Fixations in District Heating Networks: A Case Study of the Heat Roundabout's Cluster West Governance Network

by

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Summary

Drawing upon theoretical insights from the configuration theory and the collaborative governance theory this Master's thesis explores the collaborative endeavour to develop the heat roundabout. The heat roundabout is a large-scale infrastructure project aiming to supply heat from sustainable sources to households and businesses in the province of South Holland. This thesis will focus on Cluster West, which relates to developments in the port of Rotterdam, the horticulture of Westland and the cities of Rotterdam and The Hague. The consequences of global warming are felt throughout the world and an energy transition is urgently required.

In the Netherlands heat is generated by burning natural gas, instead of using surplus heat produced as a by-product of industrial processes. The heat roundabout aims to replace 20 PJ of natural gas by other, more efficient sources of heat. This heat can also come from industrial processes, because otherwise it will not be reused and discharged in the rivers, sea or air. Creating a heat roundabout is complex, expensive and requires numerous parties with different interests and agendas to work together. With this in mind it is important to study how collaboration between stakeholders in developments around the heat roundabout, more specifically Cluster West, can be identified, explained, assessed and improved.

By combining the configuration theory with the collaborative governance theory it is possible to understand what led to the start of collaboration in Cluster West, how individuals create a shared understanding to base their interactions on and what explains why progress is sometimes lacking. This thesis will employ the term fixations to denote situations in which a group of individuals is unwilling to reflect on its core beliefs and actively excludes information conflicting with their beliefs. An in-depth case study of Cluster West found three fixations, which emerged during phase two and were broken by an outside intervention. The analysis indicates that Cluster West primarily lacks a common vision, common goals and interpersonal trust.

Keywords: Cluster West, collaboration, collaborative governance theory, configuration theory, district heating network, energy transition, fixations, governance networks, heat roundabout.

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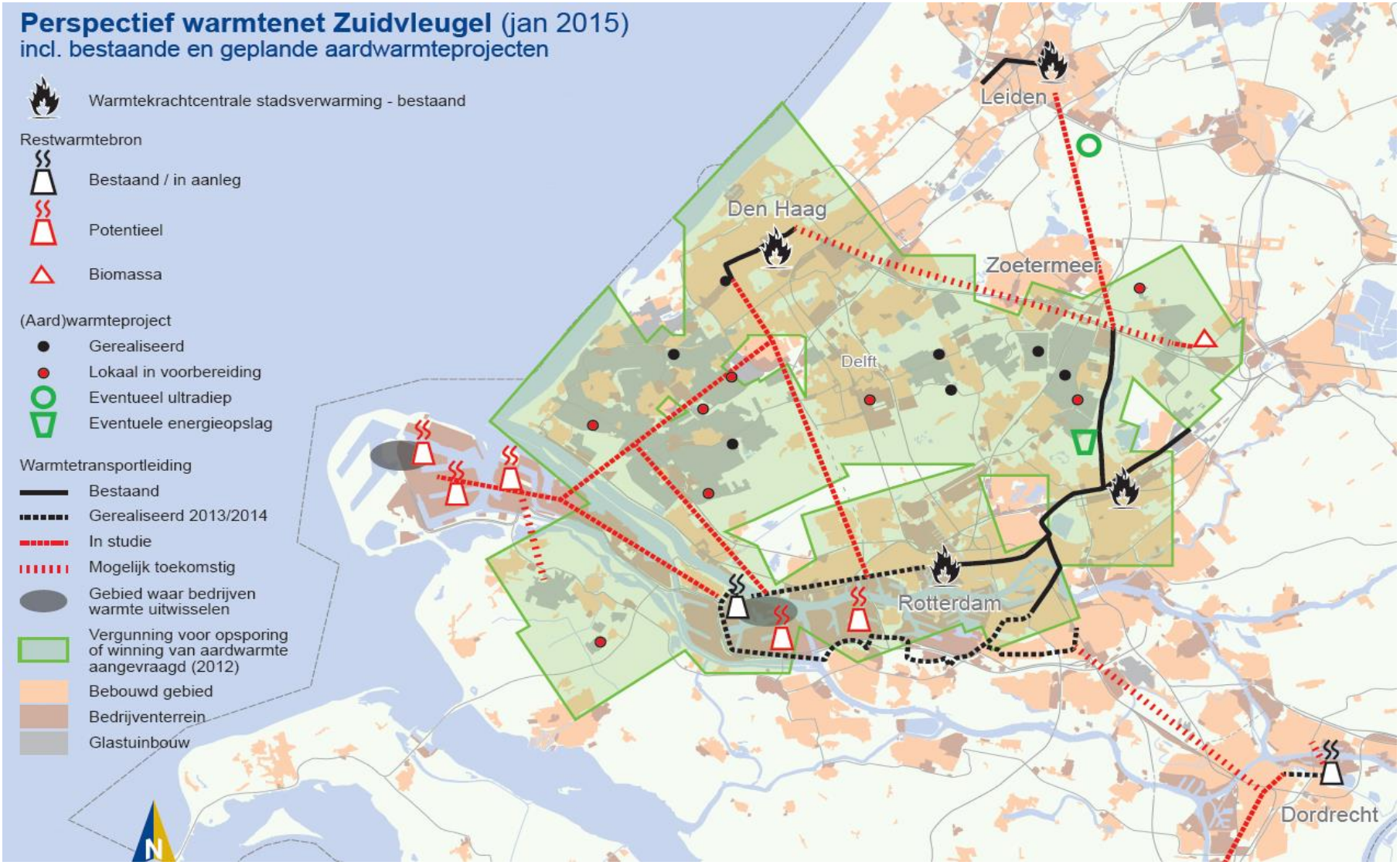

Map A **[Source: Province of South Holland, 2015]**

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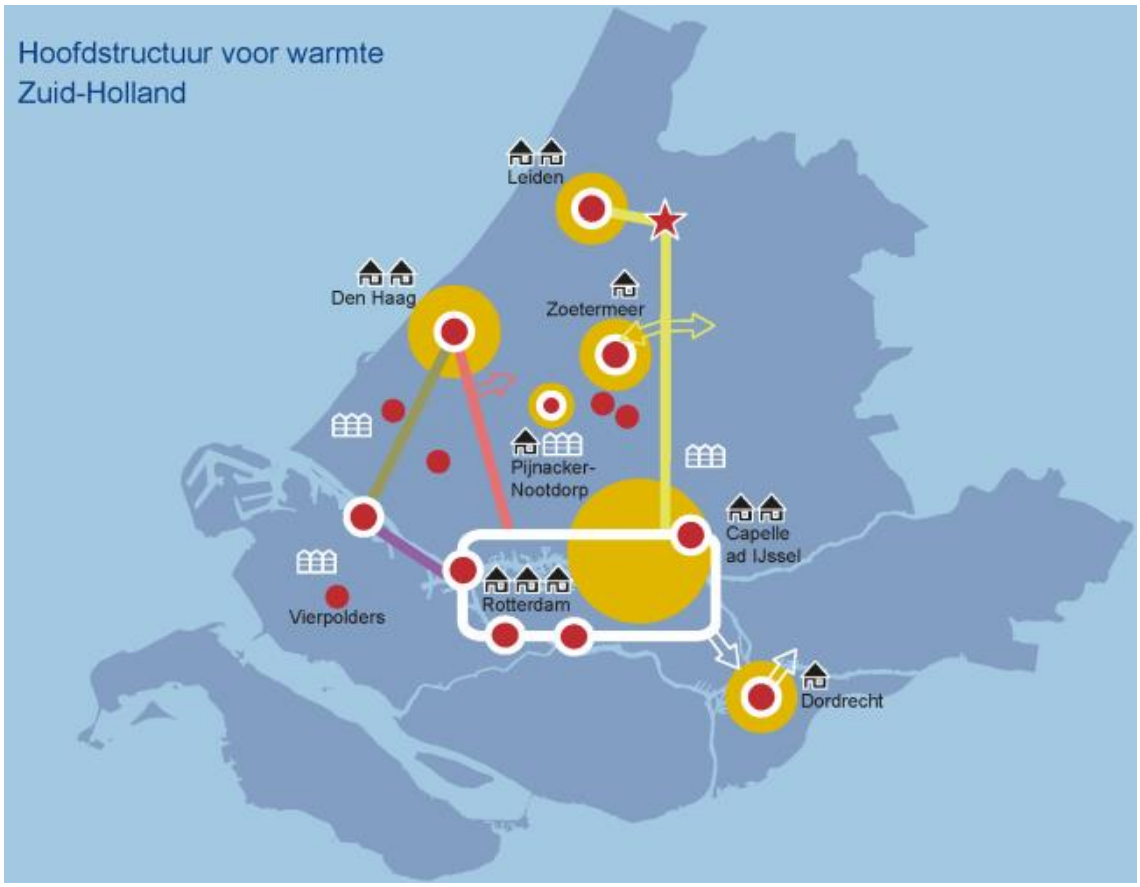

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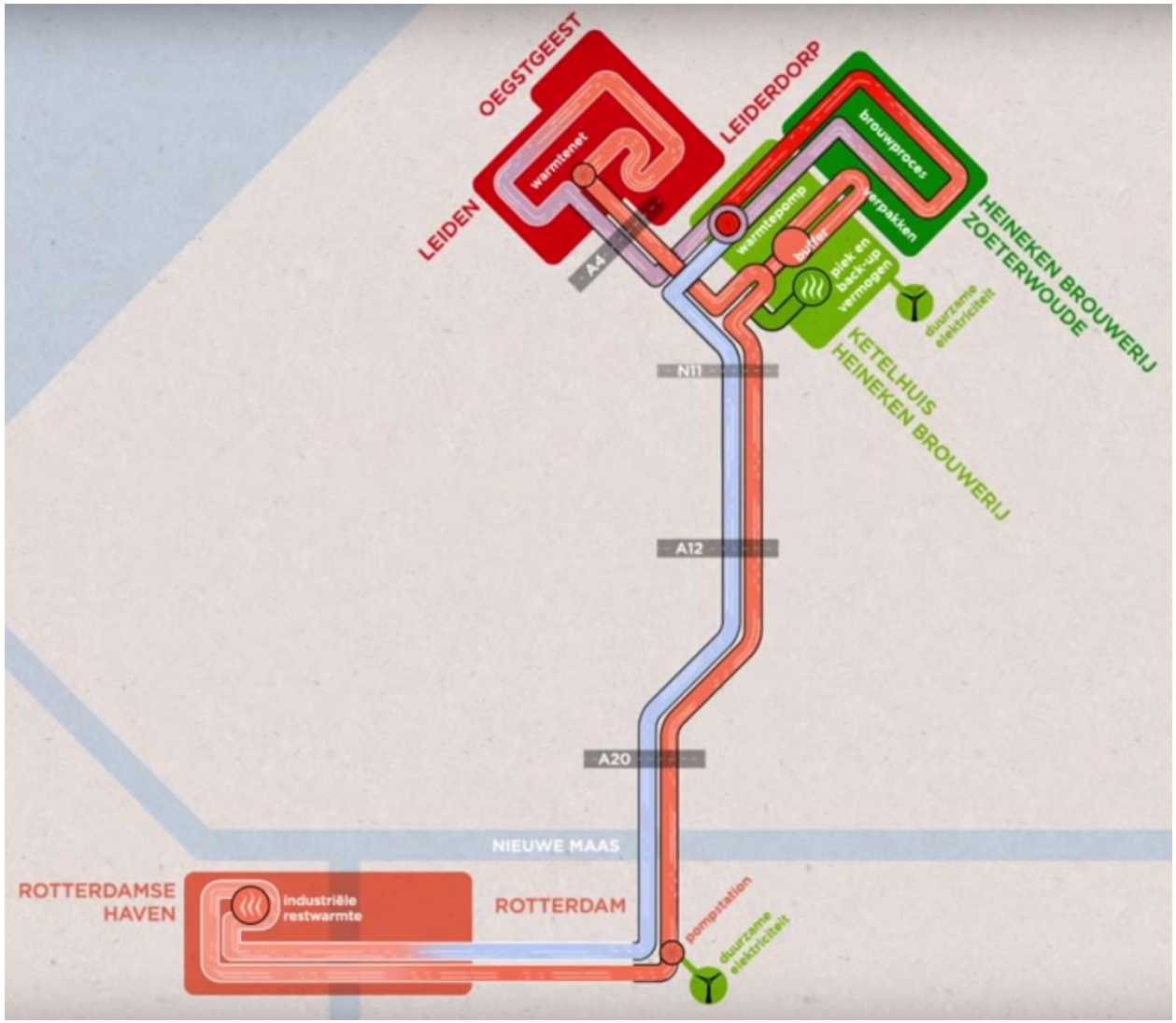


Map C **[Source: Province of South Holland, 2016]**

Chapter 1 Introduction

This thesis will start by stating the obvious: total CO_2 emissions need to be reduced in order to avert catastrophic environmental damage. Warnings about the negative consequences of global warming on our planet have been issued repeatedly. The 2014 IPCC report on global warming states that 'human influence on the climate system is clear and recent anthropogenic emissions of greenhouse gases are the highest in history.' It further warns that the 'warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia' (IPCC 2014, 2). Representatives of 196 parties attending the 2015 Climate Change Conference in Paris aimed to address this issue. Together they negotiated the Paris Agreement, which went into effect on 4 November 2016. It was hailed as a historic turning point in the goal of reducing global warming.[1] It recognises the 'need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge' (UNFCCC 2015, 1). Never before did so many UN Member States agree to such far-reaching, albeit voluntary, limitations on greenhouse gas emissions (GHG). Participants aim to limit the 'increase in the global warming temperature to well below 2 °C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels' (UNFCCC 2015, 3). In other words, parties to this agreement want to avoid 'severe, pervasive and irreversible impacts for people and ecosystems' (IPCC 2014, 8).

The Paris Agreement and increasing public awareness of global warming arguably comes just in time. The past five years are the hottest on record since humans started to document global temperatures and 2016 is the hottest year of all.[2] If this trend continues, global warming could force 'more than 100 million people into extreme poverty by 2030' (World Bank 2016, 3). The Paris Agreement stipulates that 'developed country Parties should continue taking the lead by undertaking economy-wide absolute emissions reduction targets' (UNFCCC 2015, 4). The European Union (EU) takes sustainability seriously and states in its 'Energy Roadmap 2050' that Member States have to show solidarity and intensify their efforts quickly in order to cut GHG by 80 to 95 percent by 2050 (EC 2012, 1). In more concrete terms, the EU has signed the Paris Agreement on behalf of all EU Member States, which is in line with its short-term goals to increase energy efficiency, strengthen the development of renewables and fuel investments in technological innovation (EC 2012, 19). China,

[1] Source, the Obama White House: https://www.whitehouse.gov/blog/2016/10/05/president-obama-marks-historic-moment-our-global-efforts-combat-climate-change.

[2] Source, The Guardian: https://www.theguardian.com/environment/2017/jan/18/2016-hottest-year-ever-recorded-and-scientists-say-human-activity-to-blame.

the world's largest investor in renewables, picked up the baton the US dropped during the Trump Administration and works together with the EU in achieving the goals set out by the Paris Agreement.

Efforts to combat global warming have accelerated in recent years, but the Netherlands is still trailing behind other EU Member States in terms of environmental sustainability. The share of renewables in the Dutch energy system is only 5.8 percent in 2013. This puts them at the bottom of the list together with Malta and Luxembourg (DNB 2016, 63; Eurostat 2017). In the coalition agreement of October 2012 the Liberal Party (VVD) and the Labour Party (PvdA) agreed to create the 'Energy Agreement for Sustainable Growth' in September 2013. Parties to this agreement target a fourteen percent share of renewables in 2020 and remain committed to EU sustainability plans. However, these plans are still short-term and the Dutch Council of State commented that 'concrete, consistent and credible long-term policies for the environment are still missing, for example on the field of innovation' (CoS 2016, 12).[3] McKinsey has set the necessary financial investment costs for the Netherlands' energy system to reduce GHG between 80 to 95 percent to around € 200 to 300 billion between the years 2020 and 2040 (McKinsey 2016, 30).

Governments need to address these environmental challenges during the next couple of decades. Implementing policies to stimulate renewables will require government to collaborate with other public- and private sector actors to acquire their support (e.g. Klijn and Koppenjan 2015; Pierre and Peters 2000; Rhodes 1996). Often governments have limited to no authority over what other actors decide to do. In other words, if the Dutch government decides it wants to for example phase out natural gas the success or failure of this initiative depends on the other actors' willingness to work together with government. When actors are mutually dependent they will often cluster together and interact with each other in a governance network to solve an issue (Klijn and Koppenjan 2015, 11). Normally this functions rather effectively, because an acceptable way forward is almost always found. However, in some occasions actors can get 'trapped' in discussions that continuously circle around a specific issue or actors decide to exclude those with differing opinions from participating in their meetings. The problem remains in existence and actors themselves are acutely aware of this fact, but seem stuck in a vicious cycle. Situations like this are called fixations when actors get together to solve a problem, but the interaction process between actors does not progress and becomes fixed or stagnant (Termeer 1993). Such situations are considered to be undesirable and have to be avoided.

[3] Additional source, *NRC Handelsblad* of 13 October 2016: https://www.nrc.nl/nieuws/2016/10/13/kritiek-op-ontbreken-visie-klimaatbeleid-4805019-a1526340.

1.1 Problem statement

Transitioning from fossil fuels to renewables leads to the following trilemma according to Bale, Varga and Foxon (2015, 151):

1. How to provide affordable and consistent energy services;
2. How to achieve security of supply;
3. How to reduce CO_2 emissions.

Actors want a seamless transition from fossil fuels to renewables in which all three questions are answered in a satisfying manner. However, the transition from profitable industries with entrenched interests to upcoming industries is difficult to achieve. This makes smooth transitions the exception rather than the rule. Disagreement between actors lead to setbacks or suboptimal outcomes. Public- and private sector actors endure political and societal pressure to make the energy transition a success. It goes without saying that consistent forward momentum is required and expected. Linked to this, the Netherlands' share of renewables is low compared to other European countries and total CO_2 emissions per inhabitant are relatively high and lagging behind the rest of the EU (CBS 2017). It is therefore informative to conduct an in-depth study of an energy transition collaboration in the Netherlands. One of the largest projects currently in development in the Netherlands is the heat roundabout. This district heating network will transport surplus heat from for example industries in the port of Rotterdam to households and businesses in the province of South Holland. Almost 55 percent of total energy consumption in the Netherlands comes directly from heat generation. 91 percent of this heat is generated by burning natural gas. It is thus not surprising that people are looking for ways to phase-out natural gas and replace it with more sustainable alternatives. Burning natural gas is incredibly inefficient considering the fact that all industrial processes create heat as a by-product. Currently this heat is directly discharged in the air, rivers or sea. Since these industries will remain operational in the foreseeable future, why not use the heat they produce that would otherwise be wasted? In future, a mix of heat from industries and for example geothermal sources supplied via the heat roundabout could provide the entire province of South Holland with heat.

The scope of this thesis would be too broad if the entire heat roundabout is studied. Instead the scope will be limited to a single case, namely Cluster West of the overarching heat roundabout. People involved in Cluster West occupy themselves with the development of the western part of the heat roundabout, which includes the cities of Rotterdam and The Hague, the port of Rotterdam and the horticulture of Westland. However, like with most large projects the collaboration process in

Cluster West was challenging. The energy transition threatens entrenched interests and has the potential to disrupt a system that many consider near perfect. Furthermore, it involves many actors, will have very high investment costs and a district heating network has not been tried on a province wide scale before. Connecting the heat roundabout to fossil industries to the heat roundabout was a major point of disagreement. Fixations in the interaction process can disrupt the progress of a collaborative endeavour. Studying Cluster West allows the author of this thesis to analyse how actors collaborate in one of the largest and arguably most important energy transition projects in the Netherlands. This thesis will use the configuration theory and the collaborative governance theory to study collaboration and fixations in Cluster West.

1.2 Research goal and research questions

The goal of this thesis is to assess collaboration between actors in the province of South Holland who aim to create a heat roundabout. More specifically the creation of the western part of the heat roundabout, Cluster West. The research focus will be primarily on fixations, which are extreme cases of stagnation in interaction processes. Global warming is a pressing concern requiring swift action, which can get thwarted by fixations. Developing a better understanding of fixations will hopefully lead to a reduction in fixations and improvements in the collaborative process. This leads to the following research question:

RQ *How can collaboration between stakeholders in developments around the heat roundabout, more specifically Cluster West, be identified, explained and assessed and how can this be improved?*

In order to answer the central research question three sub-questions have been developed:

SQ1 How did the collaboration within Cluster West take shape?
- Which actors were involved?
- What is the purpose of Cluster West in the context of the energy transition?
- How is the first (exploration) phase different from the second (feasibility) phase?

SQ2 When and why did fixations occur in the collaboration between actors in Cluster West?
- Which factors seem to support the creation of fixations?

SQ3 Were fixations resolved through an intervention in the cognitive or social dimension?
- Which actors, or which actors, resolved fixations?

1.3 Scientific relevance

Studying the internal processes of governance networks fits within the framework of Public Administration. In modern societies it is crucial to study the effectiveness and efficiency of collaborations. The findings of this study will contribute to the existing knowledge of collaborative endeavours. Understanding the internal processes of governance networks is scientifically relevant in the following manner. As mentioned in the introduction, the energy transition from fossil fuels to renewables has to take place sooner rather than later. Despite this recognition and the great many theories on how to identify, explain and evaluate collaboration in all sorts of different settings, from urban development to large hospitals, research on global warming from a Public Administration perspective remains rather limited. Teisman et al. (2009, 48) argued that scholars of Public Administration can make a useful contribution on topics of climate policy and climate adaptation. It is striking to them that this opportunity remains largely underused. Collaboration increasingly takes place in governance networks involving public- and private sector actors without one single leader. Successfully launching an energy transition and creating a heat roundabout will require long-term negotiations between actors that have likely interacted before and have diverse interests and agendas. To date there have been no such attempts to study the heat roundabout from a Public Administration perspective instead of a technical perspective, which is arguably just as important to the overall success of an initiative. The deterioration in relations between actors will be missed when one exclusively studies the technical nature of a project instead of the social nature as well.

1.4 Societal relevance

Many EU Member States recently started the energy transition from fossil fuels to renewables. The Netherlands has increased its efforts to make the energy transition a success, but is still lagging behind most other European countries. CO_2 emissions in the port of Rotterdam need to be reduced in order to make sure that the port retains its competitive advantage over other European seaports. The port puts its future profits in jeopardy if it fails to transition away from coal plants and a process industry based on fossil fuels. The last Citizens' Perspectives that Statistics Netherlands (CBS) published in 2016 concludes that around 50 percent of Dutch citizens agree that the Netherlands should reduce its fossil fuels consumption. Most understand the energy transition’s necessity, but the report also mentions that a large majority of Dutch citizens want businesses to do the heavy lifting. Based on the CBS report the heat roundabout would be appreciated by a majority of those who participated in the survey. The heat roundabout aims to reduce the use of natural gas for heating purposes, lower CO_2 emissions and stop heat from being discharged into the atmosphere or

water. Furthermore, semi-public and private organisations like Eneco, Heineken and the Port of Rotterdam Authority[4] play an active role in realising the heat roundabout. Connecting the process industry of the port of Rotterdam to the heat roundabout will lead to lower CO_2 emissions, which is what the Dutch public wants.

However, collaboration between parties that participated in Cluster West was not always effective. The Netherlands can only lower their natural gas consumption if actors are able to agree to a shared path forward. This thesis' research can add to a better understanding of what went wrong in the collaboration between the parties involved in Cluster West. One can reduce the use of fossil fuels by improving thermal insulation of the urban, densely populated areas of Rotterdam and The Hague. However, insulation decreases the demand for heat, but will not reduce it to zero. Natural gas is burned in order to meet the remaining demand for heat, but in the future this can be replaced by heat from the process industry in the port of Rotterdam supplied through district heating networks. To make the energy transition a success it is necessary to create new and expand existing district heating networks via the heat roundabout project. This thesis sets out to answer a highly relevant research question, because global warming and the energy transition will have a big impact on Dutch society.

1.5 Reader's guide

Chapter 2 will elaborate on the theoretical framework based on the collaborative governance theory and the configuration theory. These theories will be synthesised to enrich the discussion on collaboration in Cluster West. The theoretical description will culminate in a conceptual model, which will be used for the analysis. *Chapter 3* will introduce this thesis' research design and methods. It will operationalise the most relevant theoretical concepts, explain why a case study approach was chosen and elaborate on the use of interviews as its main source of data. *Chapter 4* provides a case description and will explain the rationale behind the heat roundabout and its development. *Chapter 5* will present the empirical findings and analyse how variables influence each other and how the findings can add to theoretical development. *Chapter 6* will conclude this research by answering the sub-questions and main research question. Furthermore, theoretical and practical recommendations are outlined. At the end of this thesis one can find the reference list and several pages of annexes.

[4] The name Port Authority will be used in the remainder of this thesis to denote the Port of Rotterdam Authority.

Chapter 2 Theoretical framework

In the theoretical framework a range of the existing literature on complexity, wicked problems and governance will be studied in order to build a conceptual model. After exploring the concepts of complexity and wicked problems, the configuration theory and collaborative governance theory will be introduced as this thesis' core theories. The main characteristics will be discussed and coupled with a discussion on cross-sector collaboration. Insights from these theories will be combined in a conceptual model that is employed in the analysis of this research.

2.1 Complexity

Complexity is a vague concept. Wagenaar (2007, 23) sees a system as complex 'when there are strong interactions among its elements, so that current events heavily influence the probabilities of many kinds of later events.' Indeed, the world is a diverse place with mutual relationships leading to local interactions between elements that will always render new and different outcomes according to Gerrits (2012, 16). Complexity is a force of itself and practically unstoppable. Governments that aim to reduce complexity end up creating a more complex society than when they started. Often new actions lead to new circumstances that demand even more actions and complexity increases every step of the way (Gerrits 2012, 18).

Public Administration scholars see the world as complex, but their definition of complexity is different from the one of non-academics. When someone encounters something that is difficult to comprehend, such as an application for a tax rebate or starting a court case, it is seen as complex. However, due to their ordered and structured format Public Administration scholars would consider these examples to be complicated instead of complex (Gerrits 2012, 14). Something is academically complex when it is unpredictable due to the involvement of interrelated elements constantly interacting and serving a certain purpose or striving towards a certain end goal. Complex systems are formed because of uncertainty and nonlinear interactions that emerge from this uncertainty. Notions of complexity are used to understand why certain policy decisions were made and how policymakers can effectively work in an increasingly complex society and government. Van Buuren, Boons and Teisman (2012, 117–118) characterise complex systems as connected subsystems that operate following their own logic and cause nonlinear dynamics with highly unpredictable consequences. This also leads to unpredictable results. Furthermore, in a complex system there is no external or internal actor in full control over what happens, which means that the self-organising capacity of the system decides what happens. The complex system evolves and is maintained without external control.

Moreover, complex systems are often path dependent, which determines what is possible in the future and subsystems tend to coevolve due to feedback patterns. Finally, instability is the status quo, because the system can jump towards other dynamic system states depending on external and internal developments.

Governance of utilities might be the most complex of all industries, particularly in the province of South Holland where many households and enormous industries have a high energy demand. The ownership of the means to produce and supply this utility is shared by private corporations like Uniper and by public-private partnerships and corporations under the control of the Dutch State like TenneT. Although the system is difficult to comprehend it is reliable and affordable, yet unable to drastically cut CO_2 emissions. Covert, Greenstone and Knittel (2016, 123) studied the current energy system and concluded that 'the world is likely to be awash in fossil fuels for decades and perhaps even centuries to come.' It is difficult to introduce renewables to a super well-organized energy system with high security of supply and high energy density. Even more, the authors argue that during the energy transition fossil fuels will remain crucial, since 'solar and wind energy are inevitably intermittent, which requires either increases in backup generation (often supplied by natural gas generators) or increases in energy storage' (Covert et al. 2016, 129). Hoping that a silver bullet will appear and provide an immediate solution to our energy problems might be desirable and a comforting thought, but considering our current predicament not the best course of action. What is necessary are 'activist and aggressive policy choices' that drive the reduction of fossil fuels consumption (Covert et al. 2016, 120).

