementation. The same is experienced in Hengelo, where legal regulations are used to prevent the implementation of the warmth-net project and local initiatives (37:4)(38:3). In terms of a facilitative role Hof van Twente mentions less market restrictions, and collaboration with energy corporation ECHT. On a citizen level, Hof van Twente's facilitative role is experienced as helpful in setting up the 'inspiration farm' and energy corporation ECHT (35:21-22).

With regards to climate adaptation, the municipalities are less outspoken over their municipal role compared to the earlier mentioned climate adaptation policy plans of action. Tubbergen was the most outspoken with an informative role, using a water-panel and an enforcing role against flood protection offenders (8:47). Hengelo mentioned an informative role where citizens are informed about possibilities to participate and provide an overview of climate adaptation project updates (34:28)(34:7). Hengelo wants to expand this project to other municipalities such as Almelo and Enschede, which suggests a pioneering role in this regard as well. Enschede and Hof van Twente did not mention having a municipal role in terms of climate adaptation.

4.7 Catalyst

Enschede	Hengelo	Hof van Twente	Tubbergen
-	++	0	0
Catalysts in the past, no recent catalysts found	Sust. team engaged, waste dep. most catalyst. No budget, more creative. Water catalyst.	Potential of catalysing alderman who was catalyst in the past. Former alderman water catalyst.	More engaged alderman, but officials have lack of time and resources. No adaptation.
No adaptation.			

++	Catalysts found
+	One catalyst found
0	Potential for catalyst found
-	Catalysts found in the past
--	No current catalysts found

While Enschede had some climate mitigation catalysts in the past and currently has 1 or 2 public officials involved in sustainability for each policy program, no outspoken catalyst has been found that has shown significant commitment to catalyse climate mitigation policy. Hengelo has a sustainability team that catalyses their sustainability agenda and shows engagement in mitigating climate change, but in terms of budget, times have changed and finding creative, efficient policy solutions has become more important in realizing their goals. Hengelo's waste department is currently most prominent as a catalyst with public officials that implemented various innovative, controversial pilot-projects. With a recyclable isolation subsidy that escalated in a legal case, but also to three more sustainable local isolation companies, and the implementation of waste-pilot despite a lack of council support, suggests Hengelo is the most catalysing municipality in terms of climate mitigation (10:11). While the current, new alderman of Hof van Twente had a catalysing role in the past and is confident in increasing council and citizen support for climate mitigation policy, this still needs to be realized. Their public officials are dependent on this, because they are seen more as coordinating than catalysing (35:16-18). While Tubbergen's new sustainability-oriented alderman is more committed to find council support for climate mitigation policy than its predecessor, public officials are unlikely to commit to climate mitigation policy due to lack of time and resources (8:14-16).

In terms of climate adaptation, Hengelo is the only municipality that currently has a policy maker that catalyses Hengelo’s current sewer plan (5:24)(34:19). Hof van Twente’s former alderman was a water expert as well. Otherwise, no catalysts for climate adaptation were mentioned.

4.8 Knowledge & Expertise

Enschede	Hengelo	Hof van Twente	Tubbergen
0	+	+	-
Integration and appointment, but not experienced on a citizen level.	Integration and sustainability team, but not experienced on a citizen level.	Sustainability expert, goals over regulations, experienced on a citizen level.	Mandatory, reactive, external knowledge. Adaptation: no urgency or improvement.
Adaptation: Mitigation/ Adaptation policy merge	Adaptation: experienced in water- and sewer policy	Adaptation: No urgency, but water-test.	

++	High internal knowledge & expertise
+	Some internal knowledge & expertise
0	Will to improve internal knowledge & expertise
-	External knowledge & expertise
--	No external knowledge & expertise

While Tubbergen has fused their knowledge through an administrative fusion with the municipality of Dinkelland, called ‘Noaberkracht,’ they have a relatively reactive attitude towards dealing with climate mitigation. Tubbergen focuses on mandatory tasks and due to a lack of capacity focus on hiring experts, for example for legal and financial issues or to represent the energy panel (8:7)(8:37). Hof van Twente focuses more on internal knowledge with the appointment of a sustainability expert and shows commitment with a focus on goals over regulations. This pragmatic attitude is confirmed on a citizen level, where the municipal guidance during a local mitigation project was experienced as satisfactory (7:17). Also, their current alderman is experienced with climate mitigation, especially in terms of windmills (10:11). Enschede and Hengelo both aim to integrate mitigation policy within their municipal organization. Hengelo uses a sustainability team to realize this, despite a lack of council approval for this goal. This shows internal motivation and the will to expand their knowledge and expertise towards other departments (5:1)(5:5-6). However, knowledge does not always have to benefit implementation, because legal knowledge is on a citizen level experienced as an obstacle in realizing Hengelo’s warmth-net project (33:13) or local initiatives in Enschede (33:12). Instead of a sustainability team, Enschede appointed a sustainability manager and has 1 or 2 public official experts for each department. Within the municipal organization, public officials are seen as competent in terms of climate mitigation, but knowledge is also gathered from partners or third parties (37:1). Despite this knowledge however, on a citizen level public officials in Enschede and Hengelo are not experienced as being knowledgeable and experts in a way that support the implementation of local citizen initiatives (33:4). Furthermore, both Enschede and Hengelo acknowledge the need to approach policy formulation in a more pragmatic way. Hengelo let public

officials attend writing-classes (5:58). Enschede sees the solution in less accountability towards the municipal council, which would make policy formulation less time-consuming for public officials (38:6).

In terms of climate adaptation, most knowledge and expertise comes from the waterboard that has a steering role and is an important water partner for all municipalities. While Hof van Twente and Tubbergen both believe climate adaptation has a lack of urgency, Hof van Twente acknowledges this should change and uses a water-test to improve their climate adaptation policy structure (6:32)(6:45). Enschede sees the need to integrate climate mitigation and climate adaption into one policy, but it is unclear how this will be realized (38:2). Hengelo seems to have the most solid climate adaptation knowledge and expertise with a 20 year focus on water- and sewer policy where the term 'climate adaptation' is mentioned, which is found to be rare (10:27).

4.9 Network

Enschede	Hengelo	Hof van Twente	Tubbergen
+	+	+	-
Regional +	Regional +	Regional +	Regional -
National +	National -	National +	National -
International +	International +	International -	International -
Adaptation -	Adaptation +	Adaptation +	Adaptation +

++	All four points +
+	Three points +
0	Two points + / -
-	Three points -
--	All points -

All four municipalities participate in the regional 'Regio Twente' network meetings. Hengelo's waste department attends their own regional meetings within 'Regio Twente,' which confirms their role as a catalyst (10:2). Tubbergen participates in the fewest climate mitigation projects and is willing to choose for their own approach, for example in the regional 'waste-free Twente' project where they do not collaborate with Twente Milieu to improve control and limit waste-tax (8:5). On a regional level, Hengelo mentions participation in the 'Netwerkstad Twente' network (5:53). While Enschede also mentions this same network and the Innovation Platform Twente (IPT) network in their policy (24:2), these were not mentioned during the interview. Collaboration with Germany is found in Enschede and Hengelo with the participation in the Euregional MONT network (37:9)(5:53). On a national level, Hof van Twente participates in the VNG-network and is a member of the 'landelijk klimaat verbond' (6:44) and due to its size, Enschede participates in the G32 network (37:9). While on a European level, Hof van Twente participates in the UN's Millennium network (6:40), Enschede and Hengelo participate in the most European climate mitigation networks. Both municipalities participate in the Covenant of Mayors, though Enschede just signed the treaty. Furthermore, Enschede participates in the Euro-cities network and Hengelo participates in the ICLEA network (5:54).

In terms of climate adaptation networks, Hof van Twente has a membership of ‘Groene Metropool Twente’ and the ‘Rijn-Oost’ water network, which suggests a strong climate adaptation-oriented network (35:31). Hengelo does not have these memberships, but did help set up a water-network project after several regional meetings. Also, regional meetings on alderman level led to high municipal support for the current municipal sewer plan (34:19). Tubbergen mainly focuses on legally mandatory meetings with the waterboard (8:11), while Enschede did not mention participating in climate adaptation-oriented networks.

4.10 Hierarchical Governance

Enschede	Hengelo	Hof van Twente	Tubbergen
+	-	+	++
Commitment to high-level climate policy, but also narrow climate vision and goals.	Committed to high-level goals where needed, but also reluctant and wants to keep control.	National level commitment as a guideline for opportunities on local level. Focus on energy.	National level due to lack of vision. Minimal commitment due to lack of capacity.
Adaptation: No approval water policy vision.	Adaptation: policy plan in line with national level.	Adaptation: national policy and waterboard.	Adaptation: national policy and waterboard.

++	All four points +
+	Three points +
0	Two points + / -
-	Three points -
--	All points -

Enschede is committed to high-level climate policy agenda’s, but recognizes their local climate policy is largely defined by this commitment to national and EU climate goals, which is mainly focused on the reduction of Co2 emissions and the increase of sustainable energy production. This results in a dynamic where their policy makers know the council want to account for this higher-level agenda, which results in the formulation of a narrow climate mitigation policy vision and goals (37:3). Hengelo’s sustainability agenda, which has not entirely been approved, is a sign that the public officials have an own vision regarding climate mitigation policy. This is also reflected in a reluctant attitude in accepting sustainability-projects from a provincial or higher governmental level, which increases project control and accountability towards their citizens. While this is less possible with legally obligatory policy area’s, such as waste, Hengelo’s waste team’s unconventional pilot-projects indicate an attempt to become less restricted from higher-level government agenda’s in this area as well (5:63). Hof van Twente is clear about their commitment to the national climate agenda, especially in terms of energy. The national energy treaty is not seen as a restriction, but as a guideline to allow public officials to find opportunities for sustainable energy growth (35:19)(35:34). Tubbergen’s lack of vision makes it natural to mainly focus on higher-level policy, but due to a lack of capacity and budget, their commitment is at a minimum level that focuses on

the most necessary and urgent activities (8:16-18). On a citizen level, this has been confirmed with the experience that public officials appear to have difficulty to act outside their box of rules & regulations (11:33).

In terms of climate adaptation, Hengelo’s climate adaptation policy is claimed to reflect national policy and has council approval. However, waste- and water projects are mostly initiated from a municipal level (5:63). Tubbergen is the only other municipality that mentioned climate adaptation, but mainly relies on national water policy and waterboard collaboration to deal with climate change risks, which is legally obligatory and therefore can also be expected for the other municipalities (8:45, 8:48). Enschede has a water policy vision, but did not receive council-support and was initiated by a former alderman.

4.11 Politics

Enschede	Hengelo	Hof van Twente	Tubbergen
0	+	+	-
Coalition Diversity +	Coalition Diversity +	Coalition Diversity -	Coalition Diversity -
Majority Coalition -	Majority Coalition -	Majority Coalition +	Majority Coalition +
Council Support +	Council Support +	Council Support ++	Council Support +
Adaptation -	Adaptation +	Adaptation +	Adaptation --

++	All four points +
+	Three points +
0	Two points + / -
-	Three points -
--	All points -

In terms of political parties, Hof van Twente is the most consistent and stable with a steady CDA/VVD coalition². In approving climate policy-oriented decisions, their council focuses strong on payback-time due to their uncertainty in profitability, but on an alderman-level the council in general is experienced as supportive of their sustainability agenda (6:28)(35:45). In this process, citizens are also being involved with voice-meetings, a questionnaire, and information-evenings (23:1)(35:4)(7:36). While Enschede’s former coalition was led by the PvdA: a consistent, strong coalition-partner, the 2014-2018 term will be led by the slowly growing party D66, who has become the leading party in Enschede’s current coalition, which does not include the PvdA. Their former coalition had a decent council majority and was diverse with four political parties in power. The decision to set a climate-friendly condition on the airport project by the current coalition, who is led by D66 and was the party who quite possibly withdrew from power in the previous term because of a lack of this condition, can be considered as an indication towards the previous coalition’s attitude regarding local climate change policy (24:6). Hengelo had a very diverse and evenly divided coalition in 2010-2014 with five parties in power and with a small majority, which creates less potential for decisiveness. It is a consolation perhaps that the coalition was relatively left. Their

² http://www.nlverkiezingen.com/GR_OV.html

current coalition has become a little less diverse and a little less left with 4 parties and CDA who joined over GroenLinks and BurgerBelangen. They still have a small council majority (10:9)(10:42). Though the council is in general committed to deal with climate change, perhaps this explains why some of their public officials and aldermen have become more decisive and less consensus-oriented in terms of initiating pilot-projects without council approval. Similar to Hof van Twente, Tubbergen is also used to have a two-party coalition. However, the previous term was ruled by PvdA and Gemeentebelangen (GB)/VVD, and excluded CDA for the first time in history since 1982. The coalition had a small majority and with two parties is less diverse compared to the more urban municipalities. Currently, CDA is back in power with GB/VVD, and has a big majority with 16 out of 19 seats. The council in general is in favor of climate change plans, as long as they are financially solid, especially if it concerns big, expensive projects (9:4).

4.12 Budget

Enschede	Hengelo	Hof van Twente	Tubbergen
-	+	0	-
Sufficient budget -	Sufficient budget -	Sufficient budget +	Sufficient budget -
Policy efficiency +	Policy efficiency +	Policy efficiency +	Policy efficiency +
Budget increase -	Budget increase +	Budget increase -	Budget increase -
Adaptation -	Adaptation +	Adaptation -	Adaptation -

++	All four points +
+	Three points +
0	Two points + / -
-	Three points -
--	All points -

A much-heard comment regarding budgets mentioned by all four municipalities, little budget is available to help realize climate mitigation goals (8:19). Hof van Twente was the only municipality that did not mention 'little budget' as having a lack of budget, because more money has been allocated to provincial and state level budgets (6:24-25). Also, little budget will stimulate creativity to come up with more efficient or collaborative solutions, which will allow other departments to receive more budgets (35:9)(35:12). Though Tubbergen recognizes little budget stimulates creative solutions, which is also seen in the current aldermen's ambition to become an experimental area for climate policy pilots, they experience a lack of budget, which led to an approach to focus on activities that require small investments, such as increasing internal awareness to improve sustainability in indirect climate change policy agenda's, such as spatial planning (9:20)(30:5). Enschede recognizes a lack of budget, but has little intention to increase their municipal budget, because their budget could have been worse if support for sustainability had not been increased for the next term. Solutions are focused on budget saving with, for example, the wish for more efficient policy documents and less policy accountability towards the municipal council (38:6). Hengelo appears to focus more on pro-active solutions to maximize budgets without extra costs,

using a holistic approach where the matching of different departments leads to new budget sources and unexpected, more efficient collaborations (10:12).

On a citizen level, the politician’s short-term attitude is seen as an explanation for the budget cuts, which keeps the energy price high and limits support from public officials for local initiatives (33:13)(33:18). With regards to budget spending, an involved citizen in Enschede and Hengelo believes there is a more internal focus between departments and on awareness projects with municipal publicity rather than on the implementation of actual local projects (33:1). This suggests a gap between citizens and the municipality, because the four municipalities in general believe they provide enough start-budget for local projects and do not require much municipal budget due to citizen commitment and financial capacity of involved citizens (37:12-13).

In terms of climate adaptation, Hengelo was the only municipality that mentioned the allocation of a budget, in this case to the water department, and also mentioned an investment dilemma between flood prevention or sewer repair (5:45)(34:1).

4.13 Subsidy

Enschede	Hengelo	Hof van Twente	Tubbergen
-	+	-	-
Regional Subsidy +	Regional Subsidy +	Regional Subsidy +	Regional Subsidy +
National Subsidy -	National Subsidy -	National Subsidy -	National Subsidy -
EU Subsidy -	EU Subsidy +	EU Subsidy -	EU Subsidy -
Adaptation -	Adaptation +	Adaptation -	Adaptation -

++	All four points +
+	Three points +
0	Two points + / -
-	Three points -
--	All points -

All four municipalities acknowledge the province of Overijssel is an important supplier of subsidies to stimulate the implementation of local climate mitigation policy, especially with the provincial ‘sustainability’ program that resulted in a subsidy program for solar panels or isolation, the organization of an energy panel, and an attractive loan arrangement for citizens (35:9)(35:20)(37:11)(41:8)(5:63)(8:2). There is also a general consensus that local level subsidies are preferred over the higher-level subsidy programs, because they are usually found to be too complex in terms of conditions and time/benefit ratio. Hof van Twente for example applied, but eventually declined participation in the national-level ‘Slok’ subsidy-program due to complex procedures and uncertainties in terms of profitability and accountability (6:42). Although Hengelo has the most experience and expertise with regards to EU-subsidies, Hengelo did find that while the foreign experience is valuable, the subsidy is based on collaboration with a foreign municipality that makes it a time-intensive, unreliable activity that

is less visible for local citizens, which could lead to citizens being sceptic about the allocation of climate mitigation subsidies (10:41). This is also in line with Hengelo’s current focus on small, stimulating-oriented subsidy-programs (10:38). Enschede, who has ambitions to be more involved in EU-subsidy programs, also acknowledges that it is important to prioritize between the different EU-subsidy programs. On a local level, Hengelo showed an exemplary role with the example where unsustainable companies resisted against isolation subsidy conditions, but also inspired other companies to act in a more sustainable way (10:21). While Hof van Twente recognizes subsidies are more allocated to other levels of governance, they provided subsidy support to energy corporation ‘ECHT’ and the ‘Inspiration Farm Hof van Twente’ (7:34), contrary to Tubbergen who did not subsidize ‘energy corporation ‘Energiek Vasse’ because they trust the higher levels of governance to take care of this (9:31).

In terms of climate adaptation, subsidies appear to be rare. Hengelo was the only municipality that mentioned a subsidy program that stimulates investments in green roofs (5:38)(34:3).

