The dynamics in the societal debate on Shale gas in The Netherlands

Master Thesis Research

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Sanne Remmerswaal

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Executive Summary

An increasing number of studies show that societal debates might be the constraining factor for implementing new energy initiatives. Environmental awareness in The Netherlands is growing and society and politicians gradually change their stance on the necessity of oil and gas. This study is aimed at understanding the dynamics behind the interaction between actors in societal debates in order to understand changing support. The Dutch societal debate on shale gas was used to study these dynamics. It was investigated how unintended and intended events can explain changes in discourses (ways to view the world) over time.
The software package T-lab was used to identify discourses and discourse developments in Dutch newspapers. T-lab uses linguistic and statistical tools to find meaningful patterns in text. Besides that, eleven semi-structured interviews were conducted to validate and supplement the results.

Three major discourses were found: 'Safety and Environment', 'Utility and Necessity' and 'Procedural Justice' (Table 1). The content of these discourses changes as a result of external impact, which is amplified by feedback from actor's responses and from changing discourses.

Table 1 Discourses in the Dutch debate on shale gas and their most important themes

Safety and Environment	Utility and Necessity	Procedural Justice
Water pollution and water use	Economy	Regulation and inspection
Spatial impact	Sustainability	Distribution of costs and benefits
Earthquakes	Geopolitics	Decision-making process
Air Pollution		

The influence of events on a societal debate can be summarised in five important effects; 'Amplify', 'Abate', 'Polarise', 'Broaden' and 'Trigger'. The case of the shale gas debate has shown that the course of events can lead the debate to reach polarised levels. At these levels, actors tend to reflect less on 'their discourse' and more extreme positions are taken. In other words, it impedes stakeholder learning. Therefore, it is important to prevent a debate to reach high polarised levels. The Dutch societal debate on shale gas provides several learning moments on how to prevent this.

First, the focus on 'Safety and Environment' in stakeholder statements and in the scope of the governmental initiated research has impeded actors to learn and thus to gain insights into the complex relationship of the discourses. It triggered actors to use 'Procedural Justice' to get through to policy makers. The concerns of 'example stakeholders' and natural events occurring abroad (pollution and earthquakes) have amplified this polarising effect. Broadening the debate and involving the concerned stakeholders can have a depolarising and abating effect. It is important to answer the actor's concerns. The risks of shale gas exploration and production should be explained and it should be explained how these risks can be mitigated. Besides that, by opening up the possibilities for the technical and procedural design, learning might be initiated. Two examples will be given. The technical design could be changed to decrease the risks of pollution and earthquakes or to make the technology more sustainable. A decision-making process could be designed in such a way that more stakeholders have to be involved and the cost and benefits can be divided so that local communities get compensated for the risks they are taking.

Second, the debate showed that the commitment for independent research can have an abating effect. The time of such a study could be used to start a dialogue with stakeholders, as explained above. This process can be time-consuming. However, discourse reflection takes time as well.

Finally, it was shown that approaching a (potential top-down) decision-moment might trigger debate polarisation. Therefore, it is suggested to approach a decision from a support position, as well as to involve stakeholders in an early stage of the permitting process when a decision-moment is not yet near.

General Summary

Research description

An increasing number of studies show that societal debates might be the constraining factor for implementing new energy initiatives (Devine-Wright, 2011; Heras-Saizabitoria, Cilleruelo, & Zamanillo, 2011; Mallett, 2007; Sauter & Watson, 2007; Assefa & Frostell, 2007). An example of an energy project in The Netherlands, of which the societal debate is becoming more complex, is the exploration and production of shale gas. Cuadrilla Resources BV. (Cuadrilla) and 'Energie Beheer Nederland BV.' (EBN), two respectively UK and Dutch based companies responsible for exploring and producing natural gas and oil, want to invest in exploration wells in the municipalities of Boxtel and Haaren, located in the province of Noord-Brabant, and in the area of the Noordoostpolder, located in the province of Flevoland. The project faces several problems in the interaction between organisations, governments and civilians (Rijksoverheid, 2013a). Complex or wicked problems, such as the case of shale gas, are often framed in different ways as a result of different values and interests (Rittel & Webber, 1973). Contextual changes, e.g. the occurrence of natural events, changing laws, elections, increasing unemployment and failures and successes in other countries, might influence the dominant perspectives (named discourses in this study) in a societal debate and thereby the interaction process between actors. This study was aimed at understanding the dynamics behind this process in order to understand changing support. Dynamics refer to:

"Macroscopic behaviour of a system as a whole conditional upon (external) conditions and (internal) feedback" (Schweitzer 2012, p.37)

In order to grasp the dynamics it is necessary to perform research on discourses over time. The following research questions were formulated:

Main question: Which intended and unintended events are key in explaining changes in discourses in the societal debate on shale gas in The Netherlands?
Sub-questions:

1. Which dynamic aspects can be identified in the societal debate on shale gas in The Netherlands?
2. Which actors were involved in the societal debate on shale gas in The Netherlands and what was their role?
3. Which discourses can be identified in the societal debate on shale gas in The Netherlands and how did these discourses develop over time?
4. Which intended and unintended events are key in the societal debate on shale gas in The Netherlands?
5. How are the actors, the events and the discourses of the societal debate on shale gas in The Netherlands related and which lessons can be learned?

Theory

Societal debates could be described as an on-going struggle between actors with a different discourse that strive to make their discourse dominant (Runhaar, 2009). This process is highly dynamic. Walker et al. (2011) described that social acceptance changes as a result of contextual influences and the interactions between stakeholders. Actors' actions and strategies provide feedback to the interactions. This main idea was used as a basis for this research.
In social sciences discourses refer to frames through which meaning is given to social or physical phenomena, and discourses can explain how actors perceive and understand the world (Runhaar, Runhaar, & Oegema, 2010). This explains that the actors involved in a decision-making process can give different meanings to a project's alternatives, i.e. the solutions proposed to a problem, and to contextual events occurring during the decision-making process. Different meanings given to a situation result in different actions taken. Discourses not only influence the way an event is perceived, but also determine whether or not an event is noticed (Entman, 2003). Discourses can be changed by actors as a result of accumulating knowledge.
Moreover, it has been described that discourses can become more dominant along a decision-making process (Hajer, 2005; Broër, 2008). These dominant discourses can control the political agenda, and influence the policy formulation of an issue (Weible, Sabatier, & McQueen, 2009).
Social acceptance can be divided into three dimensions, 1) community acceptance, 2) market acceptance and 3) socio-political acceptance (Wüstenhagen, Wolsink, & Bürer, 2007). Since socio-political acceptance can be seen as a starting point for social acceptance, this study will mainly focus on the socio-political dimension.

Methods

Since the combination of methods used in this study is relatively new, an explorative study was chosen. To be able to grasp the complexity of societal debates and to take into account the interaction between the main factors of a societal debate (events, discourses and actors) a single case was chosen. The research consisted of three types of analyses:

- Event history analysis
- Thematic cluster analysis
- Interviews

A media analysis was performed based on 497 newspaper articles from the LexisNexis database using the search word 'schaliegas' (Dutch for shale gas). The search was limited to a period of 30 months: November 2010 to April 2013.

In order to structure contextual events, the concept of 'intent' was used to divide the events into two groups; unintended events and intended events. 'Unintended events' can be split up into physical events, e.g. natural disasters, and non-physical events which include economic crisis. 'Intended events' refers to strategic actions of an actor, such as press releases, petitions, street protests or the publication of research reports or environmental impact assessments. An event history analysis was performed to identify events and to investigate event impact, which is based on event duration and visibility. Events were extracted from the newspaper database, previous research on the Dutch societal debate on shale gas and from the interviews that were conducted.

'Discourses' also refers to how communication is structured, the language that is used to communicate and to other properties of text, talk, verbal interaction or communicative events (Dijk, 1993). Therefore, discourses can be abstracted by using a software package that analyses texts (Waes, 2013; Sengers, Raven, & Venrooij, van, 2010). The software package T-lab was used to identify discourses and discourse developments. T-lab uses linguistic and statistical tools to analyse texts, such as newspaper articles (T-LAB di Lancia Franco, 2013). T-lab assists the researcher in finding meaningful patterns in text files in as systematic way. Furthermore, it makes it possible to analyse a larger dataset of texts, which gives statistically better, and therefore more representative, results. Finally, T-lab makes the research results less dependent on the researcher's interpretation. In order to identify the different discourses a thematic cluster analysis was run. The cluster analysis reveals the most important themes of the arguments used over a period of time. The software provides a list of elementary contexts which are typical to a cluster. These contexts were read to identify the most dominant discourse within the cluster. To reveal more developments the dataset was split up into eight separate time periods. For each of the eight time periods a thematic cluster analysis was performed.

Ten semi-structured interviews with experts on the shale gas debate were conducted to validate and supplement the results. Moreover, the interviews identified potential relations between actors, discourses and events and aided in the interpretation of the research results and a critical reflection on the media analyses.

Results

Three major discourses were found: 'Safety and Environment', 'Utility and Necessity' and 'Procedural Justice'. Table 2 shows the sub-themes that were identified within the three major discourses. The discourses changed in dominance over time. The 'Safety and Environment' discourse remained most dominant over time. The topic earthquakes came forward in a later stage of the debate (from August 2012 on). Moreover, this sub-theme gained a lot of dominance in the final months of the studied period of time (February-April 2013). The 'Utility and Necessity' discourse gained dominance later in the debate (from August 2012 on). This discourse starts off with the sustainability and geopolitics topics, but in a later stage economy becomes important as well. The 'Procedural Justice' discourse was mainly visible at 'peak publication periods'; times at which important decisions have to be taken. The sub-themes varied in dominance as well. Moreover, new sub-themes came forward over time. On the one hand the 'Procedural Justice' discourse is used by proponents, who point out that the Dutch laws on regulation and inspection assure safe exploration and production of shale gas. On the other hand, opponents use this discourse to point out to decision-makers that the decision-making process is not fair.

Table 2 List of discourses and sub-themes

Safety and Environment	Utility and Necessity	Procedural Justice
Water pollution and water use	**Economy**	**Regulation and inspection**
Spatial impact	Estimates of stocks	**Distribution of costs and benefits**
Traffic	Public treasury	**Decision-making process**
Visual pollution	Affordability of gas	Openness and quality of information
Noise	Competitive position	Independence and quality of research
House prices	Creation of jobs	Public support
Earthquakes	**Sustainability**	Decision power of EA
Air Pollution	CO_2 emission	Involvement
	Transition to sustainable energy technologies	
	Resource depletion	
	Geopolitics	
	Security of supply	
	Independence from other countries	

Several events were important for these discourse developments. At the start of the studied debate, the documentary Gasland caused the 'Safety and Environment' discourse to gain a sudden dominance over the other discourses, and had a long term impact. Water pollution became an important topic. The involvement of two new actors in the societal debate, the Rabobank and Brabant Water, and their concerns amplified this effect (January and April 2011). In May 2011, an information meeting in Boxtel, attended by representatives of national political parties, broadened the debate with, among others, sustainability. Environmental groups saw this as an opportunity and started using the shale gas debate to put their sustainability issue on the political agenda. Local protests led to municipalities asking questions to the ministry of Economic Affairs (EA). EA keeps focusing on the many years of experience in The Netherlands and explain that inspection is organised (by SodM) quite well in The Netherlands. This brings up a more procedural discourse. Municipalities worry that EA will force decisions on them and multiple stakeholders get annoyed that the minister is not open about the chemicals that will be used for fracking. Eventually, the province of Noord-Brabant urges the minister to call off a moratorium and to start an independent study (May 2011). Then, warnings of water companies and the earthquakes in Blackpool give rise to a political debate on security and safety. A verdict of the Dutch administrative court could have triggered the procedural justice discourse to become more dominant, but the minister quickly announced a moratorium and issues an independent study (October 2011).

A quite calm period sets in, in which the 'Safety and Environment' discourse remains dominant. Then, decreasing gas prices in the US put more emphasis on the economy sub-theme (from August 2012 on). No large benefits are expected from shale gas and the oil and gas industry is accused of giving too optimistic estimates. Meanwhile, several tremors in Groningen put emphasis on earthquakes again. Besides that, 'shale gas free' declarations of municipalities increase the interest in the topic of shale gas. In the final period of analysis an explosion of media attention can be seen (February-April 2013). The research is coming to an end and a decision has to be taken. This leads to the attention of several actors. Multiple actors voice themselves critically in newspapers and the debate polarises. A 'klankbordgroep' (Dutch for focus group) set up by EA criticizes the W+B research initiated by EA. Then, EA demands the 'klankbordgroep' to sign a confidentiality agreement, which is refused. The 'Procedural Justice' discourse gains dominance. The research comes out and more criticism is given by several stakeholders. A new study is announced by EA and the debate is abated again.

The actors involved had several learning moments during the debate. Local and regional governments were surprised by local protests and learned that a more critical reflection on decisions of EA is necessary for public support (first-order learning). Cuadrilla and other industry partners got overwhelmed by the protest as well and learned about the importance of public support and involvement (second-order learning). EA learned that openness of information can lead to information being used to defend one's own beliefs (first-order learning). This decreased the ministry's openness. Moreover, criticism on the research issued by EA helped this actor learn that a broad investigation and societal debate is needed in decision-making.

Conclusions

Three major discourses were found: 'Safety and Environment', 'Utility and Necessity' and 'Procedural Justice'. The content of these discourses changes as a result of external impact which is amplified by feedback from actor's responses and from changing discourses. Five types of relations were identified between actors, events and discourses; 'Abating', 'Amplification', Broadening', 'Polarisation' and 'Triggering'. Typically, natural events cause a long term effect on the public debate. They give a reason for discourse reflection and can increase the legitimacy of arguments. These events cannot be controlled, but one's own indented events can be controlled. Therefore, it is important to consider the impact of one's actions and the reactions that can follow these.

This research shows that discourses change and that events can be perceived in different ways. The documentary Gasland and the earthquakes in Groningen are either seen as a reason to perform more research or not. 'The shale gas revolution' in the US can be seen as temporary or not. Also, intended events can be perceived differently. The announcement of locations in the Noordoostpolder by Cuadrilla was intended to start an open and transparent process, but was not perceived as such.

Moreover, events can draw attention to a certain discourse and cause it to gain more dominance. The sustainability discourse had been present for a long time, but coal export to Europe and the manifest signed by professors provide a reason for media to report on it.

It can also be seen that the approach to reach a decision (and the potential of it being a top-down decision) can lead to polarisation of the societal debate. Both the approaches to the first and second research of EA show a polarising debate. The announcement of the first research gave the possibility for new discourses to enrich the societal debate; actors got time to reflect on their own discourse. Next to research, information meetings can broaden a debate as well, although this is dependent on the actors that are invited for the meeting. Involving new actors could broaden the debate.

Furthermore, actors' responses can strengthen or weaken a societal debate. The lack of transparency from EA and Cuadrilla fuelled the public debate and the suspicion from other actors. Moreover, the opinions of 'example actors', e.g. professors, water companies, beer brewers and the Rabobank, might polarise the societal debate; actors are less inclined to reflect on their discourses. The dialogue with Brabant Water by Cuadrilla and the dialogue with the 'Klankbordgroep' by EA show that criticism can decline. However, when it is perceived that the involvement is only temporary, the societal debate can get amplified again. Next to that, it is important that all actors remain open to different alternatives. The decision to not continue with the project should thus be a real possibility.

An important actor group that could influence a societal debate is the media. In the societal debate on shale gas, media often see only 2 discourse coalitions; proponents and opponents. This is a factor polarising the debate. The polarising role was most often assigned to television and radio media. Written media was believed to be able to bring nuance in the debate and thus have a depolarising effect. This knowledge suggests media are important actors to involve.

Finally, it should be noted that growing environmental awareness could also become important for other energy projects. The lessons explained above, are therefore important for other energy projects as well.

Discussion and Recommendations

This research used the theoretical framework of Walker et al. (2011) as a basis. The main idea that context influences acceptance by means of stakeholder interactions was used, since it covers the main dynamic aspects of societal debates. Moreover, it enables a more holistic approach.

A discourse analysis was performed and discourses were used to explain the actions and strategies of the actors involved. Values, beliefs or interests could also be used to explain these actions and strategies. However, discourses were assumed to be at the basis of these concepts.

This research used a media analysis to investigate the societal perspective on the topic of shale gas. It can be questioned whether or not media provides a good representation of society and thus the societal debate. However, a wide range of different newspapers was investigated. This increased the validity of the research. Moreover, ten semi-structured interviews were used to validate the research as well.

An aspect that was found to be important was the polarisation level of the debate. This is expected to have an impact on the stakeholder interactions and event effects that were introduced in this research. A recommendation could be to investigate this effect further.

Moreover, it can be recommended to investigate changes in discourse coalitions to better understand changes in support. For this, it might be useful to study stakeholder documents instead of using a media analysis.

Finally, it is suggested to study changing discourses over a longer time period. This way, the effect of societal trends could be taken into account as well.

Table of contents

List of Important Definitions

Concept	Definition
Local	Points out the focus on a certain municipality
Regional	Points out the focus on a certain province
National	Points out the focus on a certain country
Decision-making process	An on-going struggle and exchange of arguments between actors with a different discourse that strive to make their discourse dominant (Runhaar, 2009)
Dynamics	*"Macroscopic behaviour of a system as a whole conditional upon (external) conditions and (internal) feedback"* (Schweitzer 2012, p.37)
Discourse	Intrinsic frame through which meaning is given to social or physical phenomena and which explain how actors perceive and understand the world (Runhaar, Runhaar, & Oegema, 2010)
Discourse coalition	A group of actors that share the same discourse (to some extent)
Frame	A strategic lens that is placed upon an event or topic
First-order learning	Insights into the 'facts' and expectations of the involved actors concerning a specific topic (Kerkhof, 2004)
Second-order learning	Insights into the complex relationship between causal and normative reasoning (Kerkhof, 2004)
Societal debate	An interaction of arguments between parties with opposing beliefs
Supported outcome	A general agreement which is not necessarily based on a shared opinion, but can be result of a win-win situation

List of abbreviations

Abbreviation	Meaning
BMF	Brabantse Milieufederatie
BrabW	Brabant Water
ComB	Community of Boxtel
ComH	Community of Haaren
ComNOP	Community of the Noordoostpolder
ComMER	Commissie MER (Environmental Impact Assessment Committee)
EA	Ministry of Economic Affairs
EC	European Commission
EP	European Parliament
GL	GroenLinks
Groenfr	Groenfront
Klankb	Klankbordgroep
Milieud	Milieudefensie
MunB	Municipality of Boxtel
MunH	Municipality of Haaren
MunNOP	Municipality of the Noordoostpolder
Oranjew	Oranjewoud
ProvNB	Province of Noord-Brabant
ProvFl	Province of Flevoland
PS	Provinciale Staten (Provincial Council)
Rab	Rabobank
RoyalH	Royal Haskoning
SGVrijB	Schaliegasvrij Boxtel
SGVrijH	Schaliegasvrij Haaren
SGVrijNOP	Schaliegasvrij Noordoostpolder
SGVrijNL	Schaliegasvrij Nederland
SodM	Staatstoezicht op de Mijnen
W+B	Witteveen + Bos

Chapter 1 Introduction

Content

This introducing chapter will elaborate on the research motivations. After the research is introduced, the background of the research will be elaborated on by explaining four current societal trends and by introducing the research's case. Then the research aim, questions, approach and justification will be given.

1. Introduction

An increasing number of studies show that societal debates might be the constraining factor for implementing new energy initiatives (Devine-Wright, 2011; Heras-Saizabitoria, Cilleruelo, & Zamanillo, 2011; Mallett, 2007; Sauter & Watson, 2007; Assefa & Frostell, 2007). Countries that attempt to implement renewable energy projects increasingly face local (within a municipality) and national debates, (Wüstenhagen, Wolsink, & Bürer, 2007). Nowadays, many new energy initiatives are based on a smaller scale, making it necessary to exploit several such initiatives to sustain the same level of energy supply. This results in more decisions that need to be taken, which in turn complicates the decision-making process. Moreover, those projects frequently result in local effects, such as visual and noise pollution (McDaniel, 1983; Wolsink, 1987), leading to conflicting local and national interests. Both issues, the high amount of decisions and the local effects, complicate societal debates. Besides that, the increasing influence of media (and social media) makes the societal debate even more complex (Meier & Griffin, 1979; Anderson, 2009).

An example of an energy project in The Netherlands, of which the societal debate is becoming more and more complex, is the exploration and production of shale gas. Cuadrilla Resources BV. (Cuadrilla) and 'Energie Beheer Nederland BV.' (EBN), two respectively UK and Dutch based companies responsible for exploring and producing natural gas and oil, want to invest in exploration wells in the municipalities Boxtel and Haaren, located in the province of Brabant, and in the Noordoostpolder, located in the province of Flevoland. The project faces several problems in the interaction between organisations, governments and civilians (Rijksoverheid, 2013a). Water companies take a critical stance towards shale gas and want to be more involved in the decision-making. Municipalities declare themselves 'shale gas free' in order to force involvement by the national government. The results of an investigation set up by the ministry of Economic Affairs to gain public support were dismissed by several stakeholders (Sterk, 2013; Milieudefensie, 2012; Commissie MER, 2013; Milieudefensie, 2013b). These problems in the interaction make this case most suitable for a study on the dynamics that govern a societal debate.

Complex or wicked problems, such as the case of shale gas, are often framed in different ways as a result of different values and interests (Rittel & Webber, 1973). Therefore, diversity in the decision-making process is needed to enrich it with different types of expertise, knowledge and values (Cuppen, 2012). Values involve economic, environmental and social values. Social values can for example refer to fair distribution of the benefits and cost. Environmental values include the fear for water contamination, earthquakes and the fear for a high visual impact. An economic value can for example be the creation of jobs or the security of supply. Beside the involvement of a diverse set of stakeholders, contextual factors might be of importance as well. Several authors have indicated that the interaction between stakeholders alone cannot explain decision-making processes (Wüstenhagen, Wolsink, & Bürer, 2007; Walker, et al., 2011; Runhaar H. , 2009). Recently, it was found that the views on shale gas in the United Kingdom are changing (O'Hara, Humphrey, Jaspal, Nerlich, & Poberezhskaya, 2013). Contextual changes, e.g. the occurrence of natural events, changing laws, elections, increasing unemployment, failures and successes in other countries, might influence the dominant perspectives (named discourses in social science) and thereby the interaction process.

This study will focus on the influence of several intended and unintended events (explained in section 2.2) exercised on stakeholder discourses (section 2.1). In this explorative study a media analysis will be carried out in order to identify the stakeholder discourses, discourse development, the events that occurred and the role that actors played in this societal debate. Moreover, several interviews will be conducted to validate and supplement the research findings as well as to find relations between the mentioned aspects of the societal debate and to reveal the dynamics of the societal debate.

This document will use the following structure: After this first introductory chapter the next chapter, chapter 2, will provide an overview of the current knowledge in literature that will be used as a framework for the proposed study. It will also identify the knowledge gaps in the current literature base. Thereafter chapter 3 will explain the methods proposed. Chapter 4 will explain the actors that are involved in the societal debate and chapter 5 will introduce the identified discourses. Then, chapter 6 will use the knowledge from chapter 4 and 5 to explain the event history and chapter 7 will elaborate on the results on event impact from the event history analysis. Finally, chapter 8 will conclude this document with the conclusions, some recommendations for future research and some practical recommendations.

1.1 Problem background

In order to understand the context of the case used in the research, this section will give short summary of the case's background. Three important societal trends will be shown as well as a short description of the Dutch energy policy of the past few years, of the shale gas case and EBN's interest in the study.

1.1.1 Growing environmental awareness

Environmental awareness in The Netherlands is growing. Society and politicians gradually change their stance on the necessity of oil and gas. Since the Club of Rome published its report 'Limits to growth' in the 70's and the 1973 oil crisis took place, declining fossil fuel resources are given as a main reason to invest in new, more sustainable energy technologies (Tweede Kamer der Staten-Generaal, 1974). In the 90's global warming became an important issue as well, next to resource depletion (Tweede Kamer der Staten-Generaal, 1990; Economische Zaken, 1997). Today, this awareness still exists and the perception of society and politicians on the necessity of oil and gas has changed even more because of several events; the gas explosion in Gellingen (2004), the Deepwater Horizon oil spill of BP (2010), gas leakage at Odfjell in Rotterdam (2011), earthquakes in Groningen caused by gas production by the NAM (2013), etc.

The growing environmental awareness leads to an increasing amount of households buying an electric car or solar panels (AgentschapNL, 2013; Energie+, 2013). Societal debates are influenced by this awareness as well. The growing environmental awareness also involves an increasing awareness of the use of the subsurface (besides resource depletion and global warming). Protests against a Carbon Capture and Storage (CCS) pilot in Barendrecht rose, because actors were concerned with the potential risks of such a project and because CCS was not perceived as a solid solution for global warming. The project was cancelled due to a lack of public support (Rijksoverheid, 2010). The risk of earthquakes was the main reason for objections to underground natural gas storage in Bergermeer (Rechtspraak, 2012). And the risk of aquifer contamination is a reason for the societal debate on shale gas in The Netherlands.

Because The Netherlands is lagging behind other European countries in terms of a sustainable energy supply, multiple actors are concerned with the Dutch energy policy (Eurostat Commission, 2012). The decision-making process towards a new energy policy is highly complex as a result of conflicting perceptions on the problems and their solutions. While some perceive the declining availability of fossil fuels, and thus declining energy availability, as the problem, others perceive increasing CO_2-emmissions and the fight against global warming as the most urgent issues. Today, the Dutch government believes gas will remain important in the Dutch energy mix (as a supplement to renewable energy resources) and is therefore stimulating investments in gas production, storage and transportation (Rijksoverheid, 2013b).

Other actors prefer different solutions and believe that because of the declining oil and gas resources in the Netherlands and the world, investments should be made in other, more sustainable energy sources than oil and gas. As a result of these disagreements gas, and also shale gas, is perceived either as a polluting or clean energy technology. Moreover, gas is perceived to be a good promoter of an energy transition versus a potential delaying factor.

Recently, an agreement was reached between government, industry and several other stakeholders on a sustainable energy policy. This was perceived to be a major breakthrough (Sociaal-Economische Raad, 2013). However, at the time of permit requests for shale gas exploration in The Netherlands, no clear energy policy was present for a transition to a sustainable energy supply. The utility of shale gas in the energy transition was not clear and this raised a lot of questions amongst stakeholders. Shale gas was either seen as a solution for declining fossil fuel reserves or as a potential delaying factor for a transition to sustainable energy.

1.1.2 Growing societal engagement

The growing environmental concern can partly be explained by the high level of wealth within The Netherlands. In accordance with economic theories environment is a superior good; demand rises with income (Diekmann & Franzen, 1999). Next to that, the higher level of education and the increasing use of social media explain an increasing societal engagement (Helliwell & Putnam, 1999; Zúniga, Jung, & Valenzuela, 2012).
Moreover, between 1998 and 2010 the level of trust in the national government has decreased (Schakel & Koelewijn, 2012). Besides that, the events described above (section 1.1.1) decreased the trust in the oil and gas industry. A decreasing level of trust in institutions and politicians decreases the level of cooperation in the political arena (Huijts, Midden, & Meijnders, 2007). It makes communities more sensitive to object to risks that are taken by governments or other organisations. This increasing level of participation makes decision-making more complex.

1.1.3 On-going economic crisis

Another important trend is the economic crisis that started in 2008 and the difficulty the Dutch government experiences in taking economic measures. For years the government budget benefited from natural gas incomes (Edens & Rossum, 2012). The economic crisis and the accompanying increase in governmental budget deficit and unemployment rate make natural gas income more important.

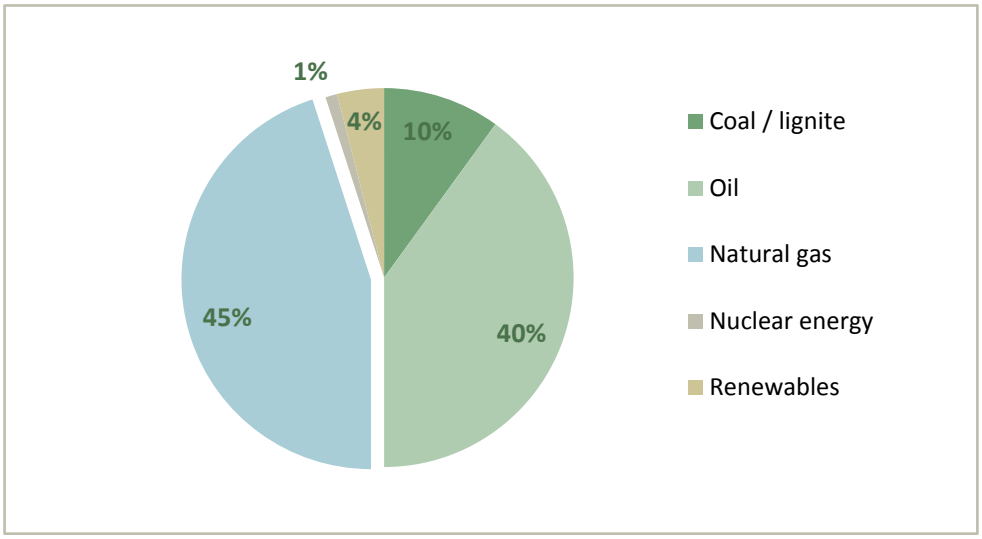


Figure 1 Dutch Energy mix 2010 (Eurostat Commission, 2013).

1.1.4 Dutch energy policy

The Dutch energy supply depends to a large extent on gas (Figure 1). In 2005 the Dutch government, realising that there is an increasing energy demand and a decreasing availability of fossil fuels, announced the ambition to make The Netherlands the main hub for gas transport in the North-Western part of Europe (Tweede Kamer der Staten-Generaal, 2012). This means that gas is transported to, stored in and exported from The Netherlands.

The main goal of this gas hub strategy is to ensure long term security of supply. Besides that the gas hub strategy should also stimulate economic growth. To realise the gas hub position, it is considered important to stimulate upstream investments in The Netherlands made by market parties (Economische Zaken, 2011a).
Security of supply was also the main reason in 1974 for the Dutch government to implement the so called 'small field policy' (Dutch: kleineveldenbeleid) (GasTerra, 2013). This policy gives priority to gas from 'small fields' (compared to the Groningen gas field). This means the Groningen gas field holds a balancing function; it is used to meet the gas needs at peak demand (Rijksoverheid, 2013c). The 'small fields policy' stimulates production from small fields through several measures, e.g. operators are assured they can sell gas produced from small fields at market-based prices to the Dutch gas trading organization GasTerra and operators of cost-ineffective off-shore gas fields can benefit from fiscal incentives (Rijksoverheid, 2013d). This way, the Groningen gas field is spared and can be used more strategically. The implementation of the 'small fields policy' arose from the first oil crisis in 1973; Arabic countries imposed an oil boycott on The Netherlands and other countries (GasTerra, 2013). This led to the main idea that The Netherlands should become more independent in its energy market. The 'small field policy' indeed lowered the gas production from the Groningen gas field, but since the year 2000 gas production from small fields is declining (GasTerra, 2013). This might explain the interest in exploring new small fields, such as shale gas.
Another important aspect of the Dutch energy policy is the use of natural gas revenues by the state. The Dutch government is accused of making irresponsible use of the gas incomes, since they did not invest the revenues in a fund. The returns from this fund could have been used at times of decreasing natural gas incomes. In 1994 an economic fund was created to use the natural gas income for infrastructural projects. However, this fund was dispensed in 2011 (Rijksoverheid, 2012). The ministry of Economic Affairs investigated the possibility of setting up a new natural gas fund which could be used for local sustainable energy projects in order to gain public support for mining activities (Rijksoverheid, 2012).

1.1.5 Case introduction: Shale gas, the societal debate and EBN's interest

The Netherlands has experienced the benefits of large reserves of natural gas and has had a cumulative income of 250 billion Euros (nominal) from gas production alone up to 2013. Shale gas is expected to be present in somewhat smaller volumes as well (Stevens, 2011; EBN, 2009). This was the main reason for EBN and Cuadrilla to invest in the exploration of this resource, which would test the feasibility and profitability of shale gas production in The Netherlands.

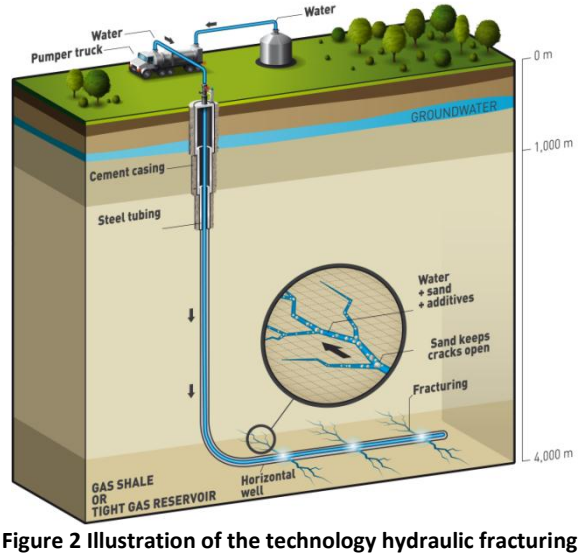


Figure 2 Illustration of the technology hydraulic fracturing (fracking). Adapted from (Total E&P Denmark B.V., 2013).