2.2 (Super-) wicked problems

Wicked problems is a term that has become popular in recent years to describe contemporary policy problems such as climate change, obesity and migration (Peters and Pierre 2016, 54). The first definition of wicked problems is from Rittel and Webber (1973, 161–167) who cite ten different characteristics of complex issues. These characteristics have been revised by the Australian Public Service Commission (2007, 3–5):

1. There is no definitive formulation of a wicked problem. Poverty can be considered a wicked problem and is in general terms similar, but discretely different in the Netherlands and Nigeria. This makes it hard to provide a concrete and definitive formulation of the concept of poverty.

2. Wicked problems have no stopping rule. Problem solvers will never know for certain whether they have solved the problem, it might be impossible to measure or even claim success in solving a wicked problem mainly because these problems are interrelated and hard to define.
3. Solutions to wicked problems are not true-or-false, but good-or-bad. Solutions are assessed on the basis of whether they sufficiently address the issue and improve a certain situation, there are no tangible grounds to claim a certain solution leads to an end state.
4. There is no immediate and no ultimate test of a solution to a wicked problem. Solutions might lead to unforeseen consequences, because wicked problems are multi-causal and have many interconnections to other issues.
5. Every solution to a wicked problem is a "one-shot operation," because there is no opportunity to learn by trail-and-error, every attempt counts significantly. In other words, policy-makers have to focus on a moving target that is evolving at the same time.
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan. There is no stable definition of a wicked problems, which means that there are no definitive solutions to wicked problems.
7. Every wicked problem is essentially unique. There always might be an additional distinguishing property that is of overriding importance. The conditions for constructing a subway in Amsterdam might look similar to those in Rotterdam, but it is ill-advised to transfer Rotterdam's solutions directly.
8. Every wicked problem can be considered to be symptom of another problem. For example, crime can be considered as a symptom of moral decay or a lack of socio-economic opportunities or any other explanation the policy maker likes best.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution. Regarding the topic of crime, it can be explained by there being too many criminals, or not enough police officers on the streets.
10. The planner has no right to be wrong. As mentioned before, a solution to a wicked problem might lead to unforeseen consequences and planners are directly responsible for chronic policy failure, which is seen as intolerable.

The characteristics of wicked problems correspondent with global warming and the energy transition. However, Levin et al. (2012, 126–129) pose that wicked problems describe most policy problems and that a more advanced understanding of wicked problems would include four other

characteristics. These additional characteristics transform a wicked problem into a super-wicked problem. Global warming is a good example of a super-wicked problem:

1. Time is running out. Hansen et al. (2013, 21) mention that global warming has to be addressed, because significant impacts will occur on a more regular basis and become more acute with each passing year.
2. There is no central authority, or only a weak central authority, to manage the problem. Policy makers are confronted with fragmented and diffuse authority with the UNFCCC as the main authority to address global warming.
3. Those seeking to end the problem are also causing it. Many of our individual daily activities result in GHG, but at the same time we are responsible for reducing global warming. Industries have an even bigger share in global warming and arguably have a bigger responsibility to mitigate it.
4. The future is discounted radically so that contemporary solutions become less valuable. Overwhelming evidence of the risks of global warming and the severity of the consequences if not addressed are recognised by decision makers, but tend to be disregarded because they interfere with short term plans. Levin et al. (2012, 128) give the example of smokers who know it creates health problems, but require immediate gratification.

Super-wicked problems are complex, because issues like global warming and the energy transition require coordinated action. This is difficult to achieve when actors have different opinions on the issue and prefer a different course of action. When global warming is discussed internationally the structural inequalities that formed between countries lead to debates between advanced, industrialised economies and those that have recently started or gone through a phase of industrialisation or have yet to do so. Developing countries consider it unfair to be limited in their growth while advanced economies were allowed to expand without barriers some hundred years ago. This leaves policy makers with a dynamic and pluralistic system, typical of many wicked problems.

2.3 From government to governance within governance networks

Complexity is one of the primary reasons for the limited effectiveness of traditional government and the ever growing needs of individuals puts a large burden on government. This caused a shift towards different forms of governance (Klijn and Koppenjan 2015, 5; Wagenaar 2007, 17). Rhodes (1996, 666) promptly understood that the outcomes of administrative action are not based on

authoritative implementation of pre-established rules, but that the outcomes result from collaboration with many other actors. In other words, 'governance signifies a change in the meaning of government, referring to new processes of governing; or changed conditions of ordered rule; or new methods by which society is governed' (Rhodes 1996, 652). Traditional top-down steering is ill-suited for solving complex, wicked societal problems that can only be solved through collaboration with other stakeholders. This means that as Pierre and Peters (2000, 194) put it 'the strength of the State has become contextual and entrepreneurial rather than, as was previously the case, something derived from the constitutional and legal strength of the State institutions.' This puts government on an equal footing with other actors, remaining a significant and influential player to be sure, but top down steering is relegated to the history books. Governance is defined as 'the coordination of activities around collective problems by mutually dependent actors' (Van Buuren et al. 2012, 118). This thesis will follow Klijn and Koppenjan (2015, 11) and understand governance as governance within governance networks. They define governance networks as:

> 'More or less stable patterns of social relations between mutually dependent actors, which cluster around a policy problem, a policy programme, and/or a set of resources and which emerge, are sustained, and are changed through a series of interactions.'

2.4 Cross-sector collaboration and collaborative governance

Bringing actors together to engage in a consensus-oriented, collective process of decision-making, is what collaborative governance entails. Ansell and Gash (2008, 544) define it as:

> 'A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets.'

This definition of collaborative governance requires participation by non-state actors, which means that preferably all relevant interests are represented when decisions are made (Ansell and Gash 2008, 545). Cross-sector collaboration is considered both necessary and desirable to address 'many of society's most difficult public challenges' (Bryson, Crosby and Stone 2006, 44). By cross-sector collaboration Bryson et al. (2006) mean 'partnerships involving government, business, non-profits and philanthropies, communities, and/or the public as a whole.' In other words, cross-sector

collaborative governance is required to address super-wicked problems like global warming by 'linking or sharing of information, resources, activities, and capabilities by organisations in two or more sectors to achieve jointly an outcome that could not be achieved by organisations in one sector separately' (Bryson et al. 2006, 44).

In the province of South Holland collaborative governance arrangements are required to address wicked problems. Interconnected stakeholders collaborate in various arrangements to develop a common approach to address a wicked problem. The Dutch State needs to work with the Port Authority, Shell, Uniper and Greenpeace to develop a robust energy transition master plan. It is important to recognise that 'cross-sector collaborations do not solve all the problems they tackle' and success is far from guaranteed (Bryson et al. 2006, 44). As the introduction to complexity and wicked problems showed, small changes can lead to unexpected consequences. Furthermore, it is likely that actors from different sectors will have different ideas on how to solve the super-wicked problem and many deep uncertainties plague collaborative action. Several definitions about the problem, urgency and plan of action will make addressing the issue a significant challenge (Bryson et al. 2006, 46). In the port of Rotterdam the energy transition threatens energy-intensive refineries. These refineries provides for example Shell with a lot of revenue. The energy transition directly threatens their business model and indirectly their survivability. There is thus a less urgent need for them to transition from fossil fuels to renewables. Public actors on the other hand want these industries to rapidly decrease their carbon footprint and prioritise decarbonisation and renewables. Different definitions of what is at stake, how to best address the issue and the timeframe for the energy transition means that actors are often at odds with each other.

Several articles about cross-sector collaboration inform this thesis' theoretical framework (Ansell and Gash 2008; Bryson et al. 2006; Emerson, Nabatchi and Balogh 2011; Japin 2014; Van Buuren et al. 2012). Two of these specifically approach their research question from the perspective of collaborative governance and one of those is the article by Emerson et al. (2011). That article provides a broader definition of collaborative governance than Ansell and Gash (2008, 544) did in their article. According to Emerson et al. (2011, 2) collaborative governance is broadly defined as:

> *'The processes and structures of public policy decision-making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished.'*

Furthermore, the authors developed a framework through which collaborative governance can be analysed, the collaborative governance regime (CGR) (Emerson et al. 2011, 5). The authors define a CGR as 'the particular mode of, or system for, public decision-making in which cross-boundary collaboration represents the prevailing pattern of behaviour and activity' (Emerson et al. 2011, 6). This framework provides some suggestions for how stakeholders can collaborate and reach collective outcomes. If actors succeed in creating an effective CGR they will likely exert more influence on the policies made concerning the energy transition (Emerson et al. 2011, 10). This thesis will take collaborative governance as its point of departure, because it is a suitable way to deal with the energy transition and the depth of the CGR framework lends itself to a thick description in single case studies (Emerson et al. 2011, 21). The CGR is a system in which 'cross-boundary collaboration represents the predominate mode for conduct, decision-making and activity' (Emerson et al. 2011, 10). Furthermore, theory on cross-sector collaboration is added and in general terms comparable to collaborative governance. Since this thesis will also use the configuration theory only the most relevant parts of the collaborative governance theory will be explained in the theoretical framework. To create a CGR several drivers are necessary, which are leadership, interdependence, consequential incentives and uncertainty.

2.5 Drivers of a CGR

Leadership is one driver that can potentially start a CGR. It is seen as crucial for 'setting and maintain clear ground rules, building trust, facilitating dialogue, and exploring mutual gains' (Ansell and Gash 2008, 554). According to Bryson et al. (2006, 47) two different leadership roles can be distinguished: sponsors and champions. Champions are individuals who aim at starting a collaboration by actively bringing actors together and using his or her 'process skills to help the collaboration accomplish its goals.' Sponsors are individuals who take more of a facilitating role in bringing actors together through his or her 'considerable prestige, authority, and access to resources they can use on behalf of the collaboration, even if they are not closely involved in the day-to-day collaborative work.' Both leadership roles can be effective and both can potentially start a CGR. This individual should be committed to 'collaborative problem solving, [have] a willingness not to advocate for a particular solution, and exhibit impartiality with respect to the preferences of participants' (Emerson et al. 2011, 9).

Consequential incentives is another driver and refers to 'either internal or external drivers for collaborative action.' One of these consequential incentives can be a problem for which they will need the resources of other actors to solve it. The energy transition can be a consequential incentive

for various actors to start work together. It is important to note that such an issue is consequential when the issue is 'salient to participants, the timing or pressure for a solutions is ripe, and the absence of attention to the incentives may have negative impacts' (Emerson et al. 2011, 9). This is particularly true for the energy transition and the developments around the heat roundabout. Humans are threatened by the effects of global warming.

Interdependence basically means that actors will work together to achieve a goal they are unable to achieve on their own. Bryson et al. (2006, 46) call this driver sector failure, because separate individual policies to address the issue have failed. Efforts to reduce the emission of GHG have been found wanting before cross-sector efforts were initiated. Ansell and Gash (2008, 550) provide a similar explanation, but define interdependency as incentives for and constraints on participation. If interdependency is rather low, because alternative venues exist where actors can pursue their goals unilaterally, then it is unlikely that they will start a CGR (Ansell and Gash 2008, 553).

Uncertainty is in wicked problems the primary challenge that actors have to deal with. If uncertainty cannot be resolved internally this might drive actors to collaborate in order to 'reduce, diffuse, and share risk' (Emerson et al. 2009, 10). Uncertainty will always be present in a complex world, because actors lack perfect information to solve an issue on their own without help from other actors. In short, all drivers will influence how a CGR develops. If one or more of these drivers are present it is more likely that a CGR will be initiated (Emerson et al. 2011, 10). If a CGR is initiated, collaborative dynamics will determine how the CGR develops.

2.6 Collaborative dynamics in a CGR: a closer look

Both Ansell and Gash (2008, 550) and Emerson et al. (2011, 6) interpret the collaborative process or collaborative dynamics respectively as cyclical. This means that collaborative dynamics constantly influence each other and do not follow a linear pathway. Emerson et al. (2011) differentiate three different elements that are in constant interaction: principled engagement, capacity for joint action, and shared motivation.

2.6.1 Principled engagement

As is common in interaction between two or more parties, each participant brings its own set of individual attitudes, values, interests and knowledge in addition to the cultures, missions and mandates of the organisations they represent (Emerson et al. 2011, 11). All relevant and significant

different interests should be represented. Principled engagement occurs of time and has four elements: discovery, definition, deliberation, and determinations (Emerson et al. 2011, 11). Actors will first start a process of discovery and definition of an issue they want to solve. As this progresses actors will engage in deliberation and interact about contentious issues and look for the common good of the collaboration. Finally, determinations are group decisions made on the basis of discovery, definition and deliberation. These determinations can entail setting a shared ambition and shared objectives or the commissioning of independent research. The variables of principled engagement and shared motivation reinforce each other and follow a sequential path.

Discovery entails the process of finding 'individual and shared interests, concerns, and values, as well as to the identification and analysis of relevant and significant information and its implication' (Emerson et al. 2011, 12).

Definition refers to the process that is characterised by a constant effort to build shared meaning by articulating common purpose and objectives, a common terminology, clarifying tasks and expectations, and devising criteria for the assessment of information (Emerson et al. 2011, 12).

Deliberation requires one to listen to the perspectives of other actors and in cooperation with others define a common good. A CGR should be a safe space were actors can openly share their thoughts to bridge differences.

Determination refers to joint procedural decisions like agenda setting and joint substantive determinations like final recommendations. When decisions are made in unison, preceded by discussions, the CGR will be stronger. All these four elements together strengthen or weaken principled engagement and will as a whole strengthen or weaken the other parts of the CGR.

2.6.2 Shared motivation

Emerson et al. (2011, 13) define shared motivation as a 'self-reinforcing cycle consisting of four elements: mutual trust, understanding, internal legitimacy, and shared commitment.' These four elements can have a positive or negative impact on the collaborative network. If principled engagement was effective, parties will feel motivated to continue their collaboration. Shared motivation will also reinforce (or undermine) the process of principled engagement. When actors no longer trust each other this will also undermine mutual understanding, legitimacy and the actors'

commitment to the collaborative endeavour and vice versa. This will have a negative impact on the CGR as a whole.

Trust is the lubricant and glue of a cross-sector collaborations (Bryson et al. 2006, 47). Trust building is an activity that actors have to engage in constantly, because without trust the likelihood of a successful collaboration deminishes (Bryson et al. 2006, 48). Ansell and Gash (2008, 558–559) agree that trust building vital and 'a time-consuming process that requires a long-term commitment to achieving collaborative outcomes.' If actors cannot interact without feeling that the others will pull the wool over their eyes, it is highly unlikely that the cross-sector collaboration will be successful. Emerson et al. (2011, 13) argue that actors have to prove to each other that they are reasonable, predictable and dependable. Furthermore, in successful collaborative endeavours actors will have to slowly build trust by 'sharing information and knowledge and demonstrating competency, good intentions, and follow-through' (Bryson et al. 2006, 48).

Mutual understanding refers to 'the ability to understand and respect others' positions and interests even when one might not agree' (Emerson et al. 2011, 14). This definition shows that actors do not have to fully agree with each other, but should have enough in agreement to make collaboration possible. While Emerson et al. (2011, 14) explicitly reject similarities between mutual understanding and shared understanding, which is how Ansell and Gash (2008, 550) define it, it is important to note that common goals and problem definitions put the purpose of a collaboration into sharper focus.

Legitimacy is the third element that makes up shared motivation. When actors in a CGR are trustworthy and credible, with compatible and interdependent interests, then this provides legitimacy and motivation for the ongoing collaboration (Emerson et al. 2011, 14). This obviously harks back to the elements of trust and mutual understanding. Without these two elements the collaborative endeavour would not be considered as legitimate. Bryson et al. (2006, 47) shine more light on how cross-sector collaboration in networks can acquire legitimacy. Both insiders and outsiders will not automatically recognise a network as legitimate, precisely because networks are difficult to grasp and usually highly complex. Cross-sector collaboration in networks is more likely to succeed when actors legitimise it as 'a form of organising, as a separate entity, and as a source of trusted interaction among members' (Bryson et al. 2006, 47). Both insiders and outsiders should be convinced that the common sense approach to tackle a wicked problem is through cross-sector collaboration in networks.

Shared commitment 'enables participants to cross to organisational, sectoral, and or jurisdictional boundaries that previously separated them and commit to a shared path' (Emerson et al. 2011, 14). Shared commitment to the process is a critical factor in understanding collaborative success or failure (Ansell and Gash 2008, 559). The level to which an actor is committed closely corresponds with its original motivation to participate in cross-sector collaboration, the belief that 'good faith bargaining for mutual gains is the best way to achieve desirable policy outcomes' and the willingness to accept outcomes that do not perfectly resemble the actor's goals and interests. Additionally, actors are more committed if they share 'ownership of the process,' which implies shared responsibility. The outcome of the process depends on the actors' ability to work together and on the level of trust that exists between actors (Ansell and Gash 2008, 559–560).

2.6.3 Capacity for joint action

Emerson et al. (2011, 14) note that a 'CGR must generate a new capacity for joint action that did not exist before and sustain or grow that capacity for the duration of the shared purpose.' In other words, without cross-sector collaboration these new possibilities could not be exploited. The capacity for joint action is defined as 'a collection of cross-functional elements that come together to create the potential for taking effective action and serve as the link between strategy and performance' (Emerson et al. 2011, 14). These elements do not interact linearly, but dynamically and consist of procedural and institutional arrangements, leadership, knowledge, and resources. The capacity for joint action influences and is influenced by the quality of the process of principled engagement and shared motivation.

Procedural and institutional arrangements are important for actors to interact with each other over a longer period of time. These arrangements 'encompass the range of process protocols and organisational structures necessary to manage repeated interactions over time' (Emerson et al. 2011, 15). In a world that is growing more complex by the day, most collaborative networks have to function for a prolonged period of time. This means that the 'structures and protocols for the administration and management of work' need to be well established. Such structures and protocols may take the form of norms of reciprocity, returning benefits for benefits, or a more formal set of ground rules like decision making rules and operating procedures to ensure a fair, equitable and open process of collaboration (Ansell and Gash 2008, 557; Emerson et al. 2011, 15). It is also important to manage the expectations that actors have of each other and about possible acceptable outcomes (Ansell and Gash 2008, 557). If actors are unsure what they can expect from each other

and from the collaborative endeavour itself, it is unlikely that they are willing to engage in joint action.

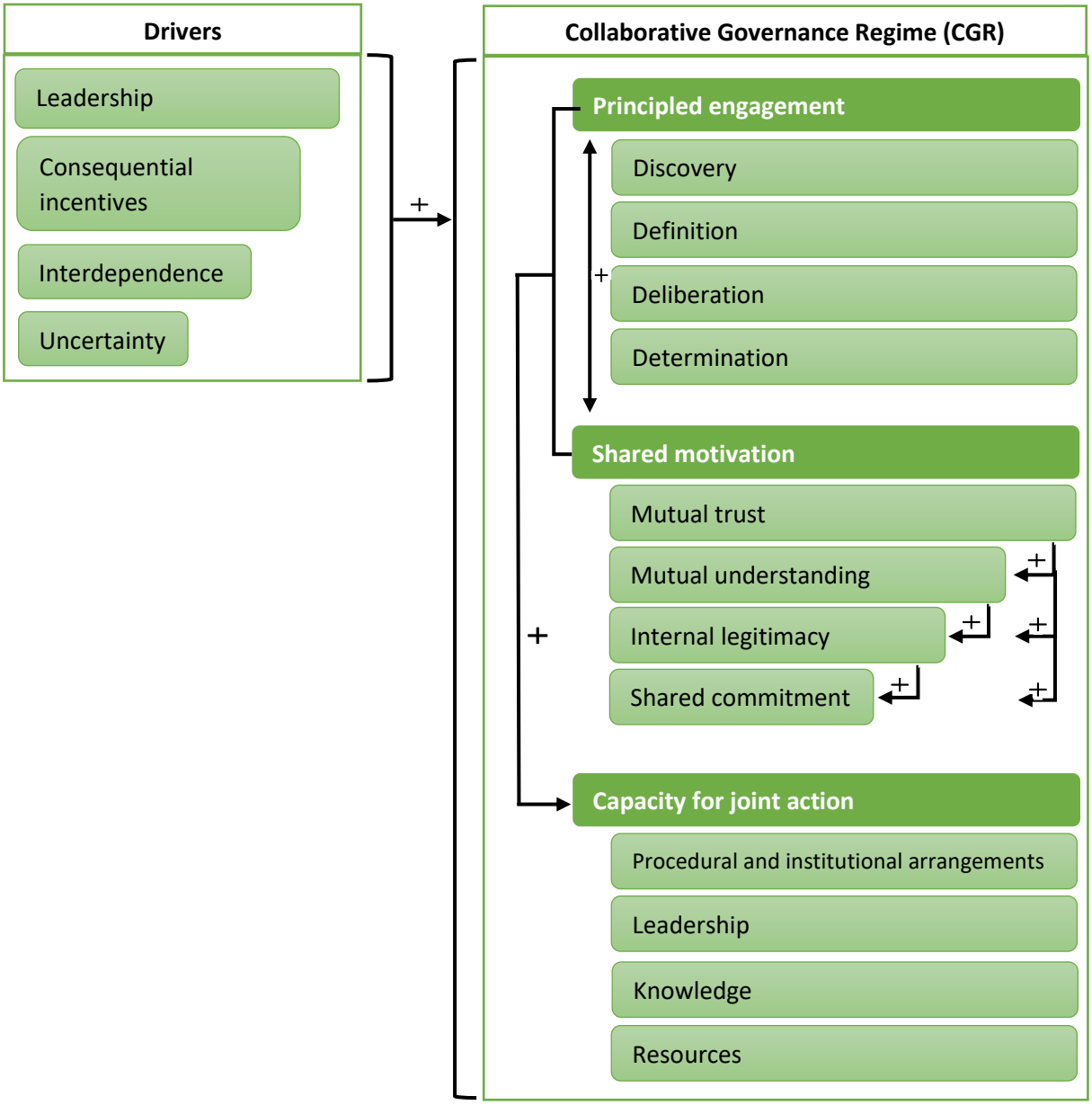
Leadership has already been addressed as one of the key drivers to start a CGR (Japin 2014). Leadership is also important for joint action, because some actors can fulfil a facilitating or mediating role in a collaborative network. An actor takes on a leadership role when he/she creates the conditions for joint action by making a crucial decision when no one else would, or by mediating in a conflict between actors that seemed insurmountable. Previously this thesis already mentioned the arguments by Ansell and Gash (2008, 554) and Bryson et al. (2006, 47) about looking not only at your own short-term self-interest, but at the long-term collective interest of the collaborative network. It is also important to note that Emerson et al. (2011, 15) put emphasis on the fact that different styles of leadership are necessary at different moments in the lifespan of a collaboration. For example, during moments of conflict an actor able to mediate between parties is needed more than a champion with well-developed process skills. On the other hand, when an agreement has been reached champions that lead the implementation are more needed than mediators. This is because their skills can then be more appropriately applied to the issue that actors are dealing with.

Knowledge is the third element that influence the capacity for joint action. Three drivers are related to this element, because shared, joint knowledge is a way to lessen uncertainty and vital to understanding consequential incentives and interdependence. Emerson et al. (2011, 16) call knowledge the 'currency of collaboration.' Without the sharing of knowledge between actors, joint action would be very unlikely. In essence, 'collaboration requires the aggregation, separation, and reassembly of data and information, as well as the generation of new, shared knowledge.' Bringing the knowledge of several actors together will create new possibilities and increase the capacity for joint action. It is common that people will consider their knowledge of the subject to be greater than the knowledge of their colleagues working for different organisations. Van Buuren (2009, 209) shows that knowledge can also lead to problems in collaboration, because 'discrepancies in the knowledge actors possess and mobilise' are often the root cause of collaborative network failure. Finally, Ansell and Gash (2008, 544) determine that 'as knowledge becomes increasingly specialised and distributed and as institutional infrastructures become more complex and interdependent, the demand for collaboration increases.' It is thus the case that higher levels of knowledge will increase the likelihood of joint action, while a dearth of knowledge leads to a lower likelihood of joint action.

Resources are the final element. Solving wicked problems requires resources like 'funding, time, technical and logistical support; administrative and organisational assistance; requisite skills for

analysis or implementation; and needed expertise, among others' (Emerson et al. 2011, 16). In a CGR it is possible to leverage and redistribute these resources as shared resources in order to achieve a certain common goal for which a CGR was created. Some actors have few resources in comparison with other actors. Effectively managing these resource differences can increase the fairness, legitimacy and efficacy of a CGR and will consequently lead to a larger capacity for joint action (Emerson et al. 2011, 16). Figure 2.1 illustrates the conceptual framework for the collaborative governance theory and explains the relationships between variables.

Figure 2.1 – Conceptual framework to analyse the process of collaboration in Cluster West



2.7 Configuration theory and its core concepts

This thesis will also use the configuration theory, because the collaborative governance theory and cross-sector collaboration are focused on the process of collaboration. Both theories discuss under what conditions stakeholders act collaboratively, while the configuration theory places particular emphasis on situation definitions. Actors construct reality based on their definitions of reality that were formed by the information they have at that moment grounded on earlier experiences. One fundamental understanding of the configuration theory is that people tend to interact with the same group of people, which is particularly the case when they work on a specific project with the same people over a longer period of time. The process of argumentation and communication that takes place causes the people involved in the project to start sharing values and beliefs and over time the values and beliefs start to become similar. Termeer (1993, 44) names such groups social-cognitive configurations. Occasionally the group within a configuration grows so convinced of its own values and beliefs that it is impossible to add third perspectives and third meanings. Configuration theorists call such situations fixations (Termeer 1993, 19). When people can no longer reflect on their beliefs and how they interact with each other and with whom then one can speak of a fixation. One can overlook the importance of configurations that develop around a project when one only looks at the process of collaboration. Van Twist and Termeer (1991, 20) mention several core concepts that together form the configuration theory. These core concepts are:

- Actors involved
- Cognitive dimension: definitions of reality
- Social dimension: interaction rules
- Social-cognitive configurations
- Multiple inclusion
- Inertia: fixations

2.7.1 Actors involved

Interactions between actors will decide how the definitions of reality are formed and changed (Van Twist and Termeer 1991, 22). However, actors are unable to interact with all actors that are potentially involved. Taking into account other work commitments and time constraints, actors have to limit the number of other actors with which they regularly interact and this is often based on interdependencies. Regular interactions between several actors will eventually lead to the establishment of a network with its own interaction rules and definitions of reality. For the heat

roundabout public and private organisations came together to solve a problem they could not solve individually. Every individual actor has its own ideas about how the world works, what is important and what is not. Furthermore, an actor has its own view on its role, its environment and the means, competences and influence of other actors before they meet for the first time. All actors already have, in varying degrees, interacted with one another before on other topics and these previous experiences will form the basis of initial interactions. Considering historical experiences and the various sectors in which actors work, it is likely that certain actors will interact on a more frequent basis, while some other actors might only sporadically interact or not at all. In the case of the heat roundabout it was split in two smaller clusters based on their geographical location, Cluster West or Cluster East. These clusters were subdivided in four separate pipeline projects. Three pipelines for Cluster West and one pipeline for Cluster East. This means that actors from Cluster West interact more often with each other than with those from Cluster East, while also interacting more with actors involved in the same pipeline project and less with those involved in others.

Actors will also give different priorities to their values and beliefs. The Port Authority weighs the importance of coal plants versus environmental suitability differently than the municipality of The Hague whose municipal council is in favour of closing all coal plants. When values are incompatible with new experiences or information, actors tend to adapt in a way that favours their priorities most. The problem that actors try to solve is gradually constructed through regular interactions between actors. However, alongside a shared definition of the problem agreed upon by all actors many individual definitions of the problem can exist as well. In general terms actors can agree what the problem is about, but actors can set their own objectives to solve the problem. Differences can exist in the ends that need to be reached or how one will reach these ends. For example, actors might agree that the energy transition is important to address global warming, but individual motivations can differ. For some actors the heat roundabout is about economic benefits (gaining a share of the heat market), for some it is about survival (without fossil fuels we no right to exist), some others have to quickly replace old sources of heat (old power plants will close soon), while some want to save the environment (keep the Netherlands liveable). All these different motivations can have an influence on how actors approach the problem and how involved they will be.