4.14 Local Initiatives

Enschede	Hengelo	Hof van Twente	Tubbergen
-	-	0	+
Energy Corp. -	Energy Corp. -	Energy Corp. +	Energy Corp. ++
Companies +	Companies -	Companies -	Companies +
Municipal support -	Municipal support -	Municipal support +	Municipal support -
Adaptation -	Adaptation +	Adaptation -	Adaptation +

++	All four points +
+	Three points +
0	Two points + / -
-	Three points -
--	All points -

Hof van Twente mentions several local initiatives that are aimed to stimulate climate change mitigation, such as the ‘Inspiration Farm Hof van Twente’ and energy corporation ‘ECHT’ (7:4)(7:7). Tubbergen mentions a construction company that helped TU Delft students to improve their innovative concept to make houses become more energy-neutral, energy corporation ‘Energiek Vasse’, and a big pig farmer that experiments with roadside grass as a source for sustainable energy or other farmers that offer their land to sustainable-minded citizens (8:27-28)(8:30, 8:32). Comparing both energy corporations, ‘Energiek Vasse’ and ‘ECHT’ are similar in the respect that they both want to improve energy saving and sustainable energy production (7:4)(11:12). ‘ECHT’ is not sure yet how to accomplish this and is in a more explorative phase with more incidental initiatives, such as the upcoming organization of the Delden-Borne run with a sustainable charity such as a solar lamp and a clean street project component, which is an annual awareness event (7:20)(7:17). ‘ECHT’ is also keen in improving citizen participation, with the ‘local ambassador’ concept and struggles with an unfair workload amongst volunteers (7:9-10). While ‘Energiek Vasse’ also experiences limitations from their voluntary character, this has more to do with not being able

to take on bigger projects and being forced to choose one project over the other. Another difference is that 'Energiek Vasse' has a more organizational, professional structure and approach with clear roles and a future vision for 2016. There is also a difference in financial capacity with the 50.000-euro prize money for finishing second place in the 'Duurzaam Dorp Overijssel' competition in 2011, a 1.5 million euro budget for the construction of a sustainable cultural center and the many subsidy programs on an EU-level they can participate in (11:30). Another substantial project is a 3-year commitment with the University of Twente to participate in a smart-meter pilot-project (11:12). In terms of municipal support, 'Energiek Vasse' experiences more resistance from their municipality. This is likely to be a combination of 'Energiek Vasse's' high ambition combined with Tubbergen's relatively small amount of climate policy documents combined with a reactive attitude towards climate mitigation (11:10). Both Hengelo and Enschede do not currently have an energy corporation. Enschede mentioned some local initiatives though, such as the company 'Macklehold' that stimulates solar panel placement, and start-up support for local sustainable initiatives in North-Enschede and 'Energiek-Boekeloo' (33:4). Also, energy companies are being set up in South-Enschede. Though Hengelo mentions they have local initiatives, it was kept more abstract and focused on how companies deal with the climate market on a different way, distinguishing between pioneering, saving, and slowly adapting companies. On a citizen level, Hengelo and Enschede were both criticized for their lack of support in realizing local initiatives, and if support is given, there is usually no follow-up due to a lack of involvement and knowledge (33:35)(33:2-3). Enschede shows the intention to improve in this area with the appointment of a trainee that explores ways to optimize support for local climate mitigation initiatives and expressed the ambition to start an energy corporation based on 'ECHT's' example (37:12-13).

In terms of climate adaptation, Tubbergen's village 'Vasse' has an infrastructure in place that contributes to water containment and water maintenance (11:20). Hengelo mentioned a local initiative on a company-level where the 'Grolsch' factory uses excess rainwater to clean their beer bottles (10:5-6).

4.15 Current Ambitions

Enschede	Hengelo	Hof van Twente	Tubbergen
++	++	++	+
Policy integration	Policy integration	Policy integration	Policy integration
More complex goals	Waste-burning	Waste separation	Household-waste
Many ambitions	Many ambitions	Many ambitions focus on vision/idea's	Little ambitions.
No clear signs to realize ambitions	Continuation of previous vision	More support and collaboration.	Benchmarking to improve vision.
Adaptation: sewer policy collaboration and groundwater pilot	Adaptation: water storage and water separation for new districts	Adaptation: contain water, drink water for drought	No adaptation

++	High number of ambitions to improve climate mitigation and adaptation
+	High number of ambitions to improve climate mitigation or adaptation
0	Moderate/unknown number of mitigation or adaptation ambitions
-	Low number of ambitions to improve climate mitigation or adaptation
--	Low number of ambitions to improve climate mitigation and adaptation

An ambition all four municipalities share is that costs should be minimized and 'sustainability' should be more integrated in their overall policy. In realizing this, Hengelo, Tubbergen and Hof van Twente both mention the focus on a balance between ecology and economy as an important cornerstone within their overall municipal policy. Hof van Twente currently has several environmental policy documents and they want to make one overall policy document that should act like this cornerstone, which would allow when and where to implement climate mitigation policy (10:26). Furthermore, Hof van Twente wants to have a more clear vision and idea's regarding sustainability, with opportunities for support and collaboration (17:11). However, Hof van Twente's current policy plan to realize their ambitions is relatively structured already compared to other municipalities such as Enschede and Tubbergen, because their sustainability-program formulates actions for the upcoming four years and they have an activity table where all Hof van Twente's sustainability activities are mentioned, with a time-frame, and budget-status. These activities vary from energy-saving, formulation of a communication plan, a pilot for sharing warmth or energy between companies, setting up an energy fund, and the stimulation of wood-boilers (23:12). Another ambition is to realize a waste-free Twente and an important dilemma is to decide on which governmental level they want to separate waste. In terms of waste, a specific ambition is to have a more sustainable waste-burning solution, which could be benchmarked in Alkmaar (10:19). Hengelo's sustainability ambitions are diverse and are high in numbers, ranging from thirteen area's, including companies, mobility, realizing the heating-net, more awareness, municipal support, sustainable houses, municipal organization, and climate adaptation (17:11)(17:13). Tubbergen expressed the ambition to be more pro-active and to be more structural policy-wise, with the integration of 'sustainability' in their overall policy, which should allow for policy translation to a citizen level (9:42)(11:13). Similar to the other

municipalities, Tubbergen wants to improve their circular economy and has a clear ambition to decrease household-waste (8:5)(21:1-2). Tubbergen also wants to use benchmarking to formulate a future vision regarding a sustainable municipality and wants to be an experimental area for sustainability pilots (9:18) (9:21, 9:30). Enschede expressed confidence in having realized their ‘quick-win’ ambitions, and will use the upcoming term to focus on more complex ambitions (37:14). Similar to Hengelo, many ambitions were mentioned, such as: waste recycling, smarter mobility with their current budget, integrating sustainability in general policy, sustainable procurement, participation in the Covenant of Mayors, implementation outside geographical area, an energy corporation, setting up ‘Buurt in Groene Actie’, criteria for liveability and maintenance for each district and the potential re-development of ‘Twente Airport’ (37:10)(37:14)(38:10)(24:4)(24:6).

In terms of climate adaptation, a few ambitions were mentioned and were all focused on water policy. Hof van Twente wants to secure villages against floods and contain water, especially drink water in case of drought (6:67). Hengelo also focuses on improving water storage and wants to implement water separation technology in new district constructions (17:16). Enschede focuses more on improving collaboration in realizing sewer policy and to improve groundwater quality using a pilot (37:5)(43:11). Tubbergen did not mention climate adaptation ambitions, which is in line with their earlier statement there is currently no urgency to adapt.

4.16 Commitment

Enschede	Hengelo	Hof van Twente	Tubbergen
0	++	+	-
‘Reimarkt’ support and information project. Sustainable public buildings. Many achievements mentioned, but not specific and lack of argumentation.	Many specific examples of commitment in their three area’s. Adaptation: many examples of commitment, with a focus on water and green-structure.	Investment in energy corporation and inspiration farm. Citizen participation with info-meetings, hof-panel, and collaboration with local initiators.	Initiative with province to stimulate citizen sustainable investments. Solar panels on public building roofs. No adaptation.
No adaptation.		No adaptation.	

++	High commitment to climate mitigation and adaptation ambitions
+	High commitment to climate mitigation or adaptation ambitions
0	Moderate/unknown commitment to mitigation or adaptation ambitions
-	Low commitment to climate mitigation or adaptation ambitions
--	Low commitment to climate mitigation and adaptation ambitions

All four municipalities committed to the provincial sustainability subsidy program with a 1 million euro investment as a condition for receiving a 1 million euro provincial subsidy in order to stimulate energy saving, energy production, sustainability awareness using the energy panel, and private investments with

attractive loans. There is also a general commitment found in making municipal buildings more sustainable, especially in terms of solar panel roofs. However, it is unsure to what extent this is an act of commitment, knowing that Tubbergen mentioned that the construction of these solar panels was financed on a provincial level.

Hengelo is very broad and specific about the commitment to their ambitions, with examples of initiatives and experiments that are currently operational, categorized into their overarching sustainable agenda theme's: sustainable economy, climate & energy, and sustainable living environment. While Hengelo's commitment might be broad compared to the other municipalities, the municipal commitment is still rather small, because only the climate-oriented departments commit, which means the policy problem of climate change has not been fully integrated yet within Hengelo's overall policy (5:33). Hof van Twente's commitment was mostly found in terms of investments with 14.500 euro for setting up 'ECHT' and subsidy to set up the inspiration farm. Hof van Twente also committed to citizen participation with information-meetings, the hof-panel citizen platform, collaboration with local initiators and local subsidy-programs. Tubbergen's commitment was mostly found in organizing 'Dorpenergie' with the province to motivate citizens to invest in sustainability, and the placement of solar panels on the municipal building's and sport-accommodation's roofs. Enschede supported the company 'Reimarkt' in order to stimulate sustainable households and participated in citizen information projects such as 'Doe groen, dat scheelt.' In order to realize sustainable public buildings, Enschede placed 1.500 solar panels and committed to sanitary facilities, green parking, and waste separation (37:14). Enschede's evaluation note mentions several achievements, but due to the lack of argumentation and the use of big words such as 'frontrunner,' the credibility of these statements are debatable and could have been used in order to account their climate mitigation policy to the municipal council (40:2). In Enschede's 2014-2018 coalition agreement, the frequent use of 'sustainability' within the various chapters suggests a direction towards their current ambition to integrate sustainability into their general policy (38:1)(25:2-4). However, the actual content does not seem to reflect more orientation towards realizing climate mitigation goals. The main focus-points of the 'sustainable environment' chapter for example, do not mention an orientation towards climate mitigation or adaptation. Instead, a sustainable energy- and waste sub-chapter is included that is minimal in terms of commitment to climate mitigation goals (25:7) (25:9). Furthermore, Enschede's current climate-oriented alderman expresses commitment to improve sustainable mobility, while the 'mobility' sub-chapter does not contain themes such as 'hybrid cars' or 're-charge stations' (25:15).

In terms of climate adaptation, Hengelo is the only municipality that showed commitment to climate adaptation policy with the commitment to improve the water maintenance conditions in several districts ranging from bringing a local stream back to the implementation of a sustainable water system (34:11)(34:35)(34:7). Also, sewer connections are improved (34:33-34) and Hengelo committed to several initiatives to improve their main green-structure (34:36)(34:31).

4.17 Comparative Analysis Table

This table provides the reader an overview of the scores that have been given in this chapter for each of the four municipalities with regards to the earlier described local climate change implementation indicators. Below this table, the most apparent findings can be found.

Table 3: implementation indicator scores for each municipality

	Enschede	Hengelo	Hof van Twente	Tubbergen
Size	++	++	-	-
Mitigation Policy Goals	+	++	+	--
Mitigation Policy Plan of Action	-	++	+	-
Adaptation Policy Goals	-	++	+	-
Adaptation Policy Plan of Action	-	++	+	-
Municipal Role	-	+	+	-
Catalyst	-	++	0	0
Knowledge & Expertise	0	+	+	--
Network	+	+	+	-
Hierarchical Governance	+	-	+	++
Politics	0	+	+	-
Budget	-	+	0	-
Subsidy	-	+	-	-
Local Initiatives	-	-	0	+
Current Ambitions	++	++	++	+
Commitment	0	++	+	-

The above table summarizes the scores that have been given at the comparative analysis. The size scores confirm the difference in citizen density between urban- and rural municipalities and according to theory (Van den Berg 2010; Bulkeley et al. 2006, 2009; Kern et al. 2004), a more professional attitude towards climate change policy implementation is expected from civil servants in Enschede and Hengelo. With this in mind, it is striking to see the difference in scores between these two municipalities. This is also the case for the rural municipalities, where Hof van Twente has shown a more professional attitude towards climate change policy implementation compared to Enschede and Tubbergen.

Based on the above comparative scores, Hengelo is overall the most engaged municipality in terms of local climate mitigation and adaptation policy with a solid goal structure and plans. Though Hengelo's has the most solid adaptation-mitigation policy balance, adaptation policy is still mainly focused on water policy. For a rural municipality, Hof van Twente has decent climate mitigation and adaptation policy in place and is generally committed to climate mitigation policy, but lacks commitment to climate adaptation. For a sized, urban municipality, Enschede has less climate mitigation and adaptation policy in place than expected. While Enschede mentions many ambitions and claims to be committed to climate mitigation, these tend to be mostly words and are too ambiguous to confirm a real commitment to local climate change policy. Tubbergen deals with climate policy as a necessity. Their focus is on obligatory area's that need to be realized with minimum capacity. Tubbergen recognized a lack of ambitions, solid climate mitigation- and adaptation policy, and a commitment to implement these policies.

As expected, based on table 2, Hengelo has shown to have catalysts that impacted both climate mitigation- and adaptation policy. Though Hengelo has become more careful with the engagement in higher governance projects, their local policy reflects national climate policy goals. Despite Hof van Twente's low amount of citizens, their professionalism and commitment is remarkable, which is also shown in their structured policy that reflects national climate policy. Therefore it is no surprise that Hof van Twente has a long-term political stable majority coalition with a municipal council that supports climate policy. The high expected score from Enschede for the 'need-based scope' indicator is in line with Enschede's ambiguous climate policy and low commitment. The ambiguous use of the word 'sustainability' throughout their new municipal policy plan is interesting. While the first thought is to think that climate mitigation policy has been integrated in their municipal policy, the word is actually used to express a long-term strategy for that particular policy area. While Tubbergen has not been committed to climate change policy implementation thus far, they did express ambitions to improve their climate vision- and policy. Despite the expectation of a high climate change risk, Tubbergen has shown little urgency to invest in climate change policy.

5. Conclusion

In order to improve knowledge about the way local governments deal with this ill-structured policy problem 'climate change', this study aimed to identify problems and opportunities in local climate change policy. In order to identify these problems and opportunities, four Twente municipalities have been compared to their similarities and differences in views on local climate policy change implementation.

The first sub-question is aimed at identifying each of the selected municipality's current view on local climate change policy. Hengelo approaches climate change as an important policy problem, which is reflected in their structured, specific policy goals- and plans. While they currently lack budget to invest in sufficient civic capacity to realize all their climate policy plans, they have a few catalysts that do what they can to realize their goals. While climate change mitigation is their main focus, they also have a solid climate adaptation policy, which is focused on water containment. On a local level, the view on local climate change policy in Hengelo was more skeptic due to a gap between citizen and the municipality that makes it difficult to implement citizen initiatives that contribute to the mitigation of climate change. Enschede is trying to find a way to give purpose to climate change as a policy problem. Enschede mentions several goals within their policy, but they are quite ambiguous and generally lack specific, measurable goals and commitment to these goals. This is also confirmed on a local level that Enschede citizens find it difficult to find support from the municipality to realize local initiatives. The balance between mitigation and adaptation is also weak. There is a big focus on climate change mitigation policy, and in their current coalition-agreement, sustainability has become a prominent word within other policy area's where its purpose has changed to advocate a long-term approach in that particular policy area instead of climate change policy. Hof van Twente is supportive of climate change policy on all three levels. There is a positive attitude regarding climate change mitigation, which is shown in their policy. There is a certain commitment to climate adaptation, but not equal to climate mitigation. Tubbergen does not have a vision regarding climate change policy. Little policy has been formulated. Due to a lack of budget and civic capacity, the mandatory, high-level policy goals are Tubbergen's main focus. On a local level, it is found difficult to find municipal support to realize local initiatives that contribute to climate change mitigation- or adaptation.

The second sub-question is aimed at identifying the similarities and differences between the four Twente municipalities. Two main similarities have been found. There is a general lack of a high budget, which requires creative, efficient policy solutions to compensate for the lack of money. Also, all four municipalities were not able to show an equal balance between climate mitigation- and adaptation policy. In terms of differences it has been found that urban municipality Hengelo has a solid climate change policy, while Enschede does not. The same goes for rural municipality Hof van Twente that has a more solid climate change policy compared to Tubbergen. In this sense, there is a similarity between the two municipality types in their difference of climate change policy. Furthermore, Hengelo and Hof van Twente showed more commitment, which is in line with their more solid climate policy. Hengelo showed the biggest presence of catalysts, while Hof van Twente showed to have a solid position political wise. Enschede is the only municipality that gave a different meaning to the word 'sustainability' in their policy. It has also been found that Tubbergen is the only municipality that hardly formulated climate change policy and admitted this should improve. Tubbergen is only able to commit to the bare minimum of climate change goals that have been determined on higher-levels of governance.

The third sub-question is aimed at identifying problems and opportunities in local climate change policy based on the earlier identified similarities and differences. A big opportunity is to invest more in climate adaptation policy and to make it an equal policy area next to climate mitigation. However, a problem in realizing this is a lack of budget. Especially for Hengelo, with a catalyst in place in the climate adaptation area, there is an opportunity to convince the council to invest in a more solid, long-term adaptation plan that covers a wider range of adaptation theme's. Tubbergen has an opportunity to formulate a climate change policy vision, with goals and plans to support their commitment. In that regard, Hof van Twente

could be used as an example to learn from. Hof van Twente could try to make more use of subsidies. Perhaps with dedicated public servants, similar to Hengelo. Enschede needs catalysts that prioritize climate change on the council agenda that will enable them to formulate solid and focused climate mitigation- and adaptation policy.

The following points for discussion regarding the conclusion of this study need to be taken into account. The views presented in this study regarding local climate change policy for each municipality are based on four sets of three interviews. While three interviews give more perspectives than one, there is still a risk that the interviewee might have incomplete or incorrect information regarding their local climate change policy. Hengelo's alderman couldn't be interviewed. Instead, a sectorial environmental manager and sustainability manager were interviewed, which is not an administrative level. The interviews with the policy maker and alderman in Enschede, took place together. A risk of this set-up is that the interviewee might have felt obligated towards the other interviewee to answer a certain way, which wouldn't be necessary if they had been interviewed separately.