Shale gas is natural gas that is trapped in shale layers. To be able to produce natural gas from shale a mixture of water, sand and chemicals is pumped into the shale layer at high pressure (Figure 2). This creates permanent fissures, through which the gas can flow towards the well. Investors and research institutions state that this process, which is called fracking, has safely been executed multiple times in The Netherlands. (EBN, 2011; Staatstoezicht op de Mijnen (SodM), 2011). Although Witteveen + Bos (W+B) performed research on the risks of such a project, stakeholders are still concerned that an exploration project would lead to earthquakes and contamination of aquifers (Witteveen + Bos, 2013).

They are also worried about the visual impact that such a project would have. Moreover, shale gas production might delay a transition towards sustainable energy, since it is an investment in fossil fuels while investments should be done in sustainable energy projects. On the other hand, natural gas is responsible for low CO_2-emmission levels compared to other fossil fuels and it might therefore be a good supplement for a sustainable and secure energy supply (Louwen, 2011). Besides that, proponents point at the beneficial effects of the shale gas revolution in the United States and they argue that shale gas could also provide a boost for the Dutch economy. In short, the societal debate on shale gas contains a diverse set of discourses and conflicting interests; it is a wicked problem. Wicked problems are framed in different ways as a result of different values and interests (Rittel & Webber, 1973).

The intention of Cuadrilla and EBN to invest in a shale gas exploration project was a reason for citizens of Boxtel and Haaren to raise their voice against this development. Several stakeholders got involved, like water companies, grassroots movements and NGO's. In order to understand the concerns and build a new engagement strategy towards stakeholders, EBN invested in a study investigating the diverse set of stakeholder perceptions (Pikaar, 2011). At present, the company still deals with diverging opinions on the proposed project. Political discussions resulted in the ministry of Economic Affairs (EA) issuing an investigation into the risks of exploring and producing shale gas and coal bed methane in order to gain the insights necessary for policy making (Witteveen + Bos, 2012). The results from this research were published in the summer of 2013 and gave an impulse to the societal debate and the interactions between the stakeholders involved. The main conclusion of the report was that shale gas could safely be explored and produced and that existing risks are manageable. Because of the narrow scope of the study and the low perceived procedural justice, public attention was intensified again.
The research of W+B (requested by EA) did not result in a situation of public support, as was intended. The minister of EA acknowledged the need for more information and decided therefore that no decisions could be taken yet. The Minister announced a new research project on the impact of shale gas exploration and production (Rijksoverheid, 2013e). In the meantime and in order to learn lessons from the decision-making process on shale gas exploration and production, up to the release of the first research of EA, a study should be performed on the societal debate.
In addition to that, multiple actors start recognizing the importance of public support, e.g. EA, EBN, regional and local governments and NOGEPA (the Dutch oil and gas company representing association) (Rijksoverheid, 2013e; Gemeente Noordoostpolder, 2013; Gemeente Boxtel, 2011a; NOGEPA, 2013a). In order to understand how public support is gained it is necessary to understand the dynamics in societal debates. Since the former research of EBN on stakeholder perception was performed, many events in the project's context have occurred; natural events (earthquakes in Groningen) (ANP, 2013; FTM, 2013; Schaliegasvrij Nederland, 2013) have alerted the local public to a higher extent, decreasing gas prices in the US have raised questions among society (Volkskrant, 2013a) and increased CO_2-emmission levels within The Netherlands have created doubts on the current energy policy (Brabants Dagblad, 2013). Such events have led to new dimensions in the public debate; new actors (with other values) got involved, the societal debate grew out to a national level, new discourses entered the societal debate and existing discourses changed in their level of dominance. The events alone cannot explain these changes. An interaction process characterised by feedback and external influences is needed to explain how such changes occur. In other words, the dynamics in the societal debate can explain changing support.
Thus, a basic understanding on the dynamics of societal debates is needed to understand changes in the level of public support. Therefore, EBN is interested in how the dynamics in societal debates can lead to changes in discourses. Their interest in this study is to gain understanding on the dynamics of societal debates.

1.2 Research aim

The literature framework, explained in Chapter 2, suggests that changes in the decision-making context might explain changing stakeholder discourses, i.e. perspectives. This occurs through a highly dynamic process; external factors (unintended events) can initiate change which in turn is propelled by multiple feedback loops (intended events). Therefore the aim of this research is to clarify the effect of unintended events, e.g. natural disasters, economic shock events, and intended events, like press releases or public statements of important actors, on stakeholder discourses and to explain how a dynamic process can lead to such changes. In order to grasp the dynamics it is needed to perform a study over time. The research will therefore mainly focus on the changes in discourses over time.

Little is known on the effects of unintended and intended events on discourses. For this reason an explorative study is performed. The study is not aimed at explaining market acceptance or community acceptance (definition in section 2.3). And although it does not include international discourse developments, international events will be used to explain changes in discourses on local and national level. In short, the study will analyse how discourses change over time.

1.3 Research questions

To reach the research objective the following main question can be formulated:

Which intended and unintended events are key in explaining changes in discourses in the societal debate on shale gas in The Netherlands?

To be able to constructively build upon current knowledge some sub-questions are formulated. First the theoretical framework from chapter 2 of this document needs to be elaborated on. After that data is gathered on events, stakeholder discourses and the role that actors played in the public debate. Finally, the data on events, discourses and actors can be integrated into a meaningful whole to be able to draw conclusions, to indicate what lessons can be learned and to recommend on further research. This results in the following research sub-questions:

1. Which dynamic aspects can be identified in the societal debate on shale gas in The Netherlands?

2. Which actors were involved in the societal debate on shale gas in The Netherlands and what was their role?

3. Which discourses can be identified in the societal debate on shale gas in The Netherlands and how did these discourses develop over time?

4. Which intended and unintended events are key in the societal debate on shale gas in The Netherlands?

5. How are the actors, the events and the discourses of the societal debate on shale gas in The Netherlands related and which lessons can be learned?

1.4 Research justification

1.4.1 Scientific Relevance

Societal debates in renewable energy projects have been a widely studied topic. The dynamics in societal debates are important to explain what is going on. Dynamics are defined as:

"Macroscopic behaviour of a system as a whole conditional upon (external) conditions and (internal) feedback" (Schweitzer 2012, p37).

Thus, multiple aspects together explain change. Events alone cannot explain changing discourses. An analysis of the interaction process in societal debates, characterised by feedback and external influences, is needed to explain how such changes occur. In other words, the dynamics in the societal debate can explain shifts in support. Thus, a study on the dynamic aspects of societal debates is needed.

Since the combination of methods used in this study is relatively new, an explorative study was chosen. Both quantitative and qualitative methods were used to study the dynamics. Mixing these methods enables the study to capture a more holistic view on the dynamic aspects studied, because it 'illuminates behaviour in context' (Cronbach, 1975; Jick, 1979). This research uses a software based quantitative analysis to study recurring patterns in text. Besides that, it uses an event history analysis to create more quantitative data. This quantitative approach has not often been used to study societal debates. Because this quantitative basis is chosen for the research, results will be less dependent on the researcher. But, more importantly, the quantitative basis makes it easier to bring the research to the next step; hypothesis testing and model creation (Poteete, Janssen, & Ostrom). Moreover, qualitative data from interviews aided in the interpretation of the quantitative data as well as in a critical reflection on it.

1.4.2 Practical Relevance

An increasing amount of studies show that public debates might be the constraining factor for implementing new energy initiatives (Devine-Wright, 2011; Heras-Saizabitoria, Cilleruelo, & Zamanillo, 2011; Mallett, 2007; Sauter & Watson, 2007; Assefa & Frostell, 2007). Multiple actors start recognizing the importance public support, e.g. EA, regional and local governments and NOGEPA (the association of oil & gas companies operating in The Netherlands) (Rijksoverheid, 2013e; Gemeente Noordoostpolder, 2013; Gemeente Boxtel, 2011a; NOGEPA, 2013a). In order to understand how public support develops it is necessary to understand the dynamics in societal debates.

The research of W+B (requested by EA) did not result in a situation of public support, as it was intended. Therefore, the minister of EA decided to take no decisions yet and announced a new investigation on the impact of shale gas exploration and production (Rijksoverheid, 2013e). In order to learn lessons from the decision-making process on shale gas, a study should be carried out on the societal debate that was held, up to the September release of the first research results by the EA. It has been suggested that involving all stakeholders in a proactive manner might improve the decision-making process and pave the way for new developments (El-Gohary, Osman, & El-Diraby, 2006). Diversity in decision-making processes is suggested in order to enrich it with different types of expertise, knowledge and values (Cuppen, 2012). Such an approach is expected to result in a supported outcome, acceptable for most stakeholders. In order to understand the process behind this approach, it is necessary to understand how discourses develop along a timeline.

Hence the focus of this study is aimed at the development of discourses over a longer period of time.

1.5 Research approach

Based on the research questions a research approach could be set up. Figure 3 shows this approach and indicates the chapters of this report that elaborate on the specific elements of the research. The research consists of 4 phases: A literature phase, a desk study, an interview phase and an integration phase.

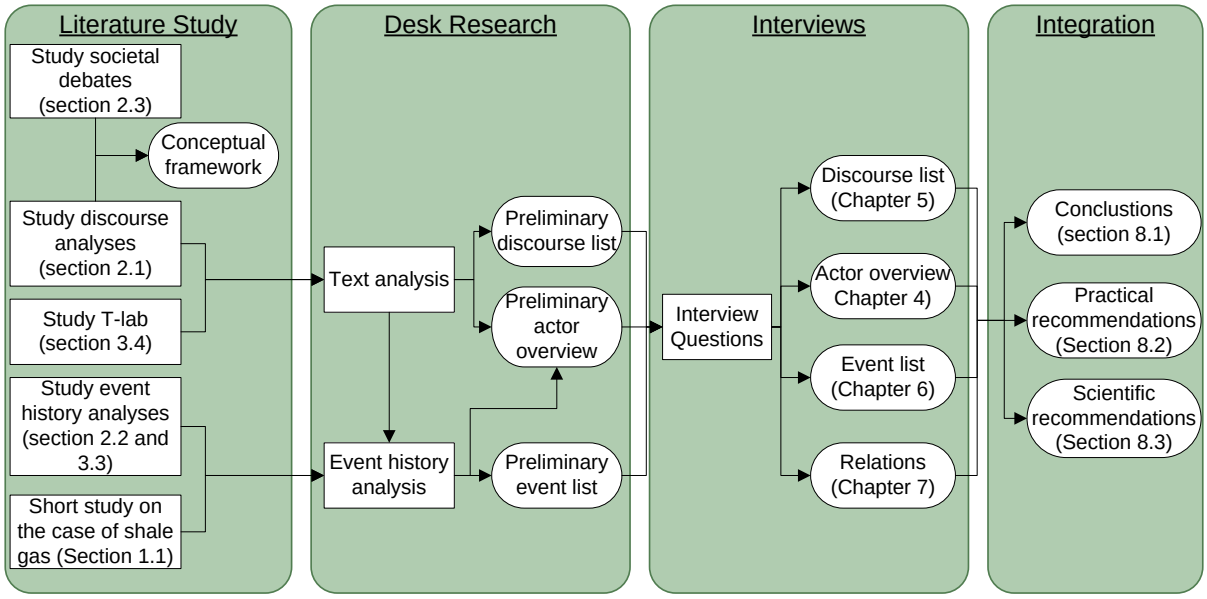


Figure 3 Research approach. This figure shows the approach of research that was used and the corresponding chapters in this report.

Chapter 2 Theory

Content

This chapter will give a short and limited overview of the literature relevant for the proposed research. Section 2.1 will introduce societal debates and the impact of multiple discourses on such debates. This section will first explain the concepts discourses and discourse coalitions. The process of coalition formation will be dealt with next, followed by the dynamics behind striving for dominance by discourse coalitions. Finally, the manner in which these concepts can be studied will be introduced.

Section 2.2 will identify some important contextual events for decision-making processes. Section 2.3 will give a short summary on the dimensions of social acceptance in order to identify this study's focus. And finally, section 2.4 will summarize all knowledge in one conceptual framework that will be used for the proposed study.

2. Theory

2.1 Discourses and societal debates

When decision-makers became more dependent on other stakeholders, more emphasis was placed on the argument exchange between these stakeholder groups (Runhaar H. , 2009). This leads to the following definition of a decision-making process:

Decision-making processes can be seen as an on-going struggle and exchange of arguments between actors with a different discourse that strive to make their discourse dominant (Runhaar, 2009).

Thus, to study the dynamics in societal debates, it would be interesting to study and explain changes in discourses. The definition of Runhaar suits the definition of dynamics used in this research:

"Macroscopic behaviour of a system as a whole conditional upon (external) conditions and (internal) feedback" (Schweitzer 2012, p37)

The exchange of arguments can be seen as internal feedback and external events can improve the legitimacy of these arguments. In order to clarify the definitions the concept discourse will be explained.

2.1.1 Discourses and discourse coalitions

At the basis of many public debates lies a conflict in norms and values. Different norms lead to different arguments and solutions for a specific issue (Rittel & Webber, 1973). Such issues are also called wicked problems. The basis of this conflict can be found in a variety of discourses, the world is viewed in different ways.

In social sciences discourses refer to frames through which meaning is given to social or physical phenomena, and discourses can explain how actors perceive and understand the world (Runhaar, Runhaar, & Oegema, 2010). In this case, frames refer to how communication is structured, the language that is used to communicate and to other properties of text, talk, verbal interaction or communicative events (Dijk, 1993). Discourses should be seen as something intrinsic to stakeholders and not as the definitions that in science is often used for frames: a strategic lens that is placed upon an event or topic.

This explains that the actors involved in a decision-making process can give different meanings to a project's alternatives, i.e. the solutions proposed, and to contextual events occurring during the decision-making process. Different meanings given to a situation result in different actions taken. Actions can refer to more research, request for permissions, etc. At the core of discourse theory lies the assumption that language is not used to reflect on the world in an objective way. On the contrary, it is used to create and change the world (Healey, 1997), so it is strategically used and determines the actions of a stakeholder or stakeholder group (Jorgensen & Phillips, 2002).

A different discourse results in the actor highlighting different facets of the situation or event (Entman, 2003). This means that discourses not only influence the way an event is perceived, but also determine whether or not an event is noticed. Or as social constructivists put it:

"*Reality cannot be discovered, it does not exist prior to its social invention.*" (Kim, 2001 p.3)

Besides that, actors can also change their beliefs and discourses as a result of events in the issue's context (Sabatier, 1998). To understand how this works some deeper understanding is needed on the types of beliefs and on the process of learning. This will be explained in the next sections (section 2.1.2 and 2.1.3).

2.1.2 Beliefs and the impact of events

Sabatier's 'Advocacy Coalition Framework' (ACF) can be used to explain how values can act as a glue that holds individuals together in an advocacy coalition (Sabatier, 1998), e.g. a strategic coalition of stakeholders. In accordance with the ACF the beliefs can be placed in a hierarchical tree structure (Figure 4).

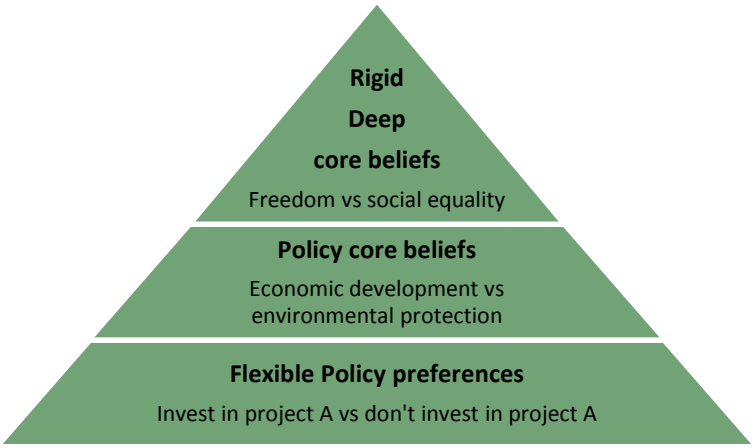


Figure 4 Sabatier's Hierarchy of beliefs from the 'Advocacy Coalition Framework.

At the top-level deep core beliefs can be seen, such as freedom versus social equality (core beliefs of different political streams).

The next level consists of policy core beliefs that refer to normative commitments and causal perceptions. Normative commitments are:

"Strategies for realizing core values within the subsystem, such as the appropriate division of authority between governments and markets, the level of government best suited to deal with the problem, and the basic policy instruments to be used." (Sabatier, 1998; p. 103)

Causal perceptions refer to the perception of the seriousness of the problem and the value that is given priority. The typical example Sabatier gives for a value priority consideration is economic development versus environmental protection. Policy core beliefs show a large overlap with the definition of discourses used in this research. This policy core level is indicated as the glue in coalition formation and could thus strategically be used to come to a supported outcome for policy making.

At the lowest level are policy preferences, the beliefs on the relative importance of causal factors and the evaluation of other actors' performance.

For each deep core belief, a hierarchy can be made. For example, freedom can be said to be achieved by economic development and therefore it can be argued that the government needs to invest in a

specific project that increases employment. As another example, social equality can be said to be reached by a fair distribution of income and thus it can be said that the government needs to implement a progressive tax system.

As explained before, events can change people's beliefs. Sabatier explains that the depth of the belief determines the ease with which the belief can be changed. Core beliefs are most rigid. On the other side, preferences from the lowest level can be changed somewhat easier as a result of experiences or the availability of new knowledge. Policy core beliefs, discourses, can be changed as a result of accumulating knowledge (Weiss, 1977).

The ACF can be related to the theory of discourses. Dependent on the way the world is viewed specific beliefs will be formulated, which in turn lead to diverse policy goals. Each actor group's interest is to reach this goal and will formulate a strategy on how to achieve this. When discourses change, the actors will reformulate their beliefs, goals and strategies. Since discourse changes provide the basis for changes in these aspects of a debate, this study will focus on discourse changes. To understand how discourses change it is necessary to study the concept of learning.

2.1.3 Discourse development and the concept of learning

During societal debates actor groups learn as a result of an interaction process; they influence each other's discourses, and potentially develop a common thinking process (in the consensus building case) (Eiser, 1986). Based on the object of learning, learning can be divided into two levels (Figure 5).

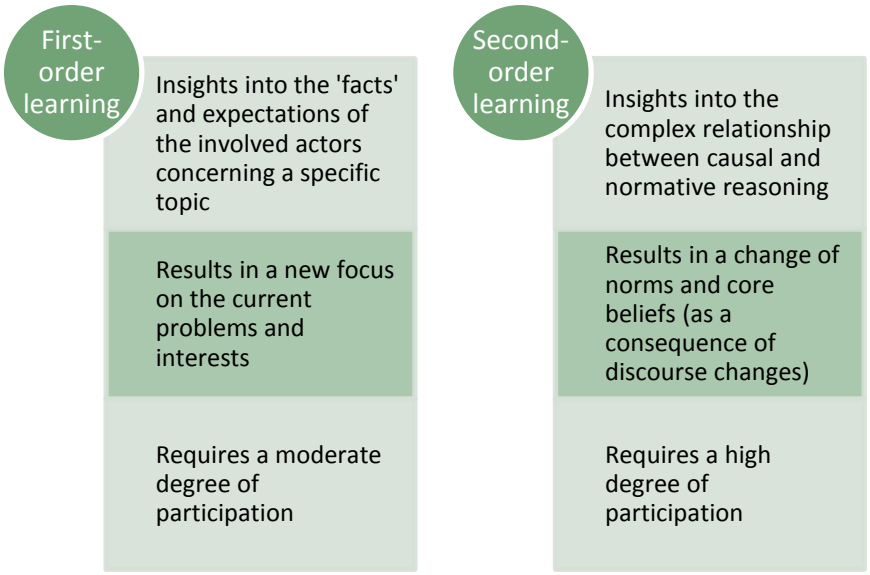


Figure 5 The characteristics of two types of learning (Kerkhof, 2004).

Discourse changes can be related to second-order learning, e.g. gaining new insights into the complex relationship between causal and normative reasoning. This means the actors start understanding the existence of multiple discourses. Second-order learning follows from a deconstruction of claims by new evidence or through a process of argumentation which cause claims to lose their factual status (Kerkhof, 2004). This type of learning results in a change of norms and core beliefs and can in this way be related to the ACF.

2.1.4 Striving for dominance

Section 2.1.1 explains that in decision-making processes often multiple discourse coalitions can be identified. Discourse coalitions are defined as groups of actors that share the same discourse (to some extent). It has been described that certain discourses can become more dominant along the decision-making process (Hajer, 2005; Broër, 2008). These dominant discourses can control the political agenda setting and policy formulation of an issue or problem (Weible, Sabatier, & McQueen, 2009). A dominant discourse can be recognised when multiple documents share the same structure or that the discourse has become institutionalised in policy (Hajer, 2005). Although dominant discourse coalitions have a certain level of power, they can be challenged by other coalitions that use information strategically in order to win political battles, e.g. winning elections, adopting motions or reaching a common agreement (Sabatier & Weible, 2007).

As explained in section 2.1.2 accumulating evidence can cause a change in the beliefs underlying the discourse. Sabatier introduced that information gained from external events can give an impulse to discourse coalitions to revise their beliefs (Sabatier, 1998). Therefore, the impact of events on discourses will be studied in more detail. To be able to study changes in discourses this study will perform a media analysis to identify discourse coalitions. The next section will explain this in more detail.

2.1.5 How discourses can be identified.

In literature, two approaches for discourse analysis are explained: a linguistic approach and an argumentative approach (Herten & Runhaar, 2012). The first focuses on language and is often used in human behavioural studies. The second focuses on arguments and is mostly used in studies into decision-making (Eaten, 1999; Sharp & Richardson, 2001).

Discourses can be abstracted by the researcher by deep reading (Broër, 2008). Another strategy is using a software package to assist in analysing texts (Waes, 2013; Sengers, Raven, & Venrooij, van, 2010). As explained before, discourses refer to how communication is structured, the type of language that is used to communicate and to other properties of text, talk, verbal interaction or communicative events (Dijk, 1993). Text analysis software could unravel the structure of text and thus give an indication on the discourses. This study uses the software package T-lab, which will be explained in section 3.4.

2.2 The influence of context on societal debates

2.2.1 Identifying events

Events can be used to gain more legitimacy for arguments of a discourse. This section will introduce such events. Several authors indicated a relationship between disasters and decision-making (Wiering & Immink, 2006; Birkmann, et al., 2010; Meijerink, 2005; Farley, et al., 2007). Ecological crises, such as declining animal populations, climate change and decreasing water quality, might form an opportunity for change (Olsson, et al., 2006; Scodanibbio, 2011; Österblom & Sumaila, 2011).

Moreover, a relation between decision-making and both environmental impact assessments (Runhaar H. , 2009) and economic crises (Aberbach & Christensen, 2001) can be seen. Khayesi and Amekudzi (2011) and Kugelberg, Jönsson and Yngve (2012) indicate that political factors, such as the national political system and the membership of political unions, turned out to be critical for decision-making processes. In Canada for instance, the 2010 Olympics were used as an argument to implement a new mental health initiative (Macnaughton, Nelson, & Goering, 2013).

2.2.2 Unintended and intended events

In order to structure contextual events, the concept of "intent" is used to divide the events in two groups; unintended events and intended events (Table 3). Unintended events can be split up in physical events, e.g. natural disasters, and non-physical events which include economic developments and other developments abroad (political decisions, documentaries, research reports).

In this research 'unintended events' also refers to actions of actors outside the boundaries of the societal debate. Since the study only focuses on the Dutch societal debate, and thus on Dutch actors, events abroad will be interpreted as unintended. Chapter 4 indicates which actors are covered within the boundaries of the societal debate.
'Intended events' refers to events that include actor's strategic actions, such as press releases, petitions, street protests or the publication of research reports or environmental impact assessments.

Table 3 Event classification

Intention	Type	Actor
Intended	Internal	EBN
	External (Operating)	Ministry of Economic Affairs
		Cuadrilla
	External (Other)	Other actors
Unintended	Natural	-
	Economic	-
	Development abroad	-

2.3 Three levels of societal debates

A large research base exists on the field of societal debates. Many authors focus on the acceptance of renewable energy technologies. An overview of these can be seen in Wüstenhagen et al. (2007). According to these studies social acceptance can be divided into three dimensions, 1) community acceptance, 2) market acceptance and 3) socio-political acceptance (Wüstenhagen, Wolsink, & Bürer, 2007). This can be seen in Figure 6. This research will focus on the latter. Section 2.3.3 will explain why.

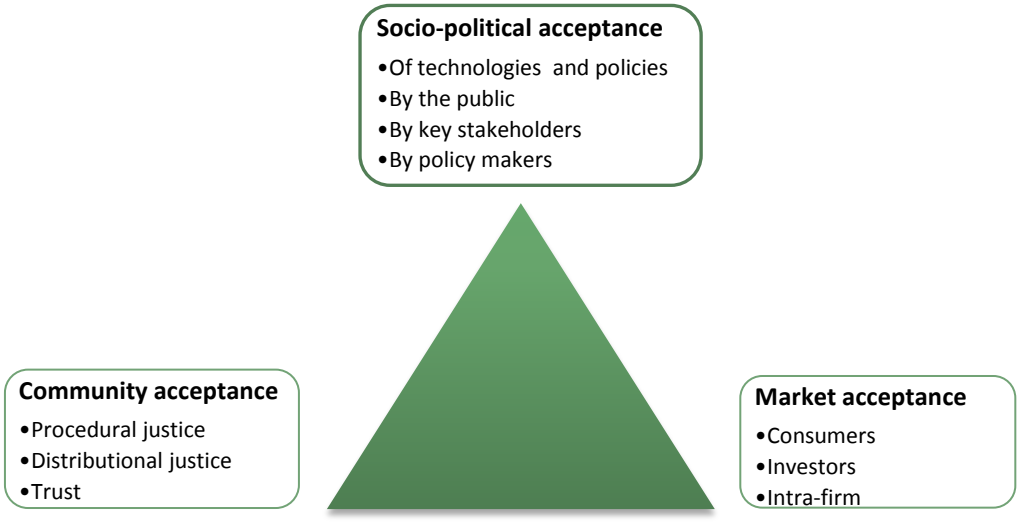


Figure 6 The triangle of social acceptance. Adapted from (Wüstenhagen, Wolsink, & Bürer, 2007)

2.3.1 Local community

Community acceptance is the acceptance by locals, in this case the inhabitants of the municipalities Boxtel and Haaren, located in the province of Brabant, and the Noordoostpolder. Community acceptance builds upon three factors; the expectations on procedural justice, e.g. whether the actors expect a fair decision-making process, the expectations on distributional justice, e.g. whether the costs and benefits are perceived to be distributed fairly (Gross, 2007), and the trust in investors and actors outside the community (Huijts, Midden, & Meijnders, 2007). This dimension was the primary focus of a previous study on shale gas (Pikaar, 2011).

2.3.2 Market adoption

Market acceptance means that the product or service is sold or used. Research into the process of market adoption can partly explain the processes involved in market acceptance. The existence of multiple adopter types results in the need for different types of communication towards these actors (Rogers, 1995). Rogers' research mainly focused on the consumers of a certain technology. Investors, the actors that provide the financial support for the same technology, influence market acceptance as well (Maruyama, Nishikido, & Iida, 2007).

Next to that, intra-firm acceptance issues can negatively influence market acceptance. Cognitive barriers within firms are explained by (Bansal & Roth, 2000).

Finally, the actions of international companies in different countries and the policy development in those countries affect market acceptance as well (Wüstenhagen, Wolsink, & Bürer, 2007). The latter provides a link to socio-political acceptance (section 2.3.3); because large firms often have a significant influence in political financial decisions they can influence the socio-political acceptance positively (Wüstenhagen, Wolsink, & Bürer, 2007).

2.3.3 Society and Politicians

Socio-political acceptance is the acceptance by policy actors and other key stakeholders, such as companies, large environmental organisations or other non-governmental organisations (NGO's). Socio-political acceptance is dependent on key stakeholders and policy actors, which should recognise that there are acceptance issues to be able to implement effective policies and technologies. The implementation of new policies or technologies can become easier when multiple successful examples (at other locations) exist (Toke, Breukers, & Wolsink, 2008).

Effective policies would build a framework that could enhance market and community acceptance. It is suggested that the institutional context influences community acceptance by means of the interactions between stakeholders (Walker, et al., 2011). This is a highly dynamic process and a simplification is shown in Figure 7.

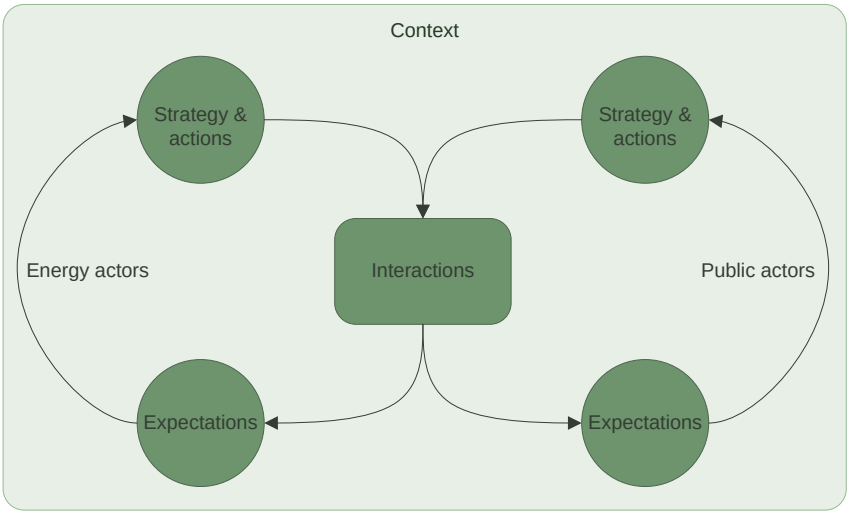


Figure 7 A theoretical framework for social acceptance in renewable energy projects.
Adapted from **(Walker, et al., 2011)**.

Since socio-political acceptance can be seen as a starting point for social acceptance, this study will mainly focus on the social-political dimension. The next chapter will integrate the knowledge from section 2.1 and 2.2 to come to one conceptual framework that will be used in this research. The main idea that context influences acceptance by means of stakeholder interactions was used as a basis in this research since it covers the main dynamic aspects of societal debates.

2.4 Integrating previous knowledge: the conceptual framework

This section integrates the knowledge from previous chapters into one conceptual framework (Figure 8) that is used in the proposed study. The framework will be illustrated with a simple example (Table 4), considering only three actors. In real life often more actors are involved, making the issue more complex.

2.4.1 Discourses, coalitions and contextual events

As explained in section 2.1 and 2.2 events can be strategically used. How this influences the decision-making process can be seen in Figure 8. Effect 1 shows that events can change a discourse. Changes in discourses can be categorised as follows:

Changes in the actors within or between discourse coalitions
Changes in the size of the discourse coalitions
Changes in the dominance of the discourse
Changes in the discourse focus, in terms of themes brought forward
Changes in the overlap with other discourses in terms of the type of language used

The first two dimensions will not be studied within this research. When events lead to an increase in discourse dominance, this is called 'amplification'. When a discourse itself changes, a new discourse is created or additional sub-themes can be counted to a certain discourse, then this is called 'broadening of the societal debate'. The opposites of amplification and broadening are 'abating' and 'polarisation'. Chapter 3 will elaborate on these four effects.
Next to that, the discourse of a stakeholder determines how the event is perceived and how it is explained or used (2). This results in some specific strategies and actions, like public statements, the initiation of a study or the organisation of protest. These actions result in an interaction process (3). This interaction process as well, can make an actor change its discourse. For example, research results can convince an actor to make adaptations to its arguments. Or one could think of a powerful actor making a statement or the release of an explaining documentary, etc. This results in effect 4 in the figure. The strategic actions in turn can lead to strategic actions of other actors, making the interaction highly dynamic. The complexity of these dynamics makes it difficult to predict the reactions of other actors. The response to an action can be different than expected when the strategy was formulated. Therefore, as for events, outcomes can be intended and unintended.
Mostly, one event alone does not lead to discourse changes, but multiple events together could lead to changes. During the interaction process certain discourses may gain or lose dominance.
Moreover, the discourse coalitions might show more and more overlap. When one discourse is becoming significantly more dominant, or when discourse coalitions start to overlap, the stakeholders involved might come to a decision. This can be a supported outcome, a consensus or a top-down decision by one actor or a small group of actors (5). The outcome does not necessarily mean that all actors agree that the decision is the ultimate solution. Some actors might recognise that they are in a minority position (the other discourses are becoming more dominant) and might agree with the decision on some conditions or in exchange for some other benefits. Appendix A illustrates the potential outcomes of a societal debate. The illustrating example in Table 2 describes a simple imaginary case on a local debate about the safety of a specific road.