2.7.2 Cognitive dimension: definitions of reality

Van Twist and Termeer (1991, 21) argue that definitions of reality (the ‘what’) are created by the actor, its environment, its negotiation strategy and the interdependent relationship that exist between actors. Through interaction actors give meaning to their surroundings: ‘what is happening,

what we think of it, what we do not know yet, what does that mean for our actions, which outcomes do we expect, and so forth' (Termeer and Kessener 2007, 258). This means that actors create definitions of reality on a large variety of themes. Mundane themes like the weather or how well ones favourite football club is doing, or more specific themes related to the project actors try to develop. Two themes will be discussed here, namely the heat roundabout and the energy transition. Actors will develop definitions of reality on several subthemes:

- Initial ideas about the heat roundabout and the energy transition;
- The actors' vision on the development of the heat market;
- Ideas about the construction of a heat roundabout;
- Opinion about coal plants and coal heat;
- Development of pipelines to transport heat from and to consumers;
- Opinion on the severity of global warming;
- Sharing of costs and benefits;
- Financial profits;
- Possible solutions.

This is just a selection of subthemes related to the heat roundabout and the energy transition. Actors develop common definitions of reality on these topics to create the necessary conditions for regular interactions to take place. The definitions of reality that were formed through interactions will form the basis for future behaviour of actors. Sometimes it happens that a new experience or new information is inconsistent with current beliefs. In that case the perception of this new experience or information and/or the existing beliefs are adapted to solve this inconsistency. In other words, actors will make sense of new experiences or information on the basis of their existing beliefs or adapt them into their belief system.

2.7.3 Social dimension: interaction rules

Actors interact with each other on the basis of interaction patterns that develop over time. Between actors a lot of interactions take place. Interactions are not limited to face to face contacts, but can also take place via for example email or telephone. Furthermore, interactions can also take place in the setting of Cluster West or as bilateral interactions between two parties involved in Cluster West. Termeer (1993) defines interaction rules (the 'how') as the rules that are more or less known by all involved actors and are used to organise joint and regular interactions. Through interactions actors construct and reconstruct interaction rules that relate to manners and etiquette. In short, what do

actors consider as acceptable behaviour. These interaction rules are constructed through interaction and determine the 'rules of the game,' the relationship between actors: who will they include and who not (the 'who'), to whom will they assign power, how will they deal with third parties, and what is (or is not) allowed in their mutual relationship (Termeer and Kessener 2007, 258).

2.7.4 Social-cognitive configurations

Social-cognitive configurations are formed by the actors (unit of analysis), their definitions of reality (what), the interaction patterns (who) and the interaction rules (how). These configurations are snapshots of ongoing processes of change in the social- and cognitive dimensions. The boundaries of these configurations are fluid and actors can switch from one configuration to another, be part of more than one configurations (multiple inclusion), leave a certain configuration, and/or join a different configuration. Several important criteria for a configuration are:

- Configurations relate to each other and cannot exist without one another;
- Between configurations social and cognitive aspects will differ;
- Within configurations social and cognitive aspects will match;
- Within configurations are certain amount of variation is possible, but that variation is rather small in comparison with other configurations;
- Configurations can overlap and actors can be included in multiple configurations.

Termeer (2006, 17) gives the example of Greenport Venlo where a dialogue started between representatives from the private sector, the province, several municipalities and regional universities. It was recognised that these actors needed each other's resources and expertise to develop Greenport Venlo, because individual initiatives would most likely fail. Representatives of these organisations engaged in dialogue on a regular basis and developed routine in their interactions, which led to the creation of a social structure (interaction rules). These regular interactions led to the development of shared definitions of reality when actors started to formulate collective dreams for their region and took concrete steps to make these dreams a reality. This strengthened the relationships between the involved actors and with it the social structure, which reinforced the cognitive dimension and vice versa. This core group of actors created a configuration around Greenport Venlo, which was termed 'founding fathers' by Termeer (2006, 18). Apart from the 'founding fathers' configuration several other configurations with deviating cognitive dimensions regarding the meaning of sustainable agriculture and a liveable region were formed. Actors do not

exclusively engage in only one configuration, but will be included in several configurations. Different configurations also means different definitions of reality and different interaction rules.

Due to constraints in time and scope this thesis will study one configuration. One could identify this configuration as Termeer (2006) did as 'founding fathers'. This group of actors created Cluster West and formed a configuration around the heat roundabout. This group of actors will be further explained in Chapter 4. Several other configuration that can be identified include 'founding fathers east', which includes actors who formed Cluster East, the 'financiers', which includes actors that would invest in the heat roundabout and the 'environmentalists', which includes actors like Greenpeace and Natuur & Milieu. Doing an in-depth study of these configurations as well would require at least a dozen more interviews, something which does not fit in the scope of a master's thesis.

2.7.5 Multiple inclusion in configurations

Termeer and Werkman (2011, 286) argue that 'many people recognize themselves in the meanings of different configurations and interact in several configurations as well.' Figure 2.2 shows where actors are included in hypothetical configurations. Notice that some actors are included in up to four configurations, while some other actors are included in one configuration. Different configurations have different definitions of reality, which means that several definitions of reality will influence each other when actors active in more than one configurations insert definitions of reality in another configuration. Actors active in more than one configuration have varying levels of involvement. In other words, not every actor has the same level of inclusion in a configuration. In the example shown below, an actor can be included in seven configurations. Of these seven configurations, a specific actor can have a high level of inclusion in configuration 1, a medium level of inclusion in configuration 3, a low level of inclusion in configuration 5 and 6 and not be included in the other configurations.

Since this thesis will only study developments in one configuration, namely the one that formed around Cluster West, it will not be able to identify varying levels of involvement. This thesis cannot argue that actors have a high level of involvement in one configuration and a low level of involvement in another configuration, because other configurations were not studied. This means that multiple inclusion will not be operationalised and is not used in the remainder of this thesis. To answer the research questions of this thesis it is not necessary to include multiple inclusion.

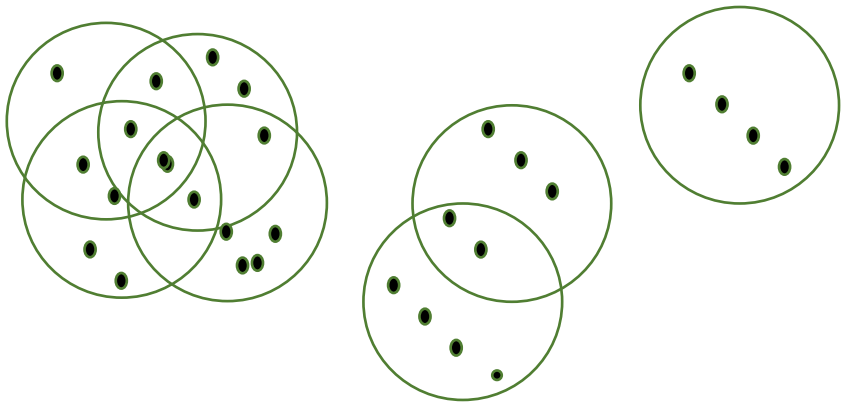


Figure 2.2 – Illustration of a hypothetical case of multiple inclusion

2.7.6 Fixations

It is impossible to communicate if the social and cognitive dimension of a configuration are constantly challenged by the included actors. Van Twist (1991) argues that if the definitions of reality are challenged on a constant basis, communication is literally impossible. This is why sometimes instances of stabilization occur to make interactions possible. However, when the definitions of reality and interaction rules become fixed they are non-negotiable. According to Voogt (1990, 130) definitions of reality should be open to reconstruction and redefinition and not end up in dysfunctional conflict in which each individual remains committed to its own definitions of reality. Termeer (1993, 261) thinks that the willingness to reflect on one's actions is the most important indicator of a fixation. If that does not happen then you get what Voogt (1990, 154) describes: 'We, in our relationship make 'reality' and others should definitely not interfere.' When a cognitive fixation occurs and actors are unwilling to reflect on their definitions of reality, the social dimension becomes the only way to counteract this and vice versa. This means that actors should look for ways to increase agreement on the procedures, the interaction patterns and interaction rules. Fixations are identified by Termeer (2017, 569) and include the presence of taboos, the repetition of moves, vicious circles, exasperating delays or an escalated conflict as symptoms of fixations in interactions. These fixations can be caused by 'path dependency, vested interests, dialogues of the deaf, or other institutional characteristics that suppress or disable initiatives to explore more adaptive, but often controversial, approaches' (Termeer 2017, 570). Hypothetically, the inclusion of coal plants in the heat roundabout in the face of mounting evidence that it will lead to carbon lock-in is an example of a fixation. The heat roundabout requires long-term financial investments and once it is decided that coal plants are essential to the project's success it might lead to an unwillingness to reflect upon one's core beliefs.

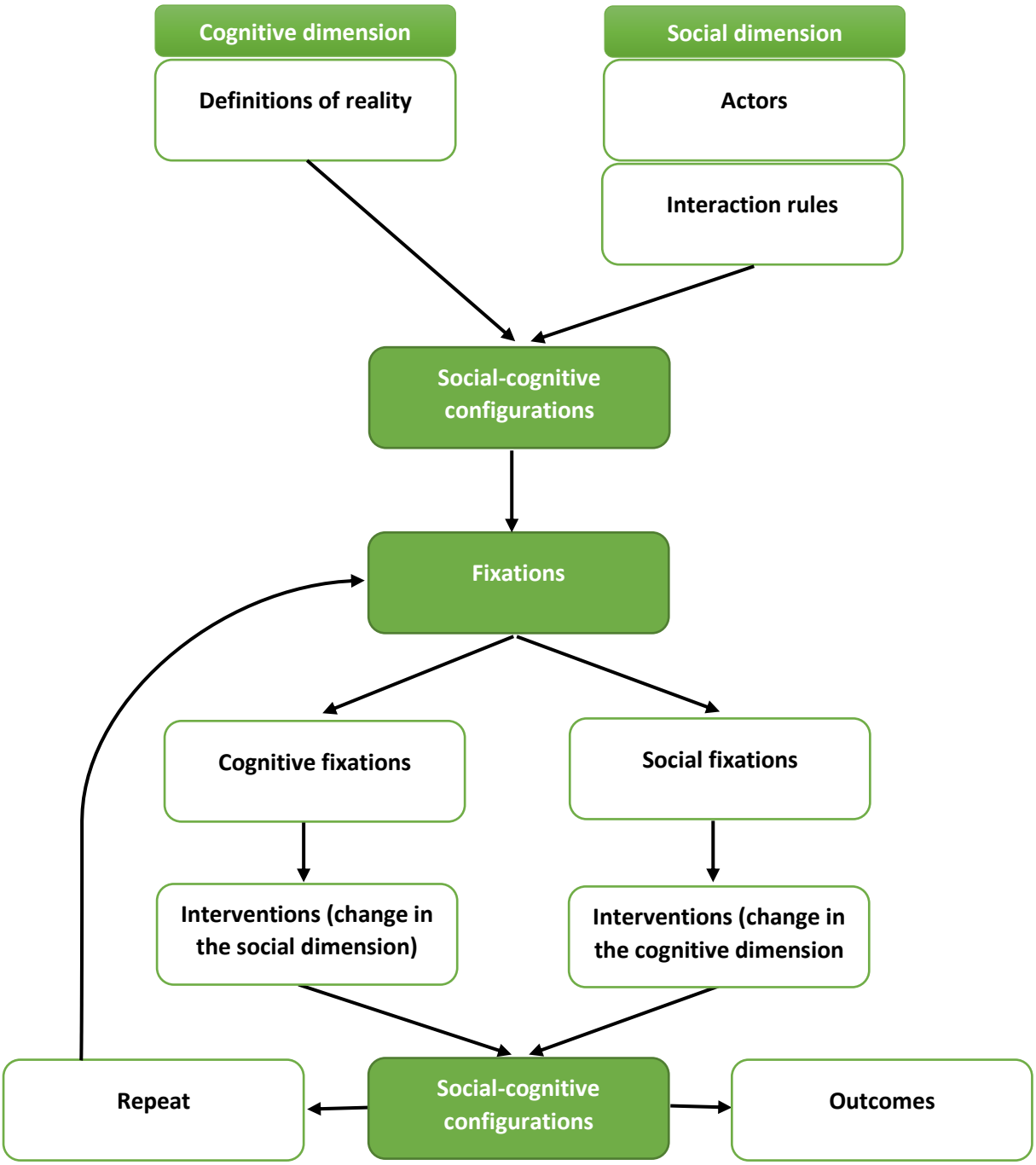


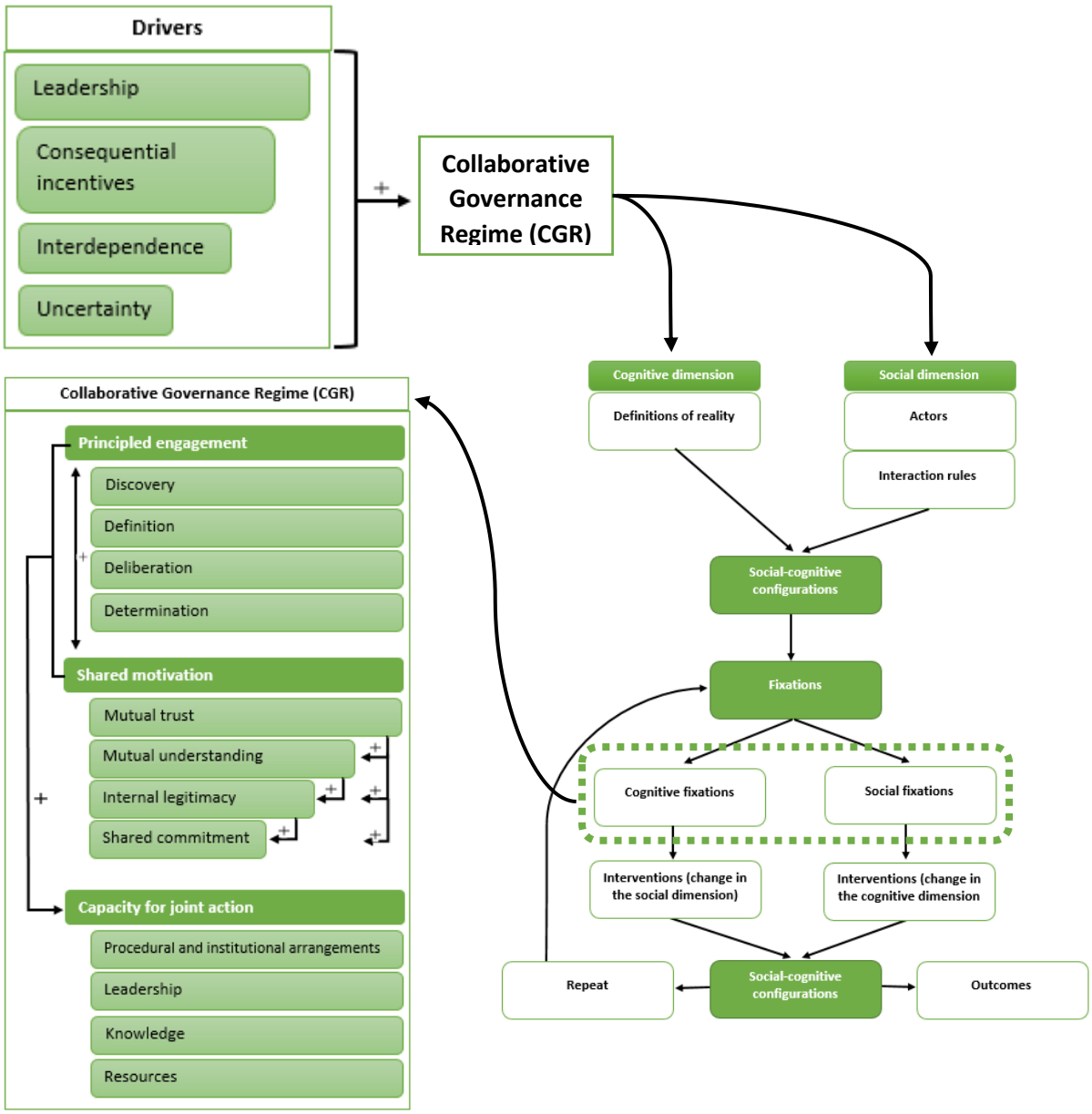
Figure 2.3 – Conceptual framework to analyse fixations in Cluster West

2.8 Synthesis of the configuration theory and collaborative governance theory

Both theories provide an excellent framework for analysis. The configuration theory allows the researcher to discover and understand the cognitive and social dimension of collaborations, whilst looking for instances in which an unwillingness to reflect on one's core beliefs led to the creation of fixations. The collaborative governance theory allows the researcher to analyse the collaborative process and interactions between actors that led to the creation of fixations. In the case of Cluster West, the configuration theory allows the researcher to trace how the cognitive and social dimension developed over the years and when fixations began to emerge. Fixations can be further studied by looking at the elements which constitute Cluster West's CGR (e.g. the elements of principled engagement, shared motivation and the capacity for joint action). Figure 2.4 gives an illustration of this thesis' synthesised framework for analysis.

Before a collaboration can start the right conditions need to be in place. This thesis uses the four drivers proposed by Emerson et al. (2011) and one or more of these drivers are necessary for a CGR to begin. Drivers energise the convening of participants and over time a CGR is created. CGRs are not unchangeable, but dynamic in nature. Changes in the context of the case, for example an important policy document is released or an important international treaty is signed, can lead to a change in the drivers. These changes reshape a CGR and might influence its effectiveness. Within the CGR actors will initiate collaborative dynamics, but at the same time actors will form shared definitions of reality, an interaction pattern and interaction rules. A stabilisation of these elements in necessary for communication to take place. Once within a group of actors these elements stabilise they will form a social-cognitive configuration. Fixations can occur when actors within a configuration are unwilling to reflect on their core beliefs about definitions of reality and/or interaction rules. These cognitive and social fixations will be studied via the collaborative dynamics of principled engagement, shared motivation and the capacity for joint action. Which elements of collaborative dynamics can provide an explanation for the emergence of fixations? Analysing this process will also lead to the uncovering of the intervention that broke the cognitive or social fixation. Quite possibly fixations are not broken, because the intervention failed or did not take place at all. It is also possible that the intervention did not solve the underlying issues. This might mean that a new configuration will lead to the creation of new fixations and the whole process repeats.

Figure 2.4 – Synthesis of conceptual frameworks



Chapter 3 Research design and methods

This chapter elaborates on the methodology used in this thesis. The concepts of the theoretical framework will be operationalised. Additionally, this chapter will delve into the methodology behind the case study method. Choices in research design and research methods have positive and negative implications for research validity and reliability. It is therefore important to clarify the limitations of the choices made.

3.1 Categorisation of variables

In order to study fixations the cognitive dimension and the social dimension have to be categorised. Several themes regularly return in interviews and several default answers were formulated on the basis of gathered interview data. Table 3.1 provides an example of the theme 'heat from coal plants.'

Table 3.1 – Definitions of reality for theme 1, heat from coal plants

1.	It is necessary to use coal heat and no need to introduce a time limit on its usage
2.	It is necessary to use coal heat, but only in the early stages
3.	It is necessary to use coal heat, but preferably other sources of heat
4.	It is unnecessary to use coal heat, there are less polluting and better heat sources available
5.	It is impossible to use coal heat, it causes too much environmental damage

Categories are deductively generated through the study of relevant literature. These categories are based on data gathered via interviews. In the conceptual model four drivers were defined, namely leadership, consequential incentives, interdependence and uncertainty. These four variables are the impetus of cross-sector collaboration, because without them the CGR would not be initiated. The more drivers are present in the data, the more likely it is that a CGR will be initiated. The three collaborative dynamics which form the CGR, namely principled engagement, shared motivation, and capacity for joint action will be categorised on the basis of the presence of underlying variables. Emerson et al. (2011, 20) note that collaborative dynamics are stronger once more variables are present and recognised in the collaboration. This thesis will give all variables the same weight, with one exception. In shared motivation the variable trust will have a higher weight, because 'trust generates mutual understanding, which in turn generates legitimacy and finally commitment' (Emerson et al. 2011, 13). Trust creates a cascading effect, which means that shared motivation will be strong when trust is present and weak when trust is absent, because the other three variables are

not present. On the basis of this categorisation it can be determined which collaborative dynamics, or rather the lack therefore categorised as an absence of variables, are responsible for fixations.

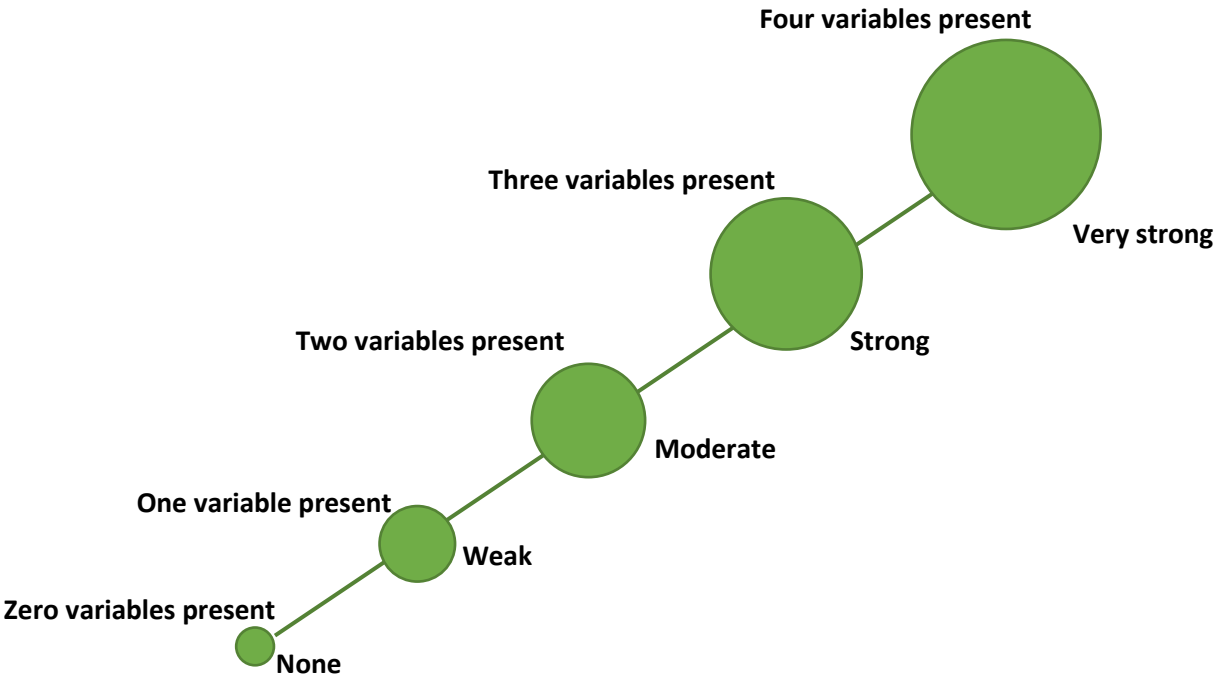


Figure 3.1 – The extent to which dynamics are present in a CGR

3.2 Operationalisation of the configuration theory

This section is based on the work by Termeer (1993) and forms a bridge between the theoretical framework and the empirical research. The operationalisation of concepts is necessary in order to transform fuzzy theoretical concepts into measurable phenomena. That information will be used to develop interview questions.

Table 3.2 – Operationalisation of the configuration theory

Actors	**Indicators**	Individuals belonging to one of the organisations involved in Cluster West are the unit of analysis. The processes of constructing and reconstructing definitions of reality are best understood as interactions between individuals. However, it is not possible to study all interactions between all individuals involved in Cluster West. That is why the term actors or parties is used to designate groups of individuals belonging to the same organisation, share the same definitions of reality and participate in the same interactions. This means that sometimes an actor or a party will be an individual, while sometimes actors or parties indicate the entire group.
Cognitive dimension:	**Indicators**	The definitions of reality actors form on two themes: the heat roundabout and the energy transition. Numerous subthemes on which actors form definitions of reality have been summarised on page 22 of this thesis. The

Definitions of reality		themes and subthemes form a guideline for the analysis. These subthemes will be discussed by the interviewees, but it is likely that subthemes of higher importance will be discussed in greater depth than others.
Social dimension: Interactions	**Indicators**	This thesis will be limited to regular interactions in the steering committee of Cluster West. Interactions in any other setting, be it via email or bilaterally, will not be studied. The Interaction patterns and interaction rules will be determined by asking individuals questions about the manner in which they interact with others. When several individuals have the same way of interacting with others, then this will be identified as an interaction rule.
Social-cognitive configuration	**Indicators**	A group of actors with an intensive interaction pattern, which work on the basis of agreed upon interaction rules and shared definitions of reality. In the case of Cluster West this group of actors is identified as the 'founding fathers' configuration consisting of the province of South Holland, the municipalities of Rotterdam, The Hague, Delft and Westland, Eneco, Uniper, the Port Authority, Westland Infra and Warmtebedrijf.
Cognitive fixations	**Indicators**	Cognitive fixations emerge when the actors of Cluster West get stuck in a certain definition of reality and are unwilling to reflect on this problematic situation. Cognitive fixations are situations where these actors do not take the alternative definitions of reality into consideration. In other words, these are the facts and there is no reason to think otherwise. The existence of taboos on discussing certain topics are an indication of cognitive fixations. Furthermore, the presence of path dependence, vested interests and dialogues of the deaf or other indications of the existence of cognitive fixations. Finally, if actors of Cluster West strengthen their own definitions of reality to defend against other definitions of reality then that is an indication of a cognitive fixation.
Social fixations	**Indicators**	Social fixations occur when actors no longer reflect on their relationships with other actors. This expresses itself in ritualized behaviour. An example of this is the having regular meetings with uncommitted and uninterested actors even when most characterise it as unproductive. It can also be expressed in excluding third party participation even when third parties could make a useful contribution. Actors will try to solve relational problems with content, which means that social fixations usually express themselves in conflicts about definitions of reality.

3.3 Operationalisation of the collaborative governance theory

For the collaborative governance theory four clusters of elements need to be operationalised: drivers, principled engagement, shared motivation, and capacity for joint action. The articles of Ansell and Gash (2008), Bryson et al. (2006) and Emerson et al. (2011) will be used to operationalise the concepts in Table 3.1.

Table 3.3 – Operationalisation of the collaborative governance theory

Cluster	Elements (concepts)	Definition	Indicators
Drivers	**Triggering leadership**	An actor (or core group of actors) that brings an issue under attention and is able to bring actors together and initiate and support a CGR. This actor should be committed to collaborative problem solving, have a willingness to take a neutral position, and exhibit impartiality and an open mind when it comes to proposed solutions.	Number and type of leadership during the process of a CGR, for example a champion, sponsor or mediator. This is the same as the leadership in the capacity for joint action, but purely for triggering a CGR. Additionally, this person needs to be respected, authoritative and able to see the issue from several perspectives and not choose sides.
	Consequential incentives	Internal (problems, resource needs, interests, or opportunities) and/or external (situational or institutional crises, threats, or opportunities) threats/opportunities that increase the likelihood of cross-sector collaboration.	Amount and intensity of internal and/or external means present within a specific timeframe. In the view of actors the issue is ripe for collaboration.
	Interdependence	The amount to which actors depend on each other to achieve a common goal they could not achieve without collaboration due to constrained resources and the joint awareness of this reality.	Extent to which actors voice their need to collaborate with other actors to make progress on an issue. Evidence that shows actors lack the ability to solve issue on their own.
	Uncertainty	Ambiguity, stemming from ignorance, about an issue, situations or solution that cannot be resolved internally, which leads actors to collaborate to reduce information asymmetry and share risks between them in wicked problems.	Extent to which actors voice their concern that risks are too big to handle individually and need to be shared. Lack of information or expertise to address the issue. Asymmetry in information between actors and the expressed need that collaboration is necessary to remove this asymmetry.
Principled Engagement	**Discovery**	The process in which actors get the opportunity to share their individual and collective interests, concerns and values without being rejected at the outset of this process.	Extent to which actors share interest, concerns and values. Recognition that actors have shared goals. Recognition that individual interests are served by working together.
	Definition	The process where shared meanings are developed by	Extent to which actors formulate a common purpose and goals.

		articulating common purpose and objectives. Division of tasks and a shared terminology will speed up this process.	Arrive at a shared problem definition. Define concepts, terms, roles, responsibilities and expectations.
	Deliberation	The process were actors interact openly and honestly with each other (safe space). This is where the contentious elements of the issue can be discussed, points of potential conflict can be expressed and a common good can be sought.	Extent to which actors engage in civil dialogues. Are transparent and open in their interactions. Offer individual perspectives and have the ability to listen to other perspectives. Change their point of view after meetings when appropriate.
	Determination	The process in which actors make collaborative decisions, both about procedure (e.g. agenda setting, tabling a discussion, assigning a work group) and substance (e.g. reaching agreements on action items or final recommendations).	Number of procedural decisions made and the number of substantive decisions made. Explicit agreement on shared ambitions and goals. Acceptability and robustness of the decisions made.
Shared Motivation	**Mutual trust**	The extent to which actors engaged in a collaborative effort trust in each other's capabilities, honesty, reasonability, predictability and dependability.	Extent to which actors believe other actors are capable, honest, reasonable, predictable and dependable. Level of trust that can be perceived among actors
	Understanding	The ability to see and accept differences between the actors' positions and interests.	Extent to which actors recognise and respect differences between actors. Feel comfortable sharing information with other actors. Feel unjudged or accepted for having a certain position or interest.
	Internal Legitimacy	The justification for the collaborative endeavour to exist, because actors recognise their interdependency, and consider the framework in which they interact as trustworthy and credible.	Extent to which actors consider the CGR and the parties with which they interact as useful, credible and trustworthy. Use this framework instead of preferring bilateral or trilateral interactions.
	Shared commitment	The extent to which actors believe in a good collaborative outcome, the initial motivation to participate in the collaborative endeavour and the willingness to accept the outcomes even when they do not perfectly correspond with their interests.	Extent to which actors are committed the CGR, the purpose for which it was created and the ambition and goals that were set for it. Feel committed to achieve outcomes together with other actors. Are able to accept the outcomes, take responsibility for the outcomes and are accountable for the outcomes.