Insights derived from this study's conclusions are that, though local climate change policy needs to be implemented by the municipality, the municipality has become financially more dependent on other administrative levels, such as the province or the EU, or on business levels, such as energy corporations that apply for their own subsidy. This suggests municipal coalitions have little control to realize their climate change policy goals. On the other hand, due to legal restrictions climate change mitigation policy solutions still need to be implemented within the municipal border. Implementation outside the municipal border might be an opportunity to attract more investors due to an increase in choice, or an opportunity for different municipalities to jointly invest in the best available climate change mitigation solution without geographical restrictions. Being able to implement outside the municipal border might also lead to a more uniform climate mitigation policy between municipalities, a more clear view, which might attract more investors. Collaborations between municipalities within the EU are also more likely to happen, because they wouldn't be restricted to their own local area. However, an important condition to realize this scenario is the successful implementation of an energy-grid network that is able to import this energy to the households within the municipality.

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APPENDIX A: CASE DESCRIPTIONS

Enschede

Enschede is an urban municipality located at the south-eastern part of the Twente region. The municipality has a surface-area of 142,72 km² (CBS, 2012), counts 158.627 residents that live in the city of Enschede, which makes Enschede Overijssel's biggest city and the 11th Dutch municipality in terms of population (CBS, 2013). In terms of real estate, Enschede has known three big town fires: one in 1862 where the whole city burned down; one during World War II where Allied airplanes accidentally bombed parts of the city thinking it was a German city; and the firework disaster on 13 May 2000 that caused a whole residential district to burn down. In 2010 the renovation-project to rebuild this residential district has been finalized. Economically, Enschede used to depend heavily on the textile industry since the 1860's with a working population of 85%, but collapsed in the 1960's, which led to an explosive unemployment increase. However, Enschede managed to recover this economical crisis with the arrival of a university (University of Twente), an academy (Saxion), important healthcare facilities such as 'Medisch Spectrum Twente' (MST), together with huge financial state investments in the industry- and service sectors, which resulted in the construction of many offices near the train station and an expansion of Enschede's shopping centre (Enschede onze Stad, 2014)(Enschede: Stad van Nu, 2014). In the 90's, a plan was developed to merge the municipalities Borne, Enschede, and Hengelo into one municipality 'Twentestad,' but was not implemented after results from a referendum in Hengelo showed a lack of citizen support for the plan. Now, in 2014, the city councils of Almelo, Borne, Enschede, and Losser decided to centralize several municipal departments, such as communication, legal affairs, and human resources. This merge is called 'Intergemeentelijke Bedrijfsvoering Organisatie' (IBO) and is expected to be operational in 2015 (Tubantia, 2014).

Climate change mitigation policy goals in Enschede

Looking at the 2010-2014 coalition agreement, it is mentioned in the section 'duurzame ruimte' that they will focus on realizing an energy-neutral municipality in 2020 with an ambition to integrate environmental, rather than specifically climate change, concerns into Enschede's policy (24:5). The agreement also mentions a decrease in aldermen from 6 to 5 with the reason there will be a good prospect in collaboration between their broad coalition and the council. However, the skeptics could say that a big focus of this coalition agreement is to improve the economy and to realize budget-cuts (24:7), and one less alderman is technically a budget-cut. The same can be said about the agreement's focus on collaboration, participation, and empowerment. Apart from the positive sides of this direction, it is unclear whether this agreement is a genuine will to choose this direction or a budget-cut in disguise. In terms of budget allocation, climate theme's could indirectly benefit with ambiguous terms such as: innovation, infrastructure, district development, urban development, and living environment, but this is unsure. In terms of innovation, it was proposed to structurally invest 3 million euro's in general with a focus on sustainable innovations in order to improve the municipal economical structure, but this is a proposition and is not directly linked to climate mitigation improvement.

In 2010, Enschede published a long-term sustainability vision called 'Nieuwe Energie voor Enschede', which formulates a long-term municipal vision on 'sustainability' that contains an analysis of the status quo, the future vision and instruments to realize this vision. This long-term vision has been determined by the municipal council on 16 november 2009 and a sustainability-oriented consultancy firm DWA was hired to write a descriptive report about the municipality's current sustainability policy and concluded that Enschede needs to further accelerate and sharpen their sustainability policy to reduce Co2 emissions in such a way that Kyoto- and climate treaty goals are met, which allows Enschede to become a climate-neutral municipality (41:3). Sustainability is seen as an investment to generate economic opportunities to improve employability, school buildings, education, and further regional collaboration between municipalities in Twente and innovative partners such as 'Twence', building cooperatives, the University

of Twente and the Saxion academy (41:2). The long-term sustainability goal is to have a climate-neutral municipality that has a 28% Co₂-reduction in 2020 compared to 1990 where sustainable energy should occupy 17% of Enschede's energy need. However, these percentages are rather confusing because on the same page it is stated there should at least be a 30% Co₂-reduction in 2020 compared to 1990 where sustainable energy should occupy 20% of Enschede's energy need. These long-term goals are then bracketed into fourteen more specified sub-goals and are further complemented with seven additional measures (41:3).

In 2012, a waste policy vision document was formulated, which was initiated by the college of mayor & aldermen, and expresses the ambition to improve its municipal waste separation with 60%, optimize waste service quality, minimize waste in public space, without extra costs in order to contribute to the sustainability goal of 30% Co₂ emission reduction in 2020. The main motives to improve Enschede's waste recycling are to improve sustainability, to reduce Co₂ emissions, and to be profitable (39:1). In terms of responsibilities, Enschede acts within the national waste policy frame, and is mainly able to influence the collection and processing of household waste. Companies are responsible for the prevention of waste material and citizens are responsible for waste separation on a household-level (39:2). Waste-partners are 'Twente Milieu N.V.', who is responsible for collecting most household waste, and 'Twente Afval en Energie' that processes combustible residual waste and gft-waste (39:3). There is also a commitment with 'Twente' to find a balance between acting as an energy supplier and recycling waste. To realize this, collaboration is necessary between 'Twente', 'Twente Milieu', and municipalities to commit to an optimal processing of waste currents (39:4).

In 2013, a temporary evaluation note of the energy note in 2010 'Nieuwe Energie voor Enschede' was formulated. This evaluation includes Enschede's accomplishments thus far, their future goals, and how Enschede copes with their limited budget. Enschede's ambition is to realize a sustainable city that uses its energy and resources responsibly. Goals are to have 30% less Co₂-emissions and 20% sustainable energy in 2020 (40:2).

In the 2014-2018 coalition agreement, Enschede expresses the ambition to be a more sustainable municipality, which is titled as 'Green Growth,' and is seen as an important investment for future economy and as a way out of the current financial crisis (25:5). Enschede also supports the regional ambition of 'Afvalloos Twente' to realize a 90% recycle-rate and household residual waste of 50 kg annually per capita in 2030, which should lead to a decrease in waste-tax as well (25:9). The 'sustainable social environment' section where Enschede's mitigation goals are expressed, mentions key-words at the start, which are: economic structure improvement, city experience, villages and districts, and urban development (25:11). These key-words do not specifically reference to climate change.

Climate change mitigation policy plan of action in Enschede

In order to realize Enschede's coalition-agreement 2010-2014 goal to manage a necessary cut down in costs and energy-neutrality in 2020, an important focus is on 'collaboration.' For example with 'Regio Twente', 'Netwerkstad Twente', or innovation platform Twente (IPT) to realize a more centralized, regional public official service to save costs (24:2). Collaboration is also used to stimulate innovation with a more steering municipal role within Enschede's three strategic 'Netwerkstad Twente' innovation-triangle projects 'Kennispark,' 'Hart van Zuid' (Hengelo), and the re-development of Enschede's airport (24:3). In terms of energy, collaboration between government, companies, and housing cooperatives should lead to energy production and energy saving projects. Residual waste processing from 'Twente' should be optimized as well and local initiatives receive municipal support. Sustainable procurement is realized in 2012 to stimulate sustainable construction, and energy is saved with investments in public lighting. Furthermore, an incremental implementation of underground block-containers and broader opening hours for citizens to deposit waste, will stimulate waste-separation (24:5).

In order to realize Enschede's climate mitigation goals expressed in their long-term sustainability vision 'Nieuwe Energie voor Enschede,' there will be a focus on having an exemplary role with public buildings, an informative, facilitative, and stimulating role in realizing more energy-saving and sustainable energy behaviour from citizens and companies, a commitment towards the environmental law, and towards themes such as sustainable houses, schools, and municipal organization, sustainable energy production, sustainable area development, communication and participation. These and a few other themes such as traffic and transport, and the industry are later added for a total of seven themes that all are specified into goals, the goal-effects, partners, and financing. The municipality will steer regular and urban projects into having a more sustainable-oriented structure with for example sustainable procurement, and investments in urban or new construction projects, which is stimulated with a 800.000 euro budget for 2008-2012 and an extra 1.500.000 euro from the council in 2009. From a third party report, Enschede recognizes that acceleration and sharpening requires constant correction and annual monitoring, which resulted in an implementation program for 2020 where each of the seven themes are bracketed into a list of activities with expected results in 2020 with a total of fifty activities (41:7).

In order to realize Enschede's waste policy vision goals, rules & regulation, communication, and collaboration with citizens and partners are used. There is also a focus on improving Enschede's waste collection infrastructure for households, districts, and the city together in combination with citizen motivation using: communication, waste rules, and waste collection levy in order to ensure citizens use this new waste infrastructure adequately (39:5). Other measurements are categorized between 'source separation' and 'post-separation.' The latter focuses on improving waste separation for bulky waste, regional collaboration, and minimize citizen effort. 'Source separation' measures are more diverse and focus on old paper collection (OPK), plastic packaging (KVM), glass collection, underground waste collection, citizen participation, the use of unemployed citizens, and research for possibilities to collect textile waste and possibilities to optimize Enschede's waste collection points (39:6). The plan is to implement several pilots to improve paper or plastic waste collection, which are 'Minicontainer OPK', Pilot 'OPK hoogbouw', and 'Pilot huis aan huis halen KVM'. Another pilot focuses on improving underground waste collection, social environment, and citizen participation with the pilot 'Milieuparken Roombeek en binnenstad' with an additional 'citizen participation' pilot that focuses on being entrepreneurial and working together with citizens in their district (39:6).

In achieving the long-term sustainability goals mentioned in this temporary evaluation note, the government depends on different factors, such as higher-level policy, economic and technological developments, but also factors such as local citizens, companies, and institutions that need to actually perform the act of saving energy, which makes it difficult to predict when this goal can be realized. In terms of budget, Enschede had a limited budget for initiatives and projects in 2013-2014. The 2014's municipal budget-cuts proposal includes an option to incidentally cut down 125.000 euro on sustainability, which is seen as a possibility because sustainability has been integrated in Enschede's internal organization. Residual budgets will be spent on specific local initiatives and projects that directly contribute to sustainability goals (40:3).

In order to realize 'Green Growth' in the 2014-2018 coalition agreement, Enschede focuses on collaboration, which is also confirmed by the coalition agreement's title 'Duurzaam, samen, sterker!' Important reasons for collaboration are to save management costs, accelerate innovations, to improve the municipal (council) position during regional collaborations, and to profile the municipality's public image (25:1). These collaborations involve regional businesses, education, and knowledge institutions, in which the municipality plays a steering role. The municipality wants to stimulate citizen participation and experiments with different types of citizen participation during the development and implementation of policies and projects, such as voice-meetings, consultation, or district-surveys. District budgets should also be freely spendable to increase citizen's steering role and realizing local district projects, which the municipality also tries to facilitate with the development of new district plans (25:3). Waste ambitions are pursued in collaboration with all municipalities in Twente, 'Regio Twente', and 'Twente Milieu,' Twente,'

(25:9). Deliberations will be held with housing cooperatives to further increase sustainable housing (25:5). Furthermore, solar-panel placement on roofs and terrain will be further stimulated and developed together with partners and is facilitated with loosening rules & regulations for solar-panel placement on redundant terrains (25:7). Sustainable innovations should eventually lead to cleaner production, economic growth and employment. The re-integration of citizens will partially be focused on the energy sector and is part of the 'Weconomy' concept. Furthermore, sustainability is stimulated depending on shareholdership, procurement, rules & regulation, and permits (25:5).

Climate change adaptation policy goals in Enschede

In the 2010-2014 coalition agreement, the municipality of Enschede aims to protect its rural area's in order to preserve its natural quality for recreational and tourist purposes (24:12). Due to the financial recession and demographic developments, Enschede wants to improve their diminishing ground value with the maintenance of green urban area's in order to improve citizen's city experience (24:10).

A concept document was formulated that includes a municipal water vision for 2012-2025 that includes water ambitions and water goals. A high amount of partners have been involved in formulating this water vision document, which suggests a deliberative policy approach (43:15). The current formulated water ambitions are: partner collaboration, water visibility, water awareness, water containment, uncoupling, and minimal housing costs. Goals that are derived from these ambitions are to decrease extreme rainfall problems, control groundwater, and to improve water quality (43:14). Enschede's former water vision in 2002 lacked realistic goals and an implementation program (43:16). In order to improve this, the new water vision has been linked to Enschede's five main ambitions: partnership, knowledge & talent, lively districts, green & sustainable, and being financially solid (43:14).

In the 2014-2018 coalition agreement, the municipality of Enschede expresses the ambition to mitigate water problems. Urban citizen agriculture initiatives are also facilitated to allow active citizens to maintain their own green area's. The rural area's and urban fringe area will also be developed (25:12). However, climate change is not explicitly mentioned as a reason for committing to these goals.

Climate change adaptation policy plan of action in Enschede

In order to realize Enschede's coalition-agreement 2010-2014 goal to protect rural area's, the implementation of more 'green' or 'blue' services and new, economic opportunities are stimulated (24:12). The maintenance of green urban area's is realized with a re-evaluation of ground use in deliberation with partners and investors with a focus on compact constructions (24:10).

In order to realize the water vision's goals, a water-program is mentioned that shows what activities Enschede's water partners will perform the upcoming years, where also several water bottlenecks are considered. The water-program is evaluated and re-formulated each two years by the college of mayor & aldermen in deliberation with their water partners. Progress is reported annually to the municipal council. Financial resources are used from the municipal sewer plan budget, subsidies, and investments from water partners, and if necessary, requests are being done to improve the water budget during the program-budget cycle or with budget changes (43:12). A water-treaty has been signed with the waterboard to improve collaboration and Enschede's participation in the 'Twents Waternet' network aims to improve collaboration effectiveness with the waterboard and other municipalities (43:3).

In order to realize Enschede's coalition-agreement 2014-2018 goal to mitigate water problems, the most important bottlenecks should be tackled first, where the implementation of a city-stream is Enschede's biggest priority (25:12). Urban citizen agriculture, the development of rural area's and the urban fringe area are stimulated with pilots, projects, and rules & regulation in order to protect nature area's (25:6). Examples are area a pilot where citizens will be completely responsible for the maintenance of their district, a project called 'Gids Buitenkans' that aims to improve green land and nature and allows for the implementation of new developments without harming Enschede's agricultural position (25:12), and

Enschede's 'Airport Twente' project that will be implemented on the condition that nature- and environmental risks are minimized (25:6).

Interviews

In order to further increase the knowledge about the way the municipality of Enschede deals with climate change, an alderman, policy-maker, and the chairman of the district-council 'Ribbelt-Stokhorst' in Enschede have been interviewed to share their experience with Tubbergen's climate policy, which have been used in the description of the next implementation indicators:

Municipal Role

Enschede has an exemplary role with regards to sustainability in a sense that the municipal organization has set their own reduction measures, which led to the placement of around 1500 solar-panels on public building roofs, sustainable public sanitary facilities, a green parking area and a wide range of waste separation in public buildings. The current sustainability-oriented alderman also sets an example with confronting colleagues about energy-saving when computer screens stay on at night. These activities are the municipality's own responsibility (38:4). For other climate policy area's the municipality has an informative, facilitating, enthusing role in order to increase commitment from partners, such as companies, to realize sustainability goals such as 30% Co2 reduction in 2020. During these collaborations it is important for the municipality to let the company steer the projects and let the municipality be more of a facilitator, but this takes time. The 'Reimarkt' for example, is an initiative that the municipality helped set up in order to help houses become more sustainable, but these houses are the responsibility of housing corporations or private owners. In facilitating citizen participation, it was mentioned that voice meetings, consultation, district-surveys, and a flexible use of district-budgets for citizens are used. While the municipality expresses commitment to play various roles in realizing climate mitigation policy goals and mentioned examples such as a more sustainable municipal building and helped set up the 'Reimarkt,' on a citizen level, the citizen interviewee expressed a lack of municipal support in realizing local citizen initiatives. Enschede would rather invest in incidental promotional activities where citizens can compete for being the most sustainable house, because this attracts publicity that improves Enschede's climate mitigation image. In terms of climate change adaptation, Enschede plays a steering role for spatial planning- and sewer policy (37:4)(38:3).

Catalyst

Within each policy program 1 or 2 public officials are involved in making 'sustainability' work, and most public officials are enthusiastic about sustainability. The current coalition-agreement is expected to help sustainability become a higher priority on the municipal agenda (37:6). Former alderman Hans van Agteren did a lot in terms of setting up sustainability in Enschede, but the tipping-point was alderman 'Jelmer van der Zee' who was the first to say 'sustainability' should be put on the municipal agenda and freed up budget to pursue sustainability goals, which led to a slow process of setting up sustainability policy and to make sustainability a higher priority on a governmental level at the municipal council (38:5). There is currently no specific adaptation-oriented policymaker or alderman that represents and catalyzes a climate adaptation-oriented agenda (38:2).