In conclusion, the conceptual framework identifies two types of events: Unintended events and intended events. The latter is represented by discourse strategies and actions. These actions can be the actions of one actor or a group of actors.

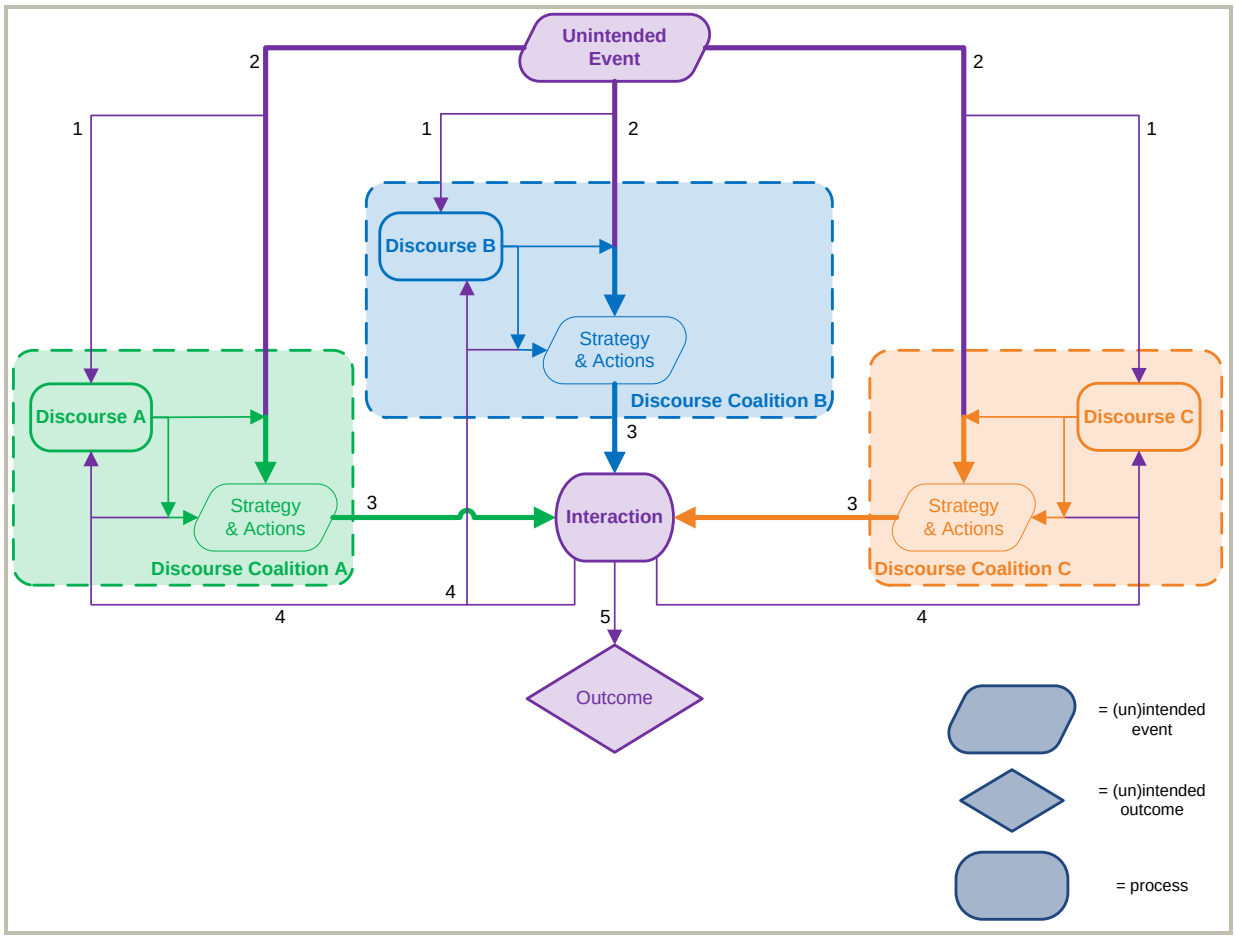


Figure 8 Conceptual framework for discourse analysis in decision-making processes.

Table 4 Illustrating example on the conceptual framework for discourse coalitions in decision-making.

Road safety
The occurrence of an accident on a specific road can be used as an argument to lower the speed limit of that road by actor A, the authority of the local municipality. However, actor B, living near the road, argues that more speed controls are needed on the specific road. Actor C, needed to finance the project, for example believes that no changes are needed to the road and might argue that other aspects caused the accident. The event can lead to actors taking several actions, carrying out research into the safety of the road, like the taking of more interviews for newspaper articles, or like the organisation of a public meeting. Besides that, an event can also change a specific discourse. Actor C believed no changes to the road were needed. This could be changed when for example an accident occurs with a near family member. Suddenly, this actor will see accidents in the past as well. Discourses can also change as an effect of the interaction between stakeholders. One of the actions of actor A could be investing in an investigation of the road's safety. The publication of a report of this investigation might give actor C new insights resulting in the actor to see the event from actor A's perspective. In the ideal case after multiple rounds of interactions, in which discourses might have changed as well as the composition of the discourse coalitions, the actors might come to a decision and for example decide to change the speed limit of the road.

Chapter 3 Method

Content

This chapter will elaborate in more detail on the methods used. First, section 3.1 will elaborate on the case design used. Section 3.2 will introduce the software T-lab and explain part of the content analysis in more detail, the event history analysis. Section 3.3 explains the second part of the content analysis, the thematic cluster analysis. Section 3.4 will elaborate on the interviews and finally section 3.5 will give a general overview of the research phases and planning.

3. Method

In the previous chapter it was explained that changes in the decision-making context might lead to changing stakeholder discourses. If context influences the discourses on shale gas exploration and production, it should be seen that the discourses change when the context changes over time. Therefore discourse changes over time are studied. During the research both quantitative and qualitative methods were used to identify the changes in discourses and context. The study used an adapted version of Runhaar's discourse approach:

Decision-making processes can be seen as an on-going struggle and exchange of arguments between actors with a different discourse that strive to make their discourse dominant (Runhaar, 2009).

This means that in societal debates an interaction can be seen between several discourse coalitions, e.g. groups of actors that share the same discourse (to some extent). To represent society a database of newspaper articles was set up and the analysis of these newspapers identified the societal discourses; what they look like and how they developed over time, e.g. changing dominance. Next to that, events were studied. Thereafter, the knowledge gained on the dynamic aspects of societal debates, e.g. actors, discourses and events (chapter 2), was integrated and related to each other. The research consisted of several analysis methods:

Frequency analysis
Event history analysis
Thematic cluster analysis
Interviews

A frequency analysis was done on the gathered newspaper articles to identify periods of time in which important events took place as well as to serve as a basis for the identification of periods of times in which discourses potentially change. The assumption was made that discourse changes can be seen after a period with a peaking publication level. The event history analysis resulted in a list of events and an indication of their impact. The thematic cluster analysis was performed to identify societal discourses and to study their development. It was investigated how changes in discourses can be explained by looking at events. Also, it was investigated whether or not an event that came forward as important in the event history analysis had an influence on the discourses.
Both the event history analysis and the thematic cluster analysis were used to identify the important actors and their role and both analyses were performed with assistance of the newspaper database and the software T-lab. The results were interpreted qualitatively. Thereafter, a number of semi-structured interviews with experts[1] were carried out in order to validate and supplement the results. The interviews could identify potential relations between the dynamic aspects of societal debates (actors, discourses and events) and aid in a critical reflection on media analyses.

3.1 Single case design

Since little is known on the relation between contextual factors and discourses in a societal debate, an explorative approach is used to find the relevant variables needed for a viable theoretical framework on the dynamics in societal debates. Only 3 factors of societal debates will be studied: actors, events and discourses. This way only the main causal relations will be identified. One case is selected to study the dynamics in societal debates in more detail. The advantage of using only one case is that a holistic approach can be taken, which takes context into account. This makes it possible to grasp the complexity of societal debates and to take into account the interplay between factors.

[1] Experts are actors that have a significant amount of knowledge on the contextual and discourse changes of the societal debate.

Discourse changes occur because of a combination of factors and not because of a set of independent effects. Moreover, the time dimension, which is taken into account in the research, results in an extra level of complexity. Therefore, the selection of only one case allows for more in-depth research.
Another problem with multiple-case studies is the problem of heterogeneity. Cases often have several differences in nature. In the case of societal debates, societies can differ in culture or in knowledge of and experience with a specific issue. This makes it difficult to compare the cases and to explain different outcomes. To prevent heterogeneity of issues, this study focuses on only one case.
Besides that, studying the history of a case can be helpful to identify lessons that can be learned.
The case of the first shale gas exploration in The Netherlands is selected because of its publicity and dynamic nature. This might lead to interesting insights in the processes behind public debates.
Moreover, the case has a high availability of documentation, i.e. 1000 newspaper articles in the database LexisNexis, which makes it useful for several statistical tests.

3.2 Data collection

A dataset was set up with newspaper articles from national and regional newspapers (Table 5 and appendix B). The search word '*schaliegas*' (Dutch word for shale gas) was entered into the database LexisNexis. The search was limited to a period of 30 months: November 2010 to April 2013. This period was chosen for practical reasons: the software package used for the thematic cluster analysis (explained in section 3.4) is not able to assign more than 30 different labels per variable. Therefore, it cannot analyse more than 30 months at once. The articles were labelled with the variables ID-number, newspaper, year, month, and day. Thereafter, a frequency analysis was carried out (appendix B).

Table 5 Overview newspapers

National newspapers	Local and regional newspapers	Specialist Journals	Newsmagazines
ANP	Brabants Dagblad	Boerderij	Elsevier
Financieel Dagblad	Stentor	Boerderij Vandaag	Forum (VNO-NCW)
Algemeen Dagblad	Gelderlander	Cobouw	Groene Amsterdammer
Volkskrant	Eindhovens Dagblad	Groente & Fruit	Vrij Nederland
Trouw	BN de Stem		
NOS	Dagblad de Limburger		
Reformatorisch Dagblad	Zeeuwse Courant		
Telegraaf	Leeuwarder Courant		
NRC Handelsblad	Leidsch Dagblad		
Nederlands Dagblad	Limburg Dagblad		
NRC Next	Twentsche Courant Tubantia		
Spits	Haarlems Dagblad		
Pers	Gooi & Eemlander		
Metro	IJmuider Courant		
	Dagblad van het Noorden		
	Noordhollands Dagblad		
	Parool		
	Almere Vandaag		

3.3 Event history analysis

A list of events was created and the events were coded to be able to draw conclusions on what type of events causes discourse shifts. Events vary in duration and visibility. For this reason the investigation focused on the duration of events and their frequency of recurrence.

Moreover, events can be intended or unintended (chapter 2). Intended events were appointed to one or multiple actors. The unintended events were categorised in natural events, economic events and events from abroad. Finally, actors used events in different ways. In other words, they can be

used to argue why shale gas exploration and production is desirable or not. Events that were mostly used to argue in favour of shale gas exploration and production in The Netherlands were coded with '+'. Events that were most often used to argue against shale gas exploration and production in The Netherlands were denoted with '-'. Events that were used for both were labelled with '0.'
This resulted in a Bit-map (Table 6) which was validated in a small internal interview at EBN. The events were found in previous analyses on the Dutch shale gas debate and in the newspaper database (Metze, 2013; Pikaar, 2011). Moreover, the elementary context analysis (section 3.4) and the interviews (section 3.5) supplemented the list of events. Although the discourse analysis mainly focuses on the national level, the research on events will take events on both national and international level into account. International events can influence the Dutch societal debate as well. Since they cannot be influenced or caused by the Dutch actors involved, international events are interpreted as unintended events. Events that did take place within the national context, but not intended by one of the actors involved were interpreted as unintended events as well; for example court decisions.

Table 6 Example BIT-MAP for Shale Gas Events, adapted from (Ven & Poole, 1990). The table is showing imaginary results, no conclusions can be drawn from this table.

Event information				Intended event			Unintended event			Outcome		
1	Research report A	5	20	1	1	0	0	0	0	0	0	1
2	Research report B	20	30	0	0	0	0	0	1	0	1	0
3	Documentary	30	300	0	0	0	0	0	1	1	0	0
4	Moratorium	4	50	1	0	0	0	0	0	1	0	0
5	Debate Lower House	20	2	1	0	0	0	0	0	0	1	0
6	Earthquakes	24	300	0	0	0	1	0	0	1	0	0

When the list of events was established and the events coded, the events were analysed on their importance with respect to changes in the societal debate. Events with an occurrence in the newspapers of higher than 25 and a duration of longer than 100 days were identified as highly important. Events with a long term impact, a high duration, but with low visibility were identified as medium important.
Next to that some events were identified as potentially important events. These events were expected to be important, based on the conceptual framework, but did not show high levels of visibility or a long duration.
These three types of important events were all placed on a plain list of events and were used as a basis for the interviews (section 3.5).

3.4 Thematic cluster analysis and the software T-lab

The software package T-lab was used to identify discourses and discourse developments. T-lab uses linguistic and statistical tools to analyse texts, such as newspaper articles (T-LAB di Lancia Franco, 2013). The software assists the researcher in finding meaningful patterns in text files in a systematic way. Furthermore, it makes it possible to analyse a larger dataset of texts, which gives statistically better, and therefore more representative, results. The software also makes the research results less dependent on the researcher's interpretation.
T-lab uses a dataset (corpus) in which the newspaper articles can be labelled with for example the publication date, the newspaper or author. This makes it possible to analyse either the whole corpus or part of it, to investigate how parts of the corpus are related to the analysis. T-lab also allows the user to exclude frequently occurring words that are not meaningful, like 'the', 'a', 'are', 'at', 'really', 'moreover', by creating a stop list. Next to that, a multi word list can be created to be able to analyse multi words, like 'United States', 'European Parliament', 'cubic meters', but also names, like 'Brabant Water'. Before this is done, T-lab normalizes the text file, e.g. it discards unreadable characters and

double spaces and it reduces capital letters to regular letters. Then, in case of languages recognised by T-lab, it lemmatizes the corpus, which means that all forms of a word are placed under one lemma or lexical unit (e.g. 'belong' and 'belonging' will be placed under the lemma 'belong'). Thereafter, the vocabulary list is reduced using the stop word list and the multi word list. Finally, the software selects key-terms by using a threshold value for word occurrences so that the number of lemmas is small enough for the software to be able to perform its analyses. The key-terms list can be manually corrected by the user, which is a necessary step when another language is used than the software recognises, e.g. Dutch. The software's tools enable a wide range of analyses. This research uses a 'Thematic Cluster Analysis'.

3.4.1 Thematic cluster analysis

In order to identify the different discourses a thematic cluster analysis was run. This provided the basis for the interview phase and enables conclusions to be drawn on the present discourses. The cluster analysis reveals the most important themes of the arguments used over a period of time.
As a first step of the analysis T-lab divides the newspaper articles into elementary contexts, also called context units (CU); sentences, chunks of text of comparable length or paragraphs (T-LAB di Lancia Franco, 2013). In this research chunks of approximately 50 words were used. To create chunks, the software looks in the text for a full stop (.) and carriage return (enter). If the chunk between such full stops is larger than 400 characters, T-lab searches for other punctuation marks (in the order: ? ! ; : ,) to break up the text.
Then, occurrence (lemma x chunk) and co-occurrence (lemma x lemma) matrices are created (Sengers, Raven, & Venrooij, van, 2010). These matrices characterize each chunk of text with the lexical units that occur in it and each lexical unit is characterized by the lemmas it often occurs together with. Thereafter, the software uses the bisecting K-means technique to find thematic clusters within the text consisting of contexts that show high similarity in words and word sequence.

The K-means technique starts with one clusters and then functions in the following way (Steinbach, Karypis, & Kumar, 2000):

1. Choose a cluster to split.
2. Find 2 sub-clusters.
3. Repeat step 2 a number of times and choose the clustering with the highest similarity level within the clusters.
4. Repeat step 1, 2 and 3 until the similarity within the new cluster falls below a threshold level.

The number of clusters in the output is chosen by the software by using the highest number of clusters for which the separation between clusters increases with an increasing number of clusters. For example, in the table below the software would select a separation into four clusters, because increasing to five would decrease the gap.

Number of clusters	Gap
2	0.026
3	0.094
4	0.16
5	0.12

Manual selection of the number of clusters is also possible. After creation of the clusters, T-lab applies a chi-square test to the occurrence matrix in order to show which lemmas are typical to a cluster (a higher chi-square value means the lemma is more characteristic to the cluster) (T-LAB di Lancia Franco, 2013). T-lab also places the clusters that were found on a multi-dimensional graph; in case of 3 clusters a two-dimensional graph, in case of 4 clusters a three-dimensional graph, etc. The axes are called factors. For the first factor the spread between the clusters is highest. Then, with increasing factor number the clusters show a lower spread.

Next to that, the software provides a list of elementary contexts (or context units) which are typical to a cluster. These contexts were read to identify the most dominant discourse within the cluster.
Moreover, the clusters were analysed on their similarity. Since the K-means technique uses hierarchical clustering methods (it starts off with one cluster) it can be studied which cluster is the parent and which is the child. T-lab graphs such analyses in a dendrogram (appendix F).
Because the analysis was mostly determined by the final months of the public debate studied, due to higher publication levels in this period (Figure 9), the dataset (or corpus) was split up in multiple smaller datasets.
Besides the overrepresentation of peak publication periods, another trend was seen. Figure 10 shows an increase in the publication level of national newspapers, e.g. Volkskrant, Financieel Dagblad, Telegraaf, Algemeen Dagblad and NOS. A regional newspaper of Noord-Brabant, Brabants Dagblad, published at a higher rate in the starting period of the societal debate. Since regional and national newspapers are expected to bring forward different arguments and thus could lead to different clustering, the dataset should be studied in separate time periods.

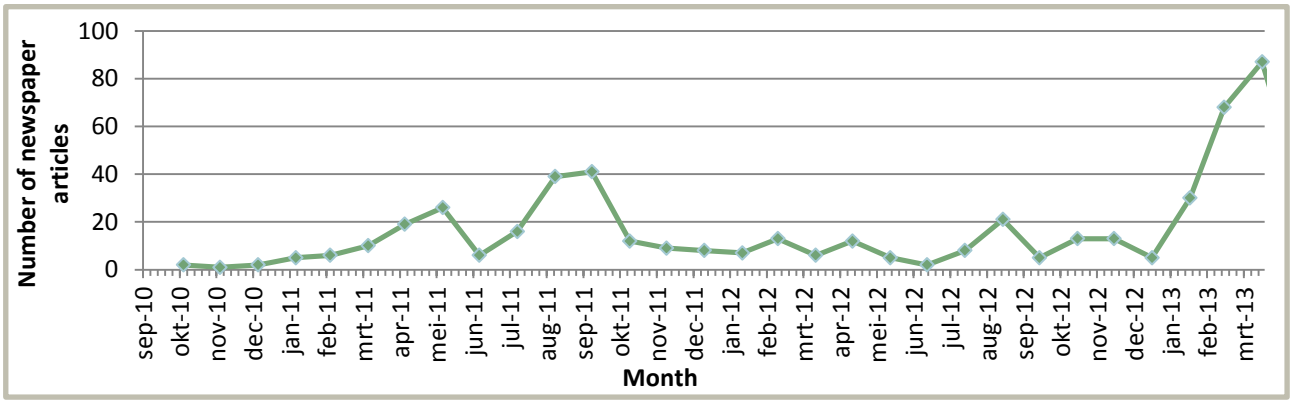


Figure 9 Number of newspaper articles. The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013.

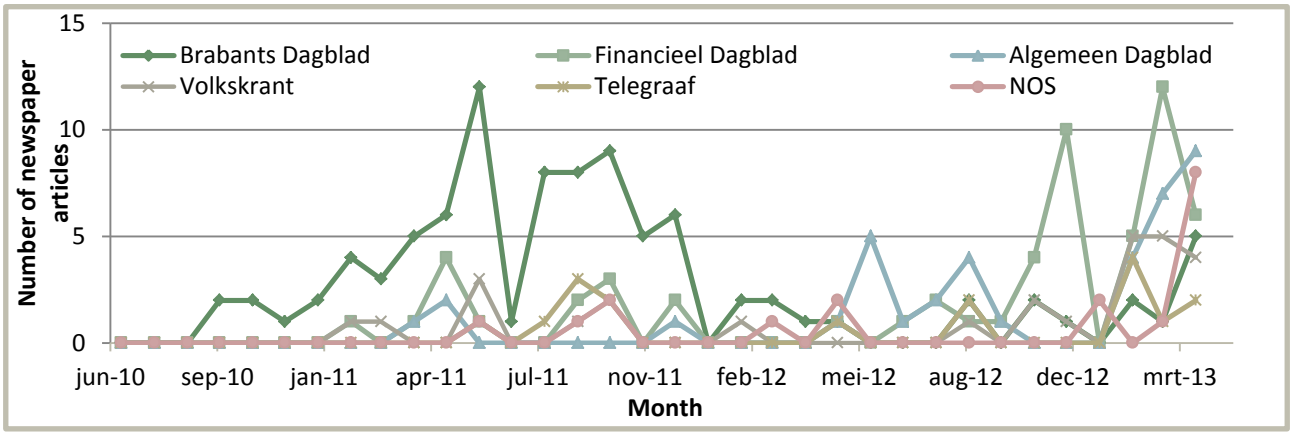


Figure 10 Frequency Analysis for a selection of the newspapers. The 3 newspapers with the highest publication level and the 3 newspapers with the highest printed copies were selected.

3.4.2 Dataset split by time period

The time during which the shale gas debate took place was split up into various small time periods based on the results of the frequency analysis and the events identified (Table 7 and appendix H). Peak publication periods were separated from periods with lower publication levels. A peak was defined as a period of increasing publication level and a minimum publication level of 19. In case of an increase larger than 200% the requirement on number of publications was omitted. This way all time periods could fulfil the T-lab requirements. A corpus of approximately 30 kB is needed for statistically reliable analyses (Lancia, 2013). Thereafter, a thematic cluster analysis was performed for each of the eight datasets. The analyses were performed multiple times to test reliability.

The thematic clusters that were found for the eight separate time periods were analysed and the elementary contexts appointed by T-lab were read to connect the clusters to four themes; technical aspects, international developments, political developments and procedural developments. These themes will be explained further in section 5.1.1. An overview over time was made for the clusters' themes, content, key events, key developments and dominance. Based on the categorisation into themes a frequency analysis was performed on the number of elementary contexts per theme (over time). Thereafter cluster nearness was studies using the dendrograms produced by T-lab (appendix F).

Table 7 Time period breakdown. The breakdown into 8 periods was based on the publication level and the dataset's size.

Month	Number of articles	Increase (%)	Size (kB)
nov-10	2		4
dec-10	1	-50%	2
jan-11	2	100%	4
feb-11	5	150%	8
mrt-11	6	20%	14
apr-11	10	67%	31
mei-11	19	90%	42
jun-11	26	37%	56
jul-11	6	-77%	29
aug-11	16	167%	29
sep-11	39	144%	104
okt-11	41	5%	67
nov-11	12	-71%	20
dec-11	9	-25%	16
jan-12	8	-11%	10
feb-12	7	-13%	17
mrt-12	13	86%	22
apr-12	6	-54%	17
mei-12	12	100%	21
jun-12	5	-58%	7
jul-12	2	-60%	6
aug-12	8	300%	26
sep-12	21	163%	37
okt-12	5	-76%	9
nov-12	13	160%	35
dec-12	13	0%	25
jan-13	5	-62%	7
feb-13	30	500%	78
mrt-13	68	127%	158
apr-13	87	28%	192

Time period	Number of articles	Size (kB)
Nov'10 – Apr'11	26	61
May'11 – June'11	45	98
July'11 – Aug'11	22	58
Sept'11 – Oct'11	80	171
Nov'11 – July'12	74	132
Aug'12 – Sept'12	29	62
Oct'12 – Jan'13	36	74
Feb'13 – Apr'13	185	426
Total	497	1082

3.5 Interviews

With the methodology as described above, it is not possible to find causal relations between events and discourses. Therefore semi- structured interviews are conducted to come to more reliable conclusions. Ten experts were asked about the events, actors and discourses of the Dutch societal debate on shale gas. Moreover, the interviewees were questioned about the role of the media.

The goal of the semi-structured interviews was to validate and supplement the results, to identify potential relations between actors, discourses and events and to aid in a critical reflection on media analyses. This way, the interviews aided in the interpretation of the previous result.

A list of interviewees can be seen in Table 8, the interviewee information (organisation and interview date) can be seen in appendix C and the interview questions can be seen in appendix D.

Table 8 Interview list

Shale gas	
EZ	Policy officer
Cuadrilla	Implementer
IMSA	Mediator
TNO	Scientist
CIEP	Scientist
University of Tilburg	Scientist
University of Utrecht	Scientist
Volkskrant	Journalist
Telegraaf	Journalist
Independent Journalist	Journalist

The interviewees were asked to identify important events. Subsequently, the previously mentioned plain list of important events (section 3.3) was shown in order to validate the list. The results were coded and can be seen in appendix I. Next to that, the event history analysis was adjusted in accordance with the interview results. Events that were not in the event history list were added. Events that were named important at least twice were added to the list of important events. Events that were on the list, but were specified as unimportant by all interviewees were removed from the list.

The interviewees were also asked to identify important discourses and discourse developments. An overview of the identified discourses can be seen in appendix G. The recognized developments were used to help in setting up the story line for chapter 6.

The questions related to the actors involved, led to a list of actors and their roles and learning moments. These data were used for chapter 4 and chapter 6. Moreover, a list of lessons to be learned from the Dutch societal debate on shale gas was created to be able to elaborate on how actors can deal with the dynamics of debates (chapter 8). The interviews were also asked about the role of the media (appendix E).
Finally, the interviews identified some relations between events, actors and discourses; meaning was given to the events. An overview was created consisting of events and effects (Table 9). This list was used for the story line in chapter 6. Five different types of relations can be seen; triggering, broadening, amplification, polarization and abating. Events can give reason for an actor to come into action, which leads to another event (trigger). Events can also lead to the addition of a new discourse or the visibility of this discourse (broadening). Next to that, events can cause a discourse to gain more or less dominance (amplification and abating). Lastly, events can polarise the societal debate. This means that actors are less inclined to reflect on their discourses.

Table 9 Example overview of the relations between events, actors and discourses.

Event	Event type	Relation	Effect	Effect event type	Source
Event A	Intended Actor A	Trigger	Event B	Intended Actor B	Interviewee A
Event B	Unintended	Broadening	Add discourse A	X	Interviewee A and B
Event C	Intended Actor B	Amplify	Discourse B	X	Interviewee C
Event A	Intended Actor A	Polarisation	X	X	Interviewee B
Event E	Intended Actor C	Trigger	Learning moment C	Actor C	Interviewee A

3.6 Operationalisation of the conceptual framework

The reasoning behind the choice of method can be summarized with Figure 11. The most important analysis type is shown in black. Of course, the analyses supplement each other. This is not shown in the figure .

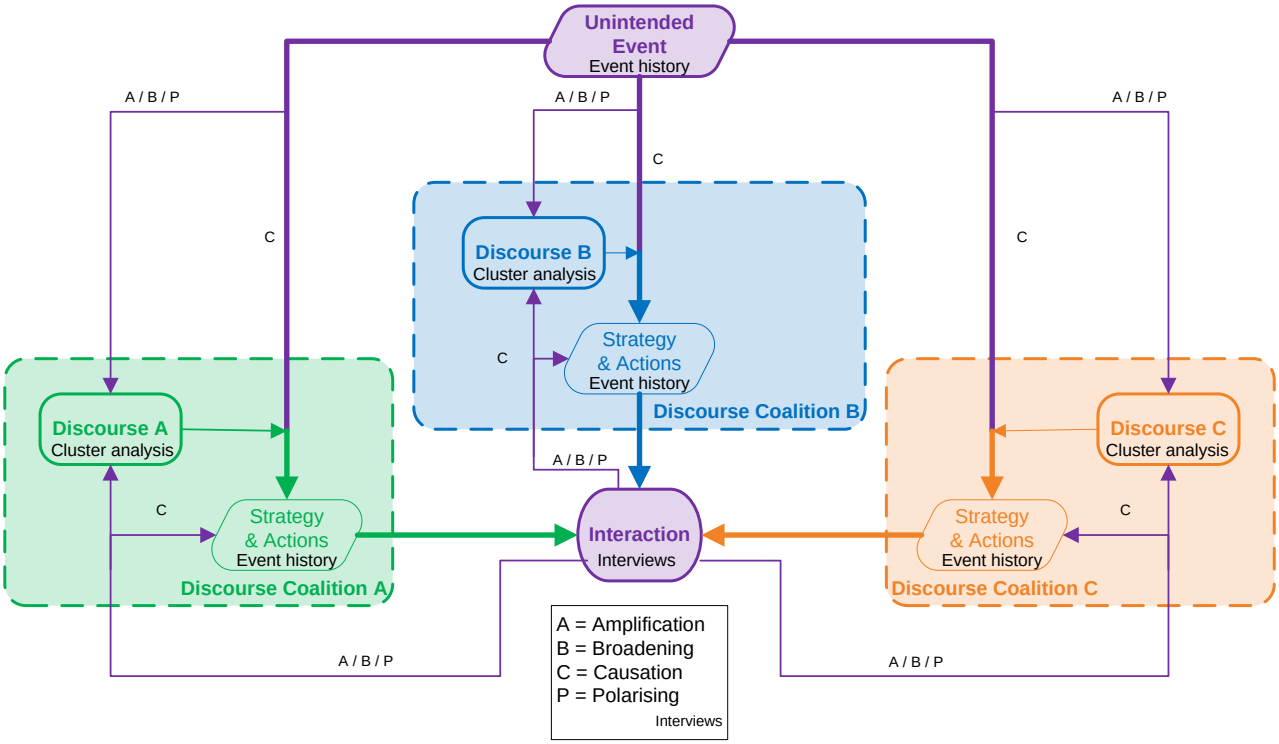


Figure 11 Link between conceptual framework and methodology.

Chapter 4 Actors' roles and interests

Content

In order to understand the contents of this research it is important to be familiar with the actors involved in the societal debate. During the media analysis and interviews several actors were identified. This chapter will give a description of the most important actors needed to understand the contents described in the next chapters. A short overview is given on these actors' roles and interests.

4. Actors' roles and interests

The list in Table 10 introduces the actors that were perceived to have had the most significant impact on the public debate. A more detailed list could be given, but this would only bring in more complexity and not improve the understanding of the societal debate. Since the Dutch shale gas debate started in the Province of Noord-Brabant, when Cuadrilla announced its plans, this actor is described in more detail. Other oil and gas companies that planned to invest in shale gas exploration in The Netherlands are categorized under a common denominator. Moreover, in case of actor groups the most important role for the debate was used. However, not all actors from such a group could be appointed to these roles.

Table 10 Actor overview of the Dutch societal debate on shale gas. Only the actors that have a significant impact on the societal debate are listed.

Sector	Actor	Description	Formal and debate role	Interest
Oil and Gas Industry	Cuadrilla Resources Ltd.	English oil and gas exploration and production company.	Permit holder of the Noord-Brabant and Noordoostpolder concessions. Explain shale gas exploration and production and inform actors on the benefits and risks of shale gas exploration (Cuadrilla, 2013).	Explore potential of natural gas from shale in Noord-Brabant and Flevoland.
	EBN B.V.	State owned company that invests in oil and gas exploration and production of hydrocarbons in Dutch territory.	Invest in exploration, production and underground storage of natural gas and oil in The Netherlands in order to safeguard income and security of supply of natural gas (EBN, 2013b). The role in the debate was gaining and sharing knowledge of subsurface potential and possible exploration and production.	Gain knowledge on the opportunities of underground resources (EBN, 2013a).
	Oil and gas companies that plan(ned) to invest in The Netherlands	Hutton Energy, Gallic Energy, BNK General Partner.	Permit holders of other location's concessions. Make the debate more national.	Respectively exploring shale gas in Noord-Brabant and Limburg, Limburg and Zeeland, Gelderland and Midden-Nederland.
	Oil and gas companies that invest abroad	Shell, CNPC (PetroChina), Chevron, BHP, BP.	Shale gas producers abroad. Bring international developments into the debate.	Produce gas in i.e. China, Poland, Ukraine and US.
	NOGEPA	Association that represents companies that explore and produce oil and gas in The Netherlands (NOGEPA, 2013b).	Protect the interest of companies that explore and produce oil and gas in The Netherlands. Urge EA to gain public support by being more transparent (IMSA, 2013; Energeia, 2013).	Enhance economic sustainability in a safe, environmentally friendly and socially responsible manner (NOGEPA, 2013c).