Capacity for Joint Action	**Procedural and Institutional Arrangements**	Those formal and informal rules and procedures that make it possible that actors can interact with each other on a regular basis.	Type and quality of e.g. decision-making rules, operating procedures and code of conduct. Extent to which actors consider these arrangements clear, fair and effective.
	CGR Leadership	The presence of an actor that makes a crucial decision at the time that the situation asks for it in for example a mediating or championing role. Authority is needed and the ability to look beyond one's own short-term self-interest.	Number and type of leadership during the process of a CGR, for example a champion, sponsor, or mediator. This is the same as the leadership driver, but initiate after the CGR is started.
	Knowledge	Information of individual actors that through aggregation, separation and reassembly will lead to new possibilities for common action.	Extent to which actors' knowledge was gathered, processed and used to develop common actions, ideas and possibilities. Knowledge shared was considered trustworthy, objective and understandable.
	Resources	Funding, time, technical and logistical support; administrative and organisational assistance; requisite skills for analysis or implementation; and needed expertise.	Extent to which actors' funding, technical and logistical support; administrative and organisational assistance; requisite skills for analysis or implementation; and needed expertise were acquired for the CGR. Contributed proportionally to their organisation's size. Accommodated for differences in resources between actors.

3.4 Methodological approach: Case study method

This thesis will use the case study method. Swanborn (2010, 22) defines case studies as the study of a social phenomenon or social phenomena:

1. In one, or only a few, of its manifestations
2. In its natural surroundings
3. During a certain period of time
4. That focuses on detailed descriptions, interpretations and explanations that several categories of participants in the system attach to the social process

5. In which the researcher start with a broad research question on an ongoing social process and uses available theories, but abstains from pre-fixed procedures of data collection and data analysis, and always keeps an eye open to the newly gathered data in order to flexibly adjust subsequent research steps
6. That exploits several sources of data (informants, documents, observatory notes)
7. In which sometimes the participants in the studied case are engaged in a process of confrontation with the explanations, view and behaviours of other participants and with the resulting preliminary results of the researcher.

In order to answer the research questions a single case study method will be used. This single case study will Cluster West, a collaborative effort of public and private parties with the goal of developing the western part of the heat roundabout between Rotterdam, The Hague and Westland. Choosing a single case study method means that the outcomes of this thesis cannot be generalised. It is the most appropriate means of researching a subject that will remain active for at least several years and this case study can identify bottlenecks and propose solutions. Issues of subjectivity and selectivity have received constant attention.

3.4.1 Strengths and limitations of case studies

While the case study method has a great many qualities and advantages, it's by no means the decisive method to study this thesis' case. George and Bennett (2006, 19–22) state that case studies have four main strengths: conceptual validity; deriving new hypotheses, exploring causal mechanism; and modelling and assessing complex causal relations. First, case studies allow a researcher to achieve high levels of conceptual validity, 'or to identify and measure the indicators that best represent the theoretical concepts the researcher intends to measure.' Second, case studies have a powerful advantage that they allow the researcher to derive new hypotheses. When a researcher asks a participant "were you thinking X when you did Y," the participant might answer with "no, I was thinking Z," which adds an additional variable the researcher might not have thought of beforehand. Thirdly, causal mechanisms are explored in-depth for an individual case, which makes it possible to include many contextual and intervening variables. Finally, complex causal relations like path dependency and lock-in are best studied with case study methods which is particularly relevant for this thesis which analyses fixations.

Case studies also have several limitations. These criticisms are case selection bias; how much a variable mattered to the outcome; underdetermination; lack of representation; single case research

designs; and the independence of cases from one another (George and Bennett 2006, 22–34). First, selection bias might lead the researcher to understate (or overstate) the relationship between the independent and dependent variables. The decision to research collaboration between stakeholders in Cluster West means that it is unlikely that the outcomes and recommendations of this thesis will be generalizable to similar circumstances. Second, case studies are strong at assessing whether and how much a variable mattered to the research outcome, but is much weaker at assessing how much it mattered to the research outcome. Third, underdetermination refers to the potential inability to discriminate between competing explanations on the basis of the evidence. It is possible that the evidence might lead one to have several beliefs about the evidence with no way of discerning which one is true. The fourth element is lack of representativeness, which is something that this thesis will be subject to (George and Bennett 2006, 30–31). In order to solve this issue the number of cases to be studied should be increased significantly. Due to time and scope constraints that is not possible, which makes it necessary to point out that this thesis will have limited explanatory power across different cases. As Swanborn (2010, 70) notes: 'in general, it remains a difficult task to generalise results from studied cases to other and larger domains of cases.' Another element of case studies which is often criticised is the single case research design (George and Bennett 2006, 32). However, this thesis will involve many observations from a single case, which alleviates most concerns relating to measurement error and incorrect inferences, because this single case study will not be a single-observation study. The sixth and final element of criticism revolves around the potential lack of independence of cases (George and Bennett 2006, 33). This issue is important to consider when studying more than one case, particularly when the researcher wants to test whether the lessons of a case studied earlier, played a causal role in the case that is currently analysed. For this thesis the lack of independence of cases plays no role, since no attempt is made at comparing cases related to the energy transition.

3.5 Position of the author

In the context of gaining work experience the author of this thesis was an intern at the External Affairs department of the Port Authority from March 2016 until December 2016. This internship coincided with the thesis writing process, which meant that a topic relevant for the Port Authority was picked for study. The Cluster West case was picked shortly before concluding the internship, which meant that colleagues of the author provided a list of relevant interviewees. Other than this initial assistance the author was given full autonomy and full independence to research the topic in whatever way was most appropriate. Not a single person working for the Port Authority tried to obstruct the author's research or pressured the author to adapt the outcomes of the analysis to fit

their preconceived notions. Additionally, the interviewee of the Port Authority did not meet the author during his time as an intern.

3.6 Data collection

Al data was collected through interviews. The researcher is familiar with the topic through reading newspaper articles and reports, but to understand fixations interviews were conducted with individuals involved in Cluster West. Interviews allow the author of this thesis to collect information on matters that are not put in writing, such as the interactions between actors and their individual interests. Semi-structured interviews are chosen, because the topic discussed is complex and requires the author of this thesis to ask follow-up questions. Interviews can take an unforeseen turn and improvisation will be required. The interview questions are developed based on the theoretical framework of this thesis and can be found in Annex 3. Each interview has a unique character, because the flow of interviews is different, questions are interpreted differently, answers are different or simply more or less candid. The validity and reliability of the interview also depends on the interview qualities of the researcher like combining active listening with asking the right questions at the right time. Researchers can avoid these problems by using a codebook for interviews. The analysis of interviews will be done by using a coding scheme, which can be found in Annex 4.

Interviewees are selected based on a common sampling technique, namely the judgement sample (Marshall 1996, 523). The author will use his own judgment to pick people for interviews. Furthermore, snowball sampling will be used to recruit interviewees through those interviewed before. Annex 1 provides an overview of the interviewees. As mentioned, this thesis will be focused on interactions in the steering committee of Cluster West. One or two persons from organisations in the steering committee will be interviewed, except for the municipality of Delft. The municipality of Delft was a bit of an outlier compared to the other actors. The plans for Cluster West revolved around Rotterdam and its port, Westland and its horticulture and The Hague and its large existing district heating network. Delft will not be approached for an interview to invest more time conducting interviews with more relevant actors. It is also important to interview the process supervisor Twynstra Gudde. That organisation has a helicopter view of interactions in Cluster West. Furthermore, considering the fact discussion focus on coal it is necessary to interview an environmental organisation. Greenpeace is the most active organisation against coal in the Netherlands and approaches the media frequently to make its case. It is therefore relevant to include Greenpeace as well, even though it is not directly involved in the steering committee.

The interviews are entirely confidential and presented anonymously. When quotes are used an interviewee will referred to as e.g. 'interviewee 5' without disclosing names or the organisation the person works for. Additional care is given to the specific wording of quotes, because it should not be possible to trace quotes back to individuals. Interviewees are told at the beginning of the interview that it will be confidential. This has the advantage that people can discuss the subject freely without fearing potential career damage. Information that can harm the relationships between actors is knowingly shared with the author. In these cases the information is only used as far as it is relevant in answering the research question. Gossip or personal frustrations not related to the topic at hand will be dismissed. Furthermore, if interviewees utter strong opinions than these will be toned down. It is definitely not the intention of the author to disrupt the negotiations surrounding the heat roundabout, put certain people in a bad light or rake up old conflicts. Every interview, except for one, is recorded in full and transcribed in an interview report. These reports typically consists of seven pages (around 2500 words) to seventeen pages (around 7400 words) of verbatim text. This is influenced by the speech rate of the interviewee and the time made available for the interview. Each report is sent via email to those interviewed for review and verification. Most of the time the text was accepted without changes, but sometimes small wording adjustments had to be made.

3.7 Coding the interviews

Conducting interviews will lead to the accumulation of data in the form of interview reports. This data needs to be classified in a codebook before it is useful for analysis. Interview questions were divided into several themes. Codes created for this thesis have been generated on the basis of academic literature and were limited to the most important concepts identified in the theoretical framework. Closed coding was used by reading through the interview reports and identifying which answers fit with which predefined code. Passages from the raw interview data will be given a colour code that correspondents with a specific theme. Annex 4 presents the coding scheme used for this thesis. This coding scheme allows the researcher to carefully classify the answers per given theme. Furthermore, Annex 4 can be used by future researchers to check which codes were used in this thesis.

3.8 Reliability and validity

Research data is only valuable and of use when it is both reliable and valid. If one's research is valid, but not reliable, that means that the empirical findings have to be rejected.

3.8.1 Reliability

According to Swanborn (2010, 36) the reliability of research refers to whether the measurements are stable over time, independent of the researcher and independent of contextual properties. In other words, can the same results be obtained if the research is repeated by a different researcher? To ensure the reliability of this research several measures were taken. First of all, a supervisor reviewed this thesis throughout the writing process, from the earliest ideas to the finished product. Furthermore, a second reader was assigned to assess to concept version of this thesis before it was handed in. The second reader will look at the concept version without any knowledge of the writing process that led to what is being read. Secondly, all steps taken in this research building up towards answering the research questions are extensively documented and explained. Thirdly, interviews are the main source of information used for this thesis' analysis. This means that all interviews are transcribed word-for-word and open for review, both as text and as audio. Requests for interview transcriptions or the audio of the interviews can be send to the author of this thesis. Adding to that, the interview questions have also been added as Annex 3. Observer bias can be avoided by recording and transcribing the interviews soon after they have concluded. In that way the researcher is able to check for biases and implement changes if necessary. Finally, the fact that fifteen people are interviewed from different organisations increases reliability. The more people interviewed, the more likely it is that biases are avoided.

3.8.2 Internal and external validity

According to Babbie (2010, 153) validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. In other words, is the researcher actually measuring what he/she wants to measure? One can make a difference between two types of validity. Internal validity refers to whether the relationship between variables is actually causal (cause and effect). In other words, can the results of this thesis be explained by an alternative cause? The extent to which this is a problem depends on how carefully the research variables are operationalised. A simple example of this would be if one wants to measure political orientations, one would not want to measure social class instead. Conclusions drawn by researchers based on bad operationalisations have to be dismissed. That is why in this thesis internal validity is ensured through working with a clear operationalisation, based on clear definitions, indicators and objectives. The same interview format was used for every interview, which means that it is possible to compare the interview results.

External validity is about the extent to which the outcomes of this thesis can be generalised to a larger population outside of the one that was studied. An example of low external validity would be taking a political orientation poll at the entrance of a Labour party campaign event. Such a political orientation poll would not be properly representative of the political orientation of the general population. The external validity of this thesis is rather limited, because a single case study is conducted. The extent to which the conclusions reached in this thesis can be generalised is therefore limited. However, generalisability has never been the goal of this study. Even more, as Flyvbjerg (2006, 219) points out, it is a misunderstanding that one cannot generalise from a single case. He goes so far as to suggest that formal generalisation of research outcomes is considerably overrated (Flyvbjerg 2006, 226). A single case study will contribute to theory building via falsification, which is according to Flyvbjerg (2006, 228) 'one of the most rigorous tests to which a scientific proposition can be subjected.' If one observation does not fit the scientific proposition it should immediately be rejected, because it cannot be considered valid for a larger population, group or phenomenon.

3.8.3 Difference between reliability and validity

Babbie (2010, 155) provides a useful analogy to understand the difference between reliability and validity. His analogy sees measurements as analogous to repeatedly shooting at the bull's-eye on a target, with reliability being portrayed as all shots being located closely together. Reliability is indeed a function of consistency, so all shots should end up closely together. Validity on the other hand means that all shots should be arranged around the bull's-eye. In other words, one effectively measures what he or she wants to measure. Figure 3.2 provides an illustration of this difference:

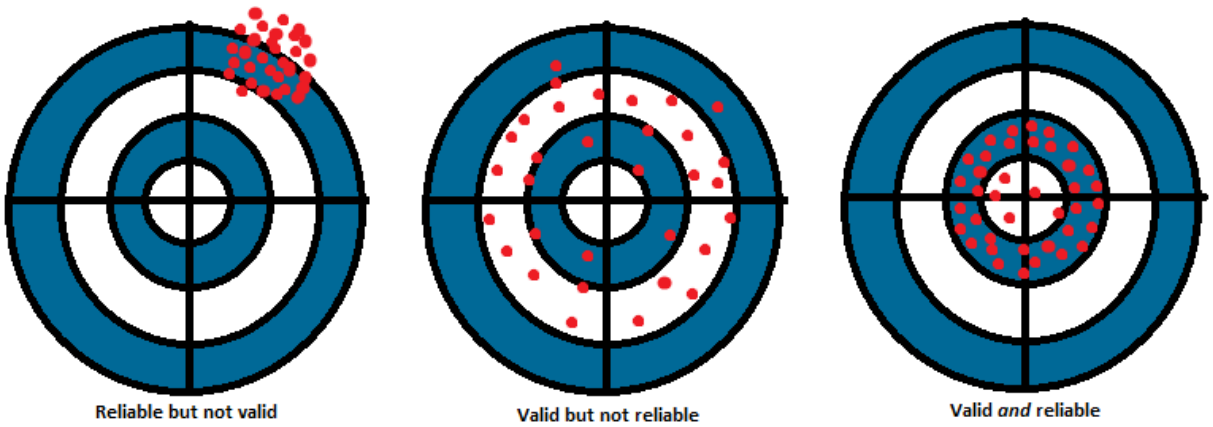


Figure 3.2 – Reliability and validity explained

Chapter 4 Case description of the heat roundabout and Cluster West

This section will introduce the case. First the reasons behind the construction of the heat roundabout get detailed and coupled with its main objectives. Next the stakeholders involved in the heat roundabout will be introduced, with particular focus on the governance structure. Lastly the timeline of the heat roundabout will be outlined.

4.1 Rationale behind the heat roundabout

The most important reason that parties are willing to commit themselves to sustainable initiatives is global warming and the dramatic consequences that inaction will have. CO_2 emissions need to be cut and the generation of heat leads to higher concentrations of GHG in the Netherlands. Almost 55 percent of total energy consumption in the Netherlands comes from the generation of heat. 91 percent of this heat is generated by burning natural gas. Of this heat 49 percent is consumed by households and 44 percent is used in industrial processes. The remaining 7 percent is consumed by greenhouses. It is inefficient to burn natural gas to create heat, whilst in the port of lot of heat is produced as a by-product. Most heat from industrial processes is deposited in the air and water. Parties plan to create an open infrastructure connecting numerous sources of heat from industrial processes, waste, geothermal and other sustainable sources to consumers.

District heating networks already exist in South Holland, but plans for a large-scale expansion are more recent. The first concrete steps were made in late 2011 when the province of South Holland and the Dutch State signed a Green Deal Heat. Those party to the Green Deal committed themselves to replacing 20 PJ of heat generated by burning natural gas with energy efficient and sustainable sources of heat. This meant that 350.000 households and 1.000 hectares of greenhouses would get sustainable heating. The Green Deal also recommended that through a public-private partnership a programme office for sustainable heating should be created. 25 parties established the Programme Office Heat Cold South Holland in October 2013. Over the years the number of participating parties grew to 33 and includes parties like the province of South Holland, energy providers like Uniper and the banking sector like Rabobank. These parties worked out plans to achieve a 20 PJ reduction via a heat roundabout. The Programme Office formulated its main objectives as follows:

1. To deal with the fundamental question of making the Dutch heat supply futureproof, affordable, reliable, sustainable, and flexible enough by embedding new technologies and insights.

2. To achieve the construction of the heat roundabout through collaboration, because the outcome will be better when parties from various sectors can help and strengthen each other through regular interaction.

In September 2013 the Agreement on Energy for Sustainable Growth was signed by 47 organisations. Saving 100 PJ of energy by 2020 and increasing the share of renewables were the objectives the parties set for themselves. Steps towards achieving the goals set out in the Agreement and by the Programme Office were made by the municipalities of Delft, The Hague, Rotterdam and Westland and the province of South Holland in late 2014. Representatives of these five parties decided to create Cluster West to construct the western part of the heat roundabout. This provides a link between the port of Rotterdam, the greenhouses in the Westland and the cities of Rotterdam and The Hague. It was also decided to create Cluster East, which would focus on realising the eastern part of the heat roundabout providing heat to Leiden and the Heineken brewery in Zoeterwoude.

4.2 Project history of Cluster West

South Holland is home to the bulk of Dutch industry and households. Collaboration had to be sought in order to combine regional plans on heat already in development. In November 2014 Cluster West was officially created as a collaborative body where the previously mentioned municipalities and the province of South Holland were joined by the Warmtebedrijf Rotterdam[5], the Port Authority, Eneco, Uniper and Westland Infra. They defined their shared ambitions in January 2015 and each organisation worked on forming its own project teams throughout February and March 2015. An outside organisation, Rotterdam Engineering, researched potential pipeline routes to connect The Hague, Rotterdam and Westland. Based on this study, numerous other studies and regular meetings the parties published a concept report exploring the possibilities for the heat roundabout in June 2015. Two months later the parties decided to disinvite Uniper and Westland Infra from steering committee meetings. Representatives of Uniper continued to work on Leiding over West, because they were involved on the project level and the parties in that project agreed to continue their collaboration. Steering committee parties did not want heat producers to be involved, because that would mean that other sources of heat like Shell and ENGIE had a right to be directly involved as well. In early 2017 Gasunie joined Cluster West. It was already cooperating with the Port Authority in a heat roundabout project team. The Ministry of Economic Affairs[6] got involved after the summer of

[5] The name Warmtebedrijf will be used in the remainder of this thesis to denote Warmtebedrijf Rotterdam.
[6] The name Economic Affairs will be used in the remainder of this thesis to denote the ministry of Economic Affairs.

2015. Economic Affairs was responsible for deciding when coal plants would close. Coal would be the main source of heat during the heat roundabout's initial stages.

A recurring element of discussion during the meetings was Uniper's coal plant, which would supply heat. Having a solid supply of heat is important to customers with a fixed daily minimum heat demand and those who cannot deal with supply fluctuations. That is why power plants and the process industry are supposed to play an important role in creating a functioning heat roundabout. Without heat from the port the viability of the project would be diminished. The final report published in October 2015 specifically states that a number of main sources with a high-energy yield would be best during the start-up period, particularly from a practical and financial perspective. However, the discussions on the adverse environmental effects of coal were growing increasingly tense and the political debate started to leak into public discourse. Once the public turned against coal and organisations like Greenpeace ramped up pressure on businesses and municipal councils some choose to reject coal. The municipal council of The Hague was an early adopter of this position in November 2015. Coal began to dominate meetings and only marginal progress could be made. The Heat Alliance South Holland, which will be discussed later, broke with earlier plans and decided in March 2017 to no longer connect Uniper's plant.

Cluster West consists of three separate pipeline projects. The focal point is Leiding over West in which Uniper participates. This main developer of this pipeline project is the Port Authority. This pipeline is supposed to link the process industry and refineries in the port of Rotterdam to the greenhouses in Westland and the city of The Hague. Westland needs to develop a new district heating network, whilst the connection to The Hague would be an extension of an already network. Another pipeline that will connect to The Hague is the Leiding door het Midden. This pipeline is developed primarily by Eneco, which also built Leiding over Noord and has a monopoly on providing heat from waste processing to households in Rotterdam via this pipeline. Leiding door het Midden will connect to Leiding over Noord, but the parties in Cluster West have decided that the heat roundabout will be an open infrastructure many actors can connect to. This means that Eneco will no longer be a monopolist in the future. This change is gradually embraced by its personnel. The final pipeline project is Leiding door de Haven, which is developed primarily by the Warmtebedrijf and will be a link between the industry on the Maasvlakte and the Botlek cluster. This pipeline ensures that households in Rotterdam have security of supply by providing heat from the port's industrial cluster. These three pipeline projects will form the western part of the heat roundabout and will be connected to the single pipeline project of Cluster East once completed.

The focus will be on developments that took place in the two and a half years that Cluster West existed. The artificial boundary between Cluster West, Cluster East and the separate pipeline projects was recently removed. In March 2017 five parties signed a declaration of intent to create a Heat Alliance South Holland with the aim of jointly realising the main infrastructure that will transport heat. These five parties are the province of South Holland, the Port Authority, Gasunie, Eneco and the Warmtebedrijf. Limiting the group to only five parties has a threefold explanation:

1. All parties have significant large-scale construction and development experience;
2. All parties are willing to investment in the main infrastructure;
3. All parties are motivated to make sure that the backbone of the heat roundabout is realised as soon as possible.

The Heat Alliance South Holland will not be part of this thesis and none of my interviewees were willing to discuss this new initiative before the declaration of intent was signed. It remains to be seen whether or not the objectives set out by the five parties will be reached. Map B on one of the first pages of this thesis shows one crucial change to the original plans, Uniper's plant is officially no longer part of heat roundabout plans. This also means that Leiding over West will be postponed, because it was supposed to be supplied with heat from Uniper's plant.

4.3 Organisational structure of Cluster West

The heat roundabout is an ambitious undertaking. Due to its scale, complexity and various interests involved it required three levels of collaboration, the administrative level, the steering committee and the project teams. Figure 4.1 illustrates the organisational structure of Cluster West. This seems like a hierarchical approach to collaboration, but there was significant overlap between these levels and many employees contributed to the meetings of their superiors. The highest collaborative level was the administrative level where regional ministers and CEOs were represented. These people met four to six times per year to make important decisions about the heat roundabout. Once every six to eight weeks the steering committee would have meetings with the agenda set by the municipality of Rotterdam and occasionally by the municipality of The Hague. Twynstra Gudde was responsible for process supervision and the official meeting records. Preparations for these meetings encompassed creating an agenda for the meeting, preparing documents that contained information on the heat roundabout, transcribing the previous meeting, preparing and writing down which decisions would be made during that meeting and making sure that every member of the steering committee had this information. Eight organisations were permanently represented in the steering committee:

- The province of South Holland;
- The municipality of Rotterdam;
- The municipality of The Hague;
- The municipality of Westland;
- The municipality of Delft;
- Eneco;
- The Port Authority;
- Warmtebedrijf.

Economic Affairs attended the meetings as the party representing the national interest, but unlike all other parties did not make a financial contribution to the steering committee's work.

Finally there were three project teams for Leiding over West, Leiding door het Midden and Leiding door de Haven working on realising these projects. The project teams coordinated amongst themselves about the types of heat sources included in the heat roundabout and some organisations were involved in more than one of these three projects. In terms of representation, organisations could decide for themselves who would represent their interests in the steering committee and project teams. The project teams worked on the realisation of the infrastructure. Depending on which part of the heat roundabout each project team intended to construct these teams consisted of different organisations. Eneco had more people working on Leiding door het Midden than on the other two projects. Apart from the project teams specifically aimed at realising the pipeline projects, the Port Authority and Gasunie worked together since 2016 in a separate project team. This project team met two times a week in The Hague to discuss the heat roundabout in five thematic working groups. Parties regularly met in a bilateral context as well and the project team of the Port Authority and Gasunie is just one such example. Another example of bilateral cooperation was between the municipality of Rotterdam and the province of South Holland, because Rotterdam used to chair the steering committee, a role that was transferred to the province for the Heat Alliance South Holland.

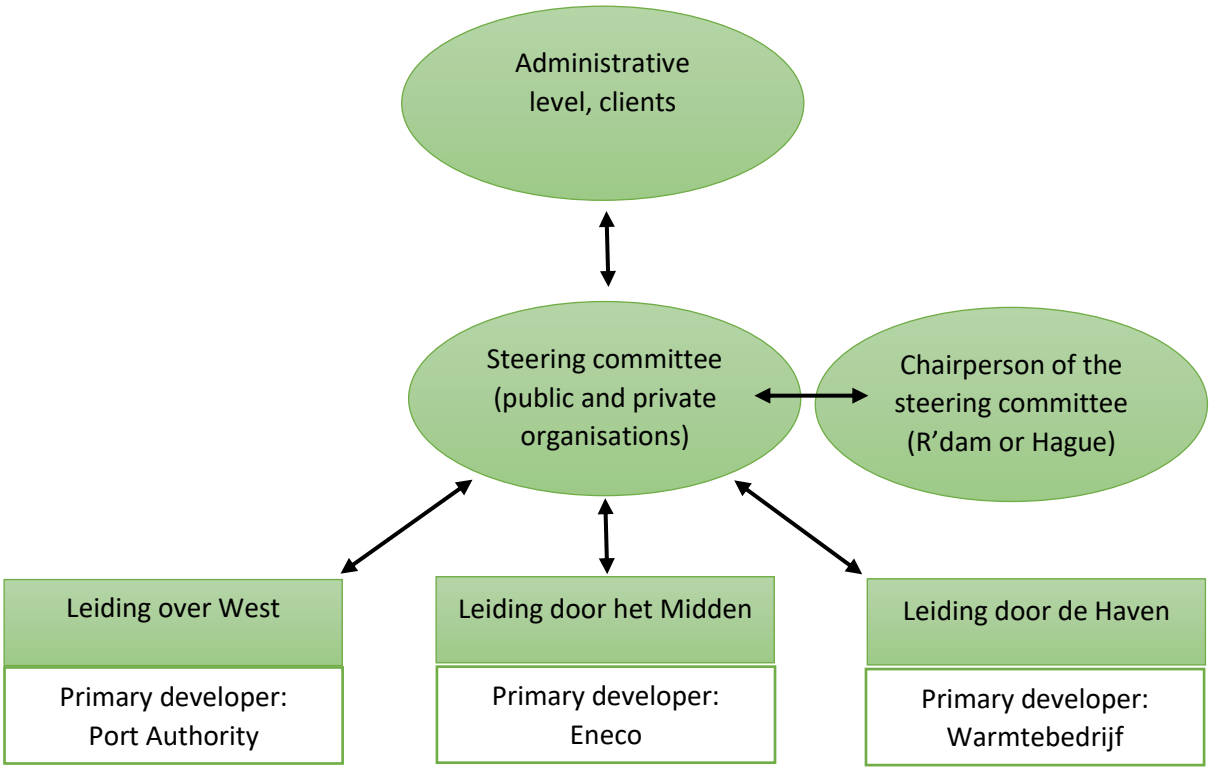


Figure 4.1 - Organisational structure of Cluster West

4.4 Concise timeline of Cluster West

Only two and a half years have passed between the creation of Cluster West in November 2014 and its disbandment in March 2017. Table 4.1 provides an overview of key events and dates. This will help the reader link events to dates mentioned in the findings.