Knowledge & Expertise

To some extent, sustainability is integrated in every municipal policy program. Each of these policy programs has a few sustainability-oriented policymakers operational. The sustainability manager aims to further integrate and develop sustainability and coordinates these policymakers to achieve this goal. The 'sustainability manager' job was introduced in the previous term where its focus was mainly on energy use and environmental policy such as 'living environment' and 'urban development.' In terms of accountability, the sustainability manager reports to the municipal secretary (37:1). Due to Enschede's size, the internal knowledge is sufficient and if necessary can be hired externally or can be retrieved

sharing knowledge from collaborations with partners (37:7). With regards to sustainability, dilemma's may appear due to the lack of knowledge. For example, many waste and green is currently used for energy production, but this costs soil, which is also needed, so choices need to be made about what activities to prioritize (37:8). Current sustainability-oriented alderman is responsible for finance, city centre, and the coordination of sustainability. The current coalition-agreement gives a more general approach towards sustainability where it is not only about environmental aspects and every alderman has a task to include sustainability aspects within their areas of responsibility (38:1). The new alderman's first impression is that public officials are extremely competent and driven to deal with sustainability goals, but the problem is insufficient capacity due to a lack of budget. Though, due to the current high priority in coalition-agreement for sustainability, budget cuts on this policy area are relatively small. Another problem is that policy currently consists of too many pages. The high page's number's purpose is mainly to account for the council's questions, but this takes much time and budget. If the council and college of mayor & aldermen would ask fewer questions and give more trust to the public officials, they would be able to formulate satisfactory policy of 40-50 pages (38:6). From a citizen level, it is suggested that legal knowledge might be used by the municipality to prevent local initiatives and to protect companies (33:12). Climate adaptation goals are less structured into policy and have no specifically appointed responsible public official that coordinates a council-supported climate change adaptation agenda. This is reflected as well in Enschede's integral implemented sustainability policy and the attention it receives in the new coalition-agreement, in contrary to the less structured climate change adaptation activities. Both mitigation and adaptation activities are present, but are not treated within one over-arching climate policy document (38:2). Climate adaptive activities such as water containment, using Wadi's, or the uncoupling of water from the sewer system, are done by other policy departments and are not part of sustainability policy. Public officials expressed the need to integrate sustainable and adaptive policy into one integral climate policy document (37:3).

Network

Enschede participates in the sustainability-oriented 'Regio Twente' network meetings on a governmental and public official level. On a national level, Enschede participates in the G32 network that deliberates about environmental and sustainability with all Dutch municipalities with 100.000 residents or more, which are around 40 municipalities. These meetings occur on a governmental and public official level. The Covenant of Mayors has also been signed. 1-2 colleagues are member of an international network called 'Eurocities.' During this term Enschede will also become a member of a green business network called 'The Sustainable Table,' which also has German members around the Twente border. Also, Enschede participates in the MONT network that celebrates its 25-year existence and one of this year's themes will be sustainability. There are Euregional meetings as well. Participating and maintaining these networks is time-consuming (37:9). No specific climate-adaptation networks were mentioned.

Hierarchical Governance

Enschede is committed to national and EU climate goals with regards to Co2 emissions and sustainable energy production (37:10). Within national politics, climate change mitigation tends to be narrowed down to energy saving and sustainable energy production, which makes other mitigation activities, such as soil recycling, or climate adaptation-oriented activities, a secondary objective. This is also reflected in local climate change policy, which is largely focused on sustainability, because the council's climate frame and goals are mainly focused on decreasing Co2 emissions and sustainable energy production, which resembles public official's sustainability-oriented attitude towards climate policy as well (37:3).

Politics

Enschede's former coalition, for the 2010-2014 term, consisted of a diverse coalition with PvdA, VVD, CDA, and 'BurgerBelangen Enschede' (BBE) with PvdA being their biggest party with 9 seats. D66 was the electoral winner with a big win of 6 seats compared to previous years, but due to a difference in opinion

about the development of the airport, they decided to withdraw from further coalition negotiations, which resulted in the latter coalition. The previous coalition had 24 seats out of 39, which is considered a decent majority. For the 2014-2018 term, D66 did manage to form a coalition with practically the same parties from the former coalition, except for ChristenUnie and PvdA, and vary from 3 to 7 seats with a decent majority in the council occupying 24 of 39 seats. Having the latter political party being excluded from the coalition is quite exceptional, looking at previous terms. The same can be said about D66 who used to have 1-2 seats, and has now become Enschede's biggest party with 7 seats, which indicates a political power-shift. In their 2014-2018 coalition-agreement, the difference in attitude with regards to the airport is also apparent, with the clear condition that the airport will only become operational if preservation of the nearby natural environment can be guaranteed (24:6). It is assumed that this was the condition other parties could not agree on back in 2010, but now perhaps time's have changed and most of the same parties were able to agree now. This example indicates a positive development for local climate policy in Enschede.

Budget

Enschede reserved 1.5 million euro for investments in sustainability and energy saving in 2009 (15:1). While the current municipal capacity is seen as competent, the capacity number is seen as insufficient due to a lack of budget. Though, due to the current high priority in coalition-agreement for sustainability, budget cuts in this policy area are relatively small (38:6). According to a local citizen, the politician's short-term attitude has led to budget-cuts and leads to public officials that use legal obstacles in order to limit investments in local ideas (33:13) and keeps the energy price high to ensure tax income (33:18). In order to deal with the lack of budget, a provincial subsidy-program has been organized on a regional level in order to save on municipal budget. Another way for Enschede to save on budget is to decrease the pages of policy documents, which can be around 300 pages. The purpose of this high number is mainly to account for the council's questions, but this takes much time and budget. If the municipal council and college of mayor & aldermen would ask fewer questions and give more trust to their public officials, they would be able to formulate more efficient policy documents of 40-50 pages (38:6). Some budget has been used to help citizens set up local initiatives (37:12-13).

Subsidy

The Province of Overijssel is an important subsidy supplier in terms of improving the sustainability of houses and schools. This subsidy is almost completed and is part of a regional subsidy-program of 50 million euro that has been reserved by the Province to set up and evolve energy-panels. An ambition is to become eligible for more subsidy-programs that focus on sustainability energy and energy-saving. While most subsidies will probably come from the Province to support local houses and schools, inter-regional subsidies or EU-subsidies should also be considered, but depending on the subsidy-program conditions, the application process can be quite complex, which is the case in most EU subsidy-programs, so it is important to prioritize (37:11).

Local Initiatives

The municipality of Enschede has several local initiatives that stimulate climate change mitigation. There is an energy initiative from a local company called 'Macklehold' that is involved in placing solar panels in different Enschede districts on a project-basis. There is also a citizen initiative that is involved in these activities, which received municipality support. However, in practice, the involved public officials do not seem to have an idea what is exactly going on or what needs to be done (33:4). The district council for the residential area 't Ribbelt/Stokhorst' has explored possibilities to generate energy in a collective way, which could result in local electricity or warmth. A suggestion is to collectively invest in a heating-installation that will become a heating-net that could become a cost-efficient gas substitute. However, the municipality does not allow the construction of pipes on public ground to create a heating-net infrastructure, which makes it difficult to realize such a local project (33:35). Some municipal budget has

been used to help citizens set up local initiatives, such as an initiative in Beijnen in the Northern part of Enschede that is involved in sustainability. Also, 'Energiek-Boekeloo' is an example where, citizens joined and decided to commit to sustainability after start-up support. In the Southern part of Enschede, local energy companies are currently being set up. The municipality has a trainee working on an assignment that explores how the government can support these local initiatives in the most adequate way. Most municipal investments in local initiatives are small and usually concern need for support in information and communication, because these citizens are passionate about stimulating sustainability development and will finance most investments privately (37:12-13). No examples have been found of local citizens that set up or collaborated in initiatives that stimulate climate change adaptation.

Current Ambitions

Now the 'quick-win' ambitions have been realized for the most part, more complex goals should be set, such as waste recycling and smarter mobility, without the need for extra budget. A main ambition is to make 'sustainability' an integrative part of public policy, similar to 'safety' policy. Structuring sustainability-oriented procurement is a part of this (37:14). Another mentioned challenge is Enschede's participation in the Covenant of Mayors and the commitment to Co2 goals (38:10). An important ambition to help reach these goals is to explore the possibilities to implement sustainability goals outside Enschede's geographical area, which is likely to increase the effectiveness of the municipality's future sustainability investments (37:10). The municipality also wants to explore the possibilities to set up an energy corporation in Enschede using benchmarks from other currently successful energy corporations, for example in Goor, in order to improve bottom-up initiatives. Other ambitions are to implement the nature-oriented version of a previously successful project 'Buurt in Actie.' This project will be called 'Buurt in Groene Actie,' where the municipality will first invest in nature in districts or villages, which then should be maintained by volunteers. Local children farms play an intermediating, recruitment role in this. Every district should also have criteria for livability and maintenance in order to improve measurability for district inspections (24:4). Furthermore, the re-development of Twente Airport will be approved on the condition that preservation of the nearby natural environment can be guaranteed (24:6).

In terms of climate change adaptation, Enschede's ambition is to collaborate with partners to further develop their sewer policy (37:5) and to set up a pilot-project to improve groundwater quality in the Roombeek district in collaboration with waterboard Regge, Dinkel, and industrial extractors, which can be used to further improve water policy (43:11).

Commitment

1.150.000 euro is invested in sustainable projects that include measures for energy-saving in houses, climate-neutral schools, solar panel placement on schools or public buildings, and support through communication, participation, and education (41:6). Enschede placed around 1500 solar-panels on public building roofs, uses sustainable public sanitary facilities, has a green parking area and a wide range of waste separation facilities in public buildings. Enschede also helped set up the 'Reimarkt' in order to help households become more sustainable. In terms of sustainable procurement, the procurement of bee-friendly plants is stimulated to protect the eco-system, which has led to an increase of local beekeeper associations and the 'Beien' foundation (37:14). In terms of citizen participation, there is a campaign called 'Doe groen. Dat scheelt', which aims to inform citizens about saving energy. Part of this campaign was an energy saving initiative on elementary schools that allowed children to collect for a solar-panel on the school's roof that are subsidized by the province of Overijssel. This campaign relates to the project 'frisse scholen' and is also a plan to realize a sustainable city farm that will stimulate sustainability awareness amongst children. In the temporary evaluation note of the long-term sustainability vision 'Nieuwe Energie voor Enschede' are: being a frontrunner in terms of energy-saving and a huge increase in green electricity production; more than 1.200 sustainable houses in 2012; pilot-projects that stimulate energy-neutral districts, sustainable schools and waste-separation; a manifesto is signed that aims to realize more sustainable and clean primary schools; the municipal organization uses primarily green

energy and green grass as energy supply; and the recycling of Twence's residual warmth to green energy has majorly increased sustainable energy supply for Enschede (40:1). The achievements mentioned in the temporary evaluation note of the long-term sustainability vision 'Nieuwe Energie voor Enschede' include that Enschede is the front-runner in terms energy-use, 1.200 sustainable houses in 2012, pilots for districts, schools, and waste separation, a signed intention statement to increase sustainable schools, municipal building uses green electricity, and a general increase in sustainable energy use due to Twence. This is far less than the fifty activities that were mentioned in the actual sustainability vision document and it is unclear what arguments back-up these six achievements. These six achievements with the statement that different factors and partners make it difficult to predict results, seems contradictory with the fifty activities with their expected results, but is also a way of saying that the large number of activities might perhaps not have been feasible enough. This is further suggested with the prediction that a new set of goals and indicators are needed that suit the municipality's ambitions, instruments, and influence capacity, together with the proposal to limit sustainability budget (40:2).

In terms of climate adaptation, no specific achievements have been found that express actual commitment to climate adaptation.

Hengelo

Hengelo is an urban municipality located at the centre-eastern part of the Twente region, surrounded by municipalities Enschede, Oldenzaal, Borne, Hof van Twente, and Haaksbergen. Hengelo's surface-area is 61.83 km² and counts 80.952 residents that live in the city Hengelo, surrounding villages Beckum and Oele, or township Woolde. Hengelo is the 2nd largest municipality in the region of Twente and the 4th biggest municipality in the province of Overijssel behind municipalities Enschede, Zwolle, and Deventer (CBS, 2013). After the French baptized Dutch land to municipalities in 1802, the municipality of Hengelo was created, which became an important location in the textile industry with big players such as machine factory 'Gebr. Stork & Co,' which led to prosperity, but was interrupted during World War II when Hengelo was bombed 40 times because of its key-industrial position, which caused around 3000 houses and stores to be damaged. After the war, Hengelo managed to recover quickly with broad streets, stores, office-buildings, and a big market area (Helemaal Hengelo, 2013). In an attempt to fuse municipalities Borne, Enschede, and Hengelo into one municipality 'Twentestad,' a referendum in Hengelo showed a lack of public support for this plan. However, Hengelo does collaborate with Almelo, Borne, Enschede, and Oldenzaal as 'Netwerkstad Twente,' which collaborates with Münster and Osnabrück and is called 'MONT' (Stedendriehoek MONT, 2014).

Climate change mitigation policy goals in Hengelo

The coalition agreement for the 2010-2014 term focuses on connection and collaboration and recognizes the need to have a future resilient, sustainable Hengelo in terms of social climate, social facilities, and a local economy. 'Sustainability' in terms of climate change focuses on the 'People, Planet, Profit' framework (society, social environment, and economic activities), Kyoto, Kopenhagen, Millennium goals, and the C2C principles, where living, housing, and working should not be shifted on the environment or people from other area's and future generations (27:4). A housing vision is also mentioned that aims to re-structure houses, which involves more sustainable constructions (27:3).

In 2012, Hengelo formulated a sustainability agenda for 2012-2016, which focuses on realizing a future-resilient, sustainable, vital city in 2030 (17:15). Goals are distinguished between three focus points: a sustainable economy, climate & energy, and a sustainable living environment. Each focus point is described with short-term goals (<2015), mid-term goals (<2020), and long-term goals (< 2030) for each sustainability player: the companies, government, and citizens, which lead to 9 sections of goals that all have their desired milestones and developments for each sustainability player (17:13). In terms of a sustainable economy, companies should realize two pilots that support sustainability of industrial terrain 'Twentekanaal', sustainable business terrains, education in sustainability, each sector should use 100% recyclable resources, and an increase of employability. The government focuses on the municipal city office building, 50% of public officials have integrate sustainability in their profession, a fair-trade certificate, diftar optimization, education system is integrated in sustainable communication network, 100% sustainable procurement, polluting production and consumption gets taxed and sustainable ways get rewarded. Citizens focus on three initiatives that improve sustainable use of redundant buildings, redundant electrical devices, and citizen initiatives should be more structured in Hengelo's sustainability agenda. In terms of climate & energy, companies should realize sustainable houses that supply energy, sustainable mobility, and a 100% Co₂ neutral industrial terrain 'Twente kanaal.' The government focuses on improving the heat-net's sustainability and independence, the implementation energy plans, municipal buildings have a 20% energy reduction, sustainable mobility policy is formulated, in 2020 30% less Co₂ emissions compared to 2007, 40% sustainable energy use, and 30% sustainable public lighting. Citizens focus on creating 250 self-sufficient energy households, 1000 isolated houses, the citizen initiative 'Duurzame Energie in de Wijk' is realized, 30% less fossil fuel use in households compared to 2007, and more consumption of sustainable cars. In terms of social environment, companies should realize a higher market share of sustainable agriculture. Other 'social environment' goals are climate-adaptation-oriented goals and will therefore be discussed in the 'climate adaptation' section.

The coalition agreement for the 2014-2018 term mainly focuses on realizing an energetic, pleasant Hengelo (26:2). While 'Energetic' could reference towards sustainable energy, it seems to be used to express Hengelo's entrepreneurial capacity. 'Sustainability' is used as a reference towards a C2C-society, which is in line with the national and regional waste policy goal of a 50% decrease of residual waste within 10 years (26:1). While a reduction of Co2 emission is mentioned, a specific commitment is not expressed.

Climate change mitigation policy plan of action in Hengelo

To realize the 2010-2014 coalition agreement's mitigation goal to have a sustainable city, Hengelo focuses on having a healthy financial household with re-designed policy and activity program based on current innovations, instead of the traditional budget-cut strategy. To further save costs, Hengelo is reserved with regards to policy development. Within this context, Hengelo wants to play a collaborative, facilitating role with regards to society and organizations (27:7), which is also shown in its title 'Investeren in Verbinding'. Collaborative governance is about defining the frame for Hengelo's future vision with clear agreements, expressed commitment, and is realized in deliberation with public official organization, citizens, institutions, and organizations (27:6). In order to improve collaboration, Hengelo focuses on citizen participation, a transparent, dynamic relation with the council, clear partner agreements, and effective collaborations with neighbour municipalities, 'netwerkstad'-partners, 'Regio Twente', and the province of Overijssel (27:2). Within these collaborations, Hengelo will focus on sustainable houses, spatial planning, stimulating dialogue, awareness, skills, knowledge, the reduction of Co2 emissions combined, and the use of more sustainable energy (27:4). There is also a focus on the MVO-principle that aims to stimulate the 3P-principle for businesses, where Hengelo will for example compensate companies if they help minimize unemployment. The increase of sustainable houses involves specific arrangements with housing cooperatives to measure social actions. In terms of spatial planning, existing business area's should be re-designed in a more sustainable way (27:5). Innovation is also mentioned to realize a sustainable, future-resilient Hengelo, but is mainly focused on improving the local economy, house market, and the social climate. Two pilot-projects are being implemented in 2010 to improve citizen participation. One of them involves a group of independent citizens or experts that formulate a municipal policy document (27:2).

In realizing the sustainability agenda's mitigation goals, Hengelo's main strategy is to focus on collaboration with partners. Instead of a previous strategy that focused on lowering environmental tax, Hengelo's new insights, knowledge, and technology makes Hengelo act more from a holistic approach where all chains are connected, which is believed to result in *real* solutions. This sustainability agenda is used as an example of this new, collaborative approach (17:2). Society's responsibility is crucial in implementing these solutions and the municipality plays an exemplary, stimulating, and informative role in realizing this. To realize Hengelo's climate mitigation goals of a sustainable economy, climate & energy, and a sustainable living environment, the formulated sub-goals are categorized in different themes and are linked to deadlines 2015 or 2020, and specific actions to realize these sub-goals (17:11). Themes for a sustainable economy are: 1. MVO & Business Terrains 2. Waste-free society 3. Information, communication, awareness, education 4. Municipal organization 5. Citizen initiative support. Themes for climate & energy are: 6. Energy action plan development 7. Sustainable houses and construction 8. Municipal organization 9. Heating-net 10. Traffic & Transport 11. Citizen initiative support. Themes for a sustainable environment are: 12. Sustainable urban development 13. Green, biodiversity, and climate adaptation (17:13). For all three main focus area's in Hengelo's sustainability agenda, examples of initiatives and experiments are mentioned. In terms of sustainable economy, these are: various symposia, the MVO-network with 100+ company members, the implementation of 'diftar', citizens that formed a millennium network, a 'fairtrade' working group, a trade-cycle, a transition-town group, gardens, the NMC-centre that improves education material, the organization of different festivities, a regional activity program that is organized in terms of energy and water (WET). The 'climate & energy' goal mentions the approval of an energy work-plan and policy plan to integrate sustainability in municipal policy using the 3P-principle, 450 houses that receive heat from Hengelo's heating-net, commitment to national climate

goal of 30% Co2 reduction in 2020 compared to 2007, a regional sustainability agenda that focuses on construction, mobility, and energy, 5 charge-stations, promotion of natural gas as a transition to green gas, solar-panels on municipal roof, 'Dikke Jas' subsidy program to improve isolation, unemployed that are trained as energy advisors for energy-saving, 6.5% energy reduction due to public lighting pilots, and Hengelo sustainability promotion with RTL4 tv-program 'Klus je Rijk' (17:19). The 'sustainable living environment' goal will be discussed in the 'climate adaptation' section.