Sector	Actor	Description	Formal and debate role	Interest
Banking sector	Rabobank	Dutch bank.	Protect the interests of clients. File lawsuit against Cuadrilla.	Safeguard integrity and continuity of its data centre, which is located near Cuadrilla's project site in Boxtel.
Energy-intensive Industry	Energy-intensive companies	BASF, Bayer, Dow.	Producing semi-finished and finished goods. Draw attention to the European competitive position.	Low gas prices, availability of gas condensates and long-term security of supply
Water sector	Brabant Water	Drinking water company from Noord-Brabant.	Produce dinging water. Set conditions for shale gas exploration in Noord-Brabant.	Safeguard aquifers to provide clean drinking water and provide water for fracking operations.
	Vitens	Drinking water company for Flevoland, Friesland, Gelderland, Utrecht, Overijssel and Noord-Holland.	Produce drinking water. Draw attention to the potential of aquifer contamination.	Safeguard underground water aquifers to provide clean drinking water and provide water for fracking operations.
	Vewin	Dutch association for water companies	Protect the interests of Dutch water companies. Draw attention to the potential of aquifer contamination.	Represent drinking water companies.
Governmental organisations	Lower House	Representatives of society	Represent society. Check EA on the topic of shale gas.	Defend societal interests.
	Ministry of Economic Affairs	Long-term legislation and policy developer	Develop legislation and policy. Carry out transparent decision-making process and later a procedural decision-making process (Economische Zaken, 2013a).	Protect state income, the Dutch mining climate and the environment (Economische Zaken, 2013a).
	Staatstoezicht op de Mijnen (SodM)	Advisor of EA and supervisor of mining activities	Advise EA on exploration permits. Explain shale gas can be explored safely.	Establish a safe mining climate
	'Commissie MER'	Environmental Impact Assessment Committee	Advise EA on its research on the risks of shale gas exploration. Take a critical stance in the media and give an impulse to the debate.	Ensure quality of study.
	'Klankbordgroep'	An advisory organ consisting of representatives from several stakeholders[2].	Advise EA on its research on the risks of shale gas exploration. Take a critical stance in the media and give an impulse to the debate.	Ensure quality of study.

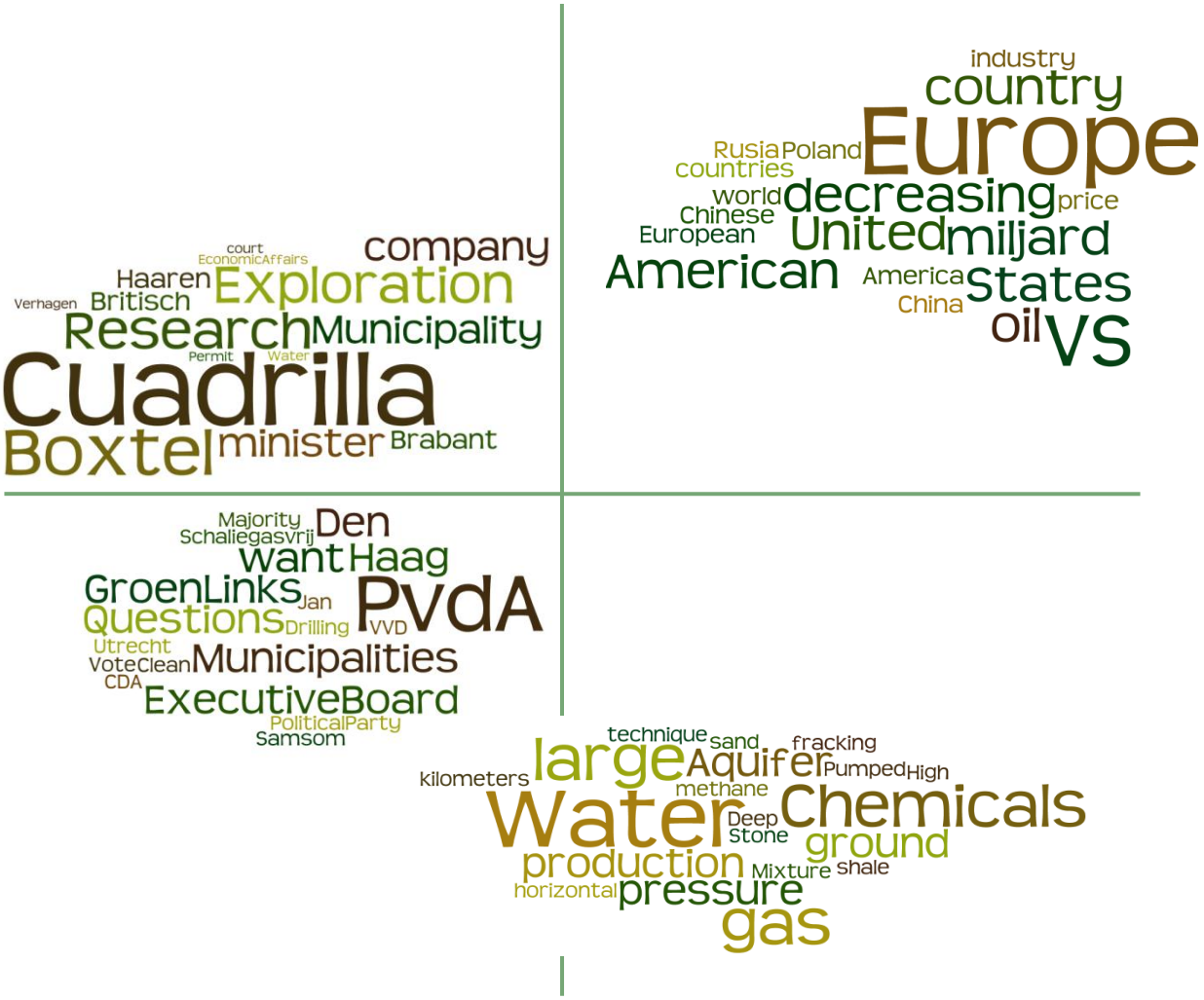
[2] Members of the 'Klankbordgroep': Province of Noord-Brabant, Municipality of Boxtel, Municipality of the Noordoostpolder, Milieudefensie, Vewin, Schaliegasvrij Haaren, NOGEPA, a so called independent researcher.

Sector	Actor	Description	Formal and debate role	Interest
Follow up governmental organisations	Province of Noord-Brabant		Advise EA on exploration permits. Take a critical stance in the media and give an impulse to the debate.	Ensure sustainable energy transition in the province of Noord Brabant.
	Municipality of Boxtel	Exploration location of Cuadrilla	Licensing authority of environmental permit. 'Owner' of drilling location area. Initially defender of permit. Set conditions for shale gas exploration and take a critical stance in the debate.	Ensure economic development in the municipality of Boxtel, ensure a fair distribution of costs and benefits and protect the area's environment.
	Municipality of Haaren	Exploration location of Cuadrilla	Potential licensing authority of environmental permit. Set conditions for shale gas exploration and take a critical stance in the debate.	Ensure economic development in the municipality of Haaren, protect the area's environment.
	Municipalities in the Noordoostpolder	Exploration location of Cuadrilla	Potential licensing authority of environmental permit. Set conditions for shale gas exploration and take a critical stance in the debate.	Ensure economic development in the area of the Noordoostpolder and a sustainable energy transition.
	Other municipalities	Potential exploration location of shale gas	Represent local interests. Force involvement	Ensure economic development in their municipality and a sustainable energy transition.
NGO's	Milieudefensie	National NGO	Limit environmental damage in The Netherlands. Campaign against shale gas and bring the debate to a national level.	Ensure a sustainable energy transition
	Brabantse Milieufederatie (BMF)	Regional NGO	Limit environmental damage in Noord-Brabant. Coordinate and fund local initiatives	Stimulate and preserve nature and environment.
	Gelderse Milieufederatie (GMF)	Regional NGO	Limit environmental damage in the Gelderland. Coordinate and fund local initiatives	Stimulate and preserve nature and environment.
	Schaliegasvrij Haaren, Schaliegasvrij Boxtel, Schaliegasvrij Noordoostpolder, Schaliegasvrij Nederland	Local and national protest Groups.	Limit environmental damage caused by shale gas exploration and production at a specific location. Campaign against shale gas and bring the debate to a national level.	Block all shale gas activities in The Netherlands.

Sector	Actor	Description	Formal and debate role	Interest
Research institutes	TNO	Research institute	Perform research on i.e. geology. Explain risks, nuance and bring facts into the debate (TNO, 2013).	Transparency of knowledge.
	Royal Haskoning	Engineering company that provides independent advice on technical issues.	Study the relation between the earthquakes in Blackpool and fracking, translate English report on shale gas exploration to the Dutch situation, and calculate the CO_2-impact of gas import from Russia. No important role was played in the debate.	Perform research for EBN and Cuadrilla. Potentially perform future commercial projects.
	Scientists	TU Delft	Research and explain new innovations to society. Explained risks of fracking and bring facts into the debate.	Ensure knowledge sharing.
		Professor transition management of the Erasmus University of Rotterdam.	Research and explain new innovations to society. Publish an anti-shale-gas-manifest.	Ensure knowledge sharing and a sustainable energy transition.
	IEA	International Energy Agency	Provide authoritative statistics, analysis and recommendations at the heart of the global dialogue on energy (International Energy Agency, 2013). Published largely discussed report which predicts a potential golden era for gas.	Ensure reliable, affordable and clean energy (International Energy Agency, 2013).
	Consortium of Witteveen + Bos, Fugro and Arcadis	Dutch engineering and consulting agency.	Research the risks and safety of shale gas. No significant role was played in the societal debate.	Perform research for EA.
	HCSS	Centre for strategic studies that analyses issues of international and national security and defence (HCSS, 2013).	*"Helps governments, non-governmental organizations and the private sector to understand the fast-changing environment and seeks to anticipate the challenges of the future with practical policy solutions and advice"* (HCSS, 2013). Bring geopolitical arguments into the debate.	Ensure knowledge sharing.

Sector	Actor	Description	Formal and debate role	Interest
Media	Written media	Multiple newspapers. (i.e. Brabants Dagblad, Trouw, RTL Nieuws)	Explain innovations and describe the pros and cons of these innovations (appendix E). Inform society and amplify the debate (appendix E). Respectively use the Dutch law on openness of governmental information to find out the contents of the chemicals used for fracking, publish anti-shale-gas-manifest of 55 Dutch professors and reports on the conclusions of preliminary versions of the report of EA.	Explain situation at the right moment (appendix E).
	Television	i.e. Tegenlicht, Brandpunt, Een vandaag	Explain innovations and describe the pros and cons of these innovations (appendix E). Polarise and amplify the debate (appendix E). Respectively show Gasland, a documentary on the US shale gas revolution, a surprised farmer from the Noordoostpolder.	Explain situation at the right moment (appendix E).
	Radio	i.e. BNR	Explain innovations and describe the pros and cons of these innovations (appendix E). Polarise and amplify the debate (appendix E). Broadcast debate between sustainability researcher and HCSS.	Explain situation at the right moment (appendix E).
Society	Local residents of Haaren	Live nearby project.	Campaign against shale gas.	Safety and low spatial impact.
	Local residents of Boxtel	Live nearby project.	Campaign against shale gas.	Safety and low spatial impact.
	Local residents of the Noordoostpolder	Live nearby project.	Campaign against shale gas.	Safety and low spatial impact.

Chapter 5 Discourses



Content

This chapter describes the results of the cluster analysis. The cluster themes are presented in section 5.1. Moreover, it explains which discourses can be recognised within these clusters. Section 5.2 elaborates on the analyses performed on eight separate time periods. Changes in cluster dominance are explained as well as additional information that came forward on the discourse content during the in-depth study on the separate time periods.

5. Discourses

5.1 Thematic cluster analysis

An elementary context analysis was performed with the software package T-lab. Words from 497 newspaper articles were clustered based on their co-occurrence. This resulted in four clusters. The cluster was automatically labelled with the lemma with the highest Chi-square value, leading to the following labels: 'Water', 'Europa', 'Cuadrilla' and 'PvdA'. 'Cuadrilla' refers to the company which holds an exploration permit for shale gas in the province of Noord-Brabant. 'PvdA' is a social-democratic Dutch political party. Table 11 shows the most central words of the clusters. Table 12 shows a few characteristic newspaper article quotations for the four clusters.

5.1.1 Themes

From Table 11 and Table 12 it can be concluded that the cluster 'Water' elaborates on the technical aspects of the hydraulic fracturing technology, or fracking. The cluster 'Europa' shows words that refer to international developments. Several countries are mentioned within this cluster. 'Cuadrilla' elaborates on procedural issues, like permit requests (vergunning), appeals to court (rechter), and research (onderzoek) on the risks of fracking that was requested from the ministry of Economic Affairs (Economische Zaken) by several actors. The cluster 'PvdA' refers to political developments. It mentions political parties and words like motion (motie), The Hague (the location of the Dutch national government) and majority (meerderheid). This cluster refers to both national and local politics.

Table 11 Four thematic clusters. The clusters were retrieved from a Thematic Cluster Analysis with the software T-lab. A high Chi-square value means the corresponding lemma is co-occurring with other lemmas from the cluster in a large extent. The Clusters are labelled with the lemma with the highest Chi-square value. (The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013.)

Cluster Water		Cluster Europa		Cluster Cuadrilla		Cluster PvdA	
Lemma	X^2	Lemma	X^2	Lemma	X^2	Lemma	X^2
water	658.942	Europa	610.902	Cuadrilla	762.408	PvdA	485.6
chemicaliën	512.99	VS	320.48	Boxtel	566.274	motie	239.022
Zand	379.711	China	255.409	proefboring	463.671	boringen	160.135
gesteente	312.07	miljard	249.178	proefboringen	335.373	GroenLinks	152.778
Druk	244.546	Amerikaanse	200.774	onderzoek	296.11	tegen	132.263
Hoge	241.315	Polen	187.222	bedrijf	286.385	VVD	123.007
fracking	164.274	olie	186.597	Haaren	253.349	Jan	109.52
grondwater	158.54	landen	180.834	gemeente	236.485	partij	106.885
gespoten	131.522	_NEWSP_FD	155.802	Britse	201.259	Schoon	106.879
grond	131.228	Europese	144.715	Vergunning	195.291	Den_Haag	102.198
Grote	126.817	wereld	141.043	Economische_Zaken	157.327	college	100.849
Gas	114.954	Rusland	134.257	wil	145.718	meerderheid	97.577
diepte	114.862	Verenigde_Staten	129.052	minister	137.863	Schaliegasvrij	93.792
mengsel	97.872	Amerika	127.748	Verhagen	131.703	vragen	93.288
schalie	90.672	prijs	123.413	rechter	110.491	CDA	88.698
methaan	86.733	industrie	121.52	Brabantse	108.685	willen	87.038
techniek	83.973	land	118.293	Brabant_Water	107.377	gemeenten	84.393
kilometer	79.076	Minder	111.871	ministerie	105.434	Utrecht	81.231
gewonnen	78.57	Chinese	111.627	AUTHOR_MWIJDEVE	103.925	Nee	76.927
horizontaal	76.89					Samsom	74.212

Table 12 Characteristic newspaper article quotations. The quotations are characteristic 'elementary contexts' of four thematic clusters from a Thematic Cluster Analysis with the software T-lab. The Clusters are labelled with the lemma with the highest Chi-square value and a list of 20 elementary contexts was automatically created. A high Chi-square value means the corresponding elementary context is more characteristic for the cluster. (The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013.)

Cluster Water	*"Om het gas vrij te laten komen, wordt de schalie horizontaal doorboord en worden onder hoge druk grote hoeveelheden water, zand en chemicaliën in de bodem gespoten. Hierdoor breekt het gesteente. Het zand houdt de ontstane scheurtjes open. De mix van water en chemicaliën wordt weer opgepompt en moet als zwaar chemisch afval worden verwerkt."* (X^2 = 218.765) *"Schaliegas wordt gewonnen via een proces waarbij onder hoge druk water, zand en chemicaliën in de bodem worden gepompt. Daarbij wordt veel water gebruikt en er kan ook seismische activiteit ontstaan. Het afvalwater kan mogelijk vervuiling van het grond - en oppervlaktewater veroorzaken."* (X^2 = 153.945)
Cluster Europa	*"Industrie lijdt onder hoge energieprijs in Europa. Schaliegas zet VS op voorsprong. De zware industrie in Europa kan steeds moeilijker concurreren met Amerikaanse bedrijven door een groot verschil in de prijs van energie. De opmars van goedkoop schaliegas in de VS geeft Amerikaanse concurrenten een groot voordeel."* (X^2 = 70.202) *"De productie zou kunnen oplopen tot 20 miljard m^2 over 15 jaar. In totaal heeft Oekraïne naar schatting ongeveer 1. 200 miljard Kubieke meter schaliegas in de grond zitten. De voorraden zijn de op twee na grootste in Europa, op Frankrijk en Noorwegen na. De overeenkomst met Oekraïne is een doorbraak in Europa."* (X^2 = 54.369) *"Op termijn zal het jaarlijks tenminste 7 miljard dollar moeten opleveren, aldus de Oekraïense minister van Energie. Het land heeft een van de grootste voorraden schaliegas in Europa. Gastekorten. Oekraïne wordt met de productie van schaliegas minder afhankelijk van gas uit Rusland. De import van Russisch gas leidde eerder tot spanningen en gastekorten."* (X^2 = 53.767)
Cluster Cuadrilla	*"Voorbereidingen proefboring Boxtel opgeschort. Het Britse bedrijf Cuadrilla begint voorlopig niet met de voorbereidingen voor een proefboring naar schaliegas in Boxtel. Directeur Frank de Boer van Cuadrilla Resources Nederland heeft dat dinsdag gezegd in reactie op de uitspraak van de rechtbank in Den Bosch die oordeelde dat Boxtel ten onrechte ontheffing heeft verleend voor de proefboring."* (X^2 = 343.637) *"waar het Britse bedrijf Cuadrilla een proefboring wil doen in Helvoirt. Het ministerie van Economische_Zaken heeft het bedrijf een vergunning verleend voor twee proefboringen in Brabant, maar het laatste half jaar is daar veel verzet tegen gerezen. Niet in de laatste plaats in Haaren, waar de gemeenteraad ook nog een vergunning moet afgeven."* (X^2 = 165.189) *"De gemeente wacht de uitkomsten van een onderzoek naar de mogelijke risico's en gevolgen af. Cuadrilla heeft van de rijksoverheid toestemming om in Brabant en Flevoland proefboringen te doen. In Boxtel en Haaren zijn al vooronderzoeken uitgevoerd. Het bedrijf laat desgevraagd weten dat nog niet bekend is waar de eerste proefboring zal zijn."* (X^2 = 157.038) *"Locaties proefboring Flevoland geselecteerd. Het Britse bedrijf Cuadrilla heeft twee mogelijke locaties in de Noordoostpolder uitgekozen voor een proefboring naar schaliegas. De komende weken laat het bedrijf op de twee plekken onderzoek doen om een definitieve keuze voor één plaats te maken. Het bedrijf heeft dat vrijdag aangekondigd."* (X^2 = 147.566)
Cluster PvdA	*"Kamermeerderheid voor schaliegas. Een meerderheid in de Tweede Kamer is voorstander van het boren naar schaliegas. Na de VVD is nu ook de PvdA om. Maar PvdA-Kamerlid Jan Vos benadrukt dat zijn partij de boringen alleen steunt als het schoon en veilig kan. De Tweede Kamer debatteert vandaag over het winnen van schaliegas. De VVD had al gezegd dat de partij voor de boringen is."* (X^2 = 72.228) *"GroenLinks is verbaasd:'In 2011 steunde de PvdA een Kamerbrede motie waarin zij als voorwaarde voor schaliegaswinning aangaf dat er sprake moest zijn van lokaal draagvlak, noodzaak voor winning en dat het schoon en veilig moest zijn.'Volgens GroenLinks-Kamerlid Liesbeth van Tongeren is daar geen sprake van. De lokale fractie van de PvdA Flevoland heeft aangegeven teleurgesteld te zijn."* (X^2 = 47.330) *"Buren keert zich tegen boringen schaliegas. Op het grondgebied van de gemeente Buren mag niet geboord worden naar schaliegas. Dat antwoordt het college van B&W op vragen van de PvdA. Deze fractie zal een motie van die strekking indienen. Inmiddels hebben 26 gemeenten in Midden-Nederland zich uitgesproken tegen proefboringen naar schaliegas."* (X^2 = 43.398)

5.1.2 Discourses

Within the clusters dominant discourses can be recognised by using the 20 characteristic 'elementary contexts' that the software automatically provides (Table 12).

In the cluster 'Water', on the technical aspects of fracking, an explanation of the technology fracking is mostly linked to the concerns in society about the risks of this technology, for their safety and for the environment. Subjects like earthquakes and water contamination come forward.

The cluster Europa mostly refers to economic interests. Words like 'profit' (Table 12) and 'prices' (Table 11) come forward. Besides that, the cluster refers to geopolitical interests as well. For example, 'independence' (onafhankelijkheid) from Russia is mentioned (Table 12). Later in this study it will be shown that this cluster also brings forward beliefs on sustainability. During the societal debate these issues are often taken together as 'utility and necessity' (nut en noodzaak). Therefore, this discourse is labelled as 'Utility and Necessity'.

Within the cluster 'Cuadrilla' the discourse 'Procedural Justice' is most dominant. Formal objections against Cuadrilla's permit, received from the municipality of Boxtel, were made in court. This pointed out fallacies in the permitting process. Moreover, within this cluster the word 'research' was often brought forward together with the concerns from several stakeholders on a study issued by the ministry of Economic Affairs. The research institutes performing the research, e.g. Witteveen + Bos, Fugro and Arcadis, were not believed to be independent by several actors. This implies they would have a stake in publishing positive results. Moreover, the scope was perceived as too narrow and local aspects were not taken into account.

In the cluster 'PvdA' national political parties and local municipalities bring forward the importance of public support (draagvlak) for a decision (Table 12). Several political parties respond to what appears to be a sudden switch in opinion by a large, social-democratic political party (PvdA), and several municipalities are mentioned in a so called 'shale-gas-free-campaign' in which they are said to have declared themselves 'shale gas free' (Schaliegasvrij). Many municipalities give the low level of public support as a reason.

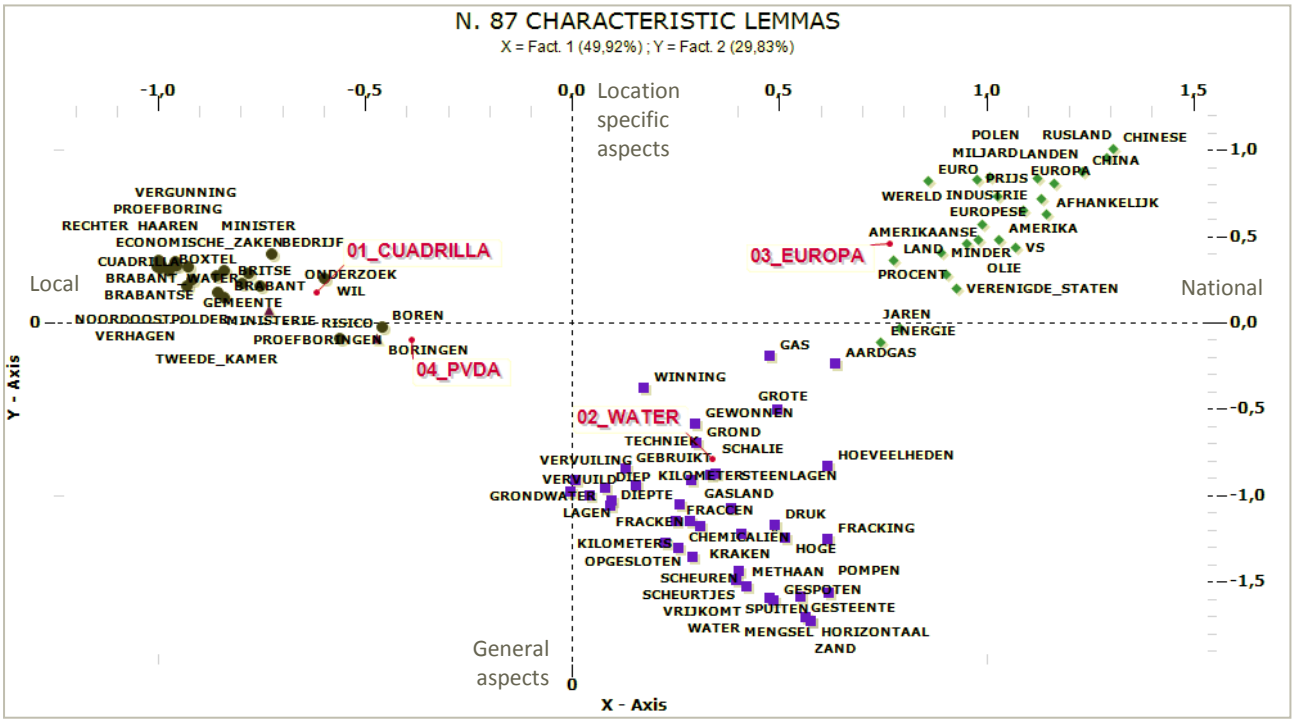


Figure 12 Clusters of an Elementary Context Analysis mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts. (The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013.)

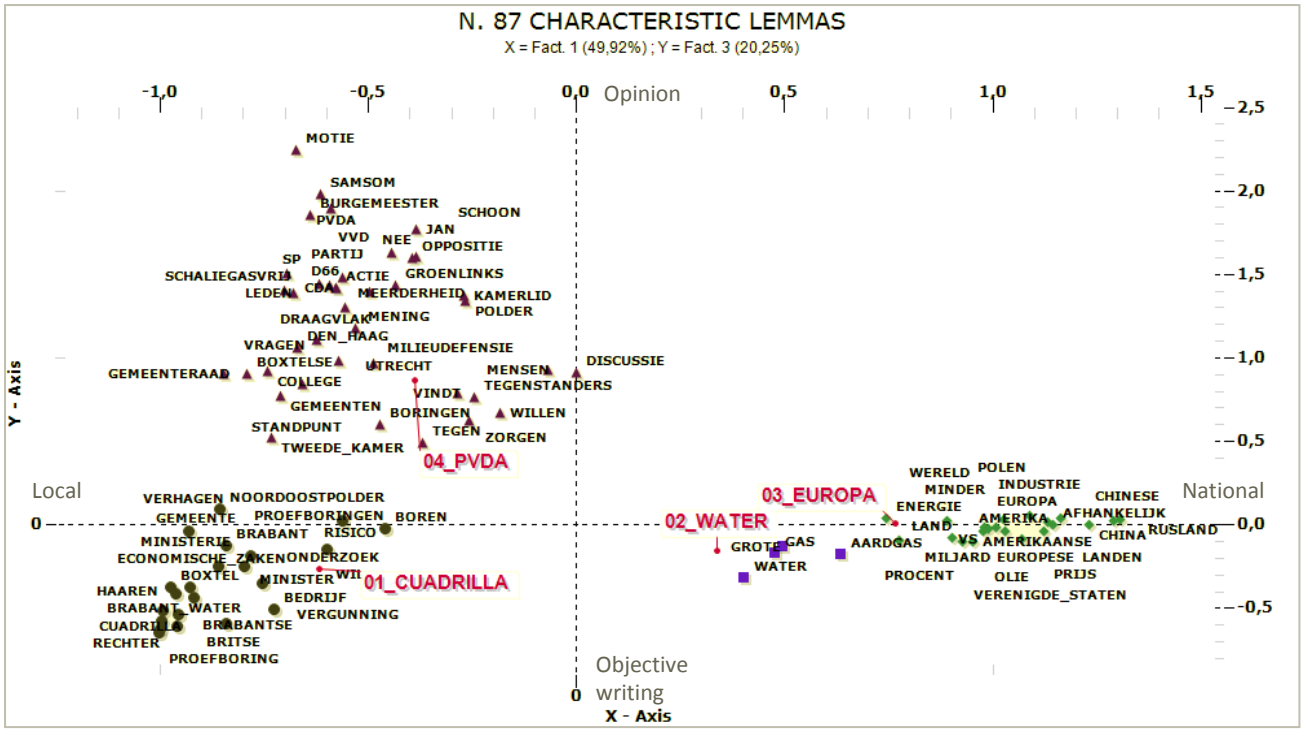


Figure 13 Clusters of an Elementary Context Analysis mapped on less significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts. (The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013.)

The above mentioned clusters were mapped on a 3D-graph by T-lab (Figure 12 and Figure 13). Figure 12 shows the most significant factorial axes and Figure 13 shows the same graph from another perspective. Words that appear near each other in the 3D-graph often occur together in the elementary contexts.

The axes of Figure 12 and Figure 13 represent the underlying argumentation structure of the discourses. Thus an interpretation of these axes cannot be left out. The X-axis in Figure 12 (factor 1) has the clusters 'PvdA' and 'Cuadrilla' on the left side, the cluster 'Europa' on the other side. The cluster 'Water' can be found in the middle of these two. Therefore an interpretation of this axis can be done by using the first three clusters. 'PvdA' and 'Cuadrilla' elaborate on issues within one country and refer to local and national issues. Europa discusses international aspects. Thus, this axis separates local and national from international. The Y-axis (factor 2) separates the clusters 'Cuadrilla', 'PvdA' and 'Europa' from 'Water'. The first three clusters elaborate on issues at a specific location, either a municipality or country. The cluster 'Water' is not related to any location. It represents general (technical) aspects. So, location specific and non-location specific issues are separated on this axis. The Y-axis of Figure 13 (factor 3) separates 'PvdA' from 'Cuadrilla', 'Europa' and 'Water'. It distinguishes the opinion of several actors from more objective writing. In 'PvdA' words like 'believe' (vinden), 'stance' (standpunt) and 'opinion' (mening) indicate that the opinion of an actor is given. The clusters in the lower part of Figure 13 just show a description of the situation.

It can be seen that the clusters 'PvdA' and 'Cuadrilla' show a high level of similarity, the clusters are relatively close to each other. This can be seen in appendix F. Not surprisingly both clusters contain procedural justice as the most dominant discourse. In 'PvdA' it can be read that many politicians, companies and municipalities believe public support is an important criteria for shale gas exploration and production; valuing public support can be seen as procedural justice as well. In 'Cuadrilla' the procedural justice of the permitting process is elaborated on in relation to an appeal to court and to the research of W+B (requested by EA). Therefore, these clusters are taken together as one discourse 'Procedural Justice'.

Figure 14 shows the result of merging 'PvdA' and 'Cuadrilla' into the cluster 'Boxtel'. Most significant to the cluster (in decreasing order) are the verdict of the court to cancel the permit for the location in Boxtel, the 'shale gas free' declaration of the municipality of Boxtel, the sudden turn of the political party 'PvdA' and the research of W+B (requested by EA). The same axis labels can be identified as in Figure 12.

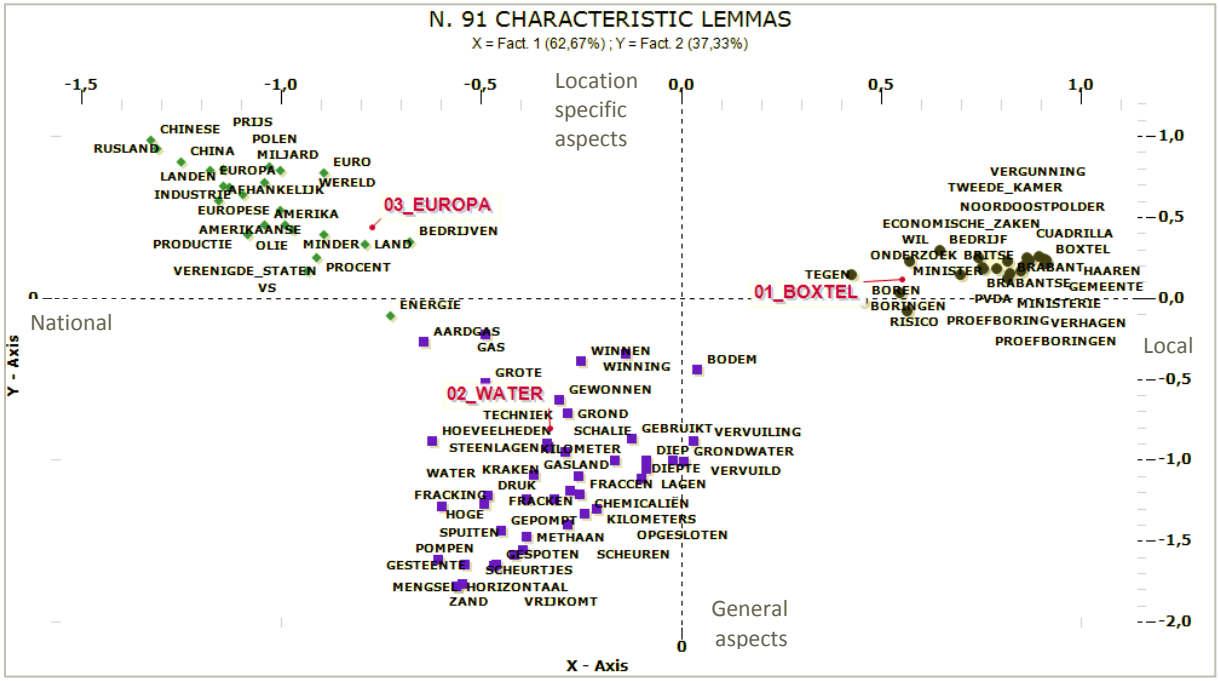


Figure 14 Clusters of an Elementary Context Analysis when forcing an outcome of 3 clusters, mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts. (The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013.)