Table 4.1 – Key dates & events of Cluster West

Date	Key event
November 2014	'Bestuurlijke opdracht' Cluster West.
January 2015	Creation of shared ambition.
March 2015	Formation of project team.
May 2015	Completion of pipeline routes study.
June 2015	Publication of the concept report first phase.
June 2015	Urgenda wins lawsuit against the Dutch State.
August 2015	Completion of emissions study.
August 2015	Uniper and Westland Infra removed from steering committee.
October 2015	Publication of the definitive report first phase.
November 2015	Report adopted by municipal councils and the provincial council.

END OF PHASE ONE	----------
November 2015	Majority of the House of Representatives votes in favour of gradual closure of coal plants.
26 November 2015	Municipal council of The Hague moves to close all coal plants as soon as possible. Rejects coal heat.
12 December 2015	Paris Agreement is adopted by consensus by representatives of 196 parties at the 21st Conference of the Parties of the UNFCCC in Paris.
December 2015	Decision on the administrative level: programme of requirements with design principles created.
January 2016	Awaydays ('heidagen') of Cluster West.
1st and 2nd quarter 2016	Working groups for the development of overarching themes. This fails.
March 2016	Westland's horticulturists submit a petition against coal heat.
April 2016	Decision on the administrative level: Develop business cases first and governance second.
25 May 2016	Heineken, a party of Cluster East, rejects coal heat.
June 2016	Creation of the citizens' initiative Rotterdams Klimaat Initiatief.
June 2016	Publication of the concept report second phase.
August 2016	Exploring the need to hire a quartermaster for Cluster West.
October 2016	Westland's mayor favours geothermal heat, but will not explicitly reject coal heat.
November 2016	Publication of the definitive report second phase.
4 November 2016	Paris Agreement goes into effect.
22 November 2016	Alderman Pex Langenberg of Rotterdam rejects the inclusion of coal heat.
23 November 2016	The mayor and municipal executive of Westland rejects coal heat.
25 November 2016	Sector association LTO Glaskracht rejects the use of coal heat in the horticulture industry of Westland.
Late November – December 2016	Intervention by the province of South Holland. Decision made to terminate Cluster West.
END OF PHASE TWO	----------
March 2017	Creation of the Heat Alliance South Holland. The heat roundabout will not include heat from coal plants.

Chapter 5 Empirical findings and analysis

5.1 Research limitations

Collaborative dynamics will be analysed via interactions between actors at the steering committee level. This means that collaborative dynamics between actors on the administrative- and project level are not captured. However, important decisions were made on these levels. As this thesis will later show, fixations were broken on the administrative level. This thesis' focus on the steering committee meant that the person responsible for this intervention, Regional Minister Han Weber of the province of South Holland, was not interviewed. Both the steering committee and administrative level included (semi-)public parties and no private parties. Private parties worked on the project level with (semi-)public parties. Uniper, a private party and heat producer, was part of the steering committee in phase one. Uniper's direct involvement meant that other heat producers like Shell and ENGIE also deserved a place at the table. This dilemma was solved by disinviting Uniper in phase two. This meant that the steering committee no longer received direct input from the private sector. Furthermore, a hard cut is made between phase one and two:

- **Phase one:** November 2014 till November 2015
    - Participants: The province of South Holland, the municipalities of Rotterdam, The Hague, Westland, Delft, Eneco, the Port Authority, Warmtebedrijf, Uniper and Westland Infra.
- **Phase two:** November 2015 till January 2017
    - Participants: Same as in phase one, excluding Uniper and Westland Infra, but including Economic Affairs.

The timeline in Chapter 4 shows that right after concluding phase one several changes took place. The municipal council of The Hague rejected coal heat, a majority of the House of Representatives voted in favour of the gradual closure of all coal plants and the Paris Agreement was signed. When parties officially concluded phase one in October 2015, these external events led to change in the context and in the drivers of a CGR. October 2015 is the unofficial cut-off point between phase one and phase two. After phase two finished phase three began in a new collaborative body in early 2017. The so-called Heat Alliance South Holland only includes (semi-)public parties. The consequences of this decision to not include private parties cannot be determined and will not be discussed.

5.2 Initiating cross-sector collaboration

This section will present the findings on the drivers of Cluster West's CGR: leadership, incentives, interdependence and uncertainty. It is assumed that Cluster West was initiated by these drivers. As mentioned by Emerson et al. (2011, 10) 'the form and direction of the CGR is shaped initially by drivers that emerge from the system context.' The question here is whether and how these drivers shaped favourable conditions for the start of a CGR in phase one and later in phase two. Each section described the drivers in phase one and phase two. It is advisable to first read the phase one sections and afterwards read the phase two sections. References in this section to specific terms or instances might not be completely clear, but these will be explained later in the thesis.

5.2.1 Uncertainty

Phase one

Beyond uncertainty about global warming and the speed with which these changes would unfold, constructing a district heating network for an entire province was unprecedented. No single actor had the technical and organisational skill and expertise to plan, develop and manage its construction. Furthermore, there was no readily available budget to accomplish the task. Constructing the heat roundabout required actors active on the heat market to work together. A new collaborative body had to be created and uncertainty marked every aspect of the project. Which sources of heat are sustainable? What does a mature heat market look like? How are we going to price heat? Who would be made responsible for the infrastructure? What was clear was the imminent threat of global warming and the necessity to make heat more attractive than natural gas, primarily in terms of costs. Currently the *'financial margins in the heat business are getting smaller and are under severe pressure' (interviewee 7).* If that does not change the heat market has no future. If actors want to develop the heat market it needs to happen sooner rather than later. Actors also aimed to avoid competition by only picking low hanging fruits. Different approaches and potential conflicts between them would only lead to more uncertainty. Moreover, the expected heat supply was unknown. Actors feared that they would construct the heat roundabout only to find out that there was no demand. And what if advancements in thermal insulation lead to a massive decrease in demand? Add that that the inevitable financial losses in the early stages due to the high investment costs. This leads actors that want to share risks between them.

Phase two

Greenpeace added to uncertainty in phase two, because it threatened to visit all financiers and use their big social media outreach to shame the parties of Cluster West for supporting coal heat. Some parties feared damage to their public image. However, coal was seen as an important component of a solution. Losing coal would lead to an increase in uncertainty. What other options were there apart from coal? Would this lead to a definitive blueprint of the heat roundabout without coal? It was uncertain whether that would be the case or whether parties were just paying lip service to these concerns. Many questions posed in the first phase were left to be answered in phase two. The concern remained that private parties would opt for low hanging fruits. Low risk and high reward areas are innately attractive from the perspective of financial gain. If that happened pipelines would be constructed in a suboptimal manner. Top-down coordination was required, but Cluster West's split in separate pipeline projects made this difficult to organise. In phase one parties agreed to a general shared purpose. Votes against coal in the Netherlands and the Paris Agreement showed that this purpose was not shared by outsiders. That was true for actors within the Netherlands and beyond. Finally, with all the developments against fossil sources, how much is sustainability worth to individual organisations? It was not at all clear how much risk parties were willing to take.

5.2.2 Interdependence

Phase one

The heat roundabout will cost several billion of euros. These investments need to be made over a long period of time. These investments carry high risks, but low financial yield in the short to medium term. This means that government has to do the initial investments, for example through subsidies. Furthermore, the project is both technically complex and economically important. Public actors have to create supporting policies to aid project development. Furthermore, public actors have sustainability ambitions, but they have to acquire required technical expertise elsewhere. For Cluster West, public parties required experienced technicians from semi-public actors like Eneco, who developed Leiding over Noord, and the Port Authority, who developed Maasvlakte 2. These parties have experience in developing large-scale infrastructure. Additionally, Eneco owns The Hague's district heating network and the Port Authority manages the entire port area. This means that public actors have to collaborate with the Port Authority in order to use heat from the port. Supplying heat to The Hague requires collaboration with Eneco. Moreover, if actors want to connect households to surplus heat the replacement of old storage water heaters with new natural gas based ones needs to stop. Local actors and government need to coordinate their actions to make this happen. Lower

surplus heat costs are required, otherwise it will be an uphill battle. Actors did not sufficiently recognised this fact.

Phase two

Parties lacked the capabilities to solve the issue on their own and the first phase report quantified and qualified this interdependence. The report was well received and democratically adopted. Economic Affairs became involved after the summer of 2015, because parties required financial assistance from government. The danger of this was that parties would shift risks to government and only reap the profits. Parties should have sought to reduce risks instead. Eventually Economic Affairs became disappointed with Cluster West. There is a link between this disappointment and the split of Cluster West in three pipeline projects in December 2015. Parties considered Cluster West to be too bureaucratic to achieve results on the project level. This meant that the level of interdependence declined in the transition from the first to the second phase. Parties would prioritise their own pipeline project instead of coordinating their actions in the steering committee. This also meant that parties primarily felt interdependence with those working on the same pipeline project, which led to the drafting of suboptimal plans for and competition between Leiding over West and Leiding door het Midden.

5.2.3 Incentives

Phase one

Actors agreed that CO_2 emissions had to be cut and natural gas replaced by renewables. As mentioned before several actors began developing their own initiatives. A lot of heat is produced in the port and there is a lot of heat demand in Westland. Economic opportunities emerged with great potential for innovation and technological development. These incentives could be enough to start a CGR, *'Cluster West is the puzzle which brings all the interests together'* (*interviewee 1*). However, they will not necessarily be successful. Parties recognised the inefficiency of a system of production and supply for every individual organisation. In phase one *'the idea of collaboration turned out to be stronger than the individual interests' (interviewee 9)*. It was seen as an *'absolute win-win situation' (interviewee 2)*. However, one can argue that sustainability has been an important policy issue for decades. While other EU Member States were making progress, the Netherlands' share of renewables was only 4.5 percent in 2013. This indicates a lack of urgency to switch from fossil sources to renewables. This made it harder for actors to initiate a CGR. To give an example, plans to distribute steam via the so-called Botlekloop were drafted in the 1990s and not developed further. Several important reasons explain why it could develop now. First there were earthquakes in

Groningen and a subsequent reduction in natural gas production. At the same time a campaign against natural gas started, which made it a politically salient issue. Second, dependence on Russia for natural gas supply. Opinions on Russia changed after Russia annexed Crimea. The reduced natural gas production in Groningen led to increased imports from and reliance on Russia. This indirectly gave Russia coercive power over the Netherlands. These two events form important incentives for public parties to address the issue.

Phase two

Several important external events influenced the CGR which formed after phase one. Late in phase one, June 2015 to be more precise, Urgenda won a lawsuit against the Dutch State. The State had to reduce GHG by at least 25 percent in 2020. In November 2015 a majority of the municipal council of The Hague and the House of Representatives voted in favour of the gradual phase-out of coal. This jeopardised all coal plants, even the modern ones. Finally, in December 2015 the Paris Agreement was signed. This agreement included stricter limits on GHG than the 2013 Agreement on Energy for Sustainable Growth. The speed with which these decisions were taken was unexpected. Meanwhile the potential of geothermal heat increased. Westland saw the commercial advantage of using local geothermal sources instead coal from the Leiding over West pipeline. This incentivised a local approach. Furthermore, after the first phase report was published parties recognised economic opportunities, but they also recognised that resource limitations required collaboration. These economic opportunities could lead to competition. Public parties feared that competition would harm their shared purpose and common efforts.

5.2.4 Leadership

Phase one

Some actors in South Holland were developing projects to reuse heat. In 2013 the Port Authority started the Deltaplan Energy Infrastructure to explore opportunities for heat, steam and CO_2 reuse. Warmtebedrijf worked on Leiding door de Haven and Eneco explored options to replace their current sources of heat. In late 2014, the municipality of Rotterdam recognised that several heat projects were being developed. Rotterdam's 32 percent stake in Eneco, 88 percent stake in Warmtebedrijf and 70 percent stake in the Port Authority gave it its authority. The question on the table was: *'you have the port on one side and on the other side you have the horticulture industry, how do we bring those together?' (Interviewee 14).* It makes sense for Rotterdam to take the lead (*interviewee 5*), because these developments took place in their area of authority. *'It should not happen that each*

organisation creates its own small infrastructure company. That is not efficient' (interviewee 14). Carl Berg, who *'only works on these kinds of complicated projects, tangled in different interests' (interviewee 2),* led this effort. *'He was the leader' (interviewee 1)* who brought actors together and wrote Cluster West's 'bestuurlijke opdracht.'[7] Triggering leadership was continued by Johanneke de Lint of Twynstra Gudde in phase one from January 2015 until October 2015. Actors appreciated her independent leadership in the process towards creating a shared purpose, because *'people could share information with Twynstra Gudde in good faith' (interviewee 1)*. Other levels were at this stage less relevant, because the administrative level included politicians and CEOs with a lot on their plate. In other words, important people otherwise not involved in the heat roundabout. Their decisions corresponded with the existing steering committee consensus. The project teams were less relevant in phase one, but became very relevant in phase two.

Phase two

Uniper and Westland Infra were disinvited and Cluster West was split in three pipeline projects with separate ownership. Initially the motivation for parties to join the CGR derived from their overlapping interests, but it was challenging to sustain motivation among all parties. Johanneke de Lint of Twynstra Gudde was instrumental in determining a common purpose. In phase two Carl Berg took the lead in the steering committee. Due to Berg's role as chairman of the steering committee and main writer of the foundational document of Cluster West his role was that of a champion. He was well-respected, had considerable authority and had the ability to see the issue from multiple perspectives and work with these differences. However, the split and the start of competition meant that Carl Berg would only chair the steering committee. Furthermore, his role was not independent. He represented the interests of the municipality of Rotterdam and preferred a certain outcome. That was not the case for Johanneke de Lint, because her only objective was the collaboration's success. There was no consensus on the administrative level. Its decisions were informed by the steering committee, where there was no consensus either. Project leaders were required to follow pipeline design principles the administrative level agreed to in December 2015. Conflict between Leiding over West and Leiding door het Midden shows that these principles were not followed. This indicates that project leaders took matters into their own hands when progress in the steering committee ground to a halt. Finally, questions arose around government. Should it become the owner of the heat roundabout infrastructure, as with electricity and natural gas? Or should it only be the financier? Should it determine how much customers pay or do other parties dictate terms? In other words,

[7] There is no direct translation of 'bestuurlijke opdracht', but it indicates creating the right environment for the project and setting priorities.

should government lead? The government decided not to lead and subsequently triggering leadership was not present in the CGR of the second phase.

5.2.5 Observations regarding drivers

Figure 5.1 summarises the findings with regards to the manifestation of drivers in Cluster West. The manifestation of these drivers will be detailed in the table itself and the presence will be indicated with either ✓ for present or ✘ for not present.

Observations for the CGR drivers

Elements of drivers	✓/✘	Manifestation
Uncertainty		**Phase one:**
	✓	Unprecedented scale of construction with no single actors having the required technical and organisational expertise. No readily available budget to construct the heat roundabout meant that parties had to pool resources. Nearly every aspect of the project raised serious questions, which promptly required answers.
	✘	Actors only picking the low hanging fruits with low risk and high reward, which is very tempting. Expected heat supply is unknown, but how quickly would thermal insulation of older buildings improve?
		Phase two:
	✓	'Threats' from Greenpeace meant parties feared that coal would damage their public image. What other options than coal are there? Recognition that this issue concerned them all. Important questions remained unanswered. Stop parties from only taking low hanging fruits. Parties recognised that uncertainty might lead to a suboptimal network.
	✘	Denial of risks associated with paying lip service to a heat roundabout without coal. Late recognition that their shared purpose including coal is not shared by the outside world. How much is sustainability worth to individual organisations? Overestimation that parties would commit themselves.
Interdependence		**Phase one:**
	✓	Actors required supportive public policies and financial support. The physical infrastructure is owned by various actors. The heat market requires an integral approach to grow. Some actors have a lot of experience with building infrastructure, some other do not.
	✘	Actors did not sufficiently recognise coordination between government and local actors is required the make the heat market grow.

		Phase two:
	✓	First phase report quantifying and qualifying interdependence was well received and democratically adopted.
	✘	Parties shifted risks to government instead of reducing risks as a whole. Split of Cluster West shifted interdependence from the steering committee to the project level and to parties collaborating on the same pipeline project.
Incentives		**Internal events (phase one):**
	✓	Alignment of interests and activities on heat. The heat market provides potential economic opportunities.
	✘	Lack of urgency to switch from fossil sources to renewables.
		External events (phase one):
	✓	Destructive earthquakes in Groningen. Lower production of natural gas in the Netherlands. Increasing dependence on Russia for natural gas.
		Internal events (phase two):
	✘	First phase report showed economic opportunities. Competition had the potential to undermine an effective CGR. Geothermal heat incentivised localised approach.
		External events (phase two):
	✓	Urgenda won lawsuit against the Dutch State. Signing of the Paris Agreement. Municipal council of The Hague and the House of Representatives voted against coal.
Leadership		**Phase one:**
	✓	Municipality of Rotterdam brought parties together to develop the western part of the heat roundabout. Johanneke de Lint is the independent process supervisor and chairperson of the steering committee.
		Phase two:
	✘	Carl Berg (municipality of Rotterdam) took the lead in the steering committee. Cluster West lost its independent chairperson and government was unwilling to lead. Project leaders did not follow the pipeline design principles.

Table 5.1 – Observations regarding drivers of Cluster West's CGR

5.2.6 Reflection on the drivers of a CGR: empirical findings and theoretical basis

It is assumed that all four drivers were present, leading to the start of collaboration. The four drivers work in various combinations to push the creation of a CGR. The process towards the creation of phase one's CGR started from a situation of uncertainty. Uncertainty is a feature of wicked problems like global warming. No single actor was endowed with perfect information and sufficient technical

and organisational expertise to pursue its interests. Furthermore, developing the heat market would require enormous financial investments that can only be done by a group of actors. This uncertainty might drive actors to share risk through collaboration. However, it can also drive actors to compete. A polarised debate about global warming fans the flames of uncertainty and actors might be tempted to invest in the low risk and high reward parts of the heat roundabout. This could cause competition to spiral out of control in the relatively small geographical area of South Holland and lead to a suboptimal network. Furthermore, the expected heat supply is unknown and before actors commit themselves to invest they prefer to have reached agreements with as many consumers as possible. This might lead to competition between parties looking for the highest share of consumers and thus the highest share of the profits. However, what if improvements in thermal insulation of buildings cause a large cut in heat usage? Would the heat market even be profitable if that happens? Turning the response to uncertainty from competition and indecisiveness to collaboration thus requires the acknowledgement of interdependence.

The scale and complexity of this issue meant that collaboration was necessary. Actors did not succeed in addressing the issue through their internal organisation and with their own resources. Some actors had already developed local district heating networks and these networks were in individual ownership. Actors like Eneco and the Port Authority have experience with developing large-scale infrastructure. To expand the existing network into a heat roundabout supportive public policies and a pooling of resources was essential. The heat market was unprofitable and its future bleak if actors remained unwilling to pour resources into its development. In order to accomplish the goals of reduced CO_2 emissions and profitability the heat market had to grow. This necessitated an integral approach including competitors and others outside one's organisation. Actors however did not sufficiently recognise that coordination between government and local actors was required to make heat more attractive than natural gas. This caused problems in the second phase. Actors are only motivated to collaborate when interdependencies are recognised. Motivation is enhanced by the presence of a third driver, namely incentives.

Actors need to be enticed into collaboration and when these enticements are connected to important outcomes the motivation to collaborate increases. Incentives will have positive consequences when actors recognise that working together might have positive effects. However, failure to collaborate may have negative consequences. For Cluster West a window of opportunity opened, because the interests and activities of actors on heat aligned. Actors were incentivised by the economic opportunities that the heat market offered them. Furthermore, two triggering events occurred in the years preceding Cluster West. Heavy earthquakes in Groningen and numerous large-

scale protests of civilians moved government to reduce the production of natural gas to stave off further earthquakes. This increased Dutch dependence on imports of natural gas from the Russian Federation. Diplomatic relations with Russia were damaged when Russia decided to illegally annex Crimea in 2014. These incentives increased the negative consequences of inaction, because it jeopardised Dutch energy independence. Developing the heat market was a good way to reduce the consumption of natural gas and decrease dependence on Russia. However, actors also felt there was a lack of urgency to switch from fossil sources to renewables. Fossil sources were still very profitable and switching to surplus heat would on the long-term mean giving up a very profitable market. However, the reputational and public image gains from participating in a CGR aimed at sustainability should not be underestimated. Also, not participating would entail a lost opportunity to influence public decisions and no stake in potential joint financial gains, even if fossil sources were an important source of income. With these incentives a fourth driver, triggering leadership, must be present before a CGR can start.

Triggering leadership should be displayed by an actor willing to instigate preliminary discussions about collaborating. This actor should recognise uncertainty about the future, the interdependencies between actors and the negative consequences of inaction. Initiating leaders must supply the motivation for actors to come together. The municipality of Rotterdam convinced other actors that collaborating would be in their best interest, surveying that developments had already started. Carl Berg of the municipality has a lot of experience in managing complex projects. He was able to combine uncertainty, interdependence and incentives to bring actors together. Over several decades he built a dense professional network and was known by most actors and seen as credible and trustworthy. It was recognised by the municipality that an integral approach bundling all developments in the heat market would be most effective. Carl Berg had formal authority due to his role within the municipality and the fact that the municipality is a shareholder of the largest organisations looking to enter the heat market. Eventually it was decided that Johanneke de Lint of Twynstra Gudde would be the independent process supervisor and chairperson of the steering committee. The chairperson was truly independent, since her only goal was the success of the collaboration. She did not represent one of Cluster West's parties.

This shows that after the first three drivers developed from the system context, it was triggering leadership that tipped the balance in favour of creating a CGR. Importantly, several drivers changed during the transition from phase one to phase two. Which is possible according to Emerson et al. (2011, 9) who argue that:

'External conditions (e.g. an election, economic downturn, extreme weather events, or newly enacted regulation) may influence the dynamics and performance of collaboration not only at the outset but at any time during the life of a CGR, thus opening up new possibilities or posing unanticipated challenges.'

These unanticipated challenges emerged due to four external events. These events changed the CGR. First, Urgenda won a lawsuit against the Dutch State in June 2015. The exact month in which the first phase concept report was published. Government had already made plans to cut GHG, but efforts had to be intensified even further. Second, the municipal council of The Hague and the House of Representatives voted in favour of the gradual phase-out of all coal plants in November 2015. And most importantly, in December 2015 the momentous Paris Agreement was signed. All (semi-)public parties knew they could not act like nothing changed. The first phase was about exploring the issue, pre-commercial and without strict obligations. In the second phase parties were supposed to develop business cases, but coal unsettled this. Furthermore, parties recognised that this issue concerned all of them when Greenpeace 'threatened' to shame those who supported coal. In the early stages, what other options did parties have apart from coal? Including coal in the first phase report went against outside developments, both in the Netherlands and beyond. Parties recognised this conflict too late. This also meant that questions which remained unanswered became even more pressing, like which sources of heat are sustainable? This increased uncertainty and indecisiveness. However, parties recognised that this uncertainty might cause parties to develop a suboptimal network (low hanging fruits). Which is why the split in three pipeline projects with separate ownership made sense at the time. Once construction was able to start these three projects would fit together like pieces of a puzzle. This reduced the risk of a suboptimal network. However, the fact that Leiding over West continued to include coal meant that parties denied risks associated with paying lip service to a heat roundabout without coal. That was not appreciated by parties who were staunchly opposed to coal. Add to that uncertainty about how much risk parties were willing to take and the overestimation that parties would commit themselves and the foundation for collaboration was more instable than before.

One of the unintended effects of the split was the shift of interdependence to the project level. This meant that parties not working on the same project did not necessarily feel the same level of interdependence as they did during phase one. Furthermore, by including Economic Affairs other parties tried to shift risks to government instead of reducing overall risks. Since resources were scarce and risks were very high, parties preferred that the Dutch State did the high risk and low reward investments. As mentioned before, actors are only motivated to collaborate when

interdependencies are recognised. The split created a more local approach and this incentivised Westland to intensify efforts to explore geothermal heat. This meant that one of the most important consumers of surplus heat preferred to use local geothermal heat instead. Second of all, the first phase report showed the economic opportunities of the heat market. It was recognised that competition had the potential to undermine an effective CGR. This did not stop some parties from positioning themselves to profit the most from the heat market in the future. In sum, a shift of interdependence from the overarching to the local level meant that parties were incentivised to look for local opportunities as well. Higher interdependence between actors working on the project level also meant that competition became harder to control, leading to competition between Leiding of West and Leiding door het Midden.

These destabilising effects could have been averted by an actor displaying triggering leadership. An actor that points out a shared purpose and actively works on keeping actors together. However, Johanneke de Lint was no longer the independent chairperson able to fulfil this role. Carl Berg of the municipality of Rotterdam now personally helmed the steering committee. Carl Berg represented the interests of the municipality, which meant that he could not be as impartial as Johanneke de Lint. Furthermore, the split meant that the project leaders got a bigger role in Cluster West. To make sure pipeline development would be a concerted effort the steering committee (and approved by the administrative level) devised a list of design principles that the project leaders had to stick to. This ensured well controlled development. However, due to a lack of leadership Leiding over West and Leiding door het Midden started to compete for the delivery of heat to the city of The Hague. This meant that the project leaders did not stick to their design principles, because otherwise that would not have happened. Parties recognised this conflict in late 2016. This shows that there was no leader who could pool uncertainty, interdependence and incentives and devise a path forward for their collaborative effort.

Recall that according to the theory of Emerson et al. (2011, 10) if one or more of these drivers are present it is more likely that a CGR will be initiated. The findings suggest that drivers themselves are interrelated and that changes in one of these drivers have cascading effects on the other drivers. In Cluster West four external events influenced all the other drivers. This is informative about a CGR, because the dynamics and performance of the first phase CGR were changed during the life of the CGR. In some cases this opens up new possibilities, but in the case of Cluster West it led to unanticipated challenges to which actors struggled to adapt. The CGR proved to be inflexible to adapt to these changes, the drivers' dynamism eventually caused the calcification of collaborative dynamics

and the formation of fixations. The remainder of this thesis will address fixations and collaborative dynamics.

5.3 Fixations in Cluster West

This section identifies two cognitive and one social fixations. Fifteen interviews form the basis of analysis. Most fixations have underlying fixations that cannot be considered separate from their respective overarching fixation. For instance, the fixation on inclusion of coal in the heat roundabout is a small manifestation of the overarching negative image of coal in the Netherlands. We study three fixations due to constraints in time. It is more informative to do an in-depth study of three fixations. All three fixations were broken in late 2016. This thesis' conceptual framework indicates that cognitive fixations can be broken by a variation in the social dimension, while social fixations can be broken by a variation in the cognitive dimension. The four fixations studied are:

> Cognitive fixation 1a: Feeding heat from Uniper's plant into the heat roundabout is an appropriate first step in the transition from natural gas to renewables on the longer term.
> Cognitive fixation 1b: Coal's negative public image.