To realize the 2014-2018 coalition agreement mitigation goals, Hengelo's role in realizing a C2C-society is to stimulate use of alternative energy and energy-saving. In order to make houses more sustainable, green-deals are being made. The warmth-net is mentioned as an important sustainable opportunity, but includes high criteria for municipal support (26:1).

Climate change adaptation policy goals in Hengelo

In the coalition agreement for the 2010-2014 term, Hengelo mentions the need to cope with the impacts of climate change and therefore includes the ambition to increase Hengelo's district water containment within their spatial planning agenda to re-structure and improve district quality (27:3).

'Climate adaption' is mentioned in the agenda's 13th theme within the 'sustainable living environment' goal where long-term drought, extreme rainfall, and urban heat-stress are mentioned as reasons to focus on climate adaptation (17:16). The sustainability agenda also expresses the need to protect planet earth's vitality that allows for the use of earth's resources, food, energy need, oxygen need, relaxation and recreation (17:14). Important focus points are the environment, urban nature development, rural area's future, bio-diversity, and Hengelo's water household. Companies should focus on green business-area's and a dominant sustainable agriculture. The government focuses on a clean, attractive, diverse and colourful rural area where citizens connect with, and a green urban area that contributes to biodiversity, regulation, flooding, and urban heat-stress. Hengelo's citizens focus on citizen initiatives that improve green-structures, un-coupling awareness, and an increased use of sustainable roofs to contain water or collect energy (17:17). Main goals that should be realized in 2015 or 2020, are the organization of various symposia to stimulate collaborations, the WeustDAG in 'Weusthagpark', project proposals for the 'FBK-Grolsch Veste' area, research to make FBK-games more sustainable, a few collective gardens, 'Transition Town Hengelo', 'Elsbeek' stream is back in district 'Driene', 'Slangenbeek & Medaillon' districts have a sustainable water system, uncoupling is standardized, water containment in 'Gensler' district, groundwater problems 'Veldwijk' district solved, sewer connections are improved, publication of a book called 'Dankzij Beken' that promotes urban water in Hengelo, two stream trips and a water playground, design of Hengelo's main green-structure, a 'tree-commission' has been elected, 'pocket money' projects to clean environment, a regional soil quality map, and the approval of a subsoil policy plan (17:18).

Furthermore, a broadened municipal sewer plan for 2013-2017 was formulated in 2012 from the legal obligatory duty to improve sewer- and water facilities in order to deal with floods (20:1).

A ground water plan was formulated in 2012 from a legal obligatory task to deal with ground water, and was produced by a third party specialist as a background document for the sewer plan for 2013-2017. The plan focuses on the prevention of future ground water inconvenience (19:1-2).

The municipality formulated a Green plan in 2013, which was formulated as a complete approach towards water, sustainability, and ecology. The eventual goal is to protect and strengthen the municipality's green core to optimize current and future liveability (18:1).

In the coalition agreement for the 2014-2018 term, the ambition is expressed to increase stream space and a more natural environment (26:3).

Climate change adaptation policy plan of action in Hengelo

To realize the 2010-2014 coalition agreement adaptation goals, Hengelo mentions the example to use more streams in districts (27:3).

In realizing the sustainability agenda's adaptation goals, Hengelo's plan of action focuses on integrating climate adaptation into spatial planning policy in order to increase Hengelo's urban green- and water infrastructure and is realized with the implementation of 'Groenplan Hengelo' that aims to integrate 'green' into water, ecology, and sustainability and serves as a framework for policy implementation. The municipal water plan focuses on stream recovery, the uncoupling of rainwater, and to solve groundwater problems and mentions several projects that should be realized in 2015 or 2020. The municipal sewer plan aims to strengthen Hengelo's current sewer capacity and focuses on making a map that provides an overview of water problem area's, back-up area's for water storage, and sewer technologies that limits sewer water from mingling with stream water. Another important part to realize Hengelo's climate adaptation goals is to encourage citizens and companies to be more aware of climate adaptation with the use of folders, newsletters, a 'waterday', and a 'treeday' that should increase support and private investments in vegetation roofs, green roofs- and gardens, rainwater uncoupling, and municipal support for local initiatives such as district gardens and the construction of green structures (17:16).

To realize the municipal sewer plan for 2013-2017 adaptation goals, citizens and companies play an important role on a private level (20:1). The municipality deals with water issues in a decisive way, with relatively little citizen input. The municipality provides knowledge about measures that have been taken and what adaptation projects are on the agenda (34:28). The municipality wants to play an exemplary role to limit climate change stress with the goal to make the city-centre more sustainable (5:73).

To realize the ground water plan 2012 adaptation goals, the municipality expresses the commitment to contribute to possible solutions and act as a point of contact for citizen and companies with ground water problems or questions. The municipality has a steering role with regards to dealing with surface groundwater. A workshop resulted in a map that provides an overview of local groundwater focus area's (19:1-2).

To realize the Green plan 2013 adaptation goals, the municipality requires making strategic considerations in terms of manageability and investments (18:1).

To realize the 2014-2018 coalition agreement adaptation goals, dam area's in Hengelo's sewer-system will be implemented to improve water maintenance during heavy rainfall. In terms of spatial planning, the green core-structure is seen as important and where possible should be strengthened, but 'new developments' that require public space should still be possible and require a smart, flexible approach without losing on green core-structure quality where the municipal council does not have to be consulted each time a new development deviates from the green core-structure map (26:3).

Interviews

In order to further increase the knowledge about the way the municipality of Enschede deals with climate change, an alderman, policy-maker, and a local citizen that is involved in plans to set up sustainable parks that are suitable for solar-panel placement, have been interviewed to share their experience with Tubbergen's climate policy, which have been used in the description of the next implementation indicators:

Municipal Role

Hengelo informs citizens about climate change in general and gives citizens advice about what they can do to deal with these changes. For example, through participation in spatial planning projects (34:10). The municipality has a facilitating role in stimulating citizens to take climate mitigation measures, such as a

competition where citizens compete for being the most energy-saving household. There is also a calculation-tool that determines how suitable and profitable a house is for solar panels (34:6) and activities have been organized that playfully educate citizens about Hengelo's climate activities. The project called 'the climate-adaptive city' aims to inform citizens about current mitigation or adaptation projects and which contact person is assigned to which project (34:7). Hengelo also has an exemplary role, for example with sustainable procurement in terms of food supply for employees, cleaning, car parking, or accountants with hybrid cars. However, on a citizen level, the citizen interviewee expressed a lack of municipal support in realizing local citizen initiatives and unreliability in realizing the warmth-net project.

In terms of climate change adaptation, the municipality informs citizens about the municipality's current measures and is it seen as an important task to stimulate affected citizens to participate and keep them informed about climate adaptation projects (34:28). In case of a project where water is redirected to the city, Hengelo has organized a quest or placed an information board that keeps citizens informed and involved in Hengelo's climate adaptation activities. Due to budget cuts however, these activities are diminishing.

Catalyst

With regards to climate change mitigation, the sustainability team in general pushes the climate mitigation agenda, which resulted in a more sustainable-oriented coalition agreement. Public officials from the waste department are also committed to push the climate change agenda with the implementation of a GFT-waste pilot-project that aims to process GFT-waste directly from the sink into the sewer-system that helps provide nutrients for bio-gas production, which can be used to heat households through a heating-network and is expected to reduce waste costs (10:11). Another aim of the project is to inspire companies to invest in this type of technology and to change legislation that currently prevents the use of it, which currently withholds an important partner such as the waterboard to get involved in such a project (10:14). Nevertheless, no specific public official or governor was found that catalysed Hengelo's climate mitigation agenda (10:43). In terms of climate adaptation, a committed water policymaker currently plays an important, catalysing role in obtaining support for the broadened municipal sewer plan for 2013-2017 (5:24) and during regional meetings on an alderman level, support was found for the current municipal sewer plan (34:19).

Knowledge & Expertise

A sustainability team is responsible for realizing the sustainability agenda, focuses on policy, education, communication (5:1), and is specialized in the area of energy and sustainable mobility. The sustainability team also aims to improve citizen involvement in climate themes on behalf of the municipality. The waste department stimulate citizen involvement themselves (5:5-6). Most of these departments that formulated climate-oriented policy, such as water, waste, spatial planning, and nature, have sustainable-minded public officials, but the spatial-planning department should be more pro-active integrating sustainability at the start of projects (5:15)(5:19-21)(5:37). Municipal departments currently are fragmented in terms of sustainability (5:33)(5:44) and public officials have problems translating the climate change story into feasible goals (5:12)(5:62). The project 'Helder Hengelo' has aimed to improve public official's writing skills (5:58), though finding policy support is more crucial (5:59-60). It is believed however that 'sustainability' has been integrated within the municipal organization, based on a research outcome that showed most Dutch municipalities have been more involved in sustainability throughout various departments than originally planned, based on their policy program (10:1). With regards to the heating-net project, a lack of knowledge and citizen participation might have contributed to its current, delayed state (33:6)(33:8). From a citizen level, it is suggested that legal knowledge might be used by the municipality to prevent local initiatives and to protect companies (33:12). In terms of climate change adaptation, Hengelo focuses on the protection of floods and drought (5:71). Over the last 10-20 years, Hengelo has been busy with regards to water management activities (10:27). In terms of policy, there is a focus on water- and sewer policy (10:4)(5:67)(5:70). The municipal water department is responsible for

water inside the city, and the waterboard for the water outside the city, and collaborate closely to share knowledge and expertise (5:40). Internally, collaboration is also important, for example between the water and spatial planning department when constructing a Wadi (5:39). While the term 'mitigation' is not used in policy, 'adaptation' is sometimes used in water policy (5:18)(5:37). Hengelo participated in a sewer-control benchmark that compared two similar municipalities from the answers of 100 questions, which enabled them to learn from each other with regards to sewer-control. One of the outcomes is that Hengelo's sewer maintenance has a good price/quality ratio and has a relatively low capacity utilization of in- and outside staff (34:23-24). Hengelo currently participates in a project to find rain water storage solutions (34:8-9) and has placed a 'Season Wadi,' which is more big and nature friendly than the regular Wadi (34:11). There is no focus on malaria, because it is not seen as a problem yet (5:35-36).

Network

Network participation is seen as an important way to share information in order to save time and money for other policy goals (5:50). On a regional level, Hengelo participates in an environment- and sustainability meeting for public officials to improve a multi-disciplinary sustainability approach (10:2), which is more visible during the actual project implementation than during the preceding workgroup meetings. The sun-card project is an example that originates from these regional meetings. The waste department has a regional meeting for public officials as well (5:51-52). On a provincial and national level, Hengelo does participate in seminars and workgroups, but prefers participation on a regional level, because of its familiarity, such as 'Netwerkstad Twente' and 'MONT' (5:53). European network-meetings such as ICLEA or Covenant of Mayors are useful and are attended by civil servants from the municipal subsidy department for lobby-purposes, but it requires time to stay up-to-date in order for it to be beneficial for the municipality (5:54). Also, it is uncertain whether international projects will be implemented on a local level, which makes it less likely to affect citizen behaviour in Hengelo (10:37). However, Hengelo has found the European projects they participated in, with Latvia and Turkey, valuable experiences that can be used as a mirror to reflect Hengelo's own governance style, which resulted in a more decisive attitude that led to some interesting pilot-projects (10:42). In terms of climate change adaptation, regional meetings are being held, which led to a water-network project (5:52) and support was found for the municipal sewer plan due to regional meetings on alderman level (34:19).

Hierarchical governance

The waste plan was formulated from a legal obligation on national level (34:16). Most of the sustainability projects, especially energy-oriented projects, are initiated from a provincial level, though they are implemented depending on the project's time, planning, and policy conditions. Accepting a provincial project also means less control over the project, which increases the risk of unreliability towards citizens. Hengelo's climate change adaptation policy reflects national policy and is believed to be in good shape. Waste- and water oriented projects are generally initiated from a more local, municipal level (5:63).

Politics

Hengelo's former coalition, for the 2010-2014 term, consisted of PvdA, SP, GroenLinks, D66, and BurgerBelangen, with PvdA being the biggest coalition-party with 6 seats, which makes for a relatively even divided coalition, which has a small majority in the council with 20 out of 37 seats. The election in general was evenly divided in terms of seats, with 8 out of 9 parties having received seats ranging from 3 to 6. Having a small majority coalition that includes five parties being in power, finding consensus will be an important factor in decision-making, though having all left parties in power might be considered a consolation. Their current coalition for the 2014-2018 term, consists of SP, CDA, D66, and PvdA, with SP being the biggest coalition-party with 7 seats, and has a small majority with 21 out of 37 seats³. The biggest change is that GroenLinks and BurgerBelangen left and CDA joined. Hengelo's current municipal

³ http://www.nlverkiezingen.com/GR_OV.html

council is committed to deal with climate change, but only municipal projects with a reliable payback-time or big, long-term projects are likely to get approved (10:9). However, decision-making has become more decisive and less consensus-oriented in terms of initiating pilot-projects without council approval (10:42).

Budget

The municipality has little budget for climate-oriented goals. The sustainability team for example, relies currently on subsidies, and creative, collaborative solutions (5:22)(5:45)(7:18)(34:22), and is especially apparent now with the current priority that is given to realizing a legal obligatory healthcare transition before 2015 (10:44-45), which leads Hengelo to find financial support from higher government levels, subsidy-programs, and from companies (10:36), because the budget needs to stay balanced to prevent provincial supervision (10:13). According to a local citizen, the politician's short-term attitude has led to budget-cuts that delayed the warmth-net project, which is suitable for local energy supply, and public officials that use legal obstacles in order to limit investments in local idea's (33:13) and keeps the energy price high to ensure tax income (33:18). Due to a lack of budget there is a lack of time to implement a project, such as the warmth-net project (33:13), one that aims to share climate information between departments (5:61) or other ways to stimulate sustainability awareness amongst public officials. While at the same time public officials themselves have insufficient time to adopt this new knowledge in practice if they do receive it (5:21-22). The college of mayor & aldermen advocates the climate agenda as much as possible to increase discussion or budget. The municipal council plays an important role in budget allocation in case of big projects, otherwise this is the sector-manager's responsibility (5:42-43). The municipal council annually evaluates budgets, which led to green roofs to be financed from the sewer fund (34:21). As a response to the lack of budget, Hengelo has learned to play an intermediate, multi-sectoral role for companies that are able and willing to invest in, usually mainstream, sustainability projects, which allows for interesting collaborations that led to new, more efficient solutions (10:12). During the creation of the municipal waste plan, an important task was to search for available budgets from other departments to guarantee financial support without having to increase waste-tax, which led to the allocation of a budget for waste (34:17). From a citizen's experience, the municipal budget that is made available for sustainability purposes is mostly used for awareness projects instead of supporting citizen's initiatives (33:1). With regards climate change adaptation, a budget has been allocated to the water department (5:45). In terms of sewer maintenance, the municipality should decide whether their budget should be spent on flood prevention or on repairing the sewer afterwards (34:1).

Subsidy

Hengelo used a subsidy-program to stimulate the use of recyclable isolation materials, which led to a legal claim from a traditional isolation company that believed to be entitled to this isolation subsidy. The company did not win the case. This legal case and three isolation companies that improved their production processes afterwards shows the effect subsidy-programs can have (10:21). Another way to stimulate private investment in sustainability is to use subsidy for attractive loan-programs (10:25). With the current lack of budget and capacity, applying for a subsidy-program can be time-consuming if the conditions are complex or have a high partner dependency with different regulations and financing, which is often the case with EU-subsidy-programs (10:41), but could be worth the investment due to valuable new collaborations (5:46-48). Nevertheless, Hengelo currently prefers to apply for small, stimulating-oriented subsidy-programs (10:38). The sustainability team is part of the 'projects and subsidies' department, which includes a subsidy team as well that can assist the sustainability team with subsidy applications (5:47), which lobbies during ICLEA or Covenant of Mayors meetings (5:54). In deciding to apply for a subsidy it is important to know how it will benefit the municipality versus the amount of time that needs to be spend on realizing this benefit (5:49).

On a citizen level, it is experienced that budget is lost on third parties that help the less knowledgeable municipality set up climate mitigation projects.

On a citizen level, it is experienced that subsidy is more spend on financing the public officials that are responsible for realizing the subsidy goal rather than on activities and investments that help realize the subsidy goal. Also, the regional cross-border subsidy is not seen as useful due to its complex conditions, and therefore, this budget is suggested to be allocated to the healthcare sector (33:7)(33:14). In terms of climate change adaptation, a subsidy-program was started to stimulate the placement of green roofs to deal with excess rainwater and urban heat-stress (5:38)(34:3).

Local Initiatives

The municipality of Hengelo has several local initiatives that stimulate climate change mitigation. A Hengelo citizen, who is also chairman of the district-council 'Ribbelt-Stokhorst' in Enschede, has the ambition to realize a plan in Hengelo to transform parts of land, that surround Hengelo's city centre, into sustainable parks that are suitable for solar-panel placement. Within this process however, it is found difficult thus far to find municipal support to help realize this plan. The same is experienced for an alternative citizen initiative to place solar panels on flat apartments in the same district, because this would be in conflict with national regulation that states housing corporation's main responsibility is to collect rent (33:2-3). Despite these obstacles, Hengelo does express on a company level the importance for companies to keep up with sustainability developments in order to survive this dynamic market and distinguishes companies into three categories: pioneering companies, companies that aim to save costs, companies that eventually manage to invest as well in order to prevent their company to price itself out of the market and go bankrupt (10:31).