5.2 Discourses over time

This section will provide a short introduction on the discourse developments over time in order to introduce some important developments and some additional information on the discourses. A more detailed description of the discourse development in relation to the events introduced can be found in chapter 6.

Due to the higher publication level in the final months and due to variations in publication levels of regional and national newspapers (section 3.4.2), the dataset was split up into 8 separate time periods (appendix B). Peaks were separated from more quiet periods.

5.2.1 Cluster dominance for the separation into three clusters.

Figure 15 shows the development in dominance of the clusters described above in Figure 14. It can be seen that the procedural developments are discussed most often in the newspapers. Next to that, the graph shows that the international developments take on an increasingly dominant role over time.

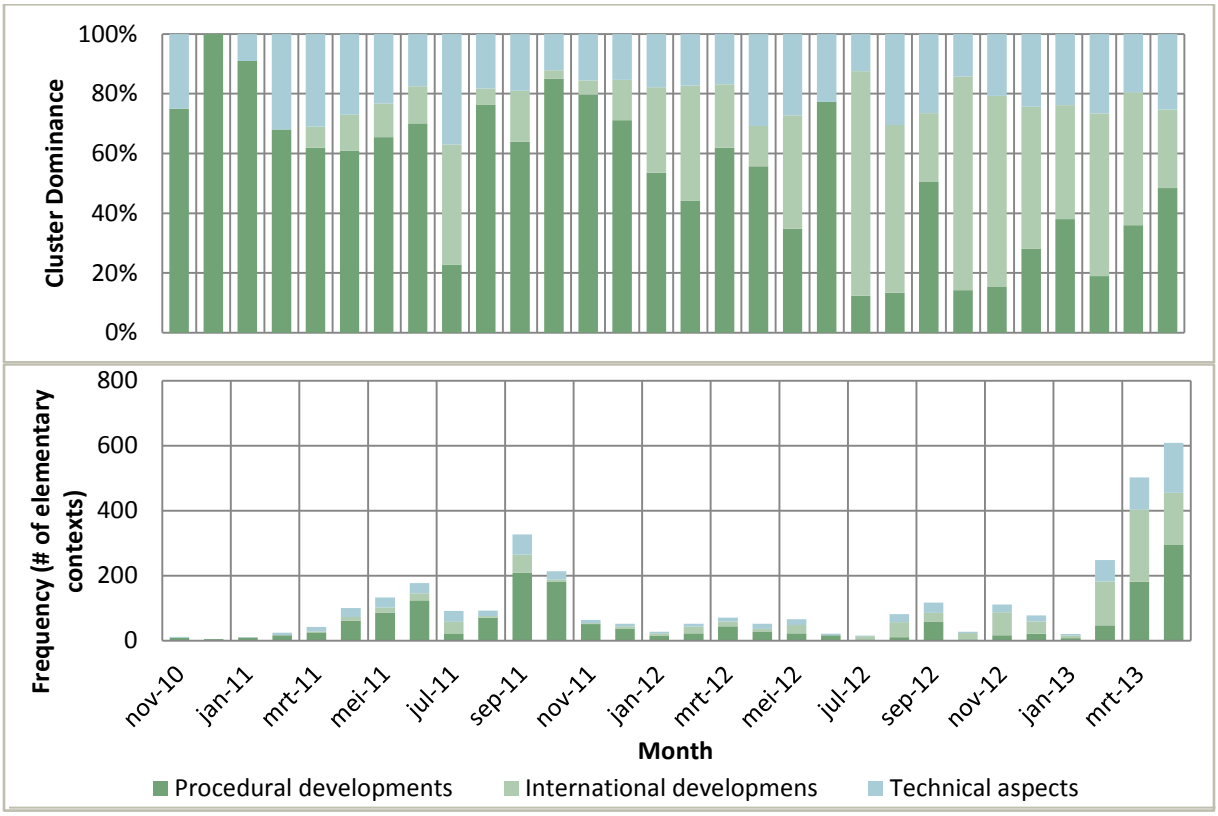


Figure 15 Cluster dominance over time. The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013. An important note has to be made on the cluster development: the disappearance of a cluster does not mean that the topic is not discussed anymore. The way arguments are structured shows such a level of overlap with another cluster that it is seen as one cluster.

5.2.2 Cluster dominance of the eight separate time periods

Eight separate elementary context analyses were performed. All of these analyses showed clusters with the same themes as mentioned above; international developments, political developments, procedural developments and technical aspects. For each month the cluster dominance was determined. This is shown in Figure 16.

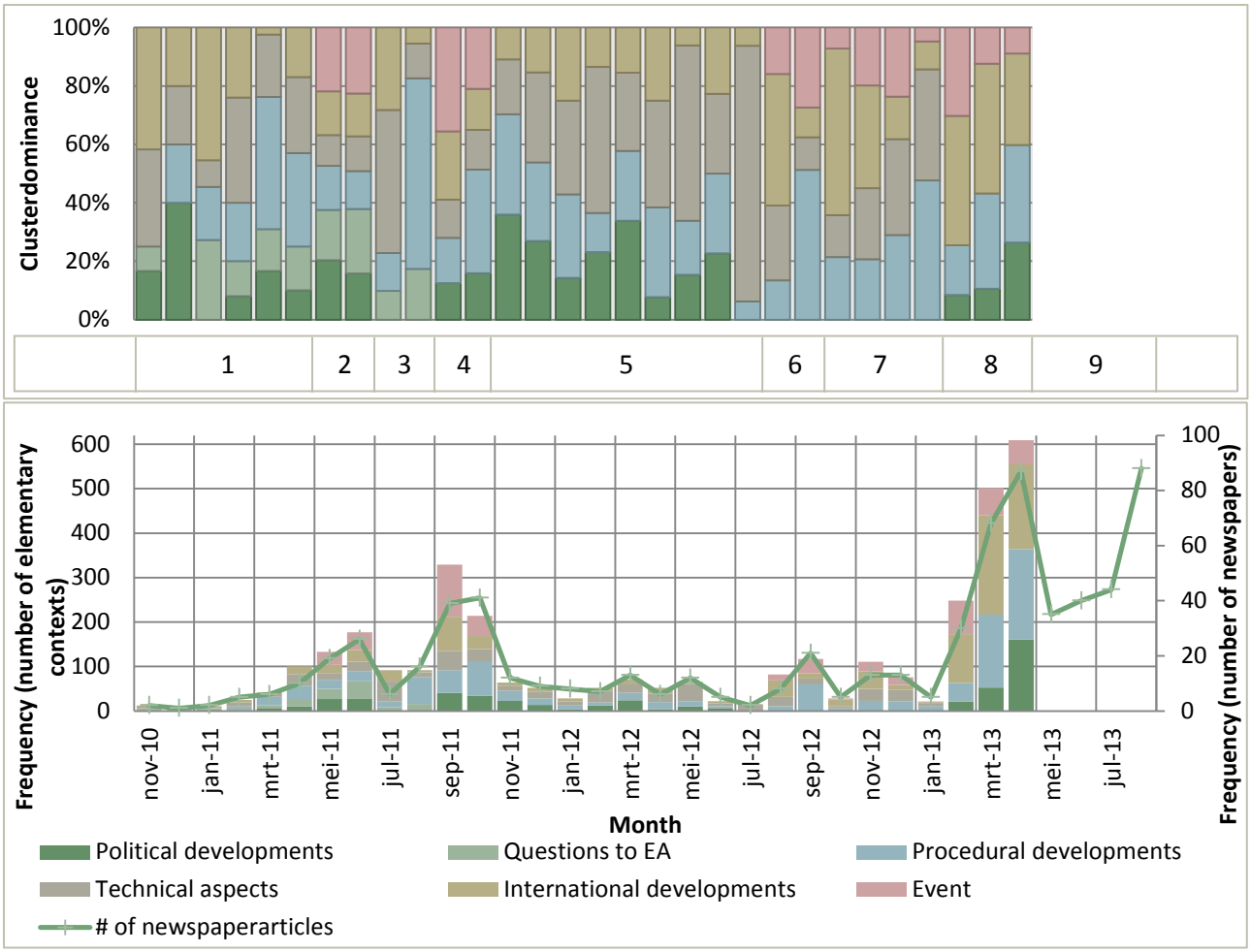


Figure 16 Cluster dominance over time of the eight separate time periods. The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013. An important note has to be made on the cluster development: the disappearance of a cluster does not mean that the topic is not discussed anymore. The way arguments are structured shows such a level of overlap with another cluster that it is seen as one cluster.

The dataset separation in eight time periods leads to smaller datasets. As a consequence of using smaller datasets often more than four clusters were generated. Since the dataset is smaller there is less statistical evidence to relate words to each other. This means the software cannot create large clusters. This leads to a larger amount of smaller clusters, instead of a few large clusters. Two new types of clusters have to be introduced. These clusters are small compared to the earlier mentioned ones and are therefore less relevant. The lower occurrence explains why the clusters did not come forward in the previously explained analysis over the complete dataset.

First, media reported on several letters that were sent to the ministry of Economic Affairs. In an early stage of the societal debate these letters are sent by several stakeholders to ask the ministry to give more information on the risks of shale gas exploration and production. This was a consequence of several environmental issues that occurred in the United States. This explains the overlap with the international development cluster (Table 13).

Moreover, stakeholders request more openness on information about the chemicals used for fracking. In a later stage of the shale gas debate stakeholders ask the minister to put the procedural

process to a halt until more knowledge is gained on the uncertainties of shale gas exploration and production and they request an independent investigation. Hence, the overlap with the cluster 'procedural developments'. The dominant discourse in this cluster is openness of information.
Furthermore, some important events are clustered separately as a result of the intensive publication on these events or as a result of their 'non-fit' to the other clusters. Time periods 2, 4 and 6 through 8 hold such events, respectively earthquakes in Blackpool (UK) as a consequence of fracking, a dialogue between Cuadrilla and Brabant Water, the global Anti-Fracking-Day, the European industry that criticizes their decreasing competitive position as a result of the shale gas revolution in the US and a movie on shale gas named 'Promised Land' (Appendix J).
It is interesting to see that the international cluster becomes more dominant (Figure 16). It is likely that this development will bring new discourses into the societal debate. This will be discussed in chapter 6.
Finally, one should notice from Figure 16 that the 'political developments' and the 'Technical aspects' clusters are not present at all times. Since T-lab uses a minimum value to see clusters as separate, this does not mean that the clusters disappeared; the clusters became more similar to other clusters and therefore T-lab did not interpret them as significantly different anymore.

Table 13 Cluster overlap and cluster dominance. The number of elementary contexts belonging to the cluster is shown. The colours refer to the closeness of the clusters. A similar colour corresponds to clusters that are close. In the first time period (November'10 to April'11) the technical aspects cluster shows overlap with the International cluster, but in a smaller extent than the cluster on questions to EA. In May and June 2011 the political development cluster shows overlap with the Procedural development cluster, but again in a smaller extent than the cluster on questions to EA. In some periods events were clustered separately; earthquakes in Blackpool (UK) as a consequence of fracking (2), the dialogue between Cuadrilla and Brabant Water (4), the global Anti-Fracking-Day (6), the European industry that criticizes their decreasing competitive position as a result of the shale gas revolution in the US (7) and a movie on shale gas named 'Promised Land' (8).

Time Period #	Theme	Political developments	Questions to EA	Procedural developments	Technical aspects	International developments	Event	Total	SUM
1	nov-10	2	1	0	4	5	0	12	
	dec-10	2	0	1	1	1	0	5	
	jan-11	0	3	2	1	5	0	11	
	feb-11	2	3	5	9	6	0	25	
	mrt-11	7	6	19	9	1	0	42	
	apr-11	10	15	32	26	17	0	100	195
2	mei-11	27	23	20	14	20	29	133	
	jun-11	28	39	23	21	26	40	177	310
3	jul-11	0	9	12	45	26	0	92	
	aug-11	0	16	60	11	5	0	92	184
4	sep-11	41	0	51	43	77	117	329	
	okt-11	34	0	76	29	30	45	214	543
5	nov-11	23	0	22	12	7	0	64	
	dec-11	14	0	14	16	8	0	52	
	jan-12	4	0	8	9	7	0	28	
	feb-12	12	0	7	26	7	0	52	
	mrt-12	24	0	17	19	11	0	71	
	apr-12	4	0	16	19	13	0	52	
	mei-12	10	0	12	39	4	0	65	
	jun-12	5	0	6	6	5	0	22	
	jul-12	0	0	1	14	1	0	16	422
6	aug-12	0	0	11	21	37	13	82	
	sep-12	0	0	60	13	12	32	117	199
7	okt-12	0	0	6	4	16	2	28	
	nov-12	0	0	23	27	39	22	111	
	dec-12	0	0	22	25	11	18	76	
	jan-13	0	0	10	8	2	1	21	236
8	feb-13	21	0	42	0	110	75	248	
	mrt-13	53	0	164	0	223	62	502	
	apr-13	161	0	203	0	191	54	609	1359

5.2.3 Additional information on the discourses

The eight additional elementary context analyses provide some extra information on the content of the three discourses found; 'Safety and Environment', 'Utility and Necessity', 'Procedural Justice.' Sub-themes were found that were less dominant in the analysis on the complete dataset, but these came forward when a smaller dataset was used. The additional sub-themes that were found did not come forward in all time periods; they changed in dominance over time.

This section will describe in which time periods the additional discourses came forward. A more detailed description of the developments over time will be given in chapter 6. Moreover, the semi-structured interviews supplemented the data as well (Table 14 and appendix G).

First, the 'Safety and Environment' cluster was broadened with worries for a high amount of traffic, visual pollution and noise. These local interests only came forward in the cluster about questions to the ministry of Economic Affairs of the elementary context analysis of the first time period of analysis: November 2010 to April 2011. In this first time period harmful methane emissions came forward as a concern as well. After a quiet period this cluster gained dominance again at the end of 2012. The topic of air pollution occurred mostly in combination with an explanation of fracking.

Another topic occurring in the technical cluster, and a substitution to the risk for contamination of the aquifers, is the extensive amount of water that is needed for shale gas exploration and production. Since this topic only came forward in the first time period, this topic got underrepresented in the analysis on the complete dataset. In the interviews the topics traffic, visual pollution and noise were brought forward as well, but translated into housing prices.

Second, the 'Utility and Necessity' cluster was specified in more detail. In the sixth time period, August and September 2012, the economic sub-theme became more dominant. Because thorough exploration of the existence and potential of shale gas or oil has not yet been done, estimates on the potential of the shale layer keeps appearing. The potential resources were said to be overestimated. This brought up topics like the impact this would have on the Dutch public treasury and the creation of jobs. In the final time period, these topics came forward again.

Two other topics that came forward in the economic discourse are the affordability of gas in terms of gas prices and the competitive position of the European energy-intensive industry. These topics came forward in November 2011 when the European energy-intensive industry placed emphasis on their declining competitive position, which was caused by declining gas prices in the US as a result of the US shale gas revolution. Since this event this discourse has not declined. The affordability of gas was related to the competitive position in a large extent. However, the interviews gave a new dimension to this topic. The affordability of gas is not only about the affordability for the Dutch industry, but about the affordability for society as well.

Another addition for the 'Utility and Necessity' cluster is the sustainability sub-theme. This theme came forward in several of the clusters. During the interviews it was most often mentioned in combination with 'Utility and Necessity'. Therefore, sustainability is categorised under this discourse. A discussion is held on whether or not shale gas production would be beneficial for a transition to a more sustainable energy supply. This discourse is used by both opponents and proponents. Some actors perceive shale gas as a relatively clean fossil fuel, and argue that it leads to a reduction in CO_2-emmisisions. Therefore, it is believed to be useful in a transition towards a more sustainable energy supply. Others believe investments in shale gas would only delay the transition and therefore prefer investments in more sustainable technologies. The sustainability discourse came forward at a low level during the first three time periods (until October 2011). In October 2012, when newspapers

started writing about the increasing amount of coal that was exported from the US to Europe, the sustainability discourse gained dominance in the written media.
This event was accompanied by an addition to the third sub-theme, the Geopolitics discourse. This discourse is not only about independence from other countries, but about security of supply as well.

Next, the 'Procedural Justice' Cluster can be elaborated on. The procedural and political clusters contain a discourse about regulation and inspection. The discourse mainly comes forward in statements of the minister of Economic Affairs. In reply to several questions of municipalities he explains that the Dutch 'mining law' (Mijnbouwwet) is sufficient to cover the worries of stakeholders. He also explains the Dutch governmental organization SodM, explained in chapter 4, has a strict inspection process. This discourse mainly comes forward in the months of the first two time periods of analysis.

The interviews brought forward a second sub-theme: a fair distribution of costs and benefits. It is explained that the local community of potential exploration locations perceive the distribution of costs and benefits as unfair. The local community will experience hindrance from the spatial impact of shale gas exploration and production and will risk pollution. However, the benefits are said to flow directly to the operating company and the public treasury. After a detailed investigation this discourse comes forward in the newspaper database as well, but only at a very low level.

Moreover, Table 14 shows how the criticism on the research carried out by engineering firm Witteveen + Bos on behalf of the ministry of Economic Affairs (explained in section 5.1.2) has its origin in a higher level discourse; how should the decision-making process be structured? Besides the independence, the level of transparency that should exist is discussed from this discourse. For example, a regional newspaper tries to force more openness on the kind and amount of chemicals used for fracking.

Also, many local and national politicians state that public support is an essential requirement for a decision (explained in section 5.1.2). In addition to that, the elementary context analyses on the first three time periods show that the decision power of the ministry of Economic Affairs is very important for the municipalities. For example, the municipality of Haaren is afraid that the ministry will force its decisions upon them.

Finally, involvement appears to be important. Municipalities declare themselves so called 'shale gas free' (schaliegasvrij) to force being involved by the ministry of Economic Affairs (Milieudefensie, 2012; IMSA, 2013). After a detailed investigation this discourse comes forward in the newspaper database as well, but only at a very low level.

Table 14 Discourse overview. Categorising was done by placing the sub-themes below the most associated high level discourse. The sub-themes were examples given by the interviewees for the content of the higher level discourses. Interviews with other actor groups or at a different time could lead to different categorization. Appendix G shows a more detailed description of the interview results on discourses.

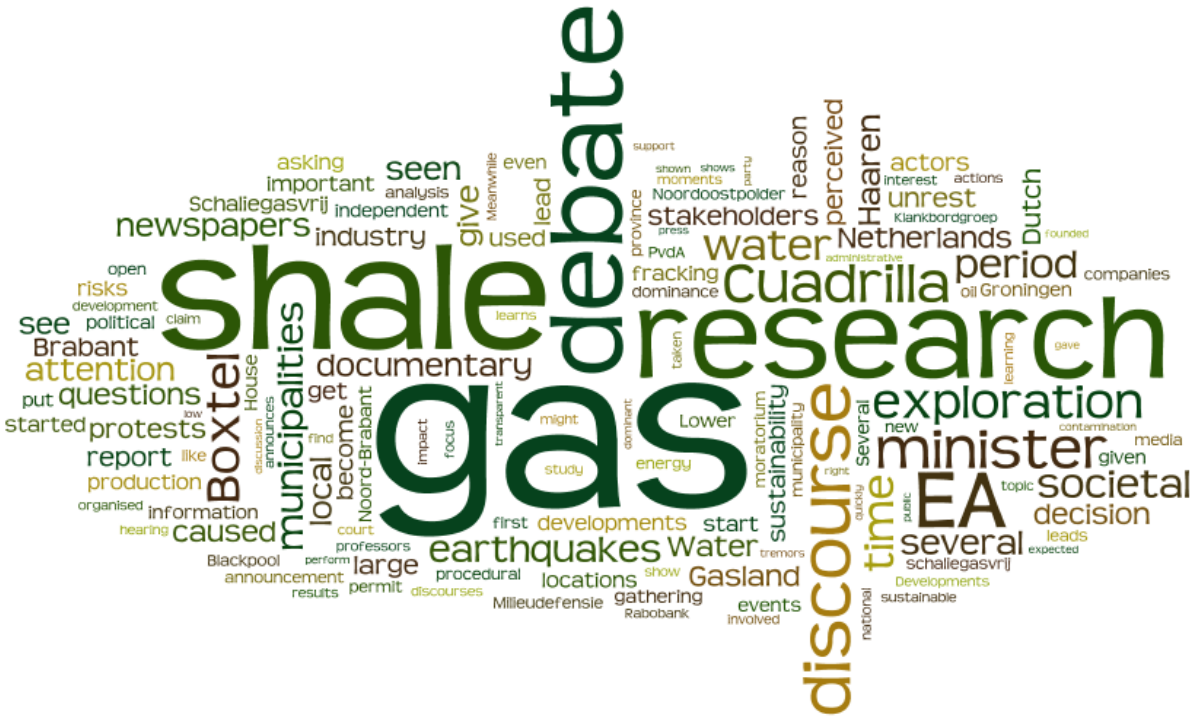
Discourses mentioned in Interviews	Discourses present in newspaper database	Final list of discourses
Safety and Environment	**Safety and Environment**	**Safety and Environment**
Water pollution	**Water pollution and water use**	**Water pollution and water use**
Spatial impact	**Spatial impact**	**Spatial impact**
Traffic	Traffic	Traffic
Visual pollution	Visual pollution	Visual pollution
Noise	Noise	Noise
House prices		House prices
Earthquakes	**Earthquakes**	**Earthquakes**
Air pollution	**Air Pollution**	**Air Pollution**
Utility and Necessity	**Utility and Necessity**	**Utility and Necessity**
Economy	**Economy**	**Economy**
Estimates of stocks	Estimates of stocks	Estimates of stocks
Public treasury	Public treasury	Public treasury
Affordability of gas	Affordability of gas	Affordability of gas
Competitive position	Competitive position	Competitive position
	Creation of jobs	Creation of jobs
Sustainability	**Sustainability**	**Sustainability**
CO_2 emission	CO_2 emission	CO_2 emission
Transition to sustainable energy tech´s	Transition to sustainable energy tech´s	Transition to sustainable energy tech´s
Resource depletion	Resource depletion	Resource depletion
Geopolitics	**Geopolitics**	**Geopolitics**
Security of supply		Security of supply
Independence from other countries	Independence from other countries	Independence from other countries
Procedural Justice	**Procedural Justice**	**Procedural Justice**
Regulation	**Regulation and inspection**	**Regulation and inspection**
Distribution of costs and benefits		**Distribution of costs and benefits**
Decision-making process	**Decision-making process**	**Decision-making process**
	Openness and quality of information	Openness and quality of information
Independence and Quality of research	Independence and quality of research	Independence and quality of research
Public debate	Public support	Public support
	Decision power of EA	Decision power of EA
Involvement		Involvement

5.3 Provisional Conclusions

In order to find the discourses present in the societal debate on shale gas, a cluster analysis was performed using the software package T-lab. Four clusters were found with the following themes: 'technical aspects', 'international developments', 'procedural developments' and 'political developments'. After investigating the elementary contexts of these clusters, the clusters could be assigned to three discourses: 'Safety and Environment', 'Utility and Necessity' and 'Procedural Justice.' The latter discourse comes forward in the clusters on procedural and political developments, two clusters that show a large level of overlap according to the software analysis. Interviews and a detailed study in which elementary context analyses were performed for 8 separate time periods provided more information on the content of the three discourses. This led to a final list of discourses which was used for further analysis (Table 14). The next chapters, chapter 6 and 7, will elaborate on changes in these discourses.

Chapter 6

Event History, actor's learning moments and discourse changes



Content

This chapter will give the Dutch shale gas debate's history. The most important events of the societal debate on shale gas in The Netherlands will be discussed, e.g. the events that came forward as important in the event history analysis or in the interviews. Some of these events led to actor learning moments and some even to discourse changes. This will be specified as well. Beside the indication of events the interviews aided in the interpretation of events, actor's learning moments and discourse changes. A more detailed list of events can be found in appendix H. The history of the debate can be separated in several phases. These are based on the time split up of the cluster analysis (section 3.4.2)

6. Event History, actor's learning moments and discourse changes

6.1 Rising societal unrest

The first introduction with shale gas in The Netherlands was when Cuadrilla requested permits for the province of Noord-Brabant and for the Noordoostpolder area. In august 2009 Cuadrilla was granted an exploration permit for hydrocarbons for an area in the province of Noord-Brabant and in June 2010 for the Noordoostpolder (Staatscourant, 2009; Staatscourant, 2010). Concurrently, EBN has reported positively on the expectations for the potential of shale gas (at the time named 'kleisteengas') available in The Netherlands (Klok, 2009).
After receiving a permit for Noord-Brabant, Cuadrilla started investigating suitable locations and started a dialogue with the municipalities at these locations; the municipalities of Boxtel and Haaren (from now on Boxtel and Haaren). Cuadrilla requested location specific permits at these municipalities (respectively September 2010 and June 2010) and both agreed to deviate from their zoning plan temporarily. Boxtel informed the community and organised two information meetings and a city council meeting. After setting several conditions for shale gas exploration they granted Cuadrilla the permit (January 2011). The information meetings gave newspapers reason to start writing about the plans in Boxtel and Haaren. Then citizens began gathering information on the internet. They found several studies performed in the US relating air and water pollution to shale gas exploration and production (Universiteit van Tilburg, 2013; Universiteit Utrecht, 2013). They found a documentary on the impact of shale gas exploration and production in the US as well; Gasland (Table 15).

Table 15 Description of the documentary Gasland.

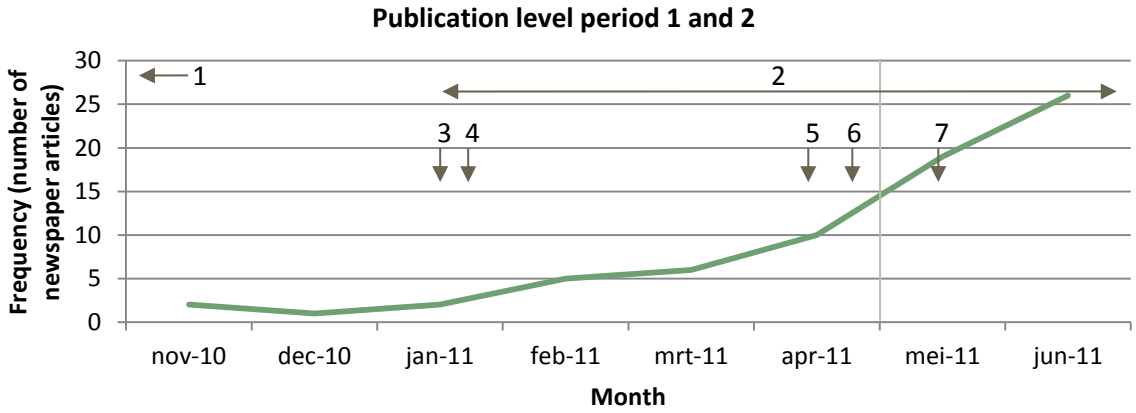
The documentary Gasland
Gasland is an American documentary on the impact of the technology called fracking in the US, and was released in January 2010. In the documentary the director narrates on his journey through the western part of the United States were fracking, at the time, already takes place for ten years. He speaks with several stakeholders and shows the stories of residents who tell about health problems and animal deaths that are, according to the documentary, related to the contamination of the air, water wells, and of surface water. In the most famous and compelling scene of the documentary one citizen shows how his drinking water got contaminated with gas by showing his water could be set on fire. The documentary caused societal unrest in the United States and several European countries.

The studies and the Gasland documentary led to societal unrest among the citizens of Haaren. Haaren announced an information meeting as well (January 2011). This led to even more turmoil in Haaren. A few citizens wanted to show Gasland at the meeting, but eventually they were not allowed to (Independent Journalist, 2013). The protests became more organised when the protest group 'Schaliegasvrij Haaren' (shale gas free Haaren) was founded: an online petition was started, BMF got involved, a strategy against shale gas was defined at an information meeting in Boxtel, 'Schaliegasvrij Boxtel' was founded, Gasland was shown in Boxtel and Milieudefensie got involved.
Not only BMF and Milieudefensie got involved. A regional newspaper, Brabant Dagblad, went along with the protests and used the Dutch law on openness of governmental information (Wet Openbaarheid Bestuur) to find out what chemicals are used for fracking. Besides that, Rabobank and Brabant Water objected to shale gas as well. Rabobank argued that tremors caused by shale gas exploration could damage their nearby located data centre and even filed an official complaint. Brabant Water was worried about aquifer contamination, but was too late for official complaints. These protests in turn led to interest from national newspapers.

Meanwhile, local and regional governments got concerned. An alderman from Haaren investigated what can be done by the municipality to block shale gas exploration. Several questions were asked to the minister of EA about his decision power, but little clarity was given, this to the displeasure of the alderman. In Boxtel an information meeting was organised at which representatives of the national

political parties GroenLinks and PvdA were present. Also the provincial parliament of Noord-Brabant got concerned and sent a letter, together with the municipality of Boxtel, to the minster of EA to ask for a moratorium and an independent study on the pros and cons of shale gas exploration and production. The minister in response believed the legislation and experience within The Netherlands are sufficient and turned down the request. However, disappointed responses eventually put pressure on him and led him to request Cuadrilla to perform more studies.
The end of this period is marked with some developments abroad. Several newspapers reported on Poland, which was positive about shale gas developments since it could make the country less dependent on Russia. The country was compared to the US, whose energy market quickly became more independent from other countries because of their shale gas revolution. Moreover, the newspapers reported that the Dutch gas reserves (mainly the large natural gas deposit in Groningen) are declining, and that The Netherlands would become more and more dependent on imported natural gas from, amongst others, Russia. At the same time, newspapers reported on earthquakes in Blackpool (UK) which were caused by fracking activities in a shale gas well operated by Cuadrilla. This event will become important during the next periods of investigation.

6.1.1 Developments in the first and second period of the societal debate.



* Cuadrilla receives permit (1), Gasland documentary (2), information meeting Haaren (3), Rabobank expresses concerns (4), Earthquakes in Blackpool (5), Brabant Water expresses concerns (6), National political parties visit information meeting in Boxtel (7).

According to most interviewees the decision-making process on shale gas started off with a quiet procedural discourse. Normal procedures for gas exploration permits were followed and because natural gas had been produced for many years in The Netherlands (without any major problems) there was no reason to expect a different course of events. The discourse was also called economic, because of high expectations about the potential and benefits of shale gas exploration and production. At this time, no unacceptable risks were perceived to be present by EA or the industry. Therefore, normal procedures were followed and the exploration permit was granted.
The documentary Gasland caused a large shift in discourse dominance. Suddenly 'Safety and Environment' gained dominance over the other discourses. Gasland paid some attention to the spatial impact of gas sources that are difficult to exploit, and a large amount of attention to the risk of water pollution. This caused societal unrest in Boxtel and Haaren, but mainly in Haaren where the community was less informed. Several protest actions and the involvement of important actors, such as Rabobank and Brabant Water, amplified this effect.
Another development was the introduction of the sustainability discourse. At the time this discourse was hardly present in the newspapers. The start of this discourse is triggered when representatives of two national political parties were present at an information meeting in Boxtel. At this meeting the societal debate was broadened with sustainability. Environmental groups, such as BMF and Milieudefensie, saw this as an opportunity and started using the shale gas debate to put their sustainability issue on the political agenda.

The local protests put pressure on local politicians, who started sending letters and asking questions to EA. EA is not able to give satisfying answers to these questions. They keep focusing on the many years of experience in The Netherlands and explain that inspection (by SodM) is well organised in The Netherlands. Moreover, the Dutch legislation is said to be sufficient to cover the discussed risks. This brings up a more procedural discourse. Municipalities worry that EA will force decisions on them and multiple stakeholders get annoyed that the minister and Cuadrilla are not open about the chemicals that will be used for fracking. Eventually, the province of Noord-Brabant urges the minister to declare a moratorium and to start an independent study on the risks of shale gas exploration and production on the environment (Gedeputeerde Staten van Noord-Brabant, 2011).