Coal heat was the most prominent fixation and returned frequently during interviews. Linked to this is the overall negative public and political image of coal. This public image that has only worsened in recent years. During Cluster West the political sensitivity of coal grew hand over fist. When phase 2 started in late 2015 four unexpected developments took place, as mentioned in section 5.2.6. These developments took place right after and just before Cluster West published its definitive phase one report in October 2015. Around this time the cognitive fixation on coal emerged. Discussions focused on Uniper's plant. Some actors were convinced that it would not be smart to let heat go to waste. Others were convinced that ultra-efficient coal plants have no surplus heat. Coal is a legitimate heat source, but Eneco argued from day one that it would not accept coal. This led to difficult discussions, because it is legal to burn coal for the purpose of creating electricity and heat. It was impossible to rule Uniper out, because some actors still supported its inclusion. *Interviewee 5* called it *'one of the large elephants in the room.'* Horticultural companies in Westland rejected coal early, like Eneco and the municipality of The Hague did. They were afraid it would negatively influence their license to operate (*interviewee 2*). According to *interviewee 1* Westland uses *'a lot of gas and their profit margins are under severe pressure.*' This means that if they shift to coal heat and *'the competition frames their produce as for example coal tomatoes, then we are finished'* (*interviewee 2*). Add to this

Uniper's *'counterproductive lobby [...] which only led to an increase in distrust'* (*interviewee 2*) and the campaign of Greenpeace against coal and their success in creating local resistance in Rotterdam via the Rotterdams Klimaat Initiatief (*interviewee 13*). Rotterdam's Alderman Pex Langenberg ruled out the possibility that Rotterdam would use coal heat in November 2016. In sum, the discussion about coal was *'a discussion [...] that entirely controlled Cluster West, sapped it from its energy, and kept everyone on their toes' (interviewee 4).*

Some parties did not expect coal to become so dominant. Although, an agenda set for the 2 July 2015 meeting of the administrative level showed that they were well aware of the necessity of an exit strategy. This still prompted some interviewees to argue that *'no one expected that the discussion about coal would become so influential and neither did the administrators. At some point you enter a certain road and then there is no way back' (interviewee 8).* The developments around coal were path dependent. The decision to use coal heat as an appropriate first step in the heat roundabout was made official in the first phase report published by the project team Cluster West. Once new developments made coal unacceptable to some parties it was really difficult to reverse what was decided earlier. The stakeholders of Leiding over West included Uniper's plant in their plans, so this did not sit well with them. Project development moved forward, which might explain why they were taken by surprise. Particularly since some actors argued that *'if you know that lock-in of a coal plant is questionable, then this should not surprise you' (interviewee 14)*. It was remarked that *'in light of the Paris Agreement you plan on connecting a whole city to heat from the port and then I think it is rather strange that you do not feel that people will question it' (interviewee 13)*. Parties that did not expect coal to become dominant argued that it is a *'rational and technical story' (interviewee 12)* to include coal and *'it was a great opportunity to connect the power plant to supply the Westland with heat. It was a very logical step and it still is very logical' (interviewee 8).*

Groupthink emerged, not necessarily within the steering committee itself, but more in the internal processes of the organisations that articulated their surprise. Groups reached dysfunctional outcomes and were unwilling to reflect on this, which is a manifestation of a fixation. *'I think that it's a group of people that only speaks with each other, makes plans together and then think everything is alright, but do not feel what happens in society' (interviewee 13)*. While this statement is not completely valid for all organisations, it does have a modicum of truth to it. To give an example, the Port Authority continued to push coal when many parties recognised that this was a nonstarter. *'It was presented as if coal was the only source in the port and they were very secretive about other sources, which they argued did not want to be included' (interviewee 9).* The Port Authority's interests in the transhipment of coal was known by all actors and it was no secret that it championed

Uniper's interests as well. It took a long time before the Port Authority relented, which raised the question of *'why they let things come to a head like this' (interviewee 14)*. A statement like *'the Port Authority is of the opinion that the current discussion about closure of new coal plants is determined by emotion too much and we therefore call for an objective approach'*[8] is unfair towards actors that brought forward a reasoned explanation why they do not want coal. However, the Port Authority is not an actor you ignore or disinvite. This meant that the cognitive fixation remained in place.[9] This cognitive fixation led to a social fixation when *'a separation between administrative parties and those parties responsible for executing the plans'* developed *(interviewee 14).* Municipalities put most of their efforts in developing the public interest, which was difficult because the public actors' interests were *'not entirely in line' (interviewee 14)*. Parties responsible for construction put most of their energy in the development of their own projects and thus their individual interests. This was given weight by *interviewee 8* who argued that '*in order to realise projects you will also need people to take action and if you are only organising meetings, so to speak, you will not progress any further*.'

This cognitive fixation was broken by a social intervention in late 2016 via strong leadership of the province of South Holland. Their intervention marked the end of phase two and the beginning of phase three in March 2017 in the newly created Heat Alliance South Holland. The province solved two cognitive fixations at once, the coal issue and the competition between Leiding over West and Leiding door het Midden, which will be discussed in the next section. Parties tried to solve this issue through discussions on the merits and demerits of coal and change the cognitive dimension. The configuration theory stipulates that variation in the cognitive dimension will not be enough to break a cognitive fixation. Regional minister Han Weber of the province of South Holland was determined that the province should lead and he and his colleagues *'kept their backs straight' (interviewee 14)*. Actors were receptive to an intervention by an actor which previously had a more reserved role in Cluster West. The province argued that there was absolutely no support for coal. Furthermore, the decision of the municipality of Rotterdam to exclude coal in November 2016 was used to strengthen the argument of the province. Other actors were confronted with the definition of reality recognising a total lack of political and public support for coal heat, which was introduced through the province's intervention. This ultimately led to the recognition that the geographical separation between Cluster West and Cluster East should be removed as well. The newly formed Heat Alliance South Holland is now led by the province. In sum, the fixation on coal emerged in late 2015 and was broken one year

[8] Source, Port Authority: https://www.portofrotterdam.com/nl/nieuws-en-persberichten/standpunt-havenbedrijf-rotterdam-over-kolencentrales.

[9] It is however important to note that the Port Authority was not the only actor that exhibited such behaviour, but considering the topic of this cognitive fixation was coal it seemed the most appropriate example.

later by the province of South Holland. It introduced variation in the social dimension and could force a cognitive breakthrough.

> Cognitive fixation 2: The business case of Leiding over West and Leiding door het Midden calculated the same amount of heat delivery to The Hague.

Another cognitive fixation was the competition between Leiding over West and Leiding door het Midden. *'From December 2015 onwards the project was split in three separate pipeline projects with separate owners' (interviewee 2).* Both projects aimed at delivering the same amount of heat to The Hague and surroundings, which exceeded the amount of heat the city required. This is another example of a cognitive fixation, because parties working on Leiding over West (e.g. Port Authority) and Leiding door het Midden (e.g. Eneco) based their projections of total heat supply on two different realities (*interviewee 12*) and were unwilling to reflect on this contradiction. *'Both Leiding door het Midden and Leiding over West fully assumed heat supply to The Hague, but you can only supply heat from own pipeline or the other' (interviewee 9).* Both continued to develop their own business cases, because in their minds the other pipeline project would fail. Eneco's contract for heat supply via a gas-fired power plant would soon end and its district heating network would then be underused. *'They were in a hurry because the power plant would soon close' (interviewee 9)*. This meant that Leiding door het Midden had to be completed. Resolving the issue with Leiding over West first did not fit in Eneco's timeframe. *'The Port Authority tried to make Leiding over West work and Eneco wanted to secure Leiding door het Midden. Everyone had its own thing and in the meetings there was the feeling that if it did not bother you it's fine' (interviewee 2).* This competition can be linked to the coal theme that characterised all of Cluster West. Leiding over West would include coal heat, while Eneco excluded coal heat from Leiding door het Midden. *'Leiding over West and Leiding door het Midden started to compete with each other. If you are developing the heat roundabout from a collective system, that would be a non-discussion, but with two owners that is a different story' (interviewee 4).* It was left to the municipality of The Hague to decide what it wanted and *'they made it very clear which source they preferred' (interviewee 14).* Leiding over West still included The Hague in their plans: *'The municipality of The Hague argued that since the coal plant was to be connected to Leiding over West they found that project less interesting. So they put very little energy into it, but eventually they were included in the business case, which made this rather awkward for them' (interviewee 9).*

Tensions rose and in several meetings actors failed to maintain proper decorum. *'It became rather emotional and people banged their fists on the table' (interviewee 14).* As with the coal discussion

this cognitive fixation was broken by a social intervention in late 2016 by Han Weber of the province of South Holland. The province recognised it would be impossible to have two pipelines supplying the same amount of heat to The Hague. Once this definition of reality was introduced, the province sat down with stakeholders of Leiding over West to decide which sources could potentially replace coal. The CEO of the Port Authority, Allard Castelein, also made an important intervention. He agreed that the time had come to explore other possibilities, which is what his employees did. At this time the permanent exclusion of coal looked inevitable already due to the province's intervention in the coal issue. This completely gutted the business case of Leiding over West. The parties agreed '*on deep geothermal sources and a connection to the port's oil refineries' (interviewee 15)* to replace Uniper's plant. These steps had *'the approval of the highest authority' (interviewee 14)*. Half a year has passed since then, which allowed for reflection: '*At the end of phase two we worked too narrowly on Leiding over West and on the one hand that is logical, you have to start somewhere, but on the other hand we have made ourselves very vulnerable' (interviewee 8)*. Currently Leiding over West has been put on hold. It is unsure whether this is a permanent postponement. '*Leiding over West has been moved back and I do not see any party involved in it at the moment. The Port Authority is no longer involved. The question still remains of how we are going to supply a large heat user like Westland, but Leiding over West does not seem like the first variant to be developed' (interviewee 12).* While many questions and uncertainties remain this segment can be summed up as follows: in late 2016 the province of South Holland, together with the Port Authority, introduced variation in the social dimension and could force a cognitive breakthrough.

Social fixation 3: The governance structure of Cluster West.

Should Cluster West be split into separate pipeline projects or remain together? In late 2015 '*we agreed that everyone works on its own pipeline project and that we only had to reconvene to sign the deal when we were ready for development' (interviewee 10).* This split led to a social fixation, because interaction rules calcified into a detrimental repeated interaction pattern. Figure 5.1 shows what led to this development.

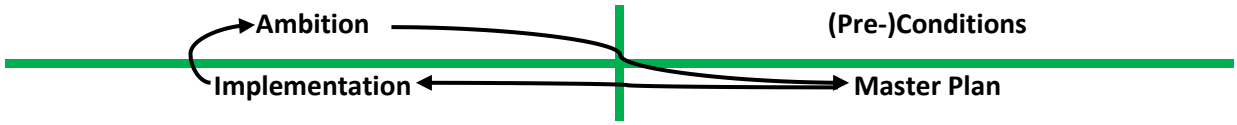


Figure 5.1 – Cluster West's interaction pattern before the intervention

Public parties set the ambitions for Cluster West and went straight to the planning phase. *'The (pre-)conditions step was skipped in Cluster West, parties went straight to the drawing board. It became*

chaotic' (interviewee 15). The heat market was *'not mature yet' (interviewee 5)* and this required that certain conditions were set in advance and during the collaboration to make the heat market more attractive than natural gas to consumers. *'In general terms, the (pre-)conditions were not sufficiently elaborated to remove all risks. The solution is that you more clearly set the general conditions, which also means that project can start running' (interviewee 12)*. Actors were hesitant to invest, because it was still unclear whether the heat market would be become profitable. Furthermore, organisations responsible for the implementation of plans started to interfere with the ambitions set for the project when progress slowed down. Distrust about the real interests of parties characterised their interactions. For some actors it was tiring to be suspected of hiding interests. During meetings actors would not talk about fundamental differences, because they needed each other to realise Cluster West. Conflict would make this less likely. Figure 5.2 shows what happened after the province of South Holland interfered.

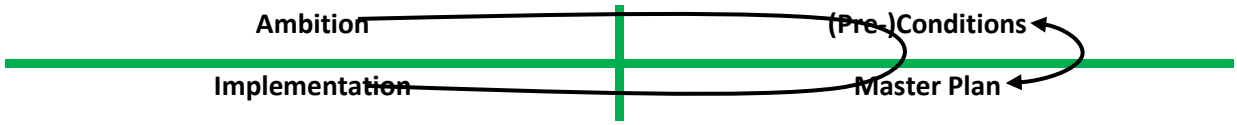


Figure 5.2 – Cluster West's interaction pattern after the intervention

Actors should work from a shared ambition and set the right conditions for the project to grow. This is what the province did via its intervention. It was necessary to make heat more attractive then natural gas, but these conditions were not created until very recently. Municipalities get the discretion to decide whether or not they want to connect houses to the natural gas network somewhere in 2017. These conditions have to be in place to make heat attractive to consumers. Actors can then work from a strong foundation to start planning pipeline projects, because a bankable business case can be created. The province has a strong energy transition team, supported by the regional minister, which worked on the right conditions and moved into the planning phase afterwards. What Figure 5.2 also shows is a relationship between (pre-)conditions and planning. Policy is made during and before the planning phase and plans influence conditions. This sweeping movement is used by the Heat Alliance South Holland and was a variation in the cognitive dimension that broke a social fixation. Old interaction patterns did not function properly, which is why the province focused on adding content to set conditions. This made planning a lower priority and formed new interaction rules and a new interaction pattern.

5.4 How cognitive and social fixations emerge

The previous section did not explain what triggered the creation of these fixations. This section will use collaborative dynamics of a CGR, namely principled engagement, shared motivation and the capacity for joint action to analyse which variables can explain the emergence of fixations. No single variable will definitively explain why fixations occurred. Numerous variables might have led to fixations, but discerning which variable influenced the emergence of fixations the most is not the goal of this analysis. The goal is to find how variables manifested themselves in Cluster West and how the variables led to the emergence of fixations. The gathered data does not indicate a single cause for fixations in Cluster West, but it identifies a set of causes. All fixations were created in the second phase of Cluster West, from late 2015 until late 2016. In phase one parties agreed to disagree on contentious issues, which did not lead to fixations. This was no longer possible when coal became a central issue in late 2015. All fixations can be traced to coal. The competition between Leiding over West and Leiding door het Midden was based on two different realities, one in which coal was included and the other in which coal was not. Pressure to start development led to a social fixation on the governance structure and was exacerbated by coal. Some parties made plans including coal, because the right conditions were not set in advance. There was uncertainty about what sustainable heat entails, which meant that coal could be pushed as a source. Via the CGR framework it will be identified which collaborative dynamics changed in the second phase.

5.4.1 Fixations: explained via the CGR framework

Principled engagement

The process of discovery was already initiated before Cluster West started. Meetings for the Green Deal, Programme Office, Deltaplan Energy Infrastructure and various working groups preceded it. These meetings were of a precompetitive nature, which was also the case in phase one of Cluster West. Actors working on the shared purpose for Cluster West in phase one were pleased with the progress made. Actors met every Thursday to develop plans. *'In Delft we had a special room where we could work together. Twynstra Gudde was the process supervisor to guide our collaboration, which was not necessary at the time. However, it was good for them to be a connecting factor and it all worked really well' (interviewee 9).* The actors devising plans were considered a *'good composition of parties'* (*interviewee 1)*. In Delft actors were working in groups addressing various elements of the network. *'Everyone had the opportunity to talk about common interests, which was insisted upon' (interviewee 1).* Individual interests were not as openly shared, but since phase one was meant to broadly explore the issue it did not matter much. Actors involved in phase one were not selected on

the basis of capabilities, but this did not prevent them from writing a well-received first phase report. A number of studies were commissioned and preliminary business cases were written. Rotterdam Engineering researched an optimal route for the network. DNV GL studied emissions and depositions. LTO Glaskracht developed a term sheet for heat delivery and security of supply. OCAP and Deltalinqs created a CO_2 roadmap about the possibilities to use CO_2 in the network. Through these studies actors gathered information, gained knowledge and fostered a common understanding. Non-members of Cluster West also made their voices heard. Greenpeace was invited to share its views and it did influence how actors perceived the issue. In phase two the fixed project location was abolished. *'All actors of the project organisation went there in the first phase, but this was no longer the case in phase two' (interviewee 1).* The steering committee was made subordinate to the pipeline projects, its consequences will be explained. *'In the exploration phase we did a collective study into several pipeline trajectories and we decided to work on the three most promising projects, whilst choosing to keep separate ownership' (interviewee 4).* Twynstra Gudde had trouble acting as everyone's process supervisor with independent projects and separate ownership.

Cluster West split in three pipeline projects early in the second phase. *'During the feasibility phase the differences between the pipelines became more apparent, which led to the decisions to split them up' (interviewee 9).* The split decreased the feeling among some actors that the project could be realised. *'When I met with the director of Westland Infra he said to me: 'oh, are you having corvée next week?'' (Interviewee 2).* Coordinating their shared efforts became harder and over time Cluster West's shared purpose became less relevant. *'It was a collection of projects and I think that the shared purpose was missing' (interviewee 4)* or even *'I have never had the feeling that we had something of a shared objective' (interviewee 2)*. The purpose and goals of the collaboration were discussed on a regular basis, but remained inconclusive*. 'As the overall results of the steering committee were lacking the projects continued to proceed' (interviewee 1).* Parties tried to develop a shared understanding about how the heat market could grow. *'This did not really take flight, because people were working on three individual projects with several individual owners and each party had its own commercial interests' (interviewee 4)*. Furthermore, *'In early 2016 we wanted to define a number of overarching themes or shared themes [...] this did not work out and parties thought 'alright then' and started to develop their own project' (interviewee 2).* Parties kept going to meetings in fear of missing out, but while *'parties understood that it was rational to work together'* they did not think it was effective *(interviewee 6)*. In order to advance Cluster West *'you really had to make steps in the right direction via bilateral and trilateral meetings' (interviewee 5)*.

It was possible to say nearly everything during meetings, *'but it did not lead to dialogue, communication, or action' (interviewee 2)*. Phase one of Cluster West was of a precompetitive and pre-commercial nature. Progress came easier, because financial gain was still of minor importance. In the second phase commercial interests became prevalent. For example, the port of Rotterdam forms the heart of the coal transhipment sector in Europe. This is a sector of commercial interest to the Port Authority and losing it would be a large financial blow. Eneco on the other hand has a monopoly on heat delivery to households in The Hague and surroundings. The heat roundabout is meant to become an open network, which would mean that Eneco loses its monopoly. These facts were not discussed at the table. *'Not because they could not do it, but because they did not want to do it' (interviewee 1).* This also meant that actors were not seen as entirely honest. *'When someone indicates his or her interests you should not get the feeling to look for other underlying interests. I think that was too prominent in Cluster West' (interviewee 4)*. From a business perspective it was understandable. They were motivated by the idea that *'maybe next time we will face each other as competitors, we have to take that into consideration as well. It damages your bargaining power when other parties known all the 'ins and outs' of your business case' (interviewee 7)*. In sum, actors felt they could talk about most issues if it did not damage established relationships. True competition started in phase two.

Before the split Cluster West was able to make procedural decisions on setting an agenda, having reasonable discussions and assigning working groups. The support of Twynstra Gudde was particularly appreciated. Working groups were established and independent research was commissioned. In terms of substance determinations were made on a shared purpose and *'everyone agreed that the exploration report was a good report' (interviewee 1)*. Most first phase determinations were of a technical nature, but Cluster West does not appear to have created procedures on conflict resolution. *'If someone says 'I do not want coal heat', then you avoid that, which is what happened all the time' (interviewee 2)*. Actors listened to each other, but were unable to tackle issues head-on and preferred to agree to disagree. On the foundation of the first phase actors built their business cases in the second phase. However, it was after the split that Cluster West lost its decisiveness. Two quotes by actors who were not involved in Cluster West when this decision was made illustrate this. *'When you want to create a heat roundabout and you decide to decompose it into separate pipeline projects, because otherwise it will not work, you have to accept that everyone will be committed to its own pipeline project and not the whole heat roundabout. In a way it was designed to prohibit collaboration' (interviewee 2). Interviewee 7* found it *'a remarkable step to do it that way, because the idea was always to create one integrated system. You will get three private projects that will never form one whole and one optimum. It cannot be done.'* The projects

were already in development, so it was easier to continue the work that was already done. The steering committee aimed to profit from this decision later, but instead they lost the ability to steer projects.

Second phase working groups were created to develop shared themes, but parties could not agree on themes. Furthermore, joint chairmanship of the municipality of Rotterdam and The Hague created confusion. In the steering committee Carl Berg of the municipality of Rotterdam usually took the lead. On the administrative level however other alderman '*often jumped in, because the alderman from Rotterdam was absent' (interviewee 4).* Who was to be decisive when necessary? *'What created problems was the fact that it was directed by several parties, which made things very difficult' (interviewee 12)*. Furthermore, government was undecided on when it would close coal plants. The parties of Cluster West could not force government to make a decision, while they voiced their discontent constantly. Often actors failed to press ahead and an example of this is the excursion to Copenhagen in 2016 to look at its successful district heating network. *'Everyone considered it as worthwhile, fun and useful to get to know each other better, but then you would expect the next meeting to discuss 'what can we do with this information?' and 'could this also work here?' That never happened during the meetings, except for looking back on such a nice and fun trip' (interviewee 2).* In sum, the lack of decisiveness can be traced back to more competition in the second phase, and splitting Cluster West into three pipeline projects with separate ownership. Furthermore, the shared purpose of Cluster West became subordinate to the goals of pipeline projects.

Shared motivation

Early in phase one actors trusted each other and concrete progress was made (*interviewee 1*). This trust was based on earlier interactions actors had in the context of the energy transition via the Green Deal Heat and the Programme Office. *'People were working hard to keep their promises and build mutual trust' (interviewee 1).* Twynstra Gudde's role was appreciated, because *'people could share information with Twynstra Gudde in good faith' (interviewee 1)* and *'[Twynstra] was trusted by all parties and therefore able to write reports we could submit to our superiors'* (interviewee 5). However, after completing phase one the discussions around coal became *'hotter and hotter' (interviewee 1)*. This is also when *'the green-populist Twitter community' (interviewee 7)* became more activist. They were effective in organising local resistance and put emphasis on disagreements within Cluster West via public events and the media. The coal discussion started around the time that the exploration phase was concluded in October 2015 and remained unresolved until late 2016 when the Port Authority agreed *'that they wanted to continue without a connection to the coal plant, because they felt that public support was non-existent' (interviewee 1)*. This whole situation was

problematic for trust between parties, which was also influenced by the indecisiveness of government about the closure of coal plants. Connecting the coal plant to the network required a *'pipeline of around 20 kilometres that would specifically run to Maasvlakte 2' (interviewee 13).* What if the government decided to close all coal plants as soon as possible? *'What we needed from the government was clarity about the closure of coal plants, but that did not happen, which made the problem even worse' (interviewee 6).* Why bother putting a lot of energy in a project when the sword of Damocles is dangling above your head? Also detrimental to trust was the fact that *'parties went to the meetings to gather information as a form of competitive advantage. This seemed like an additional interests to be present, maybe even more so than the shared goal of realising a wonderful project, which completely disappeared over time' (interviewee 1).* It was the coal issue that undermined trust and the longer it remained the more trust was lost.

Mutual understanding in terms of respecting and recognising differences between actors diminished after discussions started to revolve around coal. There was a general understanding about the shared purpose and goals. However, ideas about why these goals were important and how they should be reached were underdeveloped. This put additional emphasis on differences between actors. *Interviewee 8* believed that *'you have a lot of common goals, but also opposed goals and sometimes even competitive goals. You always have to keep that in mind and then you will understand the actions of other parties better.'* It is hard to disagree with the idea of openness to conflicting opinions and viewpoints, but the actors in Cluster West had trouble doing this in the second phase. Interviewees with a technical background argued that *'coal plants do not produce surplus heat, they have to run less efficiently. Part of the coal is specifically burned for heat and it is therefore not CO_2 neutral' (interviewee 13)* and *'you will have to produce less electricity is you want real residual heat. The result is that you are burning additional coal to produce heat, because you do not want to produce less electricity. That heat is not sustainable, it never has been' (interviewee 9)*. In other words, Uniper's coal plant is one of the world's most efficient plants and reuses most heat. What heat remains cannot be reused, because the temperature is too low. Others argued that burning natural gas is *'thermodynamically speaking a capital sin, while we have surplus heat that fits perfectly […] if you see how much CO_2 you can save by using coal heat, that is really fascinating […] the coal heat discussion has never been about the facts and that is rather disconcerting' (interviewee 7)*. Furthermore, *'if you connect a coal plant you have a lot of surplus heat and also security of supply and that would have been ideal for the horticultural sector in Westland'* (interviewee 8) and *'it is a pity to throw away the surplus heat of the port of Rotterdam, rather than just use it for the heat roundabout' (interviewee 11)*. In other words, Uniper's plant does produce surplus heat and it would

be unacceptable not to use it. This encapsulates a lack of understanding, because only one of these positions can be the truth, which points to a fundamental disagreement.

The collaboration was seen as legitimate, because all actors have shared interests and require each other's help to realise the project. In the first phase more parties participated and since it was an exploration of the issue some parties saw their involvement as nonbinding. It was more about categorising the possibilities and Cluster West suited that purpose. Positive energy to work together marked the first phase, but in the second phase that diminished quickly. *'Some parties must have seen it as something they had to do, but did not like' (interviewee 1).* Economic Affairs, which entered the steering committee in a later stage, had high expectations of Cluster West. However, *'they were disappointed, because progress was so slow [...] everyone was positive, but also lacked true commitment' (interviewee 8).* As mentioned earlier, actors considered steering committee meetings more as corvée and progress had the be made via bilateral and trilateral meetings. This illustrates the legitimacy issues of Cluster West. The lack of legitimacy can be traced back to December 2015 when parties decided to prioritise pipeline projects. *'Eventually we agreed that everyone works on its own pipeline project and that we only had to reconvene to sign the deal when we were done and ready for development' (interviewee 10)*. In practice that did not work. Leiding door het Midden was way further in its development process than Leiding over West, which put pressure on the legitimacy of Cluster West. Leiding door het Midden was almost ready to be constructed and aimed to start as soon as possible, while Leiding over West was not even close to that. The mismatch in development speeds caused an imbalance between actors.

Actors believed in a good collaborative outcome, but if the interviews were conducted in the summer of 2016 the results would have been vastly different. In early 2017 a replacement for Cluster West was finalised. *'I am very optimistic' interviewee 8* remarked and *interviewee 10* thought that *'we are making good progress.'* The turning point came in the last week of November 2016 when the municipalities of Rotterdam and Westland and sector association LTO Glaskracht explicitly rejected coal heat. The Port Authority also relented and accepted that public support for the inclusion of Uniper's coal plant was missing. This also meant that plans devised for Cluster West including coal heat had to be redrawn. No one was committed to Cluster West any longer. New ambitions, goals and objectives had to be created. *'They emit a lot of CO_2, hardly use biomass, CCS never took off and they will not be connected to the heat roundabout' (interviewee 13)*. The dark clouds that hovered over the heat roundabout were lifted. *'I am really optimistic right now, because I think that the right parties are at the table. I think that Cluster West and Leiding over West started with the right intentions, but it ultimately bogged down in administrative hassles, which the coal discussion*

worsened' (interviewee 8). The Heat Alliance South Holland for which five parties signed a letter of intent in March 2017 is ready to move forward. *'In particular about the coal plant the administrative level concluded that there is no public support and that really helped, because it created a lot of clarity, also for the Port Authority' (interviewee 6)*. There is a belief among parties that after more than a year of stagnation they can finally achieve results. *'The priority of this topic grows every day' interviewee 9* noted and according to *interviewee 1* there is *'momentum to use less natural gas right now, we have all the national attention'*. Much like in the first phase of Cluster West, actors are enthusiastic about the prospects.

Capacity for joint action

Twynstra Gudde's support was appreciated and important in structuring the actors' interactions. Twynstra Gudde was selected for process supervision in January 2015. They prepared official meeting records, prepared steering committee meetings with the municipalities of Rotterdam and The Hague and made sure that all parties would receive the necessary documents to stay up-to-date. *'In the exploration phase [first phase] and the feasibility phase [second phase] it really helped to have an independent project manager with the sole purpose of completing the assignment and writing a final report' (interviewee 5).* Decisions were made by consensus, but parties could use their veto powers to block decisions. All money spent in the context of Cluster West was subject to negotiations on the basis of a shared budget. In the first phase the Port Authority did the financial administration, while in the second phase this role went to the municipality of The Hague. Twynstra Gudde argued strongly for the need of the steering committee members to align their actions with their project team, regional minister or CEO. While these parties had their roles cut out for them, this was not the case in general since '*the roles and responsibilities of the parties involved were rather unclear' (interviewee 4)*. The way in which Cluster West was arranged, meant that some of the general conditions were not worked out properly. For instance can the government make certain guarantees which make it easier for companies to do large financial investments? How can we make natural gas less attractive? And how can we convince parties not involved in Cluster West that change is afoot? These more complex questions and decisions, next to the business cases and technical aspects, remained unanswered throughout the second phase.