In terms of climate change adaptation, the municipality finds it difficult to let citizens participate in climate change adaptation projects (34:4). On a company level though, the Grolsch factory collaborates with the municipality of Hengelo to use of excess ground water from a Hengelo district in order to clean up their Grolsch beer-bottles (10:5-6).

Current Ambitions

Hengelo wants to focus on finding a balance between ecology and economy (10:26). There should also be a focus on saving energy unless sustainable energy production would be dominant enough in a way that saving energy would not matter anymore (5:16). Waste burning should only be done for un-recyclable waste. A waste project in Alkmaar should be used as a benchmark for waste-solutions that support this goal (10:19). Furthermore, ambitions are to increase sustainability in terms of businesses (MVO), redundant business area's, waste, traffic & transport, urban environment, energy (heating-net), awareness, municipal organization, supporting initiatives, houses, and to improve climate adaptation (17:11). In terms of climate change adaptation, Hengelo wants to improve their green- and water infrastructure and formulated several policy documents to help realize this goal. Hengelo wants to have more urban streams- and green, a stronger sewer, and more rainwater uncoupling where citizens and companies should play an important (17:16).

Commitment

Hengelo invested in international climate mitigation collaboration projects, invested 1 million euro into the provincial sustainability subsidy program for attractive loans, subsidies, and information (5:63), managed to set an example with the subsidy scheme of recyclable isolation material, are creative and collaborative in finding budget for climate mitigation purposes, and an innovative waste separation pilot was set up despite a lack of council support (10:11). Hengelo organized a competition where citizens compete for being the most energy-saving household to stimulate and increase awareness with regards to energy saving. A calculation-tool was introduced to citizens for solar-panel investment orientation and the municipality has a sustainable-oriented procurement for their internal food supply, cleaning, car parking, or accountants with hybrid cars (34:6). In terms of climate adaptation, Hengelo currently has a well-supported sewer-plan and participated in a sewer-control benchmark to further improve their sewer

system. Furthermore, Hengelo constructed several wadi's, participates in a project to find rainwater storage solutions, organized informative activities (34:11). In terms of citizen involvement, the municipality informs citizens about the municipality's current measures and is it seen as an important task to stimulate affected citizens to participate and keep them informed about climate adaptation projects, which is also shown in the organization of a quest or information board placement that keeps citizens informed and involved in Hengelo's climate adaptation activities. Due to budget cuts however, these activities are diminishing (5:6). Furthermore, a project called 'the climate-adaptive city' was implemented to inform citizens about current mitigation and adaptation projects including a contact person that is assigned for each project (34:7). While these investments create a position where Hengelo can successfully implement climate adaptation policy, most of Hengelo's climate adaptation plans, goals, and actions yet need to be realized.

Hof van Twente

Hof van Twente is a rural municipality located at the centre-south of the Twente region, has a surface-area of 21.541 hectares, and is the result of a fusion in 2001 between the municipalities Ambt Delden, Diepenheim, Goor, Markelo, and Stad Delden. The municipality has 34.997 residents registered that live in one of its 6 villages: Bentelo, Delden, Diepenheim, Goor, Hengevelde, Markelo, or 13 townships. The municipality has agricultural and touristic characteristics. The town hall is established in Goor (Gemeente Hof van Twente, 2014).

Climate change mitigation policy goals in Hof van Twente

In 2010, a future vision document called 'Zicht op 2030' includes the goal to improve sustainability, which is seen as an increasingly important factor for decision-making in politics, industries, institutions, and citizens, and has an increasingly solid position in law- and regulation, policy, and implementation. Sustainability is realized when current generation demands are fulfilled without having to limit future generation demands (36:5).

The coalition agreement for the 2010-2014 term has been evaluated in July 2011 and also in this council evaluation memo in January 2014 that includes a status-quo list of Hof van Twente's expressed coalition agreement goals and new goals that have been determined due to new developments. One of the original goals is to re-design Hof van Twente's waste policy towards the regional 'Afvalloos Twente' proposal. One of their new goals is to realize the MUD-program (Meerjaren Uitvoeringsprogramma Duurzaamheid), which is a long-term sustainability plan. Another new goal, initiated from the municipal council, is to explore possibilities to improve cross-border collaboration, in order to spend Euregio-subsidies. The evaluation's conclusion is that some original coalition-goals are not completed yet or were cancelled due to new insights, but most goals have been realized successfully. The next term will focus on realizing new determined goals. The council evaluation memo of January 2014 does not include climate change means or specific climate change adaptation goals and means (29:3).

While Hof van Twente began with a temporary sustainability plan as a first start, the municipality currently has a council approved environmental policy plan for the 2011-2014 term, that was established by a council-workgroup that formulated a proposal for the sustainability project (22:4), was prepared by the college of mayors & aldermen, and open for citizen revision (22:2). The policy plan consists of various themes that have a long-term vision from 2011-2020 and short-term policy ambitions for 2011-2014. In terms of finance, the goal is to stay within the current budget. The first policy theme focuses on 'climate and energy' where the goal is to realize a climate neutral municipal organization within 2011 and 2020, and a Co2-neutral municipality in 2030 (22:3). There is a focus on mitigating the use of fossil fuels, lower Co2 emissions, and to increase the use of sustainable energy. Another theme, that includes 'mobility', expresses the commitment to play an exemplary role in terms of sustainable mobility. Another theme is completely dedicated to sustainable construction and living, where sustainable construction is seen as an inevitable goal that contributes to a climate-neutral municipality within 2011-2020. Also, 'waste' has a separate theme, where it is seen as a natural resource that contributes to a cyclic economy (22:11). In terms of goal determination, national performance cards with concrete goals derived from the climate treaty between the Dutch state and Dutch municipality union (VNG) are used for policy choices (22:4). Commitment from citizens and companies is needed to realize an energy-neutral municipality. Citizens are the climate policy's main target group and are seen as self-sufficient, outspoken, and committed, but pollute the environment through consumption, leisure activities, and mobility. Companies should act responsible with regards to the environment in a sense that they limit unnecessary damage to the environment, increase innovation, sustainable energy use and production, and compliance to legal environmental regulations (22:15). Communication is seen as an important policy instrument to inform citizens and companies about ways how they can contribute to a sustainable environment. Spatial planning should also contribute to the development of a sustainable environment, which is interpreted as 'having an acceptable living climate' (22:16). These policy goals are monitored on their progress (22:17).

Hof van Twente also formulated a long-term executive program called 'MUD' (Meerjaren Uitvoeringsprogramma Duurzaamheid) in 2013, which is the result of a policy sub-program called 'sustainable municipality', which originates from the strategic sustainability policy program called 'programma duurzaamheid.' The document has been created by a third party consultancy firm that is specialized in formulating energy advice for rural areas (23:7). Different stakeholders have been consulted for their ideas, such as entrepreneurs, energy companies, policy makers, aldermen, council members, housing cooperatives, and village councils (23:8). Appendix B includes statistical data derived from a survey amongst members of the citizen-panel called 'hofpanel' (23:1). MUD's aim is to encourage citizens and companies to contribute to sustainable developments with a focus on realizing short-term goals. One of these goals is a 20% energy reduction for the municipal organization and a 10% decrease for citizens (23:9). Long-term goals focus on an energy-neutral municipality in 2035 and an energy-neutral municipal organization in 2030. An important principle that is used in operationalizing sustainability is the People, Planet, Profit-principle (23:5). A connection is made between these municipal goals and similar goals that have been formulated on a global, European, national, provincial, and regional level (23:4). Sustainability aims to fulfill the current generation's needs without sacrificing future generation's needs, and 'good stewardship' plays an important role. Also, Hof van Twente recognizes the various roles it plays in realizing sustainability, such as: representing 35.000 different citizens, being a local legislator, policy maker, client, executor of higher government regulations, collaborator with other municipalities, and shareholder of important sustainable players such as Cogas and Twente (23:10). Demographic developments, the financial recession, and climate change are also considered. The main reasons to invest in sustainability are to improve the environment, social cohesion, and Hof van Twente's local economy. Urgency for sustainability is portrayed with statistical data that show citizen's energy expenses have become increasingly dominant over the years compared to citizen's mortgage expenses (23:6).

The coalition-agreement for the 2014-2018 expresses commitment to be an energy-neutral municipality in 2035, based on the MUD-document, with the focus on saving energy costs, improvement of the environment, and an investment in the local economy (28:1).

Climate change mitigation policy plan of action in Hof van Twente

To realize the future vision climate mitigation goals that improve sustainability, a considerable place in the annual municipal budget will be reserved for sustainability. Hof van Twente focuses on sustainable houses, which are obligatory in 2020, energy-saving, sustainable energy, sustainable agriculture, and mobility (36:7). In terms of sustainable energy, there is a focus on local energy production, which will generate an economic impulse (36:8). Sustainable agriculture focuses on a more competitive and sustainable agricultural sector with a focus on CO₂ emission minimization, animal welfare, more resilient crops, and a more flexible approach, which allows agriculture to be used for energy production, nature maintenance, and recreation as well, which is steered from European agriculture policy (36:1). C2C is mentioned as well and is linked to water preservation, which allows for heat generation from shower water, recycling of rain water. In 2030, waste emissions and surface water should be solved, and household waste should be separated, using the 'diftar' strategy. Also, most public and private asbestos areas should be clean in 2030 (36:10).

In order to realize the climate change mitigation goals of an energy-neutral municipal organization and municipality that has been formulated in Hof van Twente's environmental policy plan for the 2011-2014 term, Hof van Twente focuses on the involvement of citizens and companies, and the municipality that stimulates this involvement with their informative, facilitative role. To help monitor the progress of these operations, the college of mayor & aldermen annually formulates an updated environmental policy plan that is used by the municipal council for evaluation purposes. Hof van Twente plans to stay within their current budget with a focus on current projects (22:17).

In realizing the goals stated in the MUD-policy document within 2013-2017, Hof van Twente expresses the commitment to reserve budget and hours for this period of time, which aims to improve Hof van Twente's

direct living environment with a contribution to a 'good' environment, children's education, awareness, and district's social cohesion. An activity table is formulated where all sustainability activities are mentioned, with a time-frame, and budget-status. These activities surround communication, energy cooperative support, sustainable real estate, sustainable procurement, a MUD-project leader, waste recycling, and smart-meter implementation in the five most energy-consuming districts that will be motivated with a competition where the district with the most energy-savings after one year, will receive a barbeque (23:12).

It is expected that these investments will realize a payback time that will benefit Hof van Twente's citizens. The 'multiplier-effect' helps realize this payback time through increased local employment, collective procurement, wood-recycling, and a possible installment of a solar-panel field in the 'Zenkeldamshoek' area (23:11). Energy theme's are assessed with the 3P-principle and is planned to be realized in various ways. In terms of energy production, sustainable energy is stimulated with information, exemplary role, low-interest loans, citizen and company involvement, and a start-subsidy for their local energy corporation (23:19). Bio-mass from wood is stimulated with an explorative business-case, and a facilitative role for citizen and company investment in wood-boilers (23:20). Bio-mass from manure is stimulated with a facilitative role with possible space in the municipal allocation plan (23:21). Wind-energy is stimulated for small-windmills on local business terrains, but large-scale exploitation of windmills has insufficient council-support and will therefore not be stimulated (23:21). Soil-warmth is stimulated with an exploration of possibilities to formulate soil-warmth policy. Shale gas and coal gas is not stimulated due to uncertainty of profitability and its impact on the environment (23:15). Energy crops are not stimulated, because agricultural land is scarce and prefers production of food, livestock, and fiber or bio-plastic supply (23:16). Energy-saving is stimulated with 350 smart-meters for the most energy-demanding 5 districts in collaboration with energy suppliers and energy cooperative, an awareness increase of energy-saving school material, and a policy plan, initiated from Hof van Twente's citizen panel, is formulated to realize more efficient street-lighting and lighting in municipal buildings for the 2013-2018 term (23:17). Isolation is stimulated with more focus on house-owner awareness, minimizing most energy-demanding 5 districts, and active stimulation to participate in the energy fund that facilitates citizens in realizing sustainable measures (23:18). Also, smart couplings between companies are stimulated with a pilot-business case that aims to transform business area 'Zenkeldamshoek' into a sustainable business area with a focus on smart couplings (23:14).

In order to realize the coalition-agreement for the 2014-2018 term to become an energy-neutral municipality in 2035, the municipality focuses on a broad collaboration between companies, other governments, and local citizens where Hof van Twente plays a facilitating role with more policy room for innovative idea's (28:1-2).

Climate change adaptation policy goals in Hof van Twente

In terms of climate change adaptation, Hof van Twente's future vision document focuses on the preservation of drink water, a minimal production of waste water, and water for nature and recreation (36:7).

Hof van Twente's environmental policy plan's second theme focuses on nature, water, and soil. Nature is stimulated in order to realize a healthy, livable, cost-effective, clean, and beautiful social climate within both urban and rural area's (22:21). Water is based on the water law, focuses on having a vital and robust water-system and water-chain and is stimulated in order to deal with climate change impacts such as flood risk, waste water, rain water, and ground water (22:6).

The MUD-document and coalition agreement for the 2014-2018 term do not formulate climate-adaptive goals. The latter does mention a commitment to improve the current environmental infrastructure, but is focused on tourism.

Climate change adaptation policy plan of action in Hof van Twente

To realize the future vision climate adaptation goals to improve water preservation, Hof van Twente will have a recognizable place in the annual municipal budget. Also, goals, priorities, projects, and activities will be explicitly linked to the goals formulated in this future vision document (36:11). In terms of waste water minimization, there is a focus on local systems to process waste water (36:8).

In order to realize Hof van Twente's environmental policy plan's second theme, nature is realized with a focus on preserving and developing the current ecological main structure (EHS). Expansion of the natural area depends on this EHS where the province determined suitable area's. Other area's are eligible for natural development as well, unless this limits economical rural activities. However, municipal conditions for these economic activities require a positive effect on the environment, for example with sustainable energy (22:22). The current municipal waternote's, which are the two sewer plan's and water plan, form the basis of Hof van Twente's municipal water policy, where the water plan visualizes the new water system and stimulates incorporating this goal in urban renewal and rural development plans. The two sewer plans formulate how the municipality will realize legal obligations towards rainwater, soil water, and waste water. Business area's will be organized more in such a way that rain water will be collected for recycling or infiltration purposes (22:7).

Interviews

In order to further increase the knowledge about the way the municipality of Enschede deals with climate change, an alderman, policy-maker, and a local citizen that set up a sustainable farm and is involved in a local energy corporation have been interviewed to share their experience with Tubbergen's climate policy, which have been used in the description of the next implementation indicators:

Municipal role

The municipality of Hof van Twente plays several roles to improve climate change mitigation. An informative role is played where the municipality stimulates investments in solar panels and house isolation to improve sustainable energy production and to save energy. Information-evenings are organized to explain current policies and regulations (7:16), and to increase the chance citizens will make smart, long-term, profitable investment choices (35:21-22). Hof van Twente gives their citizens the opportunity to use a sun-card, which assesses their house's potential for investments for their house (6:54). Hof van Twente also facilitates climate change mitigation developments with local subsidy programs such as 'Sustainable Markelo' or 'Vivereon' (6:56) and with the provision of building permits, for example for a solar-panel park on a redundant area in Goor (35:8). Hof van Twente aims to limit energy market restrictions as much as possible with little legislation and no use of contractors (35:21-22). Hof van Twente also facilitates a collaborative approach between companies to work on sustainability projects without municipal involvement (6:52). Energy Corporation ECHT is exploring possibilities together with the municipality to see what municipal tasks they can take over (7:34). Furthermore, Hof van Twente plays an exemplary role. Hof-panel members confronted the municipality with their wish to increase citizen commitment, but did leave the public building's lights on at night, which was a motivation for Hof van Twente to have a more exemplary role in terms of sustainability (35:10). Sustainable projects are implemented to increase sustainability awareness amongst citizens with public energy saving and sustainable energy facilities such as the solar-park in Goor (6:13)(35:42). Citizens are also invited to tell about their local sustainability initiative during information-evenings, and the sustainability-oriented alderman visits local initiatives, such as the 'Inspiration Farm Hof van Twente' to show citizens the municipality's priority to improve climate change mitigation (7:32). No information has been found in terms of climate change adaptation.

Catalyst

During Hof van Twente's 2006-2010 term, the current sustainability-oriented alderman was a council-member and wrote a sustainability plan with two other council members (35:5). Now, as an alderman, he wants to further explore sustainability opportunities, increase municipal- and citizen support, and explore the municipality's role in realizing a sustainable society (35:16-18). The sustainability-oriented public officials are aware of sustainability developments and they stimulate the council and college of mayors & aldermen to put these developments on their political agenda, but this is more a coordinating than a catalyzing role (6:21). No information has been found that indicates the presence of a specific adaptation-oriented policy maker or alderman that represents and catalyzes a climate adaptation-oriented agenda. The climate adaptation course is mostly coordinated by the waterboard (35:39).

Knowledge & Expertise

While there is no specific climate policy, the municipality Hof van Twente has some accurate sustainability policy formulated in their environmental policy plan for 2011-2014, a sustainability implementation program called 'MUD' that further specifies their sustainability ambitions, a sustainability-oriented coalition-agreement for 2014-2018, and a document that formulates a future vision for local climate policy. While climate change awareness is not sufficiently integrated yet in every municipal department, sustainability-oriented civil servants are experienced as quite competent and reliable, that attend citizen information-meetings together with the climate-oriented alderman (7:17). While the former climate-oriented alderman had a background in water management, the current alderman has experience with realizing the spatial planning of windmills on a national level (35:1). The communication department usually does external communication, and internal communication is done usually done bilateral or with the intranet, the newsletter, or the staff-magazine (6:39). An example that shows a more integrative approach towards sustainability is the situation where the spatial planning department autonomously decided to approve a citizen request to place a solar panel on the edge of the yard, because this decision serves the 2030 energy-neutral goal, while following the precise policy rules have led to the decline of this request (35:52). Furthermore, there is one public official appointed as sustainability point of contact for questions or initiatives that contribute to the realization of sustainable, economical goals (35:44). While Hof van Twente has no specific climate change adaptation policy, their current environmental policy document does express an ambition to deal with floods and organize water adequately. Also, a sewer-policy is formulated in order to build sewer-systems that help store, filter, and transport water. While the spatial planning department is committed to include water and green solutions in the first phase of city plans (6:19), most of the knowledge and expertise with regards to water management will come from the waterboard (35:24). Next to policy, there is also a water-test 'anticipation climate policy', but this is more oriented towards mitigation, because adaptation is not seen as an urgent enough policy problem at the moment. This is expected to change in time though, because eventually: water, freshwater, and drinking water are a national interest (6:31). This water-test will become a local government responsibility and together with the introduction of new environmental legislation in 2017-2018, this would be an opportunity for the municipality to evaluate climate change as a policy problem and to define a vision, goals, instruments, and results with regards to climate change adaptation (6:32). The water-test is steered by the waterboard and is oriented towards water-retention, so the test will raise questions about the water challenges, how much and how water surplus should be dealt with (6:45).