The public debate has led to learning moments for several stakeholders (definition of learning in section 2.1.3). Both local and regional governments got overwhelmed by the societal unrests and start using a more critical stance towards shale gas exploration (Rekenkamercommissie Boxtel, 2013). Cuadrilla was surprised by the local protests as well and changed their communication strategy (Universiteit van Tilburg, 2013; Volkskrant, 2013b). Both learning moments can be seen as first-order learning.

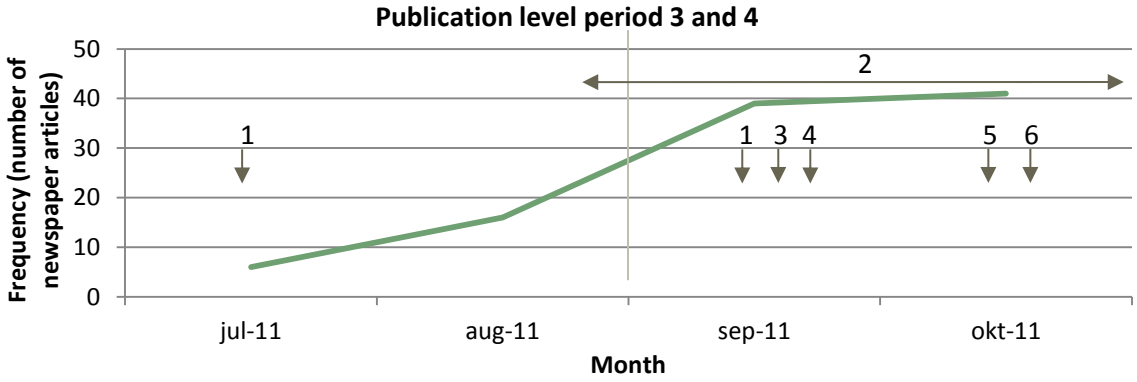
6.2 The road to a Moratorium

The shale gas debate continued while more locations in The Netherlands became targets for shale gas exploration; the province of Limburg by Hutton and Gallic Energy and the province of Gelderland and Midden-Nederland by BNK General Partner. This led BMF, GMF and Milieudefensie to write to several municipalities to ask them to declare themselves so called 'shale gas free' (schaliegasvrij). According to Milieudefensie a range of 'shale gas free' declarations took off, beginning with the municipality of Tholen in August 2011 (Milieudefensie, 2013c). Moreover, the areas of interest started overlapping with the operating area of Vitens. Therefore, this actor started to warn for water pollution as well (mainly in July and September), just like the water company Brabant Water. The debate gained even more attention when Gasland got shown on Dutch national television (September 2011).

Meanwhile, the Rabobank's procedures in court continued. This gave the minister of EA a direct reason to organise a hearing for the Lower House (Economische Zaken, 2013a). At this hearing, in September, several experts and stakeholders got the chance to explain the situation to the Lower House and to answer questions. The earlier mentioned earthquakes in Blackpool gave rise to a lot of questions.

Concurrently, more and more stakeholders were asking for a moratorium and the protests continued. Eventually, when the Dutch administrative court came to a verdict in October, the minister put a stop to the debate. The Dutch administrative court decided that Boxtel did not follow the right procedures. The reason for this was that when natural resources are found to be economically producible, a production permit can be granted for the production of the gas. Shale gas exploration could not be seen as a temporary activity. Therefore Cuadrilla's permit was cancelled. Two days later, at a Lower House debate, the minister answered the worries and requests of municipalities and announced an independent study into the risk of shale gas and coal-bed methane exploration and production. Until the research is finished, no exploration wells will be drilled, and no new permit applications will be taken into procedure. This abated the societal debate, as can be seen in the publicity frequency analysis in Figure 9 in section 3.4.1.

6.2.1 Developments in the third and fourth period of the societal debate



* Vitens expresses concerns (1), 'Schaliegasvrij' declarations (2), Gasland on Dutch television (3), hearing in the Lower House (4), verdict of the administrative court (5), announcement of a moratorium and an independent investigation (6).

In the third and fourth period of analysis, the same discourses can be noticed as the ones that started off in the first two periods. The warnings of water companies and the earthquakes in Blackpool gave rise to a political debate on security and safety. Moreover, the sustainability discourse was present in terms of CO_2 emissions. In newspapers it was explained how gas is necessary next to renewable energy and how gas is the cleanest of all fossil fuels. It was explained why shale gas is needed, mainly by TNO. The arguments used for this are: the low CO_2 emissions, affordability of gas and independence from other countries.

The verdict of the Dutch administrative court could have triggered the procedural justice discourse to become more dominant, but the minister quickly announced a moratorium.
In this period of time EA showed first-order learning. It can be seen that a range of events have put more pressure on the minister of EA which led to his eventual decision to perform an investigation on the risks of shale gas activities. These events were: the letter of Noord-Brabant, the unrest in the Lower House on the earthquakes in Blackpool, the experts' judgements at the hearing in the Lower House, the critical stance of water companies and the annulment of the permit in Boxtel.
Besides that, it is interesting to see that from this period on, Brabant Water was not mentioned very often in the newspapers anymore (appendix H). The T-lab analysis provides evidence that at this moment negotiations between Brabant Water and Cuadrilla took off. Several conditions set by Brabant Water and replies by Cuadrilla were separately clustered by T-lab in the elementary context analysis. Close reading points out that the hearing at the Lower House gave rise to this.

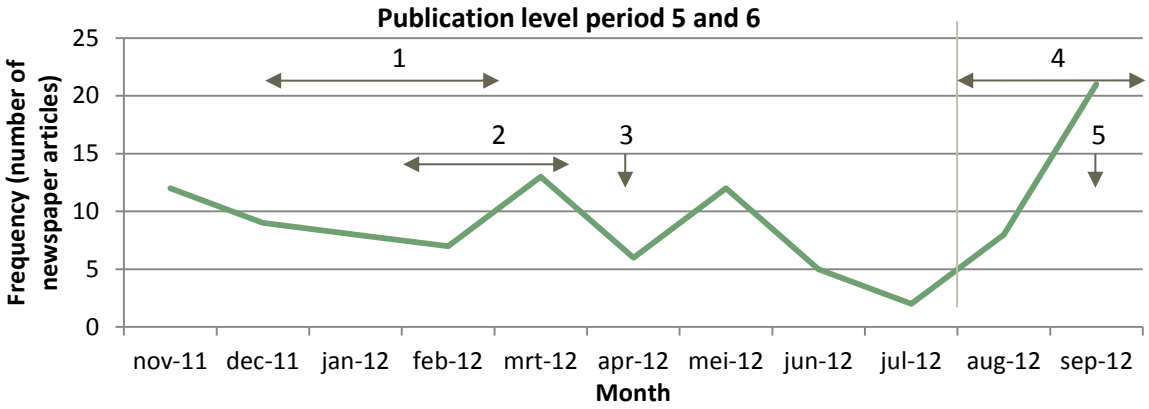
6.3 The research performed

The announcement of an independent study by EA lowered the media attention and the organisation of the research took off. Several stakeholders sent requests to the EA as to what the research should address (Gemeente Boxtel, 2011b; Schaliegasvrij Boxtel, 2011). Protest groups asked the minister to broaden the research on safety and environment with utility and necessity, but the minister responded that this is a political matter and not something for the research (November 2011). The minister did promise to consult multiple stakeholders for setting up the research questions (Economische Zaken, 2011b). These led to a broad range of questions, which could not all be answered in the time available for the study. EA also set up a 'Klankbordgroep' (Dutch for focus group). Still, the research caused some discussion. The consultation rounds and a European tender caused delay. Moreover, protest groups doubted the independence of the consortium winning the tender, Witteveen + Bos (W+B), Arcadis and Fugro. Several actors also complained about the so called 'independent' expert that was involved in the Klankbordgroep. He was not perceived as independent, being a known critic of the 'Climate Change Theory' (Economische Zaken, 2013a).

Meanwhile, the municipality of Haaren rejected Cuadrilla's permit request (January 2012). Boxtel asked Cuadrilla to withdraw the request. Cuadrilla obliged and withdrew the permit request. Haaren and Boxtel (and other municipalities) both joined the 'shale gas free' campaign of Milieudefensie, although the town board of Boxtel kept shale gas development as a possibility. The campaign made the shale gas debate more national. In April 2012, 'Schaliegasvrij Nederland' was founded by local communities and environmental organisations (Milieudefensie, BMF, GMF, and Greenpeace). The protest groups continued with several protests actions and actively reported on their interpretation of shale gas developments: they reported that waste water regulations were changed (Schaliegasvrij Nederland, 2012a), they explained how earthquakes in the province of Groningen are related to gas production in the area (Schaliegasvrij Nederland, 2012b), and they performed a study on ways for municipalities to block shale gas development (Milieudefensie, 2013a).

At the same time, some developments abroad focused the societal debate on utility and necessity again. In May 2012 he International Energy Agency (IEA) provided estimates of the global shale gas reserves and spoke of the potential of a Golden Era for Gas (International Energy Agency, 2012). But in the summer of 2012 declining gas prices in the US cause several companies to depreciate their shale gas investments and the size and benefits of estimated shale gas reserves are questioned again.

6.3.1 Developments in the fifth and sixth period of the societal debate



* Consultations rounds for the research of EA (1), 'Shale gas free' declarations Haaren and Boxtel (2), foundation 'Schaliegasvrij Nederland' (3), declining gas prices in the US (4), doubts on the research of W+B (5).

In the fifth and sixth period of the societal debate it can be seen that the verdict of the administrative court and the announcement of an independent investigation by EA put focus on the procedural discourse again. Although this only occurred at a low level, the next section will show that that this development is important. Moreover, 'shale gas free' declarations of municipalities indicate that public support is seen as a crucial condition for shale gas exploration and production.

The 'Safety and Environment' discourse remained dominant. Newspapers reported mostly on the potential for water contamination. 'Schaliegasvrij Nederland' already linked the earthquakes in Groningen to gas production, but newspapers did not copy this reasoning right away. In relation to the tremors, an English study on tremors caused by shale gas exploration concluded fracking can be done safely. No large attention is given to such developments.
In the final months of the fifth period (at the start of summer 2012) focus is put on the utility of shale gas. Declining gas prices and decreasing profitability gave a perfect argument to object to shale gas and this discourse became dominant in the newspapers of the sixth period. At that time shale gas received sparse attention, but this changed.

The year 2012 contained some learning moments for EA and for the oil and gas industry. EA experienced doubts on its research project after a press release on the consultation rounds (Economische Zaken, 2013a). The message contained a sentence from EA, explaining that fracking is a technology that has been used in The Netherlands for years (Economische Zaken, 2012). This was perceived as if the research result were already known. EA learned that press releases can be perceived and interpreted in a way much different than intended and therefore decided to give out no press releases anymore. From that point on EA used a more passive, open communication strategy (Economische Zaken, 2013a). This means that documentation is placed on the government's website, but not actively communicated towards stakeholders. The learning moment of EA can be categorised as first-order learning.
The oil and gas industry learned as well. This is shown at a congress organised by NOGEPA on the public acceptance of new technologies (NOGEPA, 2012). The importance of an open dialogue is discussed. The oil and gas industry realises small incremental innovation can still have an enormous impact on society (IMSA, 2013). This learning moment can be seen as second-order learning.

6.4 The societal debate reaches its climax

In the next period of analysis, developments in the US kept influencing the Dutch societal debate. The high production level of shale gas in the US led to a surplus of gas in the US. This led to declining fossil fuel prices and cheap coal export to Europe. CO_2 emissions were rising and it was written that the current energy policy has led to this unsustainable development. In this context, Shell pointed out that energy producers are increasingly using coal instead of gas. Together with the failing emissions trading scheme (ETS), this was explained to be the reason for increasing CO_2 emissions. Shale gas should provide a more sustainable solution according to Shell. Others claimed that it only delays a transition to a sustainable energy supply since less will be invested in sustainable energy technologies because of rising fossil fuel prices.

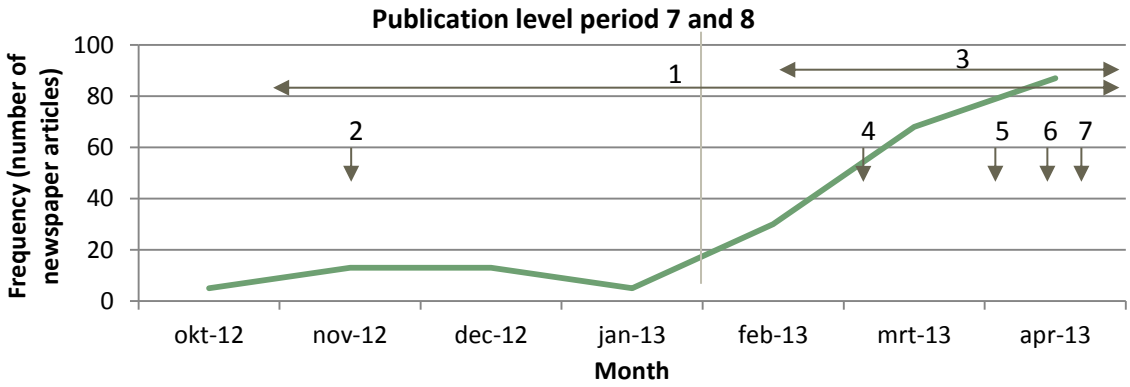
The energy-intensive industry started complaining about the declining gas prices in the US (November 2012). This damaged their competitive position. Some companies even said they would make their future investments in the US. Others claimed the revolution in the US was just a temporary development and they explained the 'bubble' would soon burst. For this argument they used the recent depreciations. Moreover, it was explained that the European gas prices will decline as well as a result of the globally new available gas resources. The declining gas prices in the US were in this context explained to be temporary as a result of a lack of export. The overproduced amount of shale gas is expected to be transported to other markets as liquefied natural gas (LNG).
The geopolitical discourse became more dominant in the newspapers. The Hague Centre for Strategic Studies (HCSS) introduced this discourse at several conferences. In March 2013, after HCSS got a large part in a television broadcast by 'Een Vandaag', this topic got discussed more and more in the newspapers and this development would continue (as can be seen in section 6.5).

At the beginning of the year 2013, earthquakes in Groningen caused by gas production by the Nederlandse Aardolie Maatschappij (NAM) got heavier than predicted. The earthquakes were caused by soil subsidence and it was expected no stronger tremors would occur than 3 on the Richter scale. However, earthquakes occurred of 3.7 on the Richter scale. Although Schaliegasvrij Nederland already linked (small) tremors in Groningen to the shale gas debate in August 2012, in February 2013 more actors of the shale gas debate started asking questions about the risk for earthquakes caused by fracking. The earthquakes in Blackpool were brought up again and in the political domain more questions about soil subsidence were asked (TNO, 2013). Suddenly, not only earthquakes were mentioned, but soil subsidence was also mentioned as a cause for these earthquakes.

February 2013 was also the month in which a new movie on shale gas came out: Promised Land. Reviews on this movie summarise the shale gas debate in a neutral, describing manner.

At the same time, a large media publication peak occurred on the topic of shale gas. The research of EA was coming to its end and some important events occurred that drew attention. First, Cuadrilla announced the locations of interest in the Noordoostpolder. The television programme 'Een Vandaag' showed a surprised farmer on whose land exploration will take place. He was not informed. The announcement and the information meeting organised by Cuadrilla got a lot of attention. It caused large societal unrest in the Noordoostpolder. In a week a new protest group was founded; 'Schaliegasvrij Noordoostpolder.' Local unrest caused the previously positive municipality to declare itself 'Shale gas free,' shale gas exploration and production was said to be incompatible with the municipality's ambitions on sustainability. Second, the 'Klankbordgroep' reported on their misgivings on the report a second and third time. Beer brewers and beverage manufacturers became critical towards shale gas as well. And the political party PvdA suddenly became more positive towards shale gas. The party, that holds a crucial vote in the Dutch Lower House, changed its position on shale gas exploration from 'negative unless it can be done safely' to 'positive as long as it can be done safely'. Opposition responded surprised. In May 2011, at the information meeting in Boxtel, the party was perceived to be negative towards shale gas exploration. Members of the PvdA party were surprised as well. At local level, most parties of the PvdA are against shale gas exploration. The national party reacted quickly and promised to consult their members. As a consequence PvdA eventually announced it would vote against shale gas exploration.

6.4.1 Developments in the seventh and eight period of the societal debate



* Coal export to Europe (1), energy-intensive industry complaints about the economic situation (2), earthquakes Groningen (3), Cuadrilla announces locations in the Noordoostpolder (4), doubts on the research of W+B (5), beer brewers express concerns (6), PvdA makes a perceived shift in stance (7).

In the final period of analysis an explosion of media attention can be seen. The research was coming to an end and a decision has to be taken. This led to the attention of several actors. Moreover, it can be seen that the societal debate polarised in response to the growing attention. Judgements were given to other stakeholder's actions and little attention was given to discuss the contents of statements; the industry was said to be lobbying for the oil and gas industry, the research of W+B was called a botched job, 'shale gas free' declarations of municipalities were not taken seriously and PvdA was called unreliable since they, in others' opinion, constantly change their stance (Dutch: 'draaikont gedrag'). It can be seen that actors were not reflecting on their own discourse anymore.

It can also be seen that Cuadrilla's actions to become more open and transparent were perceived in the opposite way; 'acting behind other actors' backs'. Protests groups claimed to have been right all the time: 'EA was still continuing planning'. Therefore, it was believed that EA would eventually make a top-down decision. It is interesting to see that the municipality of the Noordoostpolder quickly turned against shale gas, while they had been neutral towards shale gas before the event (Cuadrilla, 2013).

The developments in the US and the statements of HCSS amplified the 'Utility and Necessity' discourse: Economy, sustainability and geopolitics. More newspapers started writing about the economic aspects of shale gas exploration and production. It was discussed whether or not current energy policy was sustainable or not and whether or not shale gas should be a supplement in the energy transition. Moreover, the amount of shale gas resources in the Netherlands was debated on. There was a lot of uncertainty on the amount of recourses and actors questioned the profitability of shale gas exploration and production. Besides that, HCSS brought up a debate on geopolitical aspects. The potential risks of dependence on Russia were discussed in the newspapers after the broadcast by 'Een Vandaag'.

The earthquakes in Groningen decreased trust in the oil and gas industry. Several actors realised that estimated risks are not always correct and the discussion on compensation and Cuadrilla's ability to compensate increased again (IMSA, 2013). Society realised that earthquakes can be caused by soil subsidence. Suddenly this topic got more attention. This can be seen as second-order learning.

6.5 The societal debate continues

The public debate around the research of W+B continued. Milieudefensie and Boxtel complained that the research is just a literature study and the committee MER (an environmental assessment commission) criticised the research for not being complete.
EA responded to the press releases of the 'Klankbordgroep' by asking them to sign a confidentiality agreement. The research report was finished, but the ministry wanted to have some time to study it before coming out with its policy plans. Several members of the 'Klankbordgroep' refused participation and claimed that the minister was trying to cover the results.

Concurrently, a group of professors criticised shale gas developments as well. Their main criticism was that current policy makers had not strategically considered the impact of shale gas production on the transition to a more sustainable energy supply. More actors spoke against shale gas. The Rabobank did not grant loans to (US) farmers that participate in shale gas projects anymore. Vitens again warned for water contamination and produced a map that showed where shale gas and water zones overlap. The media organisation RTL news claimed to have a copy of the research report and said that the minister would conclude that shale gas exploration and production could be done safely. NOGEPA urged the minister to calm the societal unrest and advised the minister to gain public support by being more transparent.

Then, the minister of EA published the research on shale gas exploration and production and concluded that the risks were low and could be mitigated. He emphasised that no decisions would be taken until the committee MER had the chance to assess the research. Eventually, the committee MER assessed the research as being too narrow. The research focused too much on underground effects. The committee concluded amongst others that the current regulation was not sufficient to cover the risks of shale gas exploration and production and advised the minister to use a governmental spatial planning procedure (the so called 'Rijksstructuurvisie') to cover both underground and above ground impacts of shale gas developments. Such a particular study was said to create scope for the 'Utility and Necessity' consideration as well as for participation of local governments and communities (Commissie MER, 2013). The minister decided to postpone making a decision and announced a new study that would focus on all potential interesting locations so that local interests could be involved as well. The so called 'Rijksstructuurvisie' would be used together with an environmental impact assessment (plan-MER) to find out which locations within The Netherlands are most promising and to find out at which locations risks are easiest to mitigate. The minister also announced he wanted to involve local policy makers and the local communities surrounding the potential locations. Moreover, the research time scope would be used to investigate the technical options for risk mitigation together with water companies and the mining industry. The

moratorium was prolonged, so for the time being no important decisions would be taken (Economische Zaken, 2013b). This abated the shale gas debate again, like it did at the time of the announcement of the first research of EA.

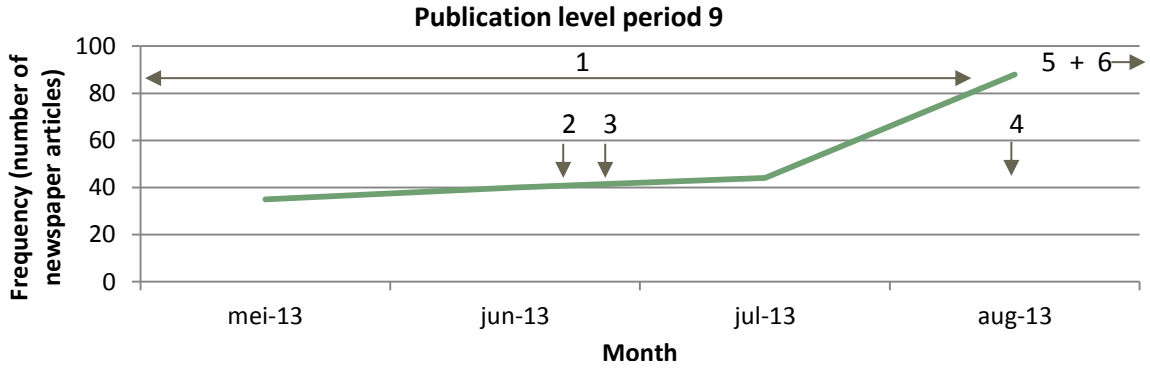
Meanwhile, developments abroad influenced the public debate as well. Disappointing results in Poland gave an argument that shale gas exploration and production is not as promising as it might seem. The adjustments of the estimates were brought up again (section 6.3). On the other hand, the UK finds more shale gas than expected. Because of the high amount of other interesting events at that time, the developments in the UK got little attention. Besides that, the economic and sustainability themes got more attention as a response to a radio debate on the news radio BNR. One of the arguments that were used was that shale gas might get the Netherlands out of the economic crisis, which was copied by newspapers. Other arguments focused on the previously introduced sustainability arguments; shale gas was either perceived as a potential supplement to other energy technologies or as a delaying factor in the transition to a sustainable energy supply.

In September 2013, after the minister of EA calmed down the debate, the societal debate kept evolving. The 'Shale gas free' campaign of Milieudefensie continued and the provinces of Noord-Brabant, Noord-Holland and Groningen declared themselves 'Shale gas free'. The municipality of Boxtel even declared to be 'fossiel vrij' (fossil fuel free) and the province of Noord-Brabant explained to be against a geothermal energy project, because it was not clear whether or not the technology fracking would be used.

Moreover, the earthquakes in Groningen continued. The decision of EA to continue with gas production in Groningen is debated on as well as the compensation given to the local community. In October a former employee of NAM accused the NAM of withholding information from the community of Groningen. The NAM, KNMI, SODM and EA were accused from ignoring risks for a too long period of time. The debate on the earthquakes in Groningen had its impact on the shale gas debate as earthquakes remained an important topic. Next to that, compensation in case of failures became more important. In this context Cuadrilla was accused of not being financially able to compensate local communities when damage occurs.

In the calm period of time after the announcement of an additional investigation, developments abroad became important again. The US became the largest oil and gas producing country (instead of Russia), which gave reason to discuss geopolitical consequences. Moreover, the German energy policy was widely debated in the Dutch newspapers. In this context, Germany was either given as an example to show that the transition to more sustainable energy could be reached in only a few years or as an example of how an energy transition should not look like. It was explained that the German 'Energiewende' from nuclear to wind energy has led to enormous increases in the energy prices.

6.5.1 Developments after the research time scope



* Criticism on the study of W+B (1), manifest Professors (2), EA asks 'Klankbordgroep' to sign confidentiality agreement (3), research report published (4), the MER committee gives EA advice (5), EA announces an additional investigation (6).

The summer of 2013 was a continuation of what was started in February 2012. The shale gas debate kept polarising and the attention for the topic remained high.
The demand for a confidentiality agreement by EA caused the procedural justice discourse to gain dominance. The decision-making process is put to discussion (IMSA, 2013; Universiteit Utrecht, 2013). An open debate is requested, but the societal debate is perceived as a debate which has to be held on the conditions of the minister. Municipalities as well had this perception at the time when the report was released (Cuadrilla, 2013). Moreover, the research provided a basis to formulate and express opinions. Stakeholders assessed the research on quality and checked whether or not all their questions are answered. This led to a high level of publications. And since the research procedures were not perceived as fair, the procedural discourse gained dominance. This resulted in more municipalities, and even the province of Noord-Brabant, declaring themselves 'shale gas free.'
Next to this, the sustainability discourse gained dominance in this final time period. This is mainly caused by the manifest signed by some 55 university professors (IMSA, 2013; TNO, 2013; Universiteit Utrecht, 2013; Universiteit van Tilburg, 2013). These events might even have polarised the public debate on sustainability; 'you either believe shale gas can be beneficial in the transition to sustainable energy or you believe it is not.' The title of "professor" was used by media and protest groups as an argument for knowing the truth.
Lastly, a learning moment can be seen in the summer period. The letter sent by NOGEPA, asking for transparency, shows that the oil and gas industry learned from the shale gas debate. Public support might have been placed higher on their agenda. This can be seen as first-order learning, since NOGEPA explained how the minister should deal with the societal debate.

6.6 Provisional conclusions

This chapter has shown that events are perceived and used in different ways. The documentary Gasland and the earthquakes in Groningen were either seen as a reason to perform more research or not. The revolution in the US was seen as temporary or not. Also, intended events can be perceived differently. The announcement of Cuadrilla was intended to start an open and transparent process, but was not perceived like that. Events can be a reason for discourse reflection as well. Earthquakes in Blackpool made politicians realise that more research was necessary to learn more about the risks of fracking and protests made local politicians and industry players realise a transparent debate is crucial for public support.
Both unintended and intended events can be a reason for several strategic actions; warnings were given right before decision-moments, local unrest and earthquakes were a reason for municipalities to send more letters to EA and criticism on the research of EA was given when it became clear that not all stakeholders' concerns were addressed. Moreover, events can gain attention for a certain discourse and cause it to gain more dominance. The sustainability discourse had been present for a long time, but larger scale coal export to Europe and the manifest signed by professors were a reason for newspapers to write about it.

It can also be seen approaching a decision-moment (and the potential of being a top-down decision) can lead to polarisation of the societal debate. Both the approaches to the first and second research of EA show a polarising debate. Stakeholders took a stance and were not willing to give in (and to reflect on their discourse) since this could lead to an undesirable decision. Uncertainties play an important role at such moments. The uncertainty of the available amount of shale gas in The Netherlands, for example, made the debate on the economic potential of shale gas more complicated. The announcement of the first research gave the possibility for new discourses to enrich the societal debate. For example, the 'Utility and Necessity' discourse became part of the societal debate. Moreover, it can be seen that the promising results in the UK (July 2013) did not get the chance to enter the public debate, because all attention was going out to the research of EA.
More specific, actors' responses can strengthen or weaken the societal debate or an issue. The lack of transparency from EA and Cuadrilla, about the chemicals, fuelled the public debate and the suspicion from other actors. Appendix H shows that this topic reduced in importance in April 2012, when Cuadrilla gave open information on the chemicals used. Polarisation can force actors to 'choose a side.' Water companies and municipalities were becoming more 'activistic' because of this effect (Telegraaf, 2013; Universiteit Utrecht, 2013; Universiteit van Tilburg, 2013; Volkskrant, 2013b). In turn, stakeholder judgements can polarise the societal debate even more; e.g. the judgements by water companies and the manifest of the professors. Moreover, the inability of EA to give a satisfying answer to questions of municipalities might have given a push to the 'Shale gas free' declarations. On the other hand, it can be seen that the protests by Brabant Water stopped when Cuadrilla started negotiating and taking the concerns of Brabant Water into account.

Lastly, it can be seen that the societal debate got enriched with a growing number of discourses. Stakeholders learned more about the topic, and because of this more aspects were taken into account in the argumentation (second-order learning). It can be seen that topics like burning water (from the documentary Gasland) were not important anymore. This is because the risk of this happening in The Netherlands is very low and because the relation between the burning water in the scene and shale gas exploration and production in that area were not proven. Another example is that no large estimates of the resources were given anymore, because several reports had shown that the available amount of shale gas in the Netherlands is much lower than expected.
Thus stakeholders learn, which means new discourses may enter the societal debate and others might disappear. This will be shown in the next chapter.

Chapter 7 Event Impact

Content

In this chapter the impact of events is discussed. An overview of the previously identified discourse developments over time will be given and the impact of events on these developments will be discussed in terms of duration and intensity of the impact. Moreover, a list of key events will be given in this chapter.

7. Event Impact

Using the results from chapters 5 and 6, an overview was made of the discourse development over time (Table 16). Next to that, the interviews and the event history analysis were used to create a list of key events (Table 18). A list of events that were indicated as important in the interviews can be seen in appendix I and appendix H shows the entire event history analysis.

Table 16 Overview of the discourse development over time in the Dutch societal debate on shale gas. The table presents what topics came forward in the newspaper clusters. Table 17 shows a specification of the time periods.

Final list of discourses	0	1	2	3	4	5	6	7	8	Summer 2013
Safety and Environment										
Water pollution and water use		X	X	X	X	X	X	X	X	X
Spatial impact	?	X	X		X			X	X	X
Traffic		X								
Visual pollution		X								X
Noise		X								
Housing prices										
Earthquakes			X		X		X	X	X	X
Air Pollution			X	X				X		
Utility and Necessity										
Economy	?			X			X	X	X	X
Estimates of stocks						X	X	X	X	
Public treasury							X	X	X	
Affordability of gas				X				X	X	X
Competitive position								X	X	
Creation of jobs								X	X	
Sustainability			X	X	X		X	X	X	X
CO_2 emission				X	X		X	X	X	X
Transition to sustainable energy technologies			X		X			X	X	X
Resource depletion				X	X					
Geopolitics	**?**		X	X		X		X	X	X
Security of supply			X						X	
Independence from other countries			X	X				X	X	X
Procedural Justice										
Regulation and inspection		X	X				X	X		
Distribution of costs and benefits		X						X		X
Decision-making process		X	X	X		X			X	X
Openness and quality of information		X								X
Independence and quality of research			X	X	X		X		X	X
Public support		X	X			X			X	X
Decision power of EA		X	X	X						X
Involvement										X
Safety and Environment	?	X	X	X	X	X	X	X	X	X
Utility and Necessity	?		X	X			X	X	X	X
Procedural Justice			X	X	X		X	X	X	X

7.1 Discourse developments

In the first period the sudden impact of Gasland can be seen in the discourse developments (Table 16). Gasland focuses on water pollution and spatial impact, and caused a lot of societal unrest. As can be seen in Table 13 the topics introduced in Gasland are still used today. The procedural discourse rose as well in the first period. On the one hand it was used by proponents to argue why The Netherlands is different from the US; the Dutch regulations are stricter. On the other side, the procedural discourse was used to break through a more technical discourse that claims fracking can be done safely. There was a request for openness of information on the chemicals used, and

Period number	Period of time
0	Before newspapers on shale gas were present
1	Nov'10 – Apr'11
2	May'11 – June'11
3	July'11 – Aug'11
4	Sept'11 – Oct'11
5	Nov'11 – July'12
6	Aug'12 – Sept'12
7	Oct'12 – Jan'13
8	Feb'13 – Apr'13
9	Summer 2013

Table 17 Time period specification

municipalities asked EA whether or not decisions will be pushed through. Eventually, opposition used the opportunity to file official complaints as a final procedural option.
In the second period the information meeting in Boxtel (with representatives from national political parties) broadened the societal debate. The involvement of Milieudefensie might have caused a broadening as well. Moreover, Earthquakes in Blackpool and a study in the US on methane leakage also added to the public debate. The response of the mining sector and EA to the first protests against shale gas broadened the discourse in this third period.

In the fourth period, when the actors were debating whether or not a study is necessary, focus was placed on the most dominant discourses: water pollution, earthquakes and sustainability.
During the media pause that was caused by EA's commitment to an independent study, developments abroad got the chance to broaden the societal debate again. So when the research was published, a boom of topics, events, and media attention followed.