During the entirety of Cluster West the municipalities of Rotterdam and The Hague were in charge. *'Coming up with ideas and plans was done by Eneco, Warmtebedrijf, and the Port Authority I believe, but bringing these parties together was mostly done by Carl Berg (Rotterdam) and Ted Zwietering (The Hague)' (interviewee 1).* They took this role, because Cluster West was a regional initiative, the highest supply and demand would originate from Rotterdam and The Hague and it was in the public

interest to explore sustainable heating. The municipalities picked Carl Berg and Ted Zwietering to represent them, because both were high-level civils servants with decades of experience. This worked well in the beginning, but in phase two hardly any decisions were made on content and *interviewee 7* argued that *'the steering committee […] was only arm wrestling about who would be behind the steering wheel of the collaboration'*. Most thinking was done on the project level and discussed in the steering committee, but important progress decisions had to be made on the administrative level. That was difficult, *'because administrators are confronted with something that, based on the available information, he/she cannot make an informed decision about' (interviewee 12)*. The business cases for financial investment were negative for all pipelines. Questions about for example the depreciation period of investments, interest rate to be used, the heat sources to be included and the price of heat were difficult to answer. These questions shuttled back and forth between the steering committee and the administrative level until more information was available to base decisions on. Twynstra Gudde might have been able to make or suggest decisions based on their role as process supervisor and their complete picture of the process. That role *'was not granted to them and this created a lot of frustration, because they were now more or less a supporting secretariat' (interviewee 2).* Moreover, *'Their inclusion was really 'light' in the form of a secretariat role' (interviewee 12)*. In other words, Twynstra Gudde *'was unable to steer the parties, because [they] did not have the mandate to do that' (interviewee 1).* Meetings on contentious issues like coal remained vague and Cluster West needed *'someone who calls out undiscussed issues and also forces decisions on these issues' (interviewee 12)*.

Some organisations were competitors, which meant that some information was well guarded to avoid harming (future) bargaining positions. Parties agreed that it would not be in their best interest to share the smallest details of their business cases, even if that helped the project as a whole. In phase one parties used a shared computer drive everyone could access via the internet. Information discussed in the steering committees was available to all, but after the split not nearly all information reached participants. *'Government is usually quite open and transparent in what its views are, but for other commercial parties that was less so' (interviewee 9)*. Overall there was no limitation to share knowledge. However, after phase one the shared knowledge was not used to create new ideas or develop new possibilities for common action. Uniper felt it was used for information and knowledge and was then discarded. Most importantly, contested knowledge on emissions and the amount of heat to be delivered to The Hague were not fully considered. The research outcomes were open to multiple interpretations and this was not alleviated by knowledge sharing. As mentioned, parties travelled to Copenhagen to look at the Danes' district heating network and actors learned about how the system was organised. This led to an accumulation of knowledge and information, rather than a

concerted effort to find valuable nuggets of information that could be used for Cluster West. It seemed that most knowledge sharing was done on the level of the project teams and not on the level of the steering committee. This thesis cannot draw a definitive conclusion about knowledge sharing between actors on the project level, because the focus was on the steering committee.

Resources were shared to a limited extent. In the first phase when the shared purpose was devised all organisations sent at least one representative to the meetings. This was also the time when Cluster West had a project office in Delft. Furthermore, the costs made for the administrative support of Twynstra Gudde, the project location in Delft, independent research and other out-of-pocket expenses were paid out of a shared budget. Every organisation was required to pay a fixed financial contribution. This contribution was the same for all organisations. *'In order to create equality between parties it was agreed that each party did the same financial contribution, there was no single party that paid more than the others' (interviewee 1)*. In phase two the municipalities of The Hague and Rotterdam had more staff capacity and these organisations decided to rotate the steering committee chairmanship. *'Rotterdam developed a lot of ideas on how to address the issue' (interviewee 5)*, *'I think that the municipality of Rotterdam wrote a lot of plans for Cluster West' (interviewee 6) and 'the documents [for Cluster West] usually came from Carl Berg who prepared them' (interviewee 4)*.

While some spoke about *'a political game between The Hague and Rotterdam' (interviewee 4)* and a game of arm wrestling between Rotterdam and The Hague, the role of Carl Berg was praised: *'he is very good in smoothing out difficulties' (interviewee 2)*. Phase two also led to the creation of a *'very asymmetrical network' (interviewee 2),* which was disliked by some parties. Organisations working on the pipeline projects like the Port Authority, Eneco, and the Warmtebedrijf had significantly more staff and financial capacity at their disposal for these projects. *'We let parties make their own decisions, but I am not sure whether all decisions worked out well [...] if you are a small organisation, you cannot do everything at the same time' (interviewee 5)*. It is difficult to judge whether this asymmetry was appropriate or not, since larger organisations are often expected to do the heavy lifting. *'The Port Authority can set up a project team in a snap, but I have one guy one the energy dossier, doing thousands of other things at the same time' (interviewee 2).* It is not a big deal to have this difference if the other parties are willing to listen to the wishes and demands of smaller actors as well, but whether or not this was the case for Cluster West cannot be determined with certainty. What is clear is that some parties used their resources for the pipeline projects they themselves developed. This meant some actors neglected their steering committee duties.

5.5 Analysis of the creation of fixations

The conceptual model will be used to analyse the relationships between the collaborative dynamics. Section 5.6.1 provides an overview of the collaborative dynamics of Cluster West. Section 5.6.2 will bring the findings of all collaborative dynamics together to analyse which elements provide an explanation for fixations. Fixations emerge when actors are unable or unwilling to reflect on their core beliefs and adjust to new developments.

5.5.1 Collaborative dynamics

Tables 5.2 until 5.7 sum up all this thesis' findings on collaborative dynamics in Cluster West. ✓ means that an element is present. ✓/✗ means that it is present, but not in a convincing manner. ✗ means that an element is not present. Moreover, the manifestation of the elements will be summarised.

Observations for principled engagement in the first phase

Elements of principled engagement	✓/✗	Manifestation
Discovery	✓	Actors continued the earlier initiated process of discovery, but now for the western part of the heat roundabout. Everyone felt free to share their individual and shared interests. Several studies were commissioned and used to gain knowledge and gather information.
Definition	✓	Actors were constantly looking for their shared interests in weekly meetings where working groups tackled different segments of Cluster West on the basis of themes (e.g. finance, technical feasibility, business case). Actors reached an agreement on the shared purpose of Cluster West and published these in a report in October 2015.
Deliberation	✓	Formalised venue for deliberation in Delft where parties met every Thursday with process supervision of Twynstra Gudde. Actors spoke of an open process. Contentious topics surrounding coal were not decisively tackled, but this issue did not reach its boiling point yet.
Determination	✓	Twynstra Gudde played an important role in decision-making via process supervision and bilateral talks. Working groups were assigned and shared themes were developed. All parties were pleased with the first phase report (except for Uniper, who disliked being excluded) and the report was democratically adopted by the municipal councils and the provincial council.

Table 5.2 – Principled engagement within Cluster West, phase 1 (2014 – late 2015)

Observations for principled engagement in the second phase

Elements of Principled engagement	✓/✘	Manifestation
Discovery	✓	Immediately after phase one the municipality of The Hague moved against coal, the House of Representatives voted in favour of the gradual closure of coal plants and the Paris Agreement was signed. This meant that the role for fossil sources in the early stages of the heat roundabout had to be reconsidered. It was difficult to initiate a process of discovery when Cluster West was split in three pipeline projects.
Definition	✘	The development speed of pipeline projects started to diverge and the business cases of Leiding over West and Leiding door het Midden were in direct and obvious competition. Shared interests gradually lost their dominance over individual interests. Visit to Copenhagen ended up a failure, because actors did not reflect on what they had learned there and whether it could be used for Cluster West.
Deliberation	✘	Project location in Delft was terminated. Twynstra Gudde had trouble being everyone's process supervisor after the split. Coordinating their shared purpose became much harder. Contentious subjects like coal and the competition between Leiding over West and Leiding door het Midden reached their boiling point. These topics were sensitive and parties were unwilling to put all their cards on the table.
Determination	✘	The spit in pipeline projects was disliked by those who got involved after the fact. Just like in the first phase actors tried to create shared themes on developing the heat market, but this failed. Determinations for the entire heat roundabout were difficult to make, because parties started to favour their own pipeline project. Government could not decide when the coal plants would close and Cluster West members could not force a decision.

Table 5.3 – Principled engagement within Cluster West, phase 2 (late 2015 – 2017)

The findings summarised in table 5.2 suggest that in the first phase principled engagement was generated and sustained via the sequential and interactive process of discovery, definition, deliberation and determination. This had a positive effect on shared motivation. The findings summarised is table 5.3 also suggest that in the second phase this process broke down and parties could not advance beyond the stage of discovery. This had a negative effect on shared motivation and could have led to the creation of fixations.

Observations for shared motivation in the first phase

Elements of shared motivation	✓/✗	Manifestation
Mutual trust	✓	Individuals knew each other from earlier interactions in the context of the energy transition. They had success in developing a Green Deal Heat and established the Programme Office. These actors were now collaborating in a regional initiative and based on their earlier experiences it was expected to be a success. Twynstra Gudde acted as the binding factor between parties and was trusted and seen as impartial.
Understanding	✓/✗	General understanding about the shared goals developed. Cooperation between actors was seen as pleasant. An agreement was reached on a general understanding of the issue, but the toughest questions had to be answered phase two. That is why mutual understanding between parties was without many details.
Legitimacy	✓	Actors had shared interests and realised they needed each other to realise Cluster West. They saw the CGR as useful and since they were exploring the issue considered their involvement as nonbinding. Many parties collaborated to get a bigger overall picture of the issue, which was useful in that phase of the collaboration.
Commitment	✓	Actors were committed to the purpose of the CGR, which was to develop the western part of the heat roundabout. Shared interests were seen as more important than individual interests and parties felt committed to achieve the goals. For this purpose they removed Uniper and Westland Infra from the steering committee to move away from a broad group to a smaller group of committed organisations and individuals.

Table 5.4 – Shared motivation within Cluster West, phase 1 (2014 – late 2015)

Observations for shared motivation in the second phase

Elements of shared motivation	✓/✗	Manifestation
Mutual trust	✗	The coal discussion and the split in pipeline projects made parties distrust each other. Several actors spoke out against coal heat, while others continued to defend it. Uncertainty about when coal plants would close meant that actors started to distrust government.
Understanding	✓/✗	There was general understanding among actors about their shared goals. Ideas about why these goals were important and how they should be reached were underdeveloped. Lack of mutual understanding on the fundamental issues whether surplus heat exists and whether two pipelines can deliver heat to The

		Hague.
Legitimacy	✓/✗	Cluster West was seen as an appropriate platform for regular interactions. However, after the split parties focused more on their individual goals instead of common goals. Lack of true commitment to the steering committee and slow progress caused parties to favour their own projects. Speed of development of Leiding door het Midden was higher, which meant they wanted to press ahead.
Commitment	✗	Commitment to Cluster West gradually disappeared. In December – January 2017 it was decided that Cluster West would be terminated and replaced with the Heat Alliance South Holland where a smaller group of actors will work on all pipeline projects at once. This removed the geographical boundary between projects that existed previously.

Table 5.5 – Shared motivation within Cluster West, phase 2 (late 2015 – 2016)

The findings summarised in table 5.4 suggest that in the first phase shared motivation was created by the self-reinforcing cycle of trust, understanding, legitimacy and commitment. This was, in part, initiated by principled engagement and at the same time reinforced the principled engagement process. The findings summarised in table 5.5 also suggest that this was not the case in the second phase. None of the four elements of shared motivation were convincingly present. This was reinforced by the negative influence of lacklustre principled engagement, which was negatively affected by an almost non-existent shared motivation.

Observations for the capacity for joint action in the first phase

Elements of the capacity for joint action	✓/✗	Manifestation
Procedural and Institutional Arrangements	✓	Decisions in the steering committee were made by consensus and parties had veto powers to block decisions. Everything spent in Cluster West was paid from a shared budget. Everyone had an equal contribution. All organisations sent at least a single representative to meetings. The financial administration was done by the Port Authority. These arrangements were effective. Smaller parties were not overshadowed by larger parties, because of consensus, veto and financial parity.
Leadership	✓	Ted Zwietering (The Hague) and primarily Carl Berg (Rotterdam) were the champions of Cluster West. Several decades of experience with these types of projects meant that other actors held them in high regard and trusted their expertise. They could commit other actors to the project and made sure that all meetings were well prepared. They also talked (together with Twynstra Gudde) to other parties bilaterally to explore their viewpoints and find out whether they

		agreed with the way words and sentences were phrased in the findings.
Knowledge	✓/✗	Actors did not feel limited to share information and knowledge, unless there were commercial interests involved. Actors agreed not to share information that might harm their business cases or undermine their future bargaining position. They shared a computer drive where information for e.g. meetings was uploaded. In the first phase they shrunk more than a dozen pipeline projects into just three and mapped the feasibility of Cluster West. They were able to do this on the basis of knowledge they gathered via research and regular interactions.
Resources	✓/✗	Without the support of the parties involved Cluster West would not exist. Next to two people from Twynstra Gudde who did process supervision paid from the shared budget no one else worked for Cluster West. The shared budget would only exist as long as people remained committed. Individuals did Cluster West as part of their job responsibilities next to other activities. Resources were shared, but to a limited extent.

Table 5.6 – Capacity for joint action within Cluster West, phase 1 (2014 – late 2015)

Observations for the capacity for joint action in the second phase

Elements of the capacity for joint action	✓/✗	Manifestation
Procedural and Institutional Arrangements	✓/✗	Arrangements made in the first phase were carried over to the second phase. Financial administration was done by the municipality of The Hague. It was decided to focus more on individual projects in December 2015. After the split a programme of requirements with design principles was created. This arrangement was not always followed, because the development speed started to diverge too much. Cluster West as a whole was no longer seen as effective.
Leadership	✗	In the second phase Carl Berg was identified as leader, but splitting up the project meant that decisions in the interest of all were difficult to make. Most actors had preferences, but no one was able to cut the Gordian knot. This meant that the coal discussion and competition between Leiding over West and Leiding door het Midden remained unanswered.
Knowledge	✗	The precompetitive phase ended when parties started to develop business cases for individual pipelines. Parties with commercial interests were hesitant to share information. Also, interactions often led to an accumulation of information, rather than a valuable source from which they could create new knowledge, opportunities and ideas.
Resources	✓/✗	Resources were shared to a limited extent and mostly came from the parties themselves. The split created an asymmetrical network where the leaders of pipeline projects had significantly more staff and financial capacity to work on

		their own project. The steering committee with a shared budget and process supervision became subordinate to the pipeline projects.

Table 5.7 – Capacity for joint action within Cluster West, phase 2 (late 2015 – 2016)

The findings summarised in table 5.6 suggest that in the first phase most elements of the capacity for joint action came together to create the potential for taking effective, collaborative action. This is stimulated by principled engagement and shared motivation. The findings summarised in table 5.7 also suggest that not a single element of the capacity for joint action was convincingly present in the second phase. This was reinforced by minimal principled engagement and little shared motivation.

5.5.2 Synthesis of collaborative dynamics and fixations

Can the collaborative governance theory shed light on why fixations emerge? The analysis points to a difference between the first and second phase. No fixations could be identified in phase one, but in the second phase three fixations emerged. The most prominent fixation was on coal, which to a large extent determined the other fixations. These fixations would not have emerged if parties had reflected on their core beliefs about coal. Through principled engagement parties developed a shared purpose and actors from different sectors with different interests and different goals worked across institutional and sectoral boundaries to solve problems together. It is crucial that actors engage in open dialogue, civil interactions and balanced interests. One of the most important characteristics of principled engagement is that it dampens differences between actors and creates conditions for shared motivation and the capacity for joint action to develop. It creates clarity about issues and helps manage differences between parties. The findings suggest that the process of principled engagement in phase one was successful, because parties moved through the stages of discovery, definition, deliberation and determination. The findings also suggest that in the second phase this iterative and self-reinforcing process broke down. Parties lost their shared sense of purpose. Individual pipeline projects and thus individual interests were prioritised instead of shared interests. If principled engagement is of low quality, like in the second phase, actors lose the ability to effectively discover what they have in common or how they can surpass the barriers that exist between them. Parties were unwilling to reflect on their core beliefs and could not look past the boundaries of their own pipelines to a problem which could only be solved together. This is not the only reason why fixations emerged, because principled engagement does not exist in a vacuum.

Principled engagement interacts with shared motivation and the capacity for joint action. According to the conceptual model principled engagement and shared motivation strengthen or weaken each

other. Developing interpersonal trust is particularly important if actors do not known each other, which was the case for numerous individuals in Cluster West. Emerson et al. (2011) suggests that trust leads to understanding, which leads to legitimacy, which eventually leads to commitment. If parties do not trust each other it is unlikely that the other three elements of shared motivation are present. The findings suggest that in phase one principled engagement strengthened shared motivation and vice versa. Actors developed a shared sense of purpose via principled engagement, which suggests that parties trusted each other, which led to a higher level of mutual understanding, which increased the legitimacy of their collaboration and the actors' commitment and vice versa. In the second phase the process of principled engagement could not progress beyond the stage of discovery, which meant that it had a negative influence on shared motivation. Actors gradually lost their sense of shared purpose and the discussions around coal meant that trust between parties declined. Declining trust then led to the erosion of understanding, legitimacy and commitment. Eventually in late 2016 parties decided that Cluster West had to be terminated and replaced by something else, because the CGR that formed around the issue stopped functioning.

The capacity for joint action is defined as 'a collection of cross-functional elements that come together to create the potential for taking effective action and serve as the link between strategy and performance' (Emerson et al. 2011, 14). According to the conceptual model the capacity for joint action is stimulated by principled engagement and shared motivation. Actors that lack trust and mutual understanding will be less likely to share knowledge and resources with each other or accept the other party's leadership. In the first phase actors were able to create effective institutional arrangements, because they had a shared purpose and repeated interactions positively reinforced the elements of shared motivation. Furthermore, the leadership of the municipalities of Rotterdam together with Twynstra Gudde was recognised and highly appreciated. While knowledge and resource sharing was never Cluster West's strongest suit, it did lead to a final report that was appreciated by all and democratically accepted by the municipal councils and the provincial council. In the second phase none of the cross-functional elements created the potential for taking effective, collective action. There was no leader who decisively steered the collaboration in a certain direction, nor were the institutional arrangements as effective as before. Parties unable to define a shared purpose via principled engagement will not feel the need to set up the necessary institutional arrangements to manage and sustain repeated interactions.

Temporary stabilisation allows actors to swing into action and construct facts about the situation on which they can base their collective and individual efforts (Termeer 2007, 12). However, if these temporary stabilisations endure in changing circumstances and actors are unwilling to adjust

stabilisation changes into fixations. In the first phase coal was already on the agenda. In a meeting of the administrative level on 2 July 2015 actors were well aware that an exit strategy was necessary to avoid lock-in of fossil heat sources. However, the fact that actors agreed to disagree meant that it was considered 'solved' for the time being. Coal has a prominent role in the first phase report which shows that it was not that big of a discussion yet. These temporary fixations changed into permanent fixations after the second phase started and The Hague moved against coal, the House of Representatives moved against coal and the Paris Agreement was signed. This meant that coal was suddenly front and centre. Several rounds of collaborative dynamics preceded the transformation of temporary fixations into permanent ones. Parties could not ignore these developments and had to consider them during their meetings. Furthermore, commercial interests exposed differences between actors, which led to a split in three pipeline projects. This meant that the development of individual business cases was prioritised. This made the process of principled engagement much more difficult. Parties lost track of their shared interests and shared purpose. Incorporating the lessons of Paris into the heat roundabout would prove difficult with some parties opposed and some others accepting of coal heat. This and uncertainty about when coal plants would close and competition led to a decline in mutual trust, which led to a decline in mutual understanding, which decreased Cluster West's legitimacy and eventually eroded all commitment. Furthermore, the cross-functional elements of the capacity for joint action like leadership and knowledge sharing also declined as a function of declining principled engagement and shared motivation. Leadership was no longer recognised, which meant that someone emphasising their shared purpose was no longer there. Once several of these rounds had taken place temporary fixations transformed into permanent ones.

This thesis will conclude by combining the findings on collaborative dynamics with the findings on drivers of a CGR.

Chapter 6 Conclusions and recommendations

On the basis of the empirical findings and analysis of Chapter 4 and 5 this part of the thesis will answer the main research question.

RQ How can collaboration between stakeholders in developments around the heat roundabout, more specifically Cluster West, be identified, explained and assessed and how can this be improved?

First we will present the answers on the sub-questions presented in section 1.2.

SQ1 How did the collaboration within Cluster West take shape?
- Which actors were involved?
- What is the purpose of Cluster West in the context of the energy transition?
- How is the first (exploration) phase different from the second (feasibility) phase?

SQ2 When and why did fixations occur in the collaboration between actors in Cluster West?
- Which factors seem to support the creation of fixations?

SQ3 Were fixations resolved through an intervention in the cognitive or social dimension?
- Which actors, or which actors, resolved fixations?

6.1 How did the collaboration within Cluster West take shape?

Which actors were involved?

This thesis focused on the steering committee of Cluster West, because all interviewees were directly or indirectly involved on that level. The number of actors involved differed between the first phase and the second phase. In the first phase a total of ten parties from the public, semi-public and private sector participated. These parties included five public actors:

- The municipalities of Delft, Rotterdam, The Hague and Westland;
- And the province of South Holland.

Next to that five semi-public and private parties active in heat production and supply in the region of Rotterdam and The Hague were represented in the steering committee:

- Eneco;
- Port Authority;
- Uniper;
- Warmtebedrijf;
- Westland Infra.

The steering committee was chaired by the municipalities of Rotterdam and The Hague in the second phase and process supervision was done by two people of consulting firm Twynstra Gudde, of which Johanneke de Lint was the chairperson of the first phase. In the second phase it was decided that the two private parties, Uniper and Westland Infra would no longer be invited to meetings of the steering committee. Only public and semi-public parties remained. In the organisational hierarchy the administrative level stood above the steering committee. Regional ministers and CEOs, with a lot of other issue on their plate, met four times a year to make decisions on the progress of the heat roundabout. However, most meetings on the administrative level were based on information from the steering committee. This meant that the steering committee was the most important level, particularly during the first phase. The steering committee oversaw three pipeline projects, each with its own project team. These project teams became increasingly important in phase two once the project was split. The project level also engaged parties not involved in the steering committee or the administrative level, but these parties fell outside of the scope this thesis. Parties agreed to contribute the same amount of money to a shared budget to pay for the expenses of the steering committee, which included for example independent research and process supervision. Figure 4.1 on page 46 shows the organisational structure of Cluster West. In March 2017 five parties entered the Heat Alliance South Holland: the province of South Holland, the Port Authority, Eneco, Gasunie and Warmtebedrijf. The province decided to take the lead and bring the heat roundabout back as a provincial initiative instead of a regional initiative. This meant that all municipalities have lost their seat at the table, but Rotterdam and The Hague continue to have influence via their shareholdership.

What is the purpose of the Cluster West in the context of the energy transition?

Cluster West is an independent continuation of the process initiated by the province of South Holland in the Green Deal and the Programme Office to achieve the central ambition of supplying 20 PJ of sustainable heat to households and the horticulture sector in Westland. This ambition was meant to be achieved via the creation of a heat roundabout, running through the province from The Hague to Rotterdam to Dordrecht and Leiden. This project played an important role within the overarching energy transition, because almost 55 percent of total energy consumption in the

Netherlands can be ascribed to the generation of heat, of which 91 percent is generated by burning natural gas. Using sustainable heat would remove the need to burn natural gas for the purpose of heating. Cluster West was created to develop and construct the western part of the pipeline infrastructure of the heat roundabout. More specifically this meant developing the area around Rotterdam and The Hague. It also brought together actors which had already started developing various infrastructure projects for the production and supply of heat. In late 2015 parties decided which three pipeline projects had the highest short-term development potential. These three pipeline projects were:

- Leiding over West
  - Primary developer: Port Authority
- Leiding door het Midden
  - Primary developer: Eneco
- Leiding door de Haven
  - Primary developer: Warmtebedrijf

For the purpose of developing the eastern part of the heat roundabout, a connection to the city of Leiden and surroundings, Cluster East was created. While the official purpose of Cluster West was the development of the western part of the heat roundabout, not every actor saw it that way. Some semi-public actors like Eneco and the Port Authority were looking for new opportunities to increase their profits. Both companies are still very profitable, but most of their current revenue comes from fossil fuels. This means that the exploration for opportunities in the next couple of decades has already started. The heat market was identified as one potential source of income. Both Eneco and the Port Authority developed heat initiatives before Cluster West. Particularly in phase two the commercial aspects began to play a more distinct role. It is assumed that commercial interests were more important than the central ambition to create a sustainable heat supply. Public actors like the municipalities and the province did not share this aim, it was not their intention to make a profit. Their focus was to gradually phase-out natural gas in favour of heat supplied via a district heating network. Not to mention the project level where various private parties were motivated by financial profit, although no definitive conclusions can be drawn about their actual motivations. In sum, actors involved in the steering committee of Cluster West never reached consensus on the purpose of Cluster West.

How is the first phase (exploration) different from the second phase (feasibility) of Cluster West?

After phase one was concluded with the publication of the final report in October 2015 several important context changes took place. In June 2015 Urgenda won a lawsuit against the Dutch State. The court decided that the Dutch State should reduce GHG by at least 25 percent in 2020. In November 2015 a majority of the House of Representatives voted in favour of the gradual closure of coal plants. One month later in December 2015 the Paris Agreement was signed. Limits on GHG were now much stricter than in the 2013 Agreement on Energy for Sustainable Growth, which guided Dutch policy. This meant that it was no longer possible for parties to agree to disagree on the topic of coal, it was now part of public and political discourse. Furthermore, phase one was of a precompetitive and pre-commercial nature, while in the second phase competition between pipeline projects started to play a major role. This meant that once parties began with the development of pipeline projects the differences between parties became more apparent. The decision was then made to split Cluster West in three separate pipeline projects, a big differences when compared to the first phase. Moreover, two parties were no longer invited to meetings of the steering committee, namely Uniper and Westland Infra. Uniper felt used by the other parties for their expertise and information and resented this decision. They remained involved on the project level working on Leiding over West together with the Port Authority. This meant that the Port Authority would now represent the interests of Uniper in the steering committee. In addition, Economic Affairs got involved after the summer of 2015. First in the capacity of observer and thereafter as participant. This meant that Economic Affairs' full involvement started in the second phase.

6.2 When and why did fixations occur in the collaboration between actors in Cluster West?

Which factor or factors seem to support the creation of fixations?

The findings of this thesis suggest that all elements of collaborative dynamics made an important contribution to the creation of fixations, but that the lack of a common vision, common goals and trust were the most important elements. These elements were most frequently addressed during interviews. As mentioned in the previous paragraph, politicians resisting coal and the Paris Agreement changed the elements of collaborative dynamics via changes in the context which caused drivers to transform between the first and second phase. In the second phase parties could not complete the process of principled engagement. Only the element of discovery was recognised, which meant that parties could not make vital determinations about for example coal and the competition between Leiding over West and Leiding door het Midden. Parties recognised their shared interests, but prioritised the development of their own pipeline project and thus prioritised their own individual interests. This lack of a common vision and common goals had an influence on shared motivation with a decrease in interpersonal trust and vice versa. Remember that the theory

of Emerson et al. (2011, 20) noted that collaborative dynamics are stronger once more variables are present and recognised in the collaboration. Trust was also given a higher weight, because 'trust generates mutual understanding, which in turn generates legitimacy and finally commitment' (Emerson et al. 2011, 13). Figures 6.1 and 6.2 illustrate the findings with regards to the presence of elements of collaborative dynamics. The figures show whether an element of for example principled engagement was present, somewhat present or not present at all in Cluster West's CGR.

As the figures show nine elements of collaborative dynamics were recognised in the first phase of Cluster West, while only one of these elements was recognised in the second phase. Particularly important was the lack of trust in the second phase, because not a single variable of shared motivation was clearly present and only two were somewhat present. The interrelated nature of every single element of collaborative dynamics makes it that unforeseen changes in the drivers of a CGR create a cascading effect. For example, elements of principled engagement and shared motivation reinforce each other and follow a sequential path, which means that a negative change in the process of discovery will have a negative effect on the other elements of principled engagement. When parties are able to adjust to unforeseen events and keep the process of collaborative dynamics going it is less likely that fixations emerge. In short, this thesis can conclude that strong collaborative dynamics will make it less likely that fixations emerge.