Network

Hof van Twente expresses the need for participation in climate change networks, in- and outside the region of Twente (6:10). Inside the region, Hof van Twente participates in the 'Environmental and Sustainability' network that is a regional deliberation meetings between 'Twente' municipalities, which are held on a civil servant and governance level, and are aimed to share, discuss, and fine-tune local climate policy on a regional level (6:35). On a more national level, Hof van Twente is member of a Dutch climate treaty, which is called 'het landelijk klimaatverbond', which is a network that consists of more

than 150 municipalities, provinces, and waterboards that agreed to collaborate in order to realize an energy-neutral society through environmental- and sustainable-oriented projects and lobby (6:44)(Klimaatverbond, 2014). Hof van Twente is also a member of VNG, a union of Dutch municipalities, that helps the municipality stay up-to-date with sustainable energy & mobility- or water & sewer developments, and can be used as a platform to participate in various European pro-climate change networks (6:44). As a member of the UN's Millennium network, Hof van Twente also commits itself to the 7th Millennium Development Goal, which focuses on ensuring environmental sustainability with the commitment to reduce Co2 emissions (6:40)(UNDP, 2014). With regards to climate change adaptation networks, Hof van Twente's former alderman was a member of the VNG-commission with regards to water management (6:40) and its current alderman is a member of a network called 'Twentse Kracht: Groene Metropool Twente' that uses municipal, provincial, state and European funds to improve the condition of rural area's, for example how to deal with the residual manure that is less allowed to be used on sand-grounds nowadays, which decreases the sand-ground's organic quality and therefore its economic value. In deliberation with farmers and Vitens, solutions are explored that restore sand-ground's organic quality (35:31). Furthermore, Hof van Twente is a member of the 'Rijn-Oost' water network that consists of seven waterboards, five provinces, and ninety municipalities (6:41).

Hierarchical Governance

Local climate goals are based on the national climate agenda, that includes energy policy based on the SER energy treaty, formulated by the social-economical national council to improve sustainable growth, and some climate change adaptation policy (6:16). In terms of sustainable energy production, the national energy treaty is an important guideline, a main framework to find opportunities for sustainable energy development, such as a potentially more efficient way to invest in public lighting (35:19)(35:34).

Politics

Hof van Twente's former coalition, for the 2010-2014 term, consisted of CDA and VVD, with CDA being the biggest coalition-party with 9 seats and VVD 4, which makes for a small majority in the council with 13 out of 25 seats. The last two terms resulted in a similar result, and the current term of 2014-2018 is no exception, making Hof van Twente the most stable political coalition of the four⁴.

The uncertainty of feasibility, profitability, and affordability that characterizes climate-related projects and initiatives, make it extra important for Hof van Twente to have a municipal council that is committed to implement climate policy (6:28). Hof van Twente has a municipal council that continuously supports the sustainability agenda and also initiates idea's, which creates a fruitful, internal dynamic (35:45). Every policy decision is judged on the degree of how beneficial citizen participation is for the policy goal. If so, citizens usually participate in an official voice meeting (6:7) where citizens can reply, but also a more pro-active approach is used where civil servants go to the citizen's neighborhood to see what's going on and what they think, and use this knowledge in their decision-making (6:51). Hof van Twente also has a citizen platform called 'Hofpanel' where in 2013, 2.248 members were asked 3-4 times a year to fill in a questionnaire where they could voice their opinion about current topics, for example, sustainability and what role the government should play in this (Hof van Twente, 2014b). Last year, 605 members filled in the questionnaire (23:1). Information-evenings are another opportunity for citizens to deliberate about what role the government should play and what direction the municipality should choose in terms of sustainability (35:4)(7:36).

Budget

Each department needs to account annually for the budget that they spent. If there is still budget left, it will usually be reserved for next year because most budgets are based on multiple-year project performance arrangements (6:24-25). While Hof van Twente currently has little budget, this is not seen as

⁴ http://www.nlverkiezingen.com/GR_OV.html

a big problem. The increase of budget allocations towards the province and state make it less necessary for the municipality to finance projects (6:54) and creative, efficient sustainability solutions also require less municipal budget, which could potentially lead to the increase of budget for other sustainability projects (35:9)(35:12). Hof van Twente's current municipal manpower capacity is also seen as sufficient for their current ambitions, and if ambitions increase, this should not necessarily have to result in a higher municipal budget, because this could be solved with more regional, internal, citizen, or company collaboration, which results in economies of scale (6:36-38). The focus on increasing cultural change towards a more climate-oriented attitude is more important than an increase in budget (35:9). Budgets for climate adaptation projects are usually co-financed together with the province or the waterboard (6:43).

Subsidy

In terms of receiving sustainability-oriented subsidy-programs, Hof van Twente participated in the 'sustainability' program, in which the municipal council and the province both invested 1 million euro's (6:43)(35:20). While the solar-panel subsidy program is rather popular amongst citizens (7:16), the asbestos-roof subsidy program, which aims to remove all asbestos from company roofs, seems to be less effective, because it is mostly used for replacing parts of the roof that are reserved for solar-panels. Because the removal also requires a private investment, companies tend to wait to remove other parts of the roof until their financial budget allows it (7:47-48). Hof van Twente applied for the Slok-program, but eventually declined participation, because it was too complicated, it would provide little money and the accountability was unclear (6:42).

In terms of providing subsidy for climate initiatives, the municipality Hof van Twente plays a less prominent role due to a shift in subsidy-allocation from municipality to higher governance levels, such as the province or the state (6:54). Nevertheless, the co-financed 2 million subsidy investment led to subsidy-programs that contribute to energy saving, energy generation, more sustainable houses or buildings such as housing cooperatives, and an attractive loan-system to stimulate private sustainability investments (6:43)(35:20).

Furthermore, together with the province, Hof van Twente subsidized public schools for teaching material to educate youngsters about contributing to a sustainable society (Hof van Twente, 2013), and energy corporation ECHT received a subsidy to create a website, folders, and to organize local meetings (7:34). In the past, Hof van Twente also facilitated several local subsidy programs for start-ups from the 'strategic sustainability plan,' such as 'Sustainable Markelo' or 'Vivereon', but the money is slowly diminishing (6:56).

No information has been found to conclude the municipality Hof van Twente receives or provides subsidies to support or execute climate change adaptation-oriented projects.

Local Initiatives

The municipality Hof van Twente has several local initiatives that stimulate climate change mitigation. The 'Inspiration Farm Hof van Twente' aims to stimulate sustainability awareness amongst different visitors, from school children to companies such as Cogas (7:4). Their philosophy with regards to energy is to do energy saving first, and sustainable energy production second (7:5)(7:30). Sustainability knowledge is open for revision in order to maintain an up-to-date, accurate teaching material (7:36)(7:44). 'Regio Twente' is also in deliberation with the 'Inspiration Farm Hof van Twente' to explore possibilities to further promote the region of Twente. For example, a cycling map for tourists has been made to allow them to visit various sustainability farms within the region of Twente and is nowadays supported with a special App that further supports these tourists during their bike-trip (7:40). During their transition, the 'Inspiration Farm Hof van Twente' hired a local company that installed their solar panels, and due to good experiences the farm helps them get known using posters that visitors can see and take notice of, in order

to stimulate the local economy, unless other companies would be a better choice. It is important to stay objective and accurate in terms of sharing information (7:45). In setting up the 'Inspiration Farm', the initiator has felt supported thus far by the municipality with subsidy, visits, and opportunity to share experience during municipal meetings. The 'inspiration farm' initiator is also a member of Hof van Twente's energy corporation ECHT (Energie Coöperatie Hof van Twente). Currently, ECHT focuses on energy saving, solar panels, solar-collectors etc. and has a workgroup that focuses on oil-fired heaters. However, the purpose of ECHT is not completely defined yet. Different meetings have been held to introduce the corporation to local citizens and to invite them to become a member for 50 euro's (7:7). ECHT explores to what extent they can take over responsibilities from the municipal's' energy panel, but chances are small because it would take away jobs from civil servants and it is difficult to ensure a reliable service from voluntary workers (7:28). Also, ECHT is currently deliberating with the municipality and city hall about using unused business area's for solar panel placement (7:29), as long as these business area's are unsuitable for agricultural purposes, though a risk of such solar-panel placement is that it can be vulnerable to vandalism (7:30). Another initiative from ECHT is to appoint local ambassadors, who are citizens that were a pioneer for a certain sustainability activity within their local neighbourhood and with their experience can help out interested neighbours accomplish the same goal. Experiences are shared during local meetings, but also to have a good time with their neighbours and to establish social cohesion, which could lead to an increase in group-investments that can lead to collective discounts. The 'local ambassador' concept has been benchmarked from the municipality of Amersfoort and is currently being implemented in a few districts in Hof van Twente to see whether it works in this municipality as well (7:9) (7:10). While the voluntary-aspect of these local initiatives create an opportunity to meet a wide range of local citizens (7:39), it also makes it difficult to control which citizens eventually participate in them, which can lead to a paradox where citizens with day-to-day jobs do most of the voluntary work, while citizens with enough free-time are less willing or capable to do these tasks (7:11). This can lead to a situation where stressed members are more willing to leave and the less willing or capable to leave as well if they feel obliged to perform certain tasks. As a volunteer with limited time it is also difficult to keep up with ECHT's board members who attend more meetings and deliberate with stakeholders (7:38). Despite its need for improvement, the website can currently be used for citizens to read about ECHT's activities, ask questions and to read about current meetings or events. For example, one announcement was about the possibility to participate in the European Solar Games where local citizens made it possible for interested citizens to visit their sustainable houses for one week. Another local initiative is a sponsor relay race of 4 times 5 km in the local forest, which is called the 'Delden-Borne Run.' Each year, the race supports a charity. Last year the revenue went to a foundation that supports sporting amongst the disabled, and this year the charity will be sustainability-oriented, which will also be in line with this year's start- and finish location: the 'Inspiration Farm Hof van Twente'. Currently, the primary charity idea is to buy small, solar-energy driven WakaWaka lamps, which provides a safe study light and a optionally a charging point for electronic devices such as i-Phones or i-Pads, and send them to countries with lots of sun, but without electricity. Each participant pays a 100 euro fee, usually sponsored by companies that get advertisement space in return (7:20), and with this money each participant buys one and sends one of those lamps (7:17). The idea is also to initiate a local sustainability project using the other, bought lamps as a reward for the participants of this project. Currently, negotiations take place with 'Twente Milieu' to see whether this project can be aimed at cleaning litter by the youth, perhaps in collaboration with local schools. In this potential project, Twente Milieu would be responsible for the operational part, in which they already have experience such as 'Wereldverbeteraars' or 'Nederland Schoon' (7:18). If the negotiation does not work out, an alternative project would be to support a more healthcare-oriented charity where cab drivers can drive and accompany patients that need to go to hospitals for chemo- or radio-therapy (7:19). There are usually enough participants for the sponsor relay race, but finding a suitable charity project can be challenging (7:21). Furthermore, Delden has participated in the 'Duurzaam Dorp Overijssel' contest where they submitted a sustainable shopping bag in order to limit the use of the plastic bags (7:32) and there is a company that invented a three-square shaped roof where each square has a specific function: a solar-panel during sunny weather, water-storage during rain, and a filter during

smog (35:43). No examples have been found of local initiatives that stimulate Hof van Twente's adaptation to the impacts of climate change.

Current Ambitions

An important ambition for Hof van Twente is to make a sustainability program, which aims to find a balance between environmental and economic development and should be an important cornerstone within municipal policy (35:3)(35:7). An important ambition within this agenda is to specify municipal sustainability actions for the upcoming 4 years and to find opportunities for support and collaboration (35:5)(35:16-18)(35:40) with energy cooperatives, private investors, and a municipality with a clear vision and idea's (35:17). There should also be more clarity about when and where sustainability policy should be implemented (6:69). Another important ambition within Hof van Twente's sustainability agenda is to realize a waste-free Twente, though no decision has been made yet how waste will be separated. Citizens could do this on a local or Twente on a regional level (35:15). In terms of policy structure, the ambition is to integrate Hof van Twente's stand-alone environmental-oriented policy plans and sectorial notes into one over-arching policy document, which will create an opportunity to make climate policy an integrative part of Hof van Twente's policy (6:70). In terms of climate change adaptation, Hof van Twente wants to secure its villages against floods and wants to contain water, especially drink water in villages, in case of drought (6:67).

Commitment

Hof van Twente allocated a 14.500 euro start-subsidy to help set up energy corporation 'ECHT' to stimulate citizen awareness and involvement (23:13), a start-subsidy to help set up 'inspiration farm Hof van Twente' that informs and increases awareness amongst citizens and companies, the organization of information meetings and the hof-panel platform, a 1 million investment in the provincial 'sustainability' subsidy program (6:43)(35:20) that resulted in energy saving, subsidies, loans and an energy panel, local subsidy programs such as 'Sustainable Markelo' or 'Vivereon,' the limitation of rules & regulations, and the implementation a the solar-park in Goor (6:56). However, Hof van Twente's policy documents do not mention these accomplishments and mainly consist of several mitigation plans, goals, and actions that yet need to be realized. In terms of climate adaptation, no specific achievements have been found that express actual commitment to climate adaptation.

Tubbergen

Tubbergen is a rural municipality located at the center-north of the Twente region, is connected to the German border, and has a surface-area of 14.741 hectares (Gemeente Tubbergen, 2014a). The municipality has 21.215 residents registered that live in one of its 10 villages: Albergen, Fleringen, Geesteren, Harbrinkhoek, Langeveen, Manderveen, Mariaparochie, Reutem, Tubbergen, Vasse, or 3 townships: Haarle, Hezingen, and Mander. The town hall is established in Tubbergen (Gemeente Tubbergen, 2014b). Vleeringen and Vasse both finished in the top 3 of 'most sustainable villages in Overijssel' (Twence, 2012). In the 70's, a location near the village of Vasse was extensively used as an area to dump chemical waste, which became a big environmental scandal in the media. Since 1974, attempts to restore the location to its natural habitat have not been successful yet, because it is difficult to predict the consequences of removing chemical waste will have on ground water quality (Project Teerput, 2005, Eindrapport Teerput Vasse, 2012). Work organization 'Noaberkracht' was introduced in March 2011 to create one local authority for the municipalities Tubbergen and Dinkelland as a response to their similar challenges in demographic developments, governance pressures, and lack of expertise. 'Noaberkracht' aims to merge both municipality's strengths in order to improve their services and products for citizens of both municipalities (VNG, 2011) (Noaberkracht, 2014).

Climate change mitigation policy goals in Tubbergen

Tubbergen's coalition-agreement for the 2010-2014 term focuses on a wanting to communicate a changing municipal role to their citizens. This communication should consist of clear expectations, which will allow citizens to account their municipality for prior decision-making. This changing role consists of needing to prioritize for the most necessary tasks and to be flexible and opportunistic with regards to developments in society. 'Developments' seem to mean the impact of the economical crisis on society and also on the municipal budget, which restricts their agenda to the essentials. The 'changing role' seems to be a responsibility-shift from government to citizens. In terms of climate change mitigation Tubbergen aims to stimulate the use and production of sustainability techniques, such as: solar panels, ground heat, and bio-energy. Tubbergen used the outcome of an energy-test in 2011, provided by waste-processing company 'Twence', as a tool to identify adequate sustainability opportunities and solutions. The test-outcome showed that solar-energy and bio-energy are the most suitable investments for Tubbergen (Twence, 2012), in which a balance should be found between ecology and economy (30:1).

Waste is seen as an important part of Tubbergen's activities to become a more sustainable municipality. In 2013, Tubbergen and Dinkelland together developed a waste policy vision document that aims to realize a waste-free municipality with a cradle-to-cradle economy that contributes to the mitigation of Co2 emissions and to new economic opportunities. Waste goals are to maximize waste recycling, to realize a 75% decrease in residual waste, and to have 50 kg annual waste per citizen in 2030, which should lead to waste-tax reduction for citizens (21:4). The philosophy is that the lower the recycling costs become and the higher the profit from recycled materials, the less waste-tax citizens have to pay (21:3).

Tubbergen's coalition-agreement for the 2014-2018 term focuses on sustainable social effects to realize vital and livable villages in terms of environment, social dynamics, local economy, and safety. Within the chapter 'economic power and jobs' Tubbergen expresses the commitment to improve Tubbergen's development in sustainability in order to decrease energy costs and improve a healthy environment (31:3). Commitment to sustainable energy is expressed, but does not include a specific goal (31:7). Minimization of residual waste and waste tax is the foundation for Tubbergen's waste vision, which focuses on a recyclable society (31:8).

Climate change mitigation plan of action in Tubbergen

In order to stimulate the use and production of solar panels and bio-energy as formulated in the coalition-agreement for the 2010-2014 term, Tubbergen focuses on citizen involvement and an informative role.

In order realize Tubbergen's waste policy vision to become a waste-free municipality and a C2C-economy, the municipality plays a facilitative role where citizen awareness and citizen responsibility are crucial. Companies focus on innovations that improve the recycling of products and packages, and national or regional trends are anticipated with pilot-projects. The 'diftar' method is used to minimize household's residual waste (21:3).

In order to realize the coalition-agreement for the 2014-2018 term to generate sustainable social effects, the municipal role and partner's role are context-specific and also depend on citizen opinion. Therefore, Tubbergen's role focuses on a business-like, entrepreneurial, and involved municipal attitude with a flexible dynamic between governors and public officials that should not negatively affect future generation's needs. Citizen dialogue is important for adequate decision-making as well, where platforms are used to connect with citizens where they can share their initiatives, idea's, and wishes (31:3). Tubbergen plays a stimulating, facilitating, and exemplary role in realizing sustainability initiatives to realize less energy costs and a healthier environment. This is done with area development and finding a balance between economical, ecological, and social interests (31:9). More sustainable energy will be realized using the energy panel and with a facilitative role in realizing sustainable initiatives from society, but Tubbergen will not invest in energy-saving measures or green energy supply (31:7). In realizing a recyclable municipality, Tubbergen will change household waste policy, where citizen and company responsibility will become more important (31:8).