7.2 Event impact; intensity and duration

Table 16 shows that the announcement of research could provide space for new discourses to enter. At the time of the first research of EA this happened for the 'Utility and Necessity' discourse. This discourse was present among key stakeholders at the time of the announcement and start-up of the research (period 4). Then, it disappeared from the newspapers in period 5 and it returned in period 6. This disappearance might be explained by the focus of the research on 'Safety and Environment'.

Table 18 shows that critical statements that are given to media can have an important impact in a societal debate. Numerous statements by actors were indicated as important events in the event history analysis and in the interviews. Examples are the concerns of water companies, the Rabobank, Beer brewers and the Professors, but also the complaints of the energy-intensive industry. The events were all mentioned for a long time period in the newspapers.

Moreover, the interviews indicated that these events had an amplifying effect on the societal debate, which means actors are less inclined to reflect on their own discourses (Cuadrilla, 2013; Independent Journalist, 2013; TNO, 2013; Volkskrant, 2013b). For example, the manifest of the professors had an enormous impact on the sustainability discourse (IMSA, 2013; TNO, 2013; Universiteit Utrecht, 2013; Universiteit van Tilburg, 2013). The discourse gained a lot of dominance and the dominant stance that came forward was that shale gas production is not beneficial for a transition towards sustainable energy.

It is interesting to see that the dialogue between Cuadrilla and Brabant Water caused a pause in media attention around this actor. At the time the water company Vitens was still expressing concerns, Brabant Water did not appear in the newspapers anymore. Moreover, when the involvement of Brabant Water was ended by Cuadrilla (Cuadrilla claimed to have come to an agreement with Brabant Water (Cuadrilla, 2012)), the water company again appeared negative towards shale gas in the newspapers (period 8 and 9).

Something similar can be seen for the 'Klankbordgroep.' At first sight the meetings with EA, Witteveen + Bos and the 'Klankbordgroep' were seen as constructive. However, when members of the 'Klankbordgroep' started perceiving the procedures as unfair, they came forward with very critical press releases. This might be explained by the perception of too little involvement and too little openness on the information.

Another category of events, natural events, strongly impacts the societal debate. It can be seen that the environmental effects of shale gas production in the US as well as the earthquakes in Blackpool and Groningen continuously influenced the societal debate since the day they took place.

Information meetings, another type of events, can be important as well. The information meeting in Boxtel shows that the presence of national actors can bring in themes that are more important on a national level, but it only had a short term impact. The 'Shale gas free' declarations can be seen as a strategy to keep the topic on the agenda, but contributed to the nationalization of the societal debate as well. This type of event does have a long term impact.
Developments abroad cannot be neglected. They can be seen as examples of what could happen in The Netherlands as well. Moratoria abroad (France, Switzerland, Germany and several states in the US) were given as reasons for a moratorium in The Netherlands and natural and economic developments were given as an argument to defend one's own case. Developments abroad typically have a long term impact and are mentioned quite often. However, like stated before, new developments abroad tend to be neglected in times of a polarised debate. The announcement of the positive results in the UK, for example, did not enter the societal debate and did not lead to discourse reflection.

Lastly, two events that only played a role for a short period of time have to be mentioned; the announcement of the locations of interest in the Noordoostpolder by Cuadrilla and the seemingly sudden switch of stance by the PvdA. Both events intensively appeared in the media for a short time. Interviewees differ in opinion on the importance of such events. They might impact the societal debate, but it is not known how. A potential effect is that trust in the concerned actors might decline.

Table 18 List of the key events of the Dutch societal debate on shale gas. An extended list of events can be seen in appendix H. 'Duration' refers to the number of days an event was discussed in the newspapers and 'Societal stance' to the major stance that was used in relation to the event. When both a positive and negative stance was used in the same extent, the stance was denoted with '0'.

Event Information					Analysis		
Event #	Event name	Time Period	# of newspaper articles	Duration (Days)	Actors	Event type	Societal stance
3	EBN positive on possibilities shale gas, 'kleisteengas'	0	3	2	EBN, TNO	Int.	-
4, 8, 25	Requested and granted permits	0	0	0	EA, MunB, Cuadrilla	Int. Proc.	-
11	Technical experts start to get involved in the debate	0	42	996	Media	Int.	0
12	Negative environmental effects US, (research results)	0	35	1028	0	Dev. Abroad Env.	-
28	Rabobank speaks against shale gas in Boxtel	1	8	110	Rab	Int. Proc.	-
35	Official complaints permit to MunB	1	3	3	Rab, ComB	Int. Proc.	-
38	Brabants Dagblad uses Dutch law (WoB) until EA more open on chemicals	1	7	357	Media	Int. Proc.	-
39	Moratorium France (prolonged)	1	44	715	France	Dev. Abroad	-
46	Brabant Water critical towards shale gas	1	9	149	BrabW	Int.	-
47	Gasland documentary is used in newspapers	1	35	735	0	Dev. Abroad	-
52	Information meeting in Boxtel (with representatives national political parties GroenLinks and PvdA)	2	3	4	MunB, GL, PvdA	Int. Proc.	-
53	Province of Brabant and municipality of Boxtel asks EA for a moratorium and an independent investigation	2	2	5	ProvNB, MunB	Int. Proc.	-
54	Earthquakes Blackpool (Cuadrilla stops drillings)	2	18	616	0	Unt. Env.	-
61	Milieudefensie gets involved	~ 2	0	0	Milieud.	Int.	-
63	Concerns for water pollution by Vitens	3	29	648	Vitens	Int.	-
64	Range of 'Shale gas free' declarations municipalities	3	33	610	Protest gr.	Int.	-
70	Rabobank & family go to court	4	20	604	Rab, ComB	Int. Proc.	-
71	Hearing Lower House Sept. 14th	4	35	129	Multiple ac.	Int. Proc.	-
73	Dialogue Cuadrilla and Brabant Water	4	6	375	BrabW	Int. Proc.	0
78	Dutch administrative court decides Boxtel did not follow right procedures and cancelled permit in Boxtel	4	31	549	0	Unint. Proc.	-
82	Dutch moratorium and commitment for independent research (&requests for broadening)	4	39	551	EA	Int. Proc.	+
104 + 105	Gas prices US decline (this leads to depreciations US)	5/6	41	273	0	Dev. Abroad Ec.	-
117	High gas supply in US leads to coal export to Europe, gas is explained to be more sustainable than coal	7	10	183	0	Dev. Abroad Env.	+
118	Large industry players complaint about the competitive position of Europe due to shale gas revolution in US	7	16	170	E-Intensive Industry	Int. Ec.	+
127	Earthquakes Groningen	8	10	79	0	Unint. Env.	-
133	Cuadrilla announces locations Noordoostpolder	8	19	22	Cuadrilla	Int. Proc.	-
141	Doubts about the independence of the research of EA	8	8	30	Klankb	Int.	-
144	Beer brewers critical towards shale gas	8	11	10	Media	Int.	-
146	Debate Lower House about the research of EA	8	39	24	EA	Int. Proc.	-
147	PvdA sees shale gas as option	8	24	2	PvdA	Int.	-
8n - 43n	Multiple times criticism on the research of EA	9	NA	NA	Multiple Ac.	Int.	-
9n	Professors speak against shale gas in a manifest	9	NA	NA	Scientists	Int.	-
10n + 11n	EA asks members 'Klankbordgroep' to sign confidentiality agreement , but several members refuse	9	NA	NA	EA, Klankb.	Int. Proc.	-
18n	Vitens is critical towards shale gas since water zones overlap shale gas zones	9	NA	NA	Vitens	Int.	-
31n	EA publishes research report and concludes risks can be mitigated, no decision will be taken yet	9	NA	NA	EA	Int. Proc.	-
44n	EA postpones decision and announces new research will be done to all shale gas locations in The Netherlands	9	NA	NA	EA	Int. Proc.	+

General Abbreviations

NA	Not available

Abbreviations Actors

BrabW	Brabant Water
ComB	Community of Boxtel
ComMER	Environmental Impact Assessment Committee
EA	Ministry of Economic Affairs
GL	GroenLinks
Klankb	Klankbordgroep

Abbreviations Actors

Milieud.	Milieudefensie
MunB	Municipality of Boxtel
Multiple ac	Multiple Actors
Protest gr.	Protest Groups
Prov NB	Province of Noord-Brabant
Rab	Rabobank

Abbreviations Event Types

Int.	Intended
Unint.	Unintended
Dev. Abroad	Development Abroad
Ec.	Economic
Env.	Environmental
Proc.	Procedural

7.3 Provisional conclusions

Although at first sight the societal debate on shale gas was perceived to come down to risks for humans and the environment, this research shows that a societal debate involves more than that. Not only safety and environment are important. 'Utility and Necessity' and 'Procedural Justice' are important as well.

Several events combined can amplify the dominance of such themes. Typically, natural events, like earthquakes and pollution, cause a long term effect on the public debate. Often, these events cannot be controlled as they are unintended. However, the response to the event can be controlled. This research has shown that a procedural discourse arose at times when the oil and gas industry and the government emphasised the safety of the technology and when decision-moments came near. The procedural discourse was used to get through to these actors.

Moreover, it can be seen that the research of W+B had an abating effect. It is interesting to see that only at the end of the calm period (at period 6) the effect of broadening is seen.

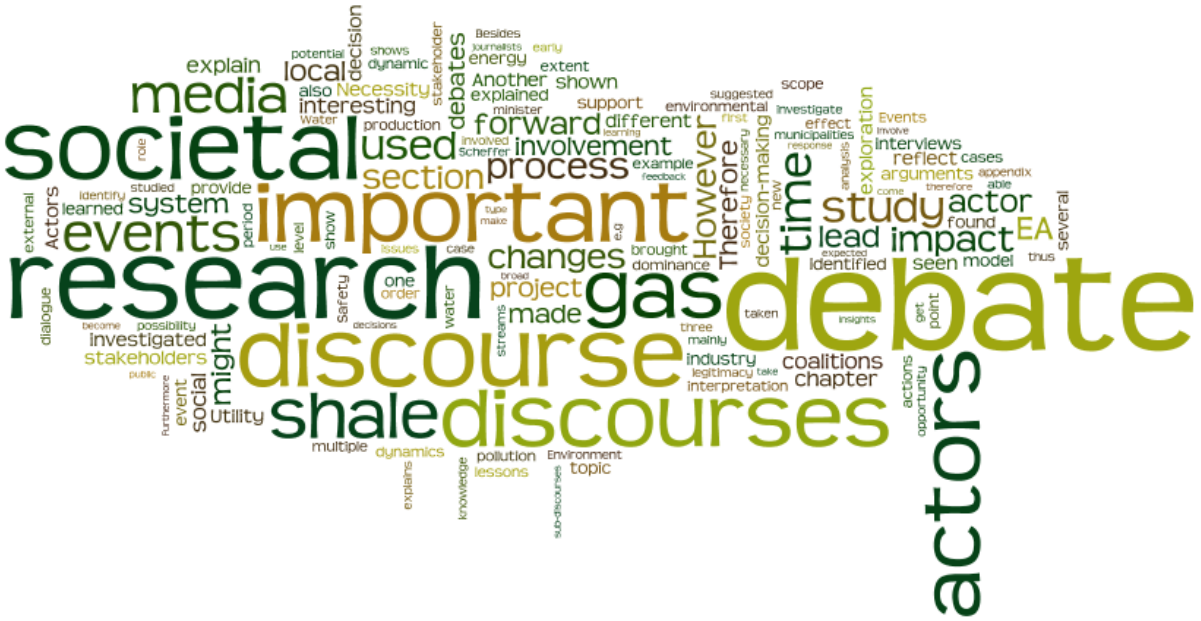
Next to that, this research shows that the opinions of 'example actors', e.g. professors, water companies, beer brewers and the Rabobank, might polarise the societal debate; actors are less inclined to reflect on their discourses. Continuous involvement of these actors could depolarise the debate again. It was shown that involvement could decrease the level of statements in the press. Moreover, the societal debate on shale gas demonstrates that involvement of new actors, e.g. national political parties and Milieudefensie, can broaden the societal debate.

In chapter 3 five potential effects of events were introduced; 'trigger', 'polarise', 'broaden', 'amplify' and 'abate'. Table 19 shows the effects that can be assigned to the events in the shale gas debate. It is important to see that some events can lead to amplification of the debate or even polarisation of the debate. As explained in section 3.5 polarisation leads to a lower reflection on discourses. In other words, it impedes stakeholders from learning. This makes it difficult to come to a supported solution. Therefore, it is important to prevent polarisation in societal debates.

Table 19 Event effect

Event name	Time Period	Event effect	Event name	Time Period	Event effect
EBN positive on possibilities shale gas, 'kleisteengas'	0	Trigger	Dialogue Cuadrilla and Brabant Water	4	Abate
Requested and granted permit	0	Trigger	Dutch administrative court cancelled permit in Boxtel	4	Trigger
Technical experts get involved in the debate	0	Broaden	Dutch moratorium and independent research	4	Abate
Negative environmental effects US	0	Amplify	Gas prices US decline	5/6	Broaden
Rabobank speaks against shale gas in Boxtel	1	Amplify	High gas supply in US and coal export to Europe	7	Broaden
Official complaints permit to MunB	1	Amplify	Large industry players complaint about the competitive position of Europe	7	Amplify
Brabants Dagblad uses Dutch law (WoB) until EA more open on chemicals	1	Amplify	Earthquakes Groningen	8	Broaden
Moratorium France (prolonged)	1	Broaden	Cuadrilla announces locations Noordoostpolder	8	Trigger
Brabant Water critical towards shale gas	1	Amplify	Doubts about the independence of the research of EA (third time complaints)	8	Polarise
Gasland documentary is used in newspapers	1	Trigger	Beer brewers critical towards shale gas	8	Amplify
Information meeting in Boxtel (with representatives of national political parties)	2	Broaden	Debate Lower House about the research of EA	8	
Province of Brabant and municipality of Boxtel asks EA for a moratorium and investigation	2	Trigger	PvdA sees shale gas as option	8	Trigger
Earthquakes Blackpool	2	Amplify	Multiple times criticism on the research of EA	9	Amplify
Milieudefensie gets involved	~ 2	Broaden	Professors speak against shale gas in a manifest	9	Amplify
Concerns for water pollution by Vitens	3	Amplify	EA asks members 'Klankbordgroep' to sign confidentiality agreement	9	Trigger
Range of 'Shale gas free' declarations municipalities	3	Polarise	Vitens is critical towards shale gas since water zones overlap shale gas zones	9	Amplify
Rabobank & family go to court	4	Amplify	EA publishes research report and concludes risks can be mitigated	9	Trigger
Hearing Lower House Sept. 14th	4	Trigger	EA postpones decision and announces new research will be done	9	Abate

Chapter 8
Conclusions and Recommendations



Content

This chapter will give the conclusions and recommendations of the research. The research questions on the three factors of societal debates (discourses, actors and events) will be answered. Moreover, the relations between these factors will be given. Thereafter, section 8.2 explains the lessons that can be learned from the Dutch societal debate on shale gas. Finally, section 8.3 will elaborate on the research limitations and will give recommendations for future research.

8. Conclusions and Recommendations

8.1 Conclusions

This research has shown that discourses change over time. The process behind these changes is highly dynamic. Multiple dynamic factors together explain these changes. The dynamic factors of a societal debate that were studied in this research are: 'Discourses', 'Actors' and 'Events' (chapter 2).

Discourses

Three major discourses were found: 'Safety and Environment', 'Utility and Necessity' and 'Procedural Justice' (chapter 5). Table 20 shows the sub-themes that were identified within the three major discourses.

Table 20 List of discourses and sub-themes

Safety and Environment	Utility and Necessity	Procedural Justice
Water pollution and water use	**Economy**	**Regulation and inspection**
Spatial impact	Estimates of stocks	**Distribution of costs and benefits**
Traffic	Public treasury	**Decision-making process**
Visual pollution	Affordability of gas	Openness and quality of information
Noise	Competitive position	Independence and quality of research
House prices	Creation of jobs	Public support
Earthquakes	**Sustainability**	Decision power of EA
Air Pollution	CO_2 emission	Involvement
	Transition to sustainable energy technologies	
	Resource depletion	
	Geopolitics	
	Security of supply	
	Independence from other countries	

These discourses and sub-themes varied in their dominance over time. New sub-themes came forward over time, while others disappeared (chapter 7). 'Safety and Environment' remains the most dominant discourse throughout the investigated time period according to the interviews (chapter 6), and 'Procedural Justice' came forward as most dominant in the newspaper database (chapter 5). Within the 'Safety and Environment' discourse the concerns about water pollution come forward quite dominantly. In a later stage of the societal debate, tremors get more attention as well.

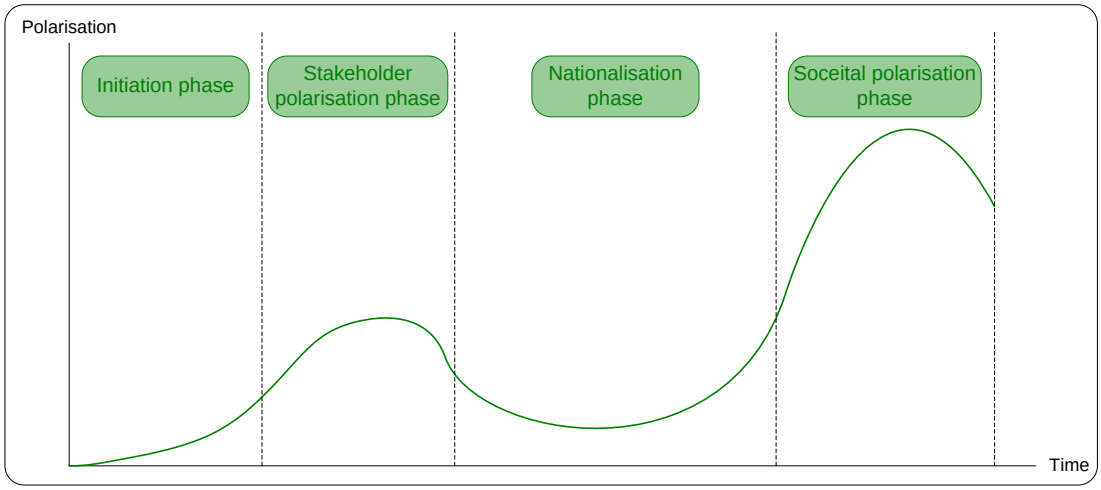
The 'Utility and Necessity' discourse gains dominance later in the debate. In the second and third period of the studied debate (May-August 2011) this discourse comes forward as well, although in a smaller extent. At the time, actors mostly elaborated on how shale gas is useful in a transition towards sustainable energy and how it can extend Dutch gas independence. This discourse comes forward in a smaller extent in the newspapers at the time when EA is committed to an 'independent investigation'. This might be explained by the focus of this research on 'Safety and Environment' (chapter 7). The debate continues and the 'Utility and Necessity' discourse gains more dominance again (from august 2012 on). Moreover, it is broadened with several economic aspects (Table 16).

The 'Procedural Justice' discourse gains dominance at 'peak publication moments'; times at which important decisions have to be taken (chapter 5). However, the discourse is present at all times (although at a lower level). On the one hand this discourse is used by proponents, who point out that the Dutch laws on regulation and inspection assure safe exploration and production of shale gas. On the other hand, opponents use this discourse to point out to decision-makers that the decision-making process is not fair (chapter 6).

The developments in these discourses showed some characteristics for the phase in which they occurred. These can be seen in Figure 17. It is suggested that these characteristics depend on the polarisation level of the debate.

Events

This research studied the impact events could have on a societal debate (chapter 7). Five potential effects of events were introduced; 'trigger', 'polarise', 'broaden', 'amplify' and 'abate'. Amplification and abating refer to a discourse gaining or losing dominance or the general growth or decline of a societal debate. Broadening indicates the introduction of new discourses or the elaboration of a certain discourse. Polarisation means that actors are less inclined to reflect on their discourses and more extreme positions are taken. Figure 17 shows the effect of the most important events in the shale gas debate as well as some suggested characteristic effects for each of the debate's phases.



Characteristics				
Actors				
Actors involved	Local	Increasing	Increasing	Increasing
Information source	Internet and meetings	Media	Internet and meetings	Media
Discourse				
Dominance	One	Few	Changing	Multiple
Focus	Narrow	Narrow	Medium	Broad
Overlap	Low	Low	Changing	Low
Reflection	Low	Low	Medium	Low
Events				
Role	Trigger	Used as evidence, Amplify & Polarise	Broaden	Used as evidence, Amplify & Polarise
Media				
Dominated by	Local community	Interest groups	Non specific actors	Interest groups
Role	Polarise	Amplify & Polarise	Broaden	Amplify & Polarise

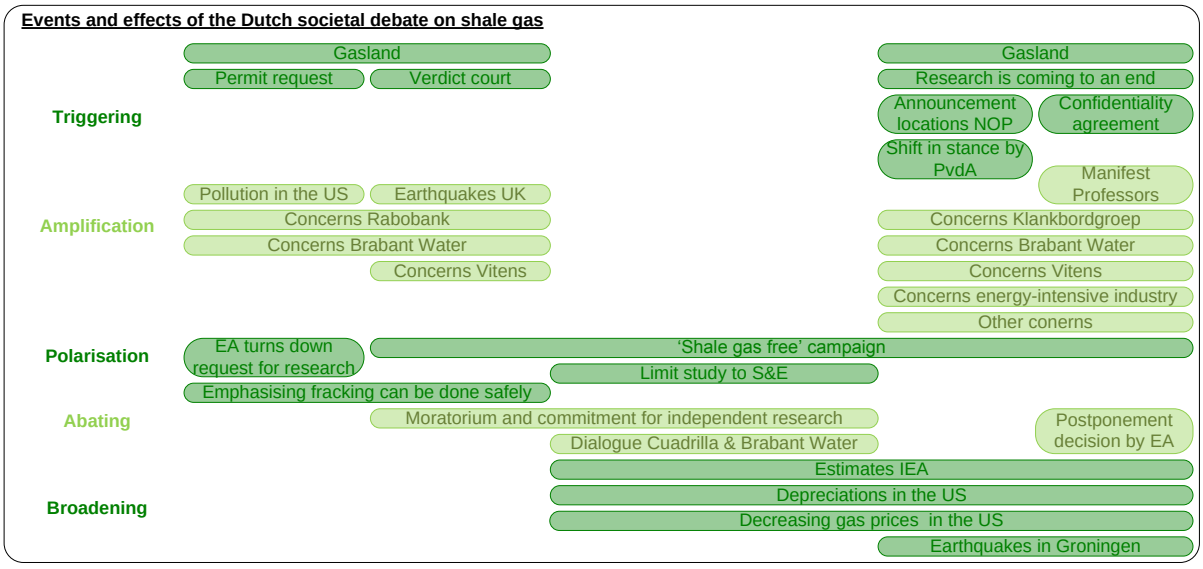


Figure 17 Overview of the shale gas debate, event effects and the suggested characteristics of four subsequent debate phases. A societal debate does not necessary follow these phases.

It was shown that natural events, such as earthquakes and pollution, can have a long term impact on a societal debate. They can increase the legitimacy of arguments and amplify the debate as well as give a reason for discourse reflection (broadening). Earthquakes in Blackpool made politicians realise that many things were still uncertain in relation to shale gas exploration and production, and amplified the requests for research. While the earthquakes in Blackpool only gave reason for research, earthquakes in Groningen also led to a discussion on the potential causes of earthquakes, the impact for inhabitants in terms of damage and the possibilities of compensation of the damage from earthquakes. This might even have brought up a debate on compensation of damage in general. So earthquakes in Groningen broadened the debate.
Events or developments abroad are often used to increase the legitimacy of arguments and can thus amplify a societal debate. Pollution in the US and earthquakes in Blackpool (UK) showed these risks are associated with shale gas exploration and production, and therefore amplified the debate. Economic developments in the US broadened the debate. It was shown what impact shale gas production could have; the US became less energy dependent, coal got exported to Europe and shale gas investing companies had to depreciate their investments.
Another type of event is the critical stance in media by several example actors. The critical stance of professors, water companies, beer brewers and the Rabobank increased the legitimacy of the arguments of the opposition of shale gas, and amplified the debate.

Amplification can also become polarisation. The debate develops in such a way that actors are less inclined to reflect on their discourse. Characteristic for such moments is that actors have more extreme statements and statements of other actors are also perceived as either pro or against a certain topic. Events can have polarising effects. By turning down a request for research or the requests for broadening the research an opportunity to learn is missed, which could have broadened the debate. Moreover, in the shale gas debate it focused the debate on procedural justice in terms of the decision-making process. The quality of the available information was questioned. This research has shown that the research for a long time did not broaden the debate (chapter 7). Only in the final months broadening was seen (from august 2012 on). This might be explained by the focus of the research on ‘Safety and Environment’.
Events not only polarise by giving focus on certain aspects, events might also polarise by creating a ‘pro’ or ‘against’ side. Emphasising fracking can be done safely, can be seen as an extreme statement pro shale gas and might therefore lead to polarisation as well. Moreover, the ‘shale gas free’ campaign stimulated actors to ‘pick a side’.

This study also identified some events that abate the societal debate. The research that was issued by EA gave time to reflect on discourses. For this it is important that stakeholders are involved to set the scope of the research, so that all actors’ questions can be answered. Like explained before, focus on a few aspects of the debate, can polarise the debate. Moreover, the time of an investigation can be used for a dialogue. The dialogue with Brabant Water by Cuadrilla shows that criticism can decline. However, when the dialogue stopped, Brabant Water showed concerns again. Information meetings provide another type of event that can abate a public debate. However, these events can amplify the debate as well. The type of actors invited to such an event can lead to broadening or polarisation of a societal debate. By inviting actors with a diverse set of discourses, the meeting can aid in broadening the debate. With respect to information meetings, the information meeting in Boxtel, with representatives from two national political parties, has aided in broadening the debate with sustainability.

New actors

Changes in discourses can partly be explained by new actors entering the debate. The Rabobank brought the topic of tremors into the societal debate in order to safeguard their data centre. Brabant Water and Vitens made the topic of water pollution more important. Milieudefensie and the political party GroenLinks brought sustainability into the debate. And HCSS gained more attention for the possibility of geopolitical changes caused by worldwide shale gas exploration and production.

Actor learning

Another important factor of the dynamic aspect 'Actors' is that actors learn and reflect on their discourses (chapter 6). Local and regional governments were surprised by local protests and learned that a more critical reflection on decisions of EA is necessary for public support (first-order learning). Moreover, the idea grew that EA would make a top-down decision. Questions about this were asked to EA. With respect to this, the decreasing level of trust in governments and institutions (section 1.1.2) is an important aspect. The risk of a top-down decision might have stimulated municipalities to declare themselves 'shale gas free'. This amplified and polarised the debate as well. This effect also came forward around the time of the publication of the research of Witteveen + Bos (W+B) (chapter 6). In the press conference the minister of EA explained how the decision-making process would be followed up. Municipalities felt lectured and therefore they did not see how they were involved in the decision-making process. The idea that EA would make a top-down decision might have grown because of this.

Cuadrilla and other industry partners got overwhelmed by the protest as well. These actors learned about the importance of public support and involvement (second-order learning). EA learned that openness of information can be used against them and directly play a role in the media (first-order learning). This decreased the ministry's openness. It was used as a reason to become less proactive in providing information, which in turn might even have amplified the debate. In a later stage, criticism on the by this actor issued research (The first, W+B, research) helped this actor learn that a broad investigation and societal debate is needed in decision-making. A narrow study is not sufficient.

Learning can be seen in the discourse developments as well (chapter 7). The complexity of the advantages and disadvantages of shale gas exploration and production is covered in larger extent during the debate (second-order learning). Moreover, it can be seen that topics are discussed more in-depth. For example, earthquakes came forward as a possibility quite early in the debate. However, only in the summer of 2013 the topic of soil subsidence came forward. Also, the connection was made between earthquakes and aquifer pollution.

The newspapers showed an increasing coverage of topics. In these terms, media learn about the topic shale gas, about the technology fracking, about gas production in general and about the impact it could have.

Interaction between actors

Next to stakeholder learning, it can be seen that the interactions between stakeholders can be important as well. Various actions and reactions can lead to amplification of effects and can cause amplification and polarisation of the societal debate (chapter 7).

EA and the industry emphasised that fracking was applied safely multiple times in The Netherlands. Moreover, it was stressed that the current laws on regulation and inspection in the mining industry were sufficient. However, people saw how (from their point of view) many mistakes were made abroad. Furthermore, adjustments to the estimates of available (and technically recoverable) shale gas resources in the Netherlands and adjustments to the expected potential intensity of earthquakes in Groningen showed people that predictions are not always correct. Opposition tried to get through to decision-makers with these facts, but they did not seem to be willing to reflect on their discourse. In turn, neither was the opposition. The nuance and complexity of the estimates got lost in the debate. This way the debate got polarised.

This might as well have led to the use of the procedural discourse. Procedural arguments were used by activist groups to influence the decision-making. EA was accused of not being open on the information used for the decision-making and the independence of the research of W+B was questioned.

Another interesting interaction process can be seen for the 'Utility and Necessity' discourse. Many actors want the ministry of EA to explain why shale gas production is useful and necessary for The Netherlands before any decisions are taken. However, the industry and EA have a more procedural view on such decisions. According to these actors these questions can only be answered after an exploratory drilling has been performed. As explained before, leaving this question unanswered decreased the possibility to learn.
Besides that, amplification was seen caused by high expectations for the benefits from shale gas. In the early days of the societal debate high expectations existed on the potential of shale gas in Europe. This meant shale gas would have a large impact on the sustainability ambitions of other actors, who therefore felt a stronger urge to respond.

Media

An important actor group that could influence the societal debate is the media. This research treated media as one of the actors involved in the societal debate on shale gas. Interviews pointed out that media can have a polarising role. The media's role is to give society an overview of shale gas, the fracking technology and the societal debate on shale gas. In a societal debate, media often focus on two discourse coalitions; proponents and opponents. This polarises the debate. In the interviews the polarising role was most often assigned to television and radio media. On the other hand, interviewees believed written media also bring nuance in the debate and thus have a depolarising effect.
Moreover, media could have a polarising effect by choosing the events to write about and the actors to refer to. In times of a polarised debate media are mostly influenced by interest groups and often write about the actions taken by these groups. Moreover, the attention to an event can get amplified. When multiple journalists write about an event, this can trigger other journalists to write about that event as well. The increased attention of media at polarised times, can amplify the polarisation.
Next to that, media choose the themes to write about. The interviews pointed out that 'Safety and Environment' was the most dominant discourse. Moreover, sustainability was appointed as the most important concern of the actors involved. Newspapers, however, wrote mostly about 'Procedural Justice' (chapter 5).
It should also be noted that the journalists who were interviewed pointed out that their attention to the subject grew, because the issue of shale gas concerns conflicting interests. In other words, journalists are interested in wicked issues. This could be recognized up front.

Relations

It was shown that events alone cannot explain changing discourses. Actors, events and discourses together are necessary to explain the dynamics in a societal debate. Changes are explained by external impact which is amplified by feedback from actor's responses and from changing discourses. As was mentioned before, five types of relations were identified between actors, events and discourses; 'Amplification', 'Broadening', 'Abating', 'Polarisation' and 'Trigger'. These relations can summarise the previously explained findings.
Events can cause actors to reflect on their discourses (earthquakes Groningen, depreciations in the US and coal export to Europe). Or they can be a reason for certain actions. The exploration permit in Boxtel gave reason to organise protest, the cancelation of this permit gave reason for a moratorium and the approaching decision in the summer of 2013 led to more protest actions. These actions in turn can lead to reactions from other actors (depending on their discourse), for example the

confidentially agreement that was provided by EA was a response of EA to the early concerns that the 'Klankbordgroep' released on the research of W+B. Actions can also have an impact on existing discourses. The emphasis on fracking as a safe technology, might have amplified the procedural discourse. Events can also give more legitimacy to arguments and thereby amplify the debate or a topic within this debate. Discourses can determine the response to unintended and intended events. Based on these described relations, it can be concluded that the conceptual model introduced in section 2.4.1 gives a valid representation of the dynamics of a societal debate.

8.2 Practical Recommendations

This research was intended to identify the lessons that can be learned from the Dutch societal debate on shale gas. It was investigated how unintended and intended events can explain changes in discourses. The case of the shale gas debate has shown that the course of events can lead the debate to reach polarised levels. At these levels, actors tend to reflect less on 'their discourse' and more extreme positions are taken. In other words, it impedes stakeholder learning. Therefore, it is important to prevent a debate to reach high polarised levels. Unintended events cannot be controlled and therefore provide no measure to abate or broaden a debate. As a first advice it should be noted that that actor's actions can have an amplifying and polarising effect. Thus, these events do provide measures to abate or broaden a societal debate. Therefore, it is important to consider the impact of one's actions and the reactions that can follow such an action. This section will elaborate on some measures that can be taken to prevent polarisation.