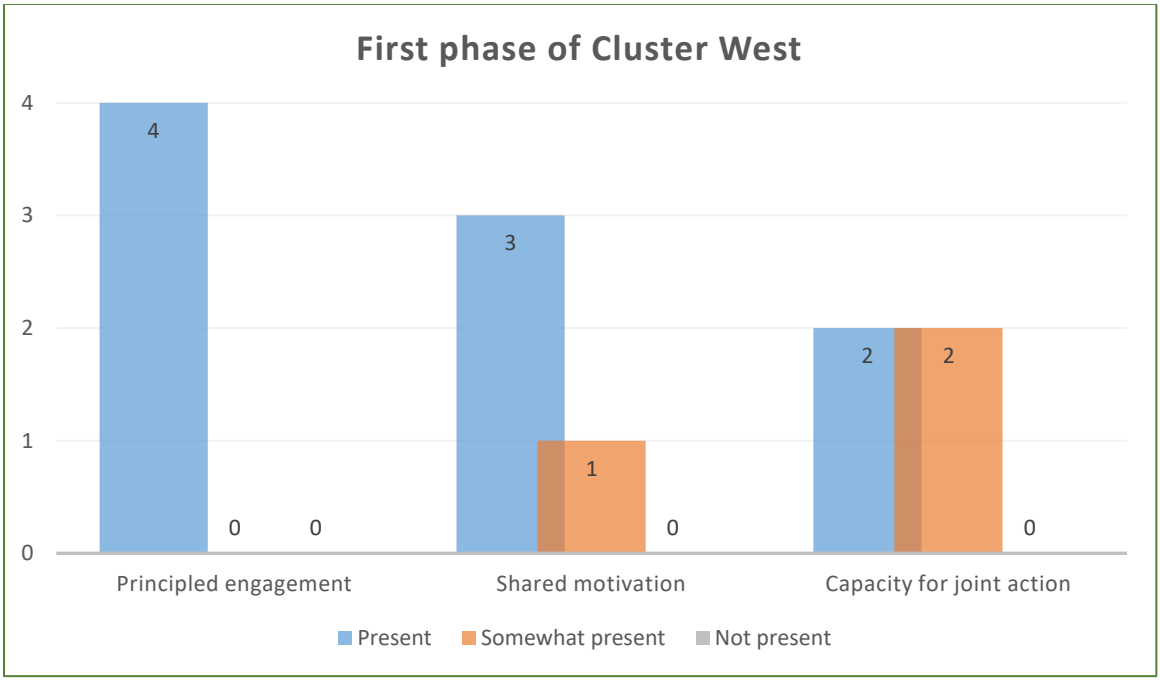


Figure 6.1 – Presence of collaborative dynamics in the first phase of Cluster West

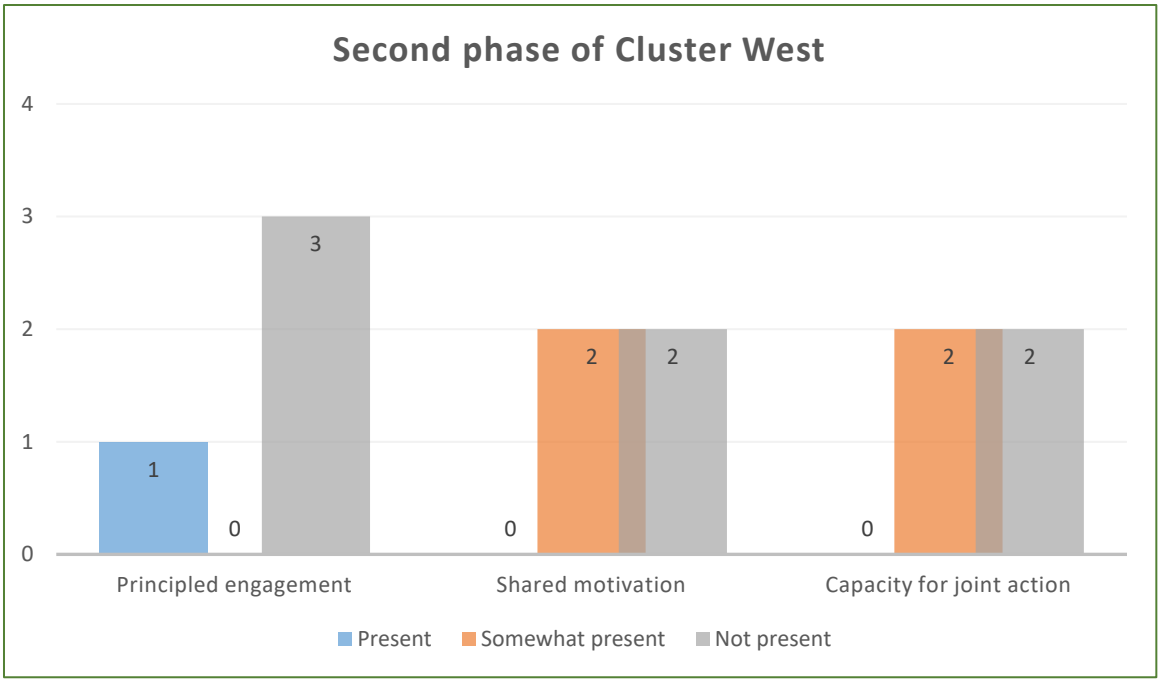


Figure 6.2 – Presence of collaborative dynamics in the second phase of Cluster West

6.3 Were fixations resolved through an intervention in the cognitive or social dimension?

Which actors, or which actors, resolved fixations?

The province of South Holland intervened in late November and December 2016 on both the cognitive and social dimension. Their intervention marked the end of phase two and the start of phase three in the Heat Alliance South Holland. Parties tried to solve the coal discussion and the competition between Leiding over West and Leiding door het Midden via discussions on the merits and demerits of coal. Changing the cognitive dimension did not work, because that required a social intervention. The regional minister of the province of South Holland, Han Weber, decided that the province would take the lead and adopt a province wide approach including both Cluster West and Cluster East. Other parties recognised the role and authority of Han Weber as working in the public interest. While the province considered Cluster West a regional initiative, their significantly higher involvement in late 2016 brought it back the provincial level by introducing different definition of reality. They looked at the issue from a provincial perspective and sat down with the parties of Leiding over West to find other sources to replace coal. Over time the proactive role of the province and the introduction of other definitions of reality led to reflection and parties realised they lost track of their common goals. Allard Castelein, the CEO of the Port Authority, also intervened and agreed that the time had come for the port to explore other possibilities.

The social fixations was also broken by the province of South Holland. In Cluster West the conditions stage was skipped in favour of the planning stage, while it was still unclear how the heat market would become more attractive than natural gas. The province had a strong team of people who, supported by the regional minister Han Weber, worked on setting the right conditions and then moved into the planning phase. The province introduced the idea that parties should first think about setting the right conditions to make the heat market attractive to consumers before scrambling to the drawing board and putting shovels in the ground. If would be a colossal waste of money if the supply is there, but natural gas remains cheaper than surplus heat. Particularly the horticulture sector in Westland is very price conscious. Parties realised that it is best to first set the right conditions and they incorporated this into their interactions. For this to work the parties decided that Cluster West had to be terminated and replaced with the Heat Alliance South Holland. This was a geographically larger initiative, but with a smaller group of committed parties.

6.4 Final conclusion and recommendations

To conclude this thesis the main research question will be answered:

> *How can collaboration between stakeholders in developments around the heat roundabout, more specifically Cluster West, be identified, explained and assessed and how can this be improved?*

When the first steps for this thesis were made the actors of Cluster West were already collaborating for several years. This thesis identified a phase one from November 2014 until November 2015 and a phase two from December 2015 until January 2017. Collaboration in phase one was much better compared to phase two. What caused this change? While studying the system context, drivers and collaborative dynamics the findings suggest that fixations emerged from November 2015 onwards. Most importantly, four external events laid the groundwork for this to happen. Preceding the start of phase two Urgenda won a lawsuit against the Dutch State in June 2015. The Dutch State had to reduce GHG by at least 25 percent in 2020, a much steeper decline than previously anticipated. It is assumed that this influenced politicians who felt that the tide was turning decisively in favour of renewables. The majority voted in favour of the gradual phase-out of coal in the municipal council of The Hague and the House of Representatives in November 2015. Both on separate occasions and without coordination. The municipal council of The Hague furthermore rejected coal heat as a potential source for the heat roundabout. Eneco agreed with the idea that not a single ounce of coal heat would enter The Hague's local district heating network. And finally, in December 2015, world

leaders agreed to the momentous Paris Agreement. This agreement was hailed as the decisive turning point in the fight against global warming. Parties in Cluster West had to address these developments.

When drivers change, as they did between phase one and phase two, the dynamics and performance of a collaboration change. The extent to which a CGR is effective is influenced over time by collaborative dynamics. This thesis aimed to find out whether, how and why fixations emerged. The findings suggest that three fixations emerged in phase two of Cluster West:

1. Cognitive fixation on the inclusion of coal in the heat roundabout and coal in general.
2. Cognitive fixation on competition between Leiding over West and Leiding door het Midden.
3. Social fixation on the governance structure of Cluster West.

These fixations, particularly the first one, dominated the meetings of Cluster West. As the conceptual model suggests, all elements of collaborative dynamics are linked and a change in one variable will have an effect on other variables. Four external events in late 2015 meant that parties had to reconsider their ideas about coal, but the conflict that ensued was amplified by a lack of leadership and the fact that some parties were seen as noncommittal. Based on the interviews the most important causes for the creation of fixations in phase two were a lack of an in-depth shared purpose, vision and goals and a lack of trust. It further suggests that the successful process of principled engagement in phase one could not be continued in the second phase. The first phase report included coal as one of the primary heat sources in the early stages of the heat roundabout. In the face of external events, that had to be reconsidered. Furthermore, the split of Cluster West in three pipeline projects early in the second phase meant that actors had to develop a more specific and nuanced understanding of their shared interests. Actors proved unable to do this and there was no leader present to kick-start this process. Only the stage of discovery was reached, which had a negative influence on shared motivation. Actors lost trust in each other and in the process, which meant that mutual understanding, legitimacy and commitment to the process also diminished. The capacity for joint action, which was not particularly well developed in the first place, was negatively influenced by principled engagement and shared motivation. Individual pipelines projects became competitive and parties became even more hesitant to share knowledge and information that might damage their bargaining position. Parties no longer felt the need to set up the necessary institutional arrangements to manage and sustain repeated interactions.

This led to calcification of behaviours among parties, which meant that an issue like coal could become a cognitive fixation. Eventually these fixations were broken through an intervention by the regional minister of the province of South Holland Han Weber and his colleagues who followed his directives. By introducing variation in the cognitive and social dimension, the province was able to forcefully break the cognitive and social fixations. This intervention was much needed, because the project was close to complete failure. The new Heat Alliance South Holland is decisively led by the province and focuses much more on creating a shared purpose with which all parties can agree and building interpersonal trust between actors. The first step in the right direction was the definitive exclusion of coal heat from the heat roundabout. Below several theoretical and practical recommendations will be given to improve theory and recommend certain improvements to make collaboration between stakeholders in the Heat Alliance South Holland more effective.

6.4.1 Theoretical recommendations

The first recommendation is to recognise that the configuration theory is an abstract theory requiring a lot of preparatory research and thinking.

The second recommendation is for scholars is to work on a stronger basis to synthesise the configuration theory and the collaborative governance theory.

The configuration theory and the collaborative governance theory are complimentary and insightful in the study of complexity, collaboration, governance networks and fixations. This thesis will provide several pointers for those that want to use the configuration theory in their future research projects. Since the configuration theory is primarily a tool to study fixations or stagnations it is most appropriate to study cases over a period of about a decade or longer. This allows for a much more nuanced understanding of when and why fixations emerged and how they were solved. Additionally, cases that have already finished or are nearly finished are the best possible cases to study if you want to learn more about fixations. Also, the configuration theory is at its best when there are clear ideological differences between parties. Interviewees can be more open in talking about their experiences in the collaboration and do not have to pick their words so carefully that they become vague. It is also very important to split your case into several time periods. If one studies a case from 1980 until 2005 it is important to look at changes in the context of the case as pointers for demarcation. For example, in 1980 the European Commission puts air pollution high on the policy agenda for that year, which marks a turning point for this issue. The Dutch Ministry of Housing, Spatial Planning and the Environment picks this up and starts working on an official report which is

published in 1984. This official report leads to a lot of political and public debate in 1984, which would mark that year as the end of phase one. If possible, the researcher should make these demarcations before conducting interviews to clearly separate these time periods for the purpose of analysis. Once the time periods are clear the researcher should take care to understand the different configurations that emerged in these time periods. Which actors were included where, when, why and in what capacity and role? Official documents for public release or meeting agendas usually include this information. And finally, once one has defined several time periods it is easier to estimate when and where fixations emerged. Fixations usually emerge in times of rapid changes and when actors are not satisfied with the (proposed) solution to a problem. For example when new national guidelines are introduced or when an important international agreement is signed.

After the researcher has estimated where fixations might occur he/she can start conducting interviews. It is via interviews that information on the elements of collaborative dynamics of the collaborative governance theory can be gathered. Since collaborative dynamics consist of twelve elements it is easy to lose track of ones findings or gather insufficient data on one or several elements. After completing a concept of the first analysis the researcher should take care to crosscheck this information. The best way to do this is by contacting most, but preferably all, interviewees to ask questions about what you discovered and whether you draw the correct conclusions. Furthermore, this provides the opportunity to ask questions that might have emerged from your analysis. Combining these steps with the earlier described steps for the configuration theory might make this more appropriate for PhD research. It is a really time-consuming and expansive study, particularly if one decides to do e.g. a comparative case study.

6.4.2 Practical recommendations

> *The first practical recommendation is for the Heat Alliance South Holland to find a common answers to the question of which elements of collaborative dynamics are necessary to reach their common objectives.*

If one looks at the success of the first phase of Cluster West it is a shame that this could not be transferred to the second phase. What was missing in both phases was a level of mutual understanding surpassing generalities and the complete and transparent sharing of knowledge and resources. The Heat Alliance South Holland is still so recent that it is too early to say whether it will succeed in constructing the heat roundabout, but several important changes have already taken place. Parties try to set the right conditions to make the heat market more attractive. Once there is

more clarity on that aspect parties can create a more in-depth level of mutual understanding. However, it seems unlikely that parties will be completely transparent in sharing knowledge and resources. Developing the heat market is just one of numerous projects these parties have and parties will continue to have conflicting commercial interests. It is important that parties in the Heat Alliance South Holland recognise this fact.

The second practical recommendation is to appoint an independent chairman for the steering committee with a clear mandate to be a process manager.

The findings suggest that a truly independent chairman was sorely missed. Twynstra Gudde did independent process supervision, but never had the mandate to act as a process manager. Furthermore, Twynstra Gudde coordinated its efforts with the municipalities of Rotterdam and The Hague and never chaired meetings. Cluster West involved many people with impressive job titles and sometimes decades of experience. The chairman should be of at least the same calibre, but also able to listen and recognise opportunities. The chairman cannot come from one of the parties themselves, because that would lead to suspicions of favouring one's employer. An independent chairman can be trusted with sensitive information, because he or she's only stake in the process is its success. The chairman should have no direct commercial interests in the heat roundabout, only in the success of the collaboration. It will be even better if the chairman is appointed by consensus by the administrative level to show that this person has the full support of regional ministers and CEOs. The appointment should be for two years, with the possibility for extension. Dismissing the chairman will require a two third majority of steering committee members with each having one vote. This dismissal will also require the approval of the administrative level. This allows parties to dismiss a chairman, while also allowing the chairman to sometimes take positions not everyone agrees with. Parties need to reach difficult decisions themselves to guarantee commitment, but the chairman should address issues that otherwise no one will touch with a ten-foot pole. In that way the chairman will support the process of building principled engagement, shared motivation and the capacity for joint action. This also decreases the risk of fixations, because the chairman encourages parties to reflect on their core beliefs. In the search for an independent chairman actors can for example contact Jan Willem van de Groep of Platform31, who led the 'Stroomversnelling' initiative committed to net zero energy refurbishments of existing buildings for the last six years. People working for any consultancy firm experienced in infrastructure projects can also be excellent for the chairmanship.

Reference List

Ansell, Chris and Alison Gash (2008). 'Collaborative Governance in Theory and Practice.' *Journal of Public Administration Research and Theory 18*(4): 543–571.

APSC – Australian Public Service Commission (2007). 'Tackling Wicked Problems: A Public Policy Perspective.' Canberra: APSC, Australian Government. Available at: apsc.gov.au.

Babbie, Earl (2010). *The Practice of Social Research*. Boston, United States: Cengage Learning.

Bale, Catherine, Liz Varga and Timothy Foxon (2015). 'Energy and complexity: New ways forward.' *Applied Energy 138*: 150–159.

Bryson, John, Barbara Crosby and Melissa Middleton Stone (2006). 'The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature.' *Public Administration Review 66*(Special Issue): 44–55.

Buuren, Arwin van (2009). 'Knowledge for Governance, Governance of Knowledge: Inclusive Knowledge Management in Collaborative Governance Processes.' *International Public Management Journal 12*(2): 208–235.

Buuren, Arwin van, Frank Boons and Geert Teisman (2012). 'Collaborative Problem Solving in a Complex Governance System: Amsterdam Airport Schiphol and the Challenge to Break Path Dependency.' *Systems Research and Behavioral Science 29*(2): 116–130.

CBS (2017). 'Monitor Duurzaam Nederland 2017, update indicatoren'. Available at: CBS.

CoS – Council of State (2016). 'Advies Raad van State op ontwerp Miljoenennota 2017.' No.W06.16.0262/III/B, The Hague.

Covert, Thomas, Michael Greenstone and Christopher R. Knittel (2016). 'Will we ever stop using fossil fuels?' *Journal of Economic Perspectives 30*(1): 117–138.

DNB – De Nederlandsche Bank (2016). 'Tijd voor Transitie – een verkenning van de overgang naar een klimaatneutrale economie.' Occasional Studies 14(2): 1–93.

EC – European Commission (2012). 'Energy Roadmap 2050.' Comprises the text of *COM(2011) 885 final*.

Emerson, Kirk, Tina Nabatchi and Stephen Balogh (2011). 'An Integrative Framework for Collaborative Governance.' *Journal of Public Administration Research 22*(1): 1–29.

Eurostat (2017). *'Share of renewables in energy consumption in the EU still on the rise to almost 17% in 2015.'* News release 43/2017.

Flyvbjerg, Bent (2006). 'Five Misunderstandings about Case-Study Research.' *Qualitative Inquiry 12*(2): 219–245.

George, Alexander, and Andrew Bennett (2005). *Case Studies and Theory Development in the Social Sciences*. Cambridge, Massachusetts: MIT Press.

Gerrits, Lasse (2012). *Punching Clouds: An Introduction to the Complexity of Public Decision-Making*. Litchfield Park: Emergent Publications.

Hansen, James, Pushker Kharecha, Makiko Sato, Valerie Masson-Delmotte, Frank Ackerman, David Beerling, et al. (2013). 'Assessing ''Dangerous Climate Change'': Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature.' *PloS ONE 8*(12): 1–26.

IPCC – Intergovernmental Panel on Climate Change (2014). 'Climate Change 2014: Synthesis Report – Summary for Policymakers.'

Japin, Xander (2014). 'De Vlaams-Nederlandse Delta: De dynamische ontwikkeling van een cross-sectorale samenwerking omtrent logistiek-economische vraagstukken.'

Klijn, Erik-Hans and Joop Koppenjan (2015). *Governance Networks in the Public Sector*. Abingdon: Routledge.

Levin, Kelly, Benjamin Cashore, Steven Bernstein and Graeme Auld (2012). 'Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change.' Policy Sciences 45(2): 123–152.

Marshall, Martin (1996). 'Sampling for Qualitative Research.' *Family Practice 13*(6): 522-525.

McKinsey (2016). 'Accelerating the energy transition: cost or opportunity?'

Peters, Brainard Guy, and Jon Pierre (2016). 'Forms of governance and policy problems: coping with complexity.' In Jurian Edelenbos and Ingmar van Meerkerk (Eds.), *Critical Reflections on Interactive Governance: Self-organization and Participation in Public Governance* (pp. 51–63). Cheltenham, United Kingdom: Edward Elgar Publishing.

Pierre, Jon, and Brainard Guy Peters (2000). *Governance, Politics and the State*. Houndsmills: Palgrave.

Rhodes, Rod (1996). 'The New Governance: Governing without Government.´ *Political Studies 44*(4): 652–667.

Rittel, Horst, and Melvin Webber (1973). 'Dilemmas in a General Theory of Planning.' *Policy Sciences 4*(2): 155–169.

Swanborn, Peter (2010). 'Case Study Research: What, Why and How?' Thousand Oaks, California: SAGE Publishing.

Teisman, Geert and Sibout Nooteboom (2009). 'Slotbeschouwing: Bestuurskundigen laten kansen liggen.' *Bestuurskunde 19*(4): 48 – 54.

Termeer, Catrien (1993). 'Dynamiek en inertie rondom mestbeleid; een studie naar veranderingsprocessen in het varkenshouderijnetwerk.' The Hague: VUGA Uitgeverij.

Termeer, Catrien (2006). 'Vitale verschillen: Over publiek leiderschap en maatschappelijke innovatie.' Inaugural speech on 7 december 2006, Wageningen.

Termeer, Catrien, and Brechtje Kessener (2007). 'Revitalizing Stagnated Policy Processes: Using the Configuration Approach for Research and Interventions.' *The Journal of Applied Behavioral Science 43*(2): 256–272.

Termeer, Catrien, and Renate Werkman (2011). 'Changing closed agricultural policy communities.' *Critical Policy Studies 5*(3): 283–298.

Termeer, Catrien, Art Dewulf and Robbert Biesbroek (2017). 'Transformational change: governance interventions for climate change adaptation from a continuous change perspective.' *Journal of Environmental Planning and Management 60*(4): 558–576.

Twist, Mark van, and Catrien Termeer (1991). Introduction to Configuration Approach: a Process Theory for Societal Steering. In Roeland J. in 't Veld, Linze Schaap, Catrien J.A.M. Termeer and Mark J.W. van Twist (Eds.), *Autopoiesis and configuration theory: New approaches to societal steering*. Dordrecht/Boston/London: Kluwer.

UNFCCC – United Nations Framework Convention on Climate Change (2015). '21st Conference of the Parties of the UNFCCC - Paris Agreement.' Available at: unfccc.int.

Wagenaar, Hendrik. 'Governance, Complexity, and Democratic Participation.' *The American Review of Public Administration 37*(1): 17–50.

World Bank (2016). 'Remarks by World Bank Group President Jim Yong Kim at the WBG-IMF Annual Meetings 2016 Climate Ministerial.'

Annex 1 Interviewees

N	Organisation	Interviewee	Position	Date	Duration
1	Twynstra Gudde			20-02-2017	80 min
2	Municipality of Westland			23-02-2017	55 min
3	Province of South Holland			27-02-2017	50 min
4	Province of South Holland			15-03-2017	45 min
5	Municipality of Rotterdam			27-02-2017	65 min
6	Municipality of Rotterdam			27-02-2017	65 min
7	Uniper			28-02-2017	70 min
8	Port of Rotterdam Authority			06-03-2017	45 min
9	Municipality of The Hague			15-03-2017	50 min
10	Eneco			09-05-2017	50 min
11	Eneco			09-05-2017	50 min
12	Ministry of Economic Affairs			29-05-2017	45 min
13	Greenpeace			30-05-2017	45 min
14	Warmtebedrijf Rotterdam			30-06-2017	70 min
15	Warmtebedrijf Rotterdam			30-06-2017	70 min

Annex 2 Organisational structure of Cluster West

Steering committee members, January 2017

N	Organisation	Actor
1	Province of South Holland	
2	Municipality of Westland	
3	Municipality of Delft	
4	Municipality of The Hague	
5	Municipality of Rotterdam	
6	Eneco	
7	Port of Rotterdam Authority	
8	Warmtebedrijf Rotterdam	
9	Ministry of Economic Affairs	

Annex 3 Interview guide

All interviews were conducted in Dutch, hence the interview questions were asked in Dutch. To facilitate those who do not speak Dutch, but want to understand the questions that were asked during the interviews, the author of this thesis has translated the interview questions into English for comprehensibility.

1.1 Introduction: Interviewer

- Thank interviewee
- Interviewer introduction.
- Ask whether the interviewee still has questions.
- Ask permission to record the interview.

1.2 Introduction: Interviewee

- Interviewee role in organisation and explain reasons for involvement (heat roundabout).

1.3 Drivers behind the heat roundabout

- How did the heat roundabout initiative get started?
- Which organisation addressed the issue and tried to bring stakeholders together?
- Was the 'problem' a shared concern before discussions started?
- How would you define the 'problem'?
- Do you agree that you need other actors to get a good outcome?

1.3 Social-cognitive configurations

- Who participated in these talks? Most important stakeholders (general inclusion)?
- How do you define your own role in the developments surrounding the heat roundabout?
- How often do you meet to discuss the heat roundabout?
- What is usually talked about during such a meeting about the heat roundabout? Can you illustrate how these meetings progress? Agenda? Action points / recommendations?
- Are you in regular contact with other actors via e.g. email, telephone, and conference call?

1.4 Fixations

- Did moments occur where discussions about the heat roundabout were mainly done with the same group of actors, while not allowing new actors to enter the talks?

- Do you believe that some actors are missing in these meetings, while they should actually be present?
- With whom did you interact the most about the heat roundabout? And with whom would you have liked to talk more and with whom less?
- Do you believe that the focus was on a certain outcome, without allowing new ideas and solutions to come into play?

1.5 Reasons for fixations: Principled Engagement?

- Do you believe you could share your individual and shared interests?
- Is the purpose of the collaboration openly discussed?
- Do you feel you can discuss contentious subjects and express disagreement?

1.6 Reasons for fixations: Shared Motivation?

- Do you believe you can trust other stakeholders? Benevolence, reliability, predictability?
- Do you feel your opinion is respected / heard?
- Is the collaboration legitimate? Is the framework in which you interact seen as viable?
- Do you believe in a good outcome? Did this change over the course of time?

1.7 Reasons for fixations: Capacity for Joint Action?

- Are there rules and procedures that help the collaboration (formal and informal rules)?
- Is there a leader who takes important decisions (implementation & mediation)?
- Are resources shared and used (money, time, personnel, etc.)?
- Is information and knowledge shared with others to create new ideas / insights?

1.8 Follow-up questions for determined fixations (cluster with most issues)

- How would you solve this lack of trust?
- Why do you think that this would be the best possible solution? Are there alternatives?
- Were these alternatives examined/explored? If not, why not?

1.5 Future

- Which possibilities do you see for the future of the heat roundabout?
- Do you have any suggestions for how the meetings about the heat roundabout can be improved? From your own experience?

- Do you see another possible avenue to reach the goals of the energy transition without the implementation of the heat roundabout? Are you working on such a project at the moment?
- Are there people who think differently about this subject then you? Do you think it is possible to speak with these people?
- Did I forget to ask a certain question, which you believe should have been asked?
- Do you have any suggestions for future interviewees for this thesis which have been involved with the heat roundabout specifically, or the energy transition in general?

Annex 4 Coding scheme

Themes	Characteristics	Colour code
0. General information heat roundabout	Information concerning the developments surrounding the Heat Alliance South Holland, both Clusters, and individual pipeline projects	Green
1. Role of actors in the heat roundabout	**1.1** Reasons for involvement **1.2** Years of involvement **1.3** Level of involvement	Turquoise
2. Drivers	**2.1** Leadership **2.2** Consequential incentives **2.3** Interdependence **2.4** Uncertainty	Red
3. Configurations	**3.1** Actors involved **3.2** Definitions of reality **3.3** Interaction rules	Blue
4. Fixations	**4.1** Cognitive fixations **4.2** Social fixations	Purple
5. Collaborative dynamics (CGR)	**5.1 Principled engagement** 5.1.1 Discovery 5.1.2 Definition 5.1.3 Deliberation 5.1.4 Determination **5.2 Shared motivation** 5.2.1 Mutual trust 5.2.2 Mutual understanding 5.2.3 Internal legitimacy 5.2.4 Shared commitment **5.3 Capacity for joint action** 5.3.1 Working across boundaries through arrangements, leadership, knowledge, and resources	Pink
6. Opinion on the collaborative process	**6.1** Opinion on the other actors involved **6.2** Opinion on the heat roundabout in general **6.3** Opinion on the collaboration in Cluster West **6.4** Opinion on the individual pipeline projects **6.5** Opinion on the most recent developments	Orange