Climate change adaptation policy goals in Tubbergen

In the coalition agreement for the term 2010-2014, there is a focus on the centralization and reduction of industrial terrains. While this goal is likely to improve climate adaptation, this is not specifically mentioned as a reason. Tubbergen also wants to realize local nature maintenance and recovery (30:1).

In 2013, Tubbergen and Dinkelland formulated a legally mandatory, sewer plan in consultation with the water board (8:11). The plan confirms legal requirements for their current sewer maintenance are met. One of the sewer plan's goals is to cope with the increasing frequency of rain water, waste water, and soil water surplus in the urban area's due to extreme weather events (GRP, 2013-2018, pg. 7).

The coalition agreement for the term 2014-2018 mentions the goal to find a balance between the maintenance of Tubbergen's natural environment quality and economic opportunities, but this is not specifically connected to a climate adaptation theme. The main reason for this seems to be the lack of urgency the municipality feels to adapt to the current impacts of climate change (8:24). In terms of livability, the wish is expressed to develop a document in collaboration with society to formulate Tubbergen's livability vision for 2030, which is called 'Mijn Dorp 2030' (31:10).

Climate change adaptation policy plan of action in Tubbergen

In order to centralize Tubbergen's business terrains as mentioned in the 2010-2014 coalition agreement, settlement requests are dealt with cautiously and opportunities to re-design or re-use current business terrains are investigated. If agricultural area becomes available, business might be able to use this area to decrease current industrial terrain size (30:4) with a focus on finding a balance between economic expansion and living environment. (30:4). Local nature maintenance and recovery is realized with development prospects that entrepreneurs use to improve Tubbergen's rural quality. This strategy is phrased as 'maintenance through development' (30:1).

In order to realize the sewer plan's goal to deal with extreme weather events, the municipality Tubbergen & Dinkelland focuses on a collaborative approach within the municipal organization and with the water- and purification managers within the scope of the current sewer tax. Research is done to determine what

the municipalities and the waterboard should choose to deal with extreme weather events. Tubbergen is more focused on outsourcing compared to Dinkelland, which is something to find consensus about for the future. In terms of private water uncoupling, the municipalities play a neutral role that excludes enforcement, subsidy, or encouragement. The water panel is used to deal with company's and citizen's questions and statements. Sewer-tax will increase each year with 4% due to necessary sewer renovation or sewer replacement (52:11).

A balance between natural environment quality and economic opportunities is found with policy that limits the chopping of trees and a subsidy project called 'Groene Diensten' that focuses on rural construction, recovery, and maintenance (31:11). While 'environmental quality' could contribute to climate adaptation, this is not specifically mentioned as a reason to improve Tubbergen's natural environment.

Interviews

In order to further increase the knowledge about the way the municipality of Tubbergen deals with climate change, an alderman, policy-maker, and the chairman of a local energy cooperative in Tubbergen have been interviewed to share their experience with Tubbergen's climate policy, which have been used in the description of the next implementation indicators:

Municipal role

The municipality of Tubbergen plays several roles to improve climate change mitigation. An informative role is played in which the municipality has set up an energy-panel to increase sustainability living awareness amongst the public (9:13)(9:22). The municipality is also an informant of the impacts and solutions with regards to climate change (8:49), informs citizens and companies of currently available subsidy-programs (8:36), and advises how buildings can be exploited more cost efficiently with the use of sustainable energy (9:16). The municipality also plays an intermediate, facilitating role in which the municipality uses its network to help, for example local energy corporation 'Energiek Vasse', deal with smart-grid legal obstacles by involving Cogas and research institutions in the process (9:30). A platform called 'Oans' has been set up to facilitate citizen participation, which allows citizens to share their climate-oriented idea's with the municipality, which creates more potential for the municipality to implement citizen-supported idea's that help Tubbergen deal with climate change (8:41-42). Furthermore, the municipality of Tubbergen plays an exemplary role with the construction of solar-panels on the municipality building's roof (9:59), the decision to make public sport-accommodations climate-neutral (8:49), and investments in sustainable living awareness in response to outcomes of an energy-test (9:12, 9:14, 9:66). The municipality of Tubbergen also plays several roles to improve climate change adaptation. An informative role is played in which a, legally mandatory, water-panel has been set up in response to their published sewer-plan (8:39). An intermediate, facilitating role is played as well where the municipality uses the same platform 'Oans' to collect citizen-supported idea's that help Tubbergen to adapt to impacts of climate change (8:41-42). Furthermore, the municipality plays an enforcing role in which offenders of flood-protection regulations are penalized accordingly (8:47).

Catalyst

In the previous term, the municipality of Tubbergen did not have a public official who took a leading role in committing to the implementation of sustainability policy. The current sustainability-oriented policymaker believes he should fulfill this role (8:14), but due to a lack of support there is not enough time, manpower, and money available to make this happen (8:16). The policymaker does believe however that the newly elected alderman is more committed to the sustainability agenda than its predecessor (8:8-9). The new sustainability-oriented alderman aims to increase the amount of sustainability propositions that have the potential to be approved by the municipal council and college of mayors & aldermen (9:4). While he acknowledges the importance of using political or personal conviction during debates about

sustainability issues, his preference for a more rational, argumentative approach might limit him in finding enough support to get certain climate mitigation policy plans implemented (9:71). While the sustainability-oriented policymaker and alderman acknowledge the importance to adapt to changes in climate (8:23)(9:10), there is currently no specific adaptation-oriented policy maker or alderman that represents and catalyzes a climate adaptation-oriented agenda. The climate adaptation course is mostly coordinated by the waterboard (8:11).

Knowledge & Expertise

While the basic attitude of public officials towards climate change issues is experienced as rather positive, they do tend to be conservative and reactionary when it comes to actual dealing with climate change developments (8:7, 8:10, 8:22-23, 8:29). The drive to set up local climate policy is mostly externally driven and topic-specific, in which the policy is not part of an over-arching climate policy document. Also, climate goals have not yet been integrated in other policy themes (8:12). The municipality hired a consultancy-firm to represent the municipality's energy-panel where they share information about energy with citizens and companies, and publish articles about energy in district-or week magazines in order to compensate for the lack of internal expertise that is currently available amongst civil servants within the municipality of Tubbergen (8:37). On a more local level, energy corporation 'Energiek Vasse' still experiences a lack of knowledge and expertise, such as financial and legal experts, to help set up pilot-projects successfully (11:25). Since an energy-test has been conducted by Twente as part of an awareness-project initiated by the Province of Overijssel, the municipality of Tubbergen has become more aware of sustainability bottlenecks and solutions (9:12, 9:14, 9:66) and due to an organizational fusion called 'Noaberkracht', Tubbergen and Dinkelland's public officials have merged their knowledge and expertise with the aim to cope with the trend of national government to decentralize governmental tasks to the local level (9:49). In terms of climate change adaptation, the municipality mainly relies on the waterboard's expertise (8:11)(8:43-44).

Network

As a member of 'Regio Twente', the municipality of Tubbergen participates in the 'Environmental and Sustainability' meeting, which is an opportunity for civil servants or aldermen to discuss environmental or sustainability-oriented projects on a regional level, to what extent a municipality wants, needs, or is capable to participate in such a project, to share information, evaluate, and consult each other with regards to environmental or sustainability topics (9:51). During one of these meetings, members collectively agreed to make the region of Twente a waste-free area. While the municipality of Tubbergen and Dinkelland both agreed to commit, they did not choose the regional path of collaboration with Twente Milieu. Instead, they chose a more autonomous approach, which would give them more control and less waste-tax for their citizens (8:5). In terms of water control, the municipality collaborates extensively with the waterboard, which for example led to the meandering of rivers to prevent floods in villages (8:43). Also, the municipality has regular meetings with the waterboard. One of the results from these meetings is a plan that describes how the municipality should deal with excess water in rural area's and urban area's. These meetings have an obligatory, legally mandatory character (8:11).

Hierarchical Governance

With regards to climate change, the municipality of Tubbergen currently does not have a clear vision. Due to a lack of political support, public officials do not have enough time, manpower, or money to focus on other activities than the obligatory climate goals that have been set on a regional, provincial, national level. Another way for public officials to deal with the limited capacity for local climate policy is to adapt their focus on what currently occupies their local community the most in terms of climate change (8:16-18). From a citizen experience, public officials find it difficult to act outside their box of rules & regulations in a way that would benefit a local sustainability project (11:33). EU-regulations such as Natura 2000, that initially aim to improve the balance between ecology and economy, also have the risk to limit local

sustainability initiatives if an entrepreneurial, ambitious village such as Vasse has a rich ecological environment (9:52). In terms of climate change adaptation, apart from water-management, which is mainly coordinated by the waterboard, the municipality lets most climate change risks depend on national policy (8:45, 8:48).

Politics

Tubbergen's former coalition, for the 2010-2014 term, consisted of PvdA and Gemeentebelangen (GB)/VVD with the latter being the biggest coalition-party with 8 seats and PvdA with 3, which makes for a small majority in the council with 11 out of 19 seats. CDA was their biggest opposition party for this term with 8 seats, which is a historical political power-shift, because CDA has been in power since 1982⁵. However, in the municipal elections in 2014, the coalition in Tubbergen changed again to a CDA majority coalition with GB/VVD, with a big majority of 16 out of 19 seats. While for most decisions the approval of college of mayors & aldermen is sufficient, the big, expensive projects also need municipal council approval, because of the uncertainty of payback time and high risk (9:4).

Budget

While a budget can be seen as an obstacle in finding creative solutions (9:20), the municipal budget of Tubbergen to deal with climate change issues is currently quite low (30:5). The sustainable-oriented policymaker receives an annual 500-hour budget from the energy panel-project to spend on sustainability activities. Writing the policy waste plan is estimated on 400 hours, which leaves small opportunity to conduct other sustainable-oriented activities (8:19), which is an important reason for the policymaker to focus on climate implementation at the start of projects in other policy area's, such as construction projects, which is a feasible, cheap climate implementation strategy (8:21). The low budget for climate policy in Tubbergen is also resembled in the titles of both the climate-oriented policymaker and alderman, in which the policymaker has 'environment, sustainability & waste' in its agenda, and the alderman 'healthcare, finance, sustainability, waste, energy, innovation, and social real-estate' (8:1)(9:1). The word 'sustainability' in both titles also suggests more municipal budget is being invested in climate change mitigation compared to climate change adaptation.

Subsidy

While 'ECHT' mostly relies on municipal subsidy, 'Energiek Vasse' is more internationally oriented with many subsidy opportunities with the help of a member that runs a subsidy company. Due to the energy corporation's voluntary nature 'Energiek Vasse' has to prioritize between the different subsidy opportunities in order to realize a concrete result for their local community and politicians.

In terms of providing subsidy for climate initiatives, the municipality of Tubbergen realizes it does not play such a prominent role compared to the Province of Overijssel or the EU (9:31), who already provide several subsidies to pioneering villages such as Vasse, or private investors that take over the need for villages to request subsidies from the municipality. If projects need subsidy from the municipality, this mostly indicates a lack of public support, otherwise it would have already been picked up by the Province of Overijssel or private investors (9:54-55). In terms of receiving subsidy for climate initiatives, Tubbergen has the approval of the Province of Overijssel to upgrade their energy-panel from 1.0 to 2.0, which focuses on making houses within the municipalities of Tubbergen and Dinkelland more sustainable with technology such as: isolation or solar-panels (8:2). Energy corporation 'Energiek Vasse' has the opportunity to participate in many subsidy-programs, but as a voluntary organization it is impossible to successfully participate in all of them so they have decided to pick a few subsidy-programs that can be finished successfully in a way that shows a stimulating result towards their local citizens and towards politicians (11:30). No information has been found to conclude the municipality of Tubbergen receives or provides subsidies to support or execute climate change adaptation-oriented projects.

⁵ http://www.nlverkiezingen.com/GR_OV.html

Local initiatives

The municipality of Tubbergen has several local initiatives that stimulate climate change mitigation. On a company level, a local construction company 'Groothuis Wonen', which is a subsidiary from TBI, shared their knowledge with TU Delft students to improve the development of their innovative renovation concept to help houses become more energy-neutral (8:27-28). In terms of agriculture, a project from a big pig farm pioneers with the use of roadside grass instead of ferment corn in order to help reduce Co2 emissions and generate energy for the farm and local public buildings (8:30, 8:32). Other farmers play a more facilitative role where they make their land and its stable available for sustainable-minded citizens to renovate it for purposes such as: an office, living space, or garage, which is called a 'knoop-erf' (9:55). Energy corporation 'Energiek Vasse' has the ambition to make their village climate neutral in 2016 and to be the most prosperous village in the Netherlands. The energy corporation has been set up by 'Duurzaam Vasse' that participated in the 'Duurzaam Dorp Overijssel' competition in 2011, which resulted in a second place and a 50.000 euro reward, which has been used for setting up the energy corporation, the appointment of a project manager, exploration to implement smart-meters in Vasse, a 2016 future vision, and the formulation of a marketing- and project plan. Currently the corporation consists of seven board members, two supply officers, two trainees, and one communication employee. 1.5 million euro budget has been allocated to construct sustainable cultural centre 't Esschoes', which is currently in progress (Wij zijn 'Energiek Vasse', 2014b) and focuses on solar panels. Vasse's local involvement is shown with a 20% participation in this budget. The solar panels already generate more energy than is needed for the cultural centre. A consultancy firm has been hired to formulate a future vision for Vasse in 2016 to improve decision-making. The marketing- and project plan focus on future generations, education and the expectation that this will positively influence local household's attitude towards climate mitigation (Hoppe et al. 2014).

'Energiek Vasse' also committed to participate in a smart-meter pilot-project for 3 years where the University of Twente will guide them throughout the project (11:10). This project will include a competition between neighborhoods or districts that compete for the lowest energy rate, which includes an educational program for primary schools to make local households more aware of sustainability (11:12-13). While this energy corporation is ambitious and suggests initiatives to help the municipality mitigate the impacts of climate change, the actual implementation of these initiatives depends on a committed mayor and public officials that are willing to support these initiatives. 11 years ago, Tubbergen's former mayor implemented a system where village councils filtered citizen questions and then passed them to higher levels of governance. Because the mayor trusted the village council to suggest feasible, locally supported energy initiatives these initiatives gained usually received municipal support, unless money was the issue. Then the initiative was put on the next budget-term. However, the current mayor has shown to be less pioneering than its predecessor and is in its last term. The biggest problem is a reserved attitude amongst public officials to facilitate local energy initiatives. The municipality has for example decided not to support the construction of windmills on Tubbergen land. 'Energiek Vasse's' suggestion to construct windmills in Uelsen, Germany still did not gain municipal support. The current coalition has expressed the ambition to stimulate citizen initiatives and a more supportive attitude from public officials, and perhaps the next mayor will be more supportive again, but it is expected to take 3 to 4 years in order for public officials to have a more positive attitude towards local citizen initiatives in terms of climate policy. This also requires a less skeptical attitude from citizens towards these public officials, because this could frighten young, more progressive public officials to act more pioneering. Another mentioned implementation obstacle is legislation. Despite Minister Kamp's intention to set up two local energy pilot-programs, current legislation will not allow implementation, which means energy corporations depend on the commitment of national politicians that allow for legal exceptions during the implementation of these pilots. Another obstacle is the energy corporations size and voluntary character,

which is less suitable to take on big projects that require professional time management, organization, and study.

'Energiek Vasse' currently focuses on re-defining their direction, what projects are in progress, and what projects should be supported to further realize this direction. In terms of climate change adaptation, fewer examples can be found, though village 'Vasse' is known for its use of water-mills due to its long history of flooding incidents. A water-basin has for example been installed to centralize residual rainwater and a tube-infrastructure has been built to maintain their ground water (11:20).

Current ambitions

While the municipality of Tubbergen has become more aware of sustainability issues and has become more willing to take action, their approach thus far has been quite reactionary and incidental. For the next term, the municipality wants the sustainability mentality to be more structurally embedded in all policy-area's, such as: public space, healthcare, and in village plans as well. The formulated sustainability goals within these policy area's should then be formulated in such a way they can be translated to a citizen context (9:42)(11:31). With the use of benchmarking, the municipality currently explores which way should be chosen to really make a difference in creating a sustainable society (9:18). Another climate mitigation ambition for the municipality of Tubbergen is to create a circular economy. Therefore, the municipality has set a goal to decrease Tubbergen's household-waste from 200 kg to 50 kg in 2030 (8:5, 21:1-2). The municipality wants to set an example with the decision to make their public sport-accommodation more sustainable (Gemeente Tubbergen, 2014c). With regards to climate change adaptation, Tubbergen's ambition is to cope with the increasing frequency of water surplus in the urban area's due to extreme weather events from climate change (GRP, 2013-2018, pg. 7). The municipality has not yet specified any clear ambitions with regards to other climate adaptation issues. Perhaps because the municipality believes there is currently no direct urgency to adapt (8:24). Furthermore, due to the lack of local innovative capabilities such as Universities, and its small, governmental structure, the municipality wants to promote Tubbergen as an experimental area for potentially sustainable innovations that could be further implemented and explored. This experimental role can then be combined with an educational role where students can deal with real assignments in which they have the opportunity to potentially contribute to a current climate experiment project in Tubbergen (9:21, 9:30).

Commitment

Tubbergen invested 1 million euro in the provincial sustainability subsidy program for subsidies, loans, and the energy panel. Tubbergen also organized a project called 'Dorpsenergie' in collaboration with the Province of Overijssel in 2012, with the aim to motivate citizens to invest in local sustainable energy generation and energy saving (Overijssel Duurzaam, 2012)(8:2), which is stimulated with the construction of solar panels on the municipality building's roof, which was financed by the Province of Overijssel and installed by Twence B.V. (Duurzame Gemeente, 2011). While some companies and 'Energiek Vasse' have shown commitment to contribute to the realization of local climate mitigation goals, it is unsure whether the municipality played a stimulating role in this. In terms of climate adaptation, no clear examples can be found that shows municipality commitment to climate adaptation goals.