Engagement strategy

It should be noted that actions taken by actors depend on 'their discourse'. Therefore, for each project a stakeholder analysis should be done in advance and during the project, to be able to monitor changes in discourses, to predict possible responses and to create an engagement strategy. Many ways to perform such an analysis exist (Reed, et al., 2009). Moreover, an optimal fit should be found between the stakeholder's position and the strategy to manage this stakeholder (Blair, et al., 1996).

Involvement

The research has shown that the involvement of actors can have an abating effect and the involvement of new actors can broaden a debate. Societal debates are not static. Actors influence each other and arguments can be copied. Therefore, involvement of a diverse set of actors is important. Moreover, the dialogue with Brabant Water shows that a continuous involvement of actors is important (section 6.2.1 and section 6.4.1). Actors should be able to trust that the involvement is not only a temporary development.

When involving actors it is important to stimulate discourse reflection. This can be done by opening up the possibilities for an issue that was brought forward. When doing this, it is important to involve all actors that have the issue on their agenda in a dialogue. This can be either a dialogue in the media or a physical meeting.
For example, for the 'Safety and Environment' discourse, possibilities could be opened up by implementing changes to the technologies used (e.g. use other chemicals, use a lower amount of water), the level of inspections or by providing compensation. Other risks can be brought forward, as well as manners to mitigate these risks. As a recent development, the risk of earthquakes entered the debate as a result of several events; the earthquakes in Groningen continued to occur and appeared to be stronger than expected, a former NAM-employee accused the NAM of ignoring risks for a too long period of time and the community of Groningen does not perceive the compensation for the damage of the earthquakes as fair. It is important to address these concerns. The risks of earthquakes occurring due to the shale gas exploration and production should be explained as well

as the ways to mitigate these risks. Moreover, agreements could be made on the compensation that should be given in case an earthquake does take place.
The 'Utility and Necessity' discourse can be addressed by explicating what economic and geopolitical aspects shale gas should secure, and by discussing how shale gas could aid in a transition to a sustainable energy supply (e.g. a combination with geothermal energy, investing the state's gas incomes in sustainable energy technologies). With respect to the energy transition, recently, an agreement was reached on the Dutch energy policy by several industry-players, governmental and non-governmental organisations (SER-Akkoord). This could provide a basis for a discussion on how shale gas fits in this policy. Moreover, events that occur abroad could be used to initiate a debate on the Dutch energy transition. This research has shown that the increased use of coal was used to explain why the current energy policy is not sufficient. Moreover, recently the German energy policy entered the debate. Such topics can be used to initiate a dialogue on what the transition should and should not look like.
As a response to the questions that rose from the 'Procedural Justice' discourse, changes in the permitting process can be discussed. For example, an issue that comes forward is the fear of municipalities that a decision will be forced on them. This resulted in an increasing number of municipalities declaring themselves 'shale gas free' in order to force being involved (section 6.5.1). This might be resolved by creating more opportunities during the permitting process for municipalities to give advice to EA. Moreover, a decision-making process could be designed in such a way that more stakeholders have to be involved and the cost and benefits can be divided so that local communities get compensated for the risks they are taking.
As explained in section 8.1, discourse reflection is important. The proposed changes can provide an opportunity for operators and decision-makers to initiate discourse reflection and to broaden the debate.

Besides involvement, timing is important as well. The societal debate on shale gas shows that multiple actors were surprised by the project. Local communities only found out about the project after municipalities had decided to leave their zoning plan temporarily. The province of Noord-Brabant and Brabant Water found out too late to formally advise on the project or object to the project. And citizens in the Noordoostpolder were surprised by Cuadrilla's plans (appendix H). It is important to involve stakeholders early on in the permitting process, when a decision is not yet near. This can make objections to a project visible as soon as possible and it gives more time to use measures to abate the debate.
Moreover, early involvement provides the opportunity to show actors what type of research is performed, what options can be considered and how the project can be carefully planned.
Next to that, as was explained before, it is important that actors remain open to different alternatives. The decision to cease continuation of the project should thus be a real possibility as well. This only holds, before a permit is granted.

Finally, lessons can be learned from the involvement of media. This research used written media to perform a discourse analysis, but treated media as an actor with a role in the debate as well. Media play an important role in societal debates. Their discourse is communicated to society and therefore it is important to involve this actor actively as well. Media could be invited to information meetings, and interviews could be given. The interviews with journalists pointed out that it is important for media to reach their readers on an emotional level (appendix E). This should be taken into account during the involvement of the media and the media can be provided with stories that can reach this emotional level.

Research

Section 8.1 introduced that a government issued investigation to a policy issue can provide an opportunity to abate a societal debate in case of high polarisation levels and can give time for actors to reflect on their discourses. However, the shale gas debate shows that it may also lead to unrest among stakeholders. The minister of EA has announced a complementary investigation on shale gas which focuses on finding the best locations for shale gas exploration and production, involving local interests in the process. Therefore, it is important to learn the lessons from the first research. The scope of the first research was perceived to be too narrow by some of the key stakeholders. In the decision-making process of a wicked issue it is important to take into account the diversity in discourses. A broad scope of research can answer questions from actors with different discourses, but will also make the research more time-consuming. However, discourse reflection takes time as well. Therefore, the time of the research should be used for a learning process as well. It was recognised that the societal debate reached polarised levels. This makes it important to take time.

The second research is a governmental spatial planning procedure for the underground ('Rijksstructuurvisie ondergrond') which could cover both underground and above-ground impacts of shale gas developments. The so called 'Rijksstructuurvisie' is used together with an environmental impact assessment ('plan-m.e.r.') to find out which locations within The Netherlands have the least impact on its surroundings and to find out at which locations risks are easiest to mitigate. With the 'plan-m.e.r.' the issues brought forward by the 'Safety and Environment' discourse can be investigated. Besides that, it is important to keep the 'Utility and Necessity' discourse into consideration as well. The minister explained he wants to weigh off local interest against national interests. To do so, he will mainly look at 'Safety and Environment' and at financial and economic issues (Economische Zaken, 2013b). It is important to see that 'Utility and Necessity' not only comes down to financial and economic aspects. Sustainability and geopolitics are important issues as well. Sustainability is one of the important underlying discourses on shale gas exploration. Therefore, it should be investigated whether or not shale gas could be useful in a transition to a sustainable energy supply and if so, how. For this, it should be weighed off to what extent one is prepared to make changes in order to make a shale gas exploration and production project more sustainable.

Furthermore, the time scope of the research can be used to involve local and regional governments, water companies, environmental organisations, the mining industry and other actors. The minister of EA explained he wants to involve local governments and communities in local specific research and water companies and the mining sector to investigate how risks can be mitigated. He wants this process to be open and transparent. To do so, it is important to realise that a proactive communication is necessary for such a process. To mitigate risks the minister mainly points at technical solutions. However, procedural solutions could be found as well. New regulations or a higher level of inspection and monitoring could provide solutions for the concerns on 'Safety and Environment'. Next to that, it should be realised that only a consideration of local and national interests is not sufficient. This research brought forward that a fair distribution of costs and benefits are an important issue as well. Therefore, it is important to investigate which compensation measures are possible.

Finally, it should be noted that the first research has led to much criticism, because promises made on forehand were not followed through, e.g. the 'Klankbordgroep' was promised it would get several opportunities to give feedback on the research but did not get all of these opportunities. 'Procedural Justice' was used to prevent the minister from making a top-down decision. Approaching a decision-moment when no support is found yet, can trigger the debate to become more polarised. Approaching a decision from a support situation, might have a different outcome.

Societal Trends

Finally, it should be seen that the focus of this study was on events. Contextual trends can be important as well (section 1.1). It is important to take these into consideration.
The growing societal involvement (as a result of education and the introduction of social media) could be used to enrich a decision-making process.
The growing environmental awareness has led to the ambition to initiate a transition towards a more sustainable energy supply. The aim is to achieve a completely sustainable energy supply by 2050. Although recently an agreement was reached on how this aim should be reached (the SER-akkoord) and it has become clearer what the transition would look like, a transition period is still characterised by many uncertainties, e.g. it is not clear which technology or technologies will become dominant. Uncertainties in decision-making processes make them more complex. This not only counts for the shale gas exploration project, but it could also become important for other energy projects. The lessons learned, as explained above, are thus important for other energy projects as well. The three main discourses that were identified, 'Safety and Environment', 'Utility and Necessity' and 'Procedural Justice', would probably come forward as important in other projects as well. Therefore, this research could provide a basis for setting the agenda of a dialogue with the stakeholders of such a project.

8.3 Discussion and Scientific Recommendations

This research used the theoretical framework of Walker et al. (2011) as a basis. The main idea that context influences acceptance by means of stakeholder interactions was used since it covers the main dynamic aspects of societal debates (Walker, et al., 2011). Moreover, Walker's use of external impact and feedback enables a more holistic approach, which is for example not covered in Kingdon's streams model. Wüstenhagen et al. (2007) give an overview of some other theories on social acceptance (section 2.3) (Wüstenhagen, Wolsink, & Bürer, 2007). These, however, are not as holistic as Walker's framework. Besides that, socio-political acceptance, covered in Walker's framework, can be seen as a starting point for social acceptance.
A discourse analysis was performed and discourses were used to explain the actions and strategies of the actors involved. Values, beliefs or interests could also be used to explain these actions and strategies. In this case Sabatier's 'Actor Coalition Framework' could be useful (Sabatier & Weible, 2007). However, discourses were assumed to be at the basis of these concepts. An actor's discourse determines that actor's values, beliefs and interests (section 2.1.2).
Another aspect that was found to be important was the polarisation level of the debate. This is expected to have an impact on the stakeholder interactions and event effects that were introduced in this research. A recommendation could be to investigate this effect further.

In this research a combination of quantitative and qualitative methods was used. Besides the advantages associated with these methods (section 1.4), some limitations should be recognized as well. This section will identify these limitations. Moreover, some recommendations for future research are given.

Discourse development

The focus of this study was on changes in discourses. Section 2.4.1 introduced five factors for change in discourses; the actors of a discourse coalition, the size of discourse coalitions, discourse dominance, discourse focus and discourse overlap.

The first two were not measured in this research. Discourse coalitions can be found by performing a cluster analysis on actor's documents. Thereafter, the actor's clustering could be statistically related to the found discourse clustering. Another possibility is using Toulmin's 'structural model of argumentation'. Arguments can assist in linking stakeholders to a specific discourse and can give insights into the discourse coalitions' composition. (Toulmin, 1958).

When appointing stakeholders to discourse coalitions it is important to realize that actors cannot be appointed to one discourse. One actor uses multiple discourses and it would be interesting to study to what extent each discourse is important for an actor. This way the overlap in discourses can be studied and opportunities for negotiation can exposed. For this, it is important to realise that accumulating evidence could lead to discourse reflection (section 2.1.2).
When actors are assigned to the discourses, coalition size could be analysed as well.

Discourse dominance was analysed with a media analysis. Moreover, the interviews gave an indication of the perceived dominance. The interviews and the media analysis appeared to contradict each other. 'Procedural Justice' came forward as the dominant discourse in the media analysis and 'Safety and Environment' in the interviews. The above explained analysis of stakeholder documents might overcome this issue. It would be interesting to study the changes in each of the main actors' discourses and relate these to changes in the overall discourse dominance.
Discourse focus was measured in terms of the themes that were brought forward. With respect to this, it would be interesting to study how these themes are used in relation to the stance on shale gas exploration or production. Themes might be introduced in favour of a certain technological development. However, after this first introduction the theme might be used in a different way. For example, low CO_2 emission was, in an earlier stage of the societal debate, mostly used in favour of shale gas exploration and production; gas was explained to cause little CO_2 emission. In a later stage of the debate, this theme was more often used to explain why no investments should be made in fossil fuels. To explicate this difference the most dominant stance on a certain theme should be analysed as well.
Discourse overlap was analysed by analysing the overlap of the thematic clusters (section 5.2.2.). However, such a study becomes more relevant when this can be related to the actors involved; to the discourse coalitions.
Besides studying the five factors of change it would be interesting to study the level of polarisation of the debate. This research indicated that the level of polarisation might be an important factor that influences the amount of changes. Therefore, it might be interesting to investigate the impact of events on the polarisation level of a societal debate. For such a research the polarization level could be measured in two ways.
First, the amount of extreme statements over time could be measured. This could be related to the events occurring during this time period.
Second, the methods used in this research could provide a basis for the measurement of polarisation. A cluster analysis could be performed on stakeholder documents to provide a basis for measuring the distance between actors' stances.

Events

Another limitation of this study is that mainly events from the political and societal domain were uncovered. It would be interesting to study the impact of institutional changes. Since such impacts are not expected to have a direct effect, it is suggested to study a longer period of time.
Moreover, the possibility exists that not all events were covered. Less visible events could have been missed. However, ten semi-structured interviews brought up several events with a small visibility.

Actors

The research has shown that actors had several different learning moments. Some of these had an abating effect on the societal debate and some an amplifying effect. To understand the differences that emerge it is necessary to understand how individuals and organizations learn. Organizational learning theory suggests that a blend of focuses is required for effective learning (Wang & Ahmed, 2003). This could be studied in more detail in relation to societal debates. Moreover, the response to or impact of events could be studied separately for each stakeholder group. Stakeholder documents could be investigated to unravel the visibility and duration of events for each stakeholder.

Time scope of the research

Another limitation is the time scope of this research. Previous research on the discourses of the shale gas debate shows that using a different timeframe for newspaper selection could lead to different clustering (Waes, 2013). However, it is not expected that such changes would lead to another interpretation of the clusters. The study does show that the results depend on the researcher's interpretation and the 'theoretical frame' that is used by the researcher. Interviews with multiple experts limited the dependence on the researcher's interpretation. Moreover, the event history analysis supplemented the results as well.

Besides that, studying the societal debate for a longer period of time could lead to new insights. During the research time the shale gas debate was still reaching its climax and thus not all discourse changes might have been covered. The advantage of studying a societal debate while it is still ongoing is that the debate is still vivid in the actors' memories. Therefore, the dynamics of a debate and the shifts in the importance of certain discourses can be unravelled to a larger extent.

Media Analysis

This research used a media analysis to investigate the societal perspective on the topic of shale gas. It can be questioned whether or not media provides a good representation of society and thus the societal debate. Interviewees differ in opinion on this topic (appendix E). However, when indicating what was missing, the interviewees mainly referred to aspects that are brought forward in expert and local debates. This study focuses on a national debate. Moreover, it investigates a societal debate, not a debate between experts. Experts can influence the societal debate. It is assumed that when this happens, the topic will come forward in the newspaper dataset. Besides that, a wide range of different newspapers was investigated (appendix B). This increased the validity of the research.

However, the use of media does bring forward some other issues, as explained above. Therefore, stakeholder documents can be used for a cluster analysis as well.

Furthermore, it has been suggested that social media should be taken into account in the research. As indicated in section 1.1, social media can have an impact on the societal debate. However, research has shown that social media are mainly used by local communities (Brinker, 2013). Moreover, expert opinions come forward in a higher extent through this medium (Universiteit van Tilburg, 2013). The inclusion of social media could lead to an overrepresentation of these actor groups.

Another important issue with social media came forward during the interviews. Both journalists and scientists tried to give a neutral reflection on shale gas in the newspapers. In social media, the neutrality of these statements was often questioned in a large extent. This might have polarised the debate and might have caused the actors to feel less inclined to express themselves in the media.

Finally, this research performed a limited study on the impact of media on a societal debate. This aspect could be investigated in more detail. This study identified some events, which were expected to be covered in a larger extent by media or to have a longer impact on the societal debate, e.g. Shell's plans in South-Africa, the announcement of potential exploration locations in the Noordoostpolder and the positive results of shale gas exploration in the United Kingdom (appendix H). It could be investigated how and why this did not occur.

Interviews

In order to minimize dependence on the researcher's interpretation ten semi-structured interviews were conducted to validate the research findings and to aid in the interpretation of the results. Like for the newspaper dataset it would be desirable to cover a broad range of opinions. Because few interviews were conducted with actors with a local or environmental perspective, more interviews were held with actors external to the debate; journalists and scientists. The industry and national government were represented because of their high level of knowledge on the debate.

Discourse analysis and dynamics

Several suggestions could be made for discourse analyses on societal debates. First, section 8.1 suggests that the higher level discourses might be present in other cases in the energy industry as well. Furthermore, societal debates on the topics of other industries might show a similar pattern. It would be interesting to study the differences and similarities between industries' debates. Moreover, unsuccessful and successful cases could be compared. Next to that, a comparison could be made between cases that grow from local support or local protest. It would be interesting to study cases that resulted in a supported outcome and cases that resulted in multiple coexisting discourses in order to investigate how the stakeholder interactions led to these outcomes as well as to identify what influence events had in the specific cases. Heterogeneity issues could complicate such studies (section 3.1).

Second, section 8.1 explains contextual trends can be important for societal debates as well. This research used several concepts from the field of system dynamics; the definition of dynamics in which it is characterized by external influences and internal feedback and the growing or declining legitimacy of arguments. Contextual trends can in this case be external influences. It would be interesting to study the impact of such contextual trends by studying a longer period of time. The knowledge of the system dynamics field could be useful for this.
System dynamics is an approach to understanding complex system developments over time and has applications in for example the areas of mechanics, ecology and economics. Multiple authors have suggested that 'systems thinking' can be applied in the social area as well, explaining the social system (Folke, 2006; Scheffer, 2009; Lyst, Kacperski, & Schweitzer, 2002). System dynamics uses feedback loops and stocks and flows to explain how a seemingly simple system can become complex (Schweitzer, 2012). These stocks and flows can be identified in the social system as well.
Scheffer et al (2009) were one of the first to identify the similarities that can be seen between social systems and biological systems (Scheffer, 2009). Scheffer explains how the loss of resilience can bring the system towards a perturbation point (Figure 18). On such a perturbation point only one small force is needed to bring the system into a different equilibrium state.

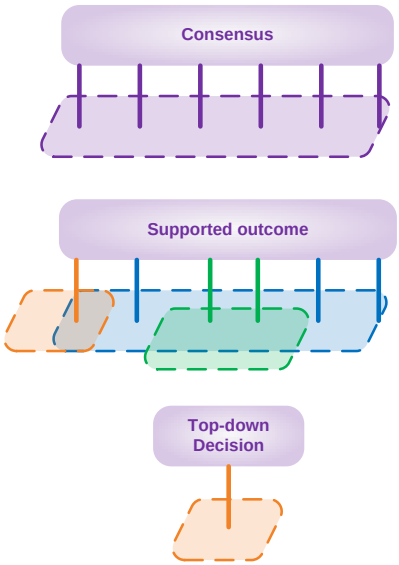


Figure 18 Graphical illustration of resilience. Adapted version from (Scheffer, 2009 p.92).

A: the case resulting in consensus shows the most resilient system. Since the result is carried by multiple actors, small external forces are not expected to change the equilibrium.

B: the case resulting in a supported outcome can be as resilient as the consensus based case. However, accumulating evidence can lead to changes in discourses and in the discourse coalitions and thereby make the outcome less supported, e.g. less stable or resilient.

C: the case of an unsupported top-down decision, which is the most unstable case of the three examples. One small external force can result in a new stable situation.

The conceptual framework used for this research (section 2.4.1) could be related to the knowledge on perturbation points to study sudden changes during decision-making processes from a more system dynamics perspective (Figure 18). In this case the system would consist of several elements: discourses, discourse coalitions (including the actors involved), events (including the actions taken by

actors) and the solution that is proposed. Figure 18B represents discourse coalitions as orange, blue and green clouds and the solution as a purple cloud.

This might relate as well to Weiss' (1977) study that explained how the accumulation of knowledge could lead to shifts (Weiss, 1977). Slowly, declining support in combination with exogenous forces, an event, might explain the existence of so called tipping points in society.
It would be interesting to study the relation between support and the system elements in more detail with the use of system dynamical models. Discourses could be represented as a stock and increasing or decreasing dominance of a discourse as flow. The rabbit fox model and the bass innovation model could form a starting point for such a study. A suggested parameter to couple events to discourse changes is the availability of legitimate arguments, which in turn depends on events.
For such a study, as was explained above, it would be necessary to perform a long term study on, for example, the changes in discourses on gas or fossil fuels in general. Then, contextual trends can be taken into account. Increasing environmental awareness (section 1.1.1) could lead to declining support for oil and gas projects and could thereby decrease system resilience. An external effect, such as the documentary Gasland, might change the equilibrium.
The former suggests similar events could have a different impact, depending on the moment the event takes place. Then again, polarisation levels should be taken into account. A long term study on, for example, the discourses on gas or fossil fuels could identify such differences.

Third, an important note that has to be made is that the method used in this research is a discourse in itself as well. The interpretation was made that the world of public debates can be seen as a world characterised by discourse coalitions and interactions between those. Therefore, it is necessary to enrich this method by integrating it with experiences from other disciplines. Two suggestions are made:

- The suggested elaboration using system dynamical models could give new insights.
- Kingdon's streams model might be helpful as well and could also explain the impact of events on changing interactions and changing discourses. In the streams model interpretation of decision-making processes three separate streams exist; problems, solutions and actors (Kingdon, 1995). A decision can only be made when the three streams come together. This is called a window of opportunity. When a policy entrepreneur, e.g. a lobbyist or a mediator, recognises such a window of opportunity it can be used to reach breakthroughs in decision-making processes. This might give some interesting insights to further develop the proposed engagement strategies. Moreover, the knowledge on coupling streams might be related to increasing overlap in actor's discourses.

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Appendix A – Potential outcomes of a societal debate

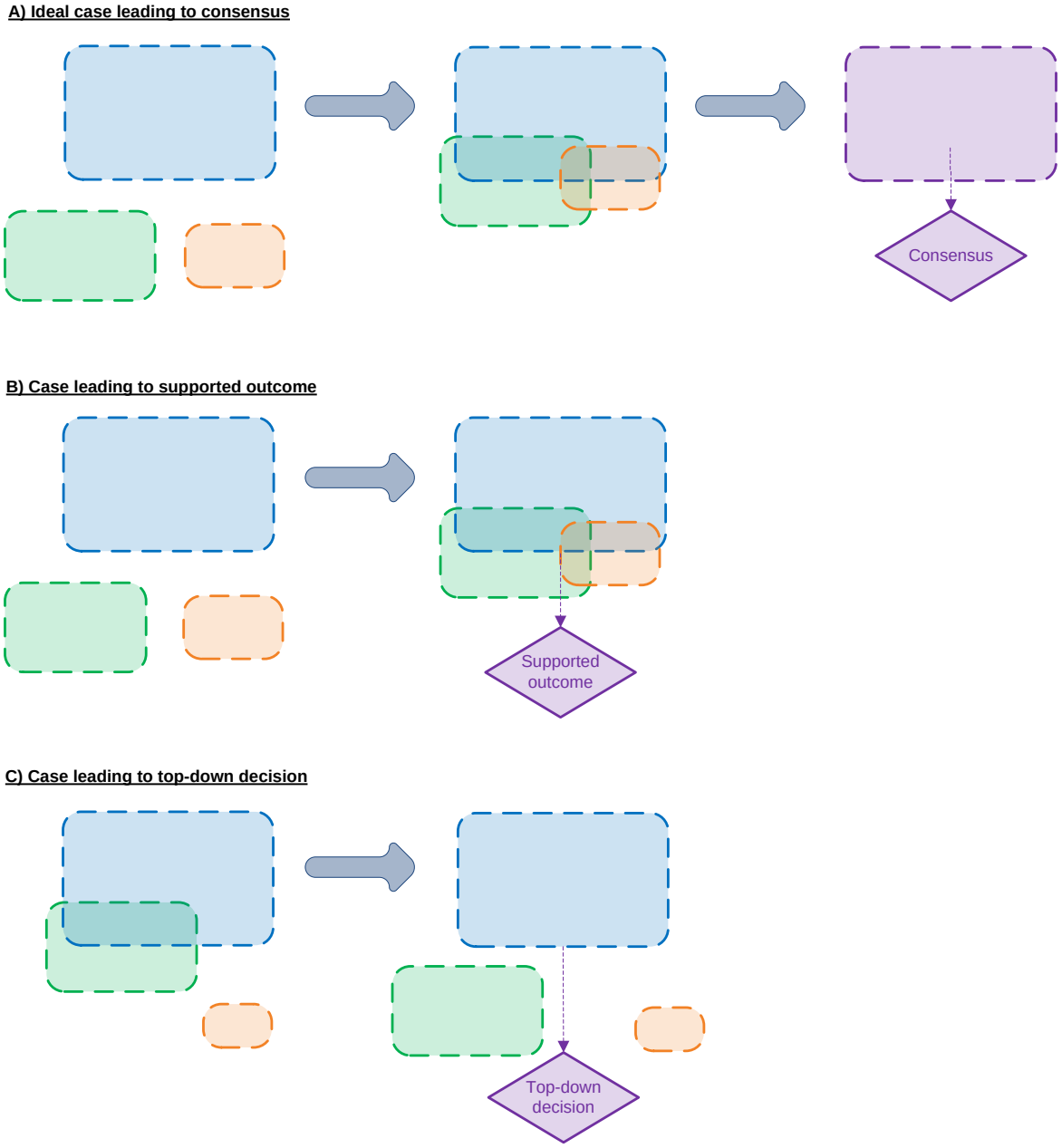

Figure 19 Three potential outcomes of a societal debate

Appendix B – Numerical data on the newspaper database

Table 21 Frequency analysis, newspaper overview and divided time periods. T-lab analyses were performed on the time period from November 2010 to April 2012. The Newspaper overview corresponds to this time period as well. The divided time periods should have a minimum size of 30 kb to obtain relevant results from the Elementary Context Analysis.

Month	Number of articles
nov-10	2
dec-10	1
jan-11	2
feb-11	5
mrch-11	6
apr-11	10
may-11	19
jun-11	26
jul-11	6
aug-11	16
sep-11	39
oct-11	41
nov-11	12
dec-11	9
jan-12	8
feb-12	7
mrch-12	13
apr-12	6
may-12	12
jun-12	5
jul-12	2
aug-12	8
sep-12	21
oct-12	5
nov-12	13
dec-12	13
jan-13	5
feb-13	30
mrch-13	68
apr-13	87
Subtotal	497
may-13	35
jun-13	36
jul-13	46
aug-13	88
Total	704

Newspaper	Number of Articles	Printed copies
National newspapers		
ANP	79	
Financieel Dagblad	57	56.245
Algemeen Dagblad	38	422.946
Volkskrant	27	254.502
Trouw	24	104.032
NOS	18	130.489[3]
Reformatorisch Dagblad	18	50.810
Telegraaf	17	596.148
NRC Handelsblad	16	200.040
Nederlands Dagblad	7	26.228
NRC Next	5	80.966
Spits	3	338.571
Pers	2	278.750
Metro	1	451.339
Local and regional newspapers		
Brabants Dagblad	97	119.995
Stentor	34	120.706
Gelderlander	32	137.900
Eindhovens Dagblad	31	101.097
BN de Stem	27	103.614
Dagblad de Limburger	17	120.523
Zeeuwse Courant	16	51.243
Leeuwarder Courant	12	82.580
Leidsch Dagblad	11	29.766
Limburg Dagblad	11	40.101
Twentsche Courant Tubantia	11	107.907
Haarlems Dagblad	8	36.522
Gooi & Eemlander	7	24.742
IJmuider Courant	7	5.995
Dagblad van het Noorden	5	125.882
Noordhollands Dagblad	5	128.271
Parool	5	72.033
Almere Vandaag	2	75.882
Specialist Journals		
Boerderij	8	38.830
Boerderij Vandaag	4	6.969
Cobouw	1	9.726
Groente & Fruit	1	5.002
Newsmagazines		
Elsevier	4	122.745
Forum (VNO-NCW)	4	24.803
Groene Amsterdammer	1	21.002
Vrij Nederland	1	43.711

Time period	Number of articles	Size (KB)
Nov'10 – Apr'11	26	61
May'11 – June'11	45	98
July'11 – Aug'11	22	58
Sept'11 – Oct'11	80	171
Nov'11 – July'12	74	132
Aug'12 – Sept'12	29	62
Oct'12 – Jan'13	36	74
Feb'13 – Apr'13	185	426
Total	497	1082

[3] Reach

Appendix C – List of Interviewees

Table 22 Interview details. Abbreviations: CIEP (Clingendeal Insitute Energy Programme), EA (Ministry of Economic Affairs), UU (Utrecht University), UvT (University of Tilburg).

	Category	Stakeholder	Type	Function or department Interviewee	Date
1	Industry	Cuadrilla	Interview	Multiple (two)	10 Sept 2013
2		EBN	Brainstorm	Multiple (six)	17 Sept 2013
3	Mediator	IMSA	Interview	Consultant	12 Sept 2013
4	Government	EA	Interview	Energy markets department	29 Aug 2013
5	Scientists	UvT	Interview	Assistant Professor in Public Administration	30 Aug 2013
6		UU	Interview	Professor in Energy and the environment	28 Aug 2013
7	Research Institutes	CIEP	Interview	Geologist	27 Aug 2013
8		TNO	Interview	Gas Technology department	22 Aug 2013
9	Journalists	Independent	Interview	Financial Journalist	21 Aug 2013
10		Volkskrant	Interview	Scientific Journalist	26 Aug 2013
11		Telegraaf	Interview	Journalist	15 Aug 2013

Appendix D – Interview questions of the semi-structured interviews

Table 23 Semi-structured interview questions. The main questions and the explanations were sent in advance.

Onderwerp	Uitleg	Hoofdvraag	Eventuele opvolgende vragen
Start	Uitleg onderzoek: media-analyse waarbij ik de veranderingen in discoursen onderzoek en die probeer te verklaren aan de hand van gebeurtenissen. Ook kijk ik welke rol de verschillende belanghebbenden hierin gespeeld hebben. Een discours kan gezien worden als een lens waardoor mensen naar de wereld kijken en de manier waarop betekenis gegeven wordt aan gebeurtenissen, en wordt ook wel een referentiekader genoemd.	Uitleg vertrouwelijke omgang gegevens. Mag het interview opgenomen worden? Heeft u nog vragen?	(eventueel clusters T-lab laten zien uit onderzoek Sengers)
Gebeurtenissen	**1** In mijn onderzoek definieer ik twee soorten gebeurtenissen; onbedoelde gebeurtenissen en bedoelde gebeurtenissen. Onbedoelde gebeurtenissen kunnen gebeurtenissen zijn die buiten menselijke verantwoordelijkheid vallen en gebeurtenissen die onbedoeld zijn, maar wel door mensen veroorzaakt (bijvoorbeeld natuurrampen of economische achteruitgang). Dit zijn ook alle gebeurtenissen uit het buitenland. Bedoelde gebeurtenissen kun je interpreteren als acties van actoren waar ze (vaak) een strategie achter hebben.	**1a** Wat zijn volgens u de belangrijkste (on)bedoelde gebeurtenissen gedurende het Nederlandse schaliegas debat? **1b** Hoe zagen jullie deze gebeurtenissen? **1c** Hoe ging u en hoe gingen andere stakeholders met deze gebeurtenissen om en waarom zo?	**1**(de gebeurtenissen die het debat beïnvloed hebben) **1d** Van deze lijst met gebeurtenissen, welke gebeurtenissen acht u het meest belangrijk?
Discours	**3** In een maatschappelijk debat kun je vaak verschillende discoursen (referentiekaders) herkennen, als gevolg daarvan zullen stakeholders dan ook verschillende standpunten innemen. **6** Een discours omvat vaak meerdere waardes. Waardes kunnen bijvoorbeeld zijn: veiligheid, zekerheid, rechtvaardigheid, milieuvriendelijkheid, etc.	**3** Welke discoursen zag u terug komen in het debat en welke verschuivingen zag u hierin? **4** Hoe gingen jullie en andere stakeholders met deze verschuivingen om en waarom zo? **5** Wat is jullie bijdrage in de verschuivingen geweest en wat is de bijdrage van eerder genoemde gebeurtenissen geweest? **6** Welke waarden waren voor jullie belangrijk en hoe ziet u die terug in de discourses?	**3a** Op welke momenten veranderde het spel? **3b** In hoeverre werd er meer of minder gesproken over schaliegas in relatie tot de energietransitie en de wet en regelgeving? **3c** Ontwikkelingen discoursen stap voor stap uitleggen. Herkent u dit? **4** Hoe worden gebeurtenis in discours geplaatst? **5a** Hebben jullie overleg gehad met andere stakeholders of onderhandeld? **5b** Als er een bijdrage is geweest, wat voor effect heeft dit gehad? **5c** Tussen november 2011 en juli 2012 is het erg rustig. Wat gebeurt er in die tijd? Hoe hebben de verschillende stakeholders die tijd gebruikt? En hebben er in die tijd veranderingen plaatsgevonden?

Onderwerp	Uitleg	Hoofdvraag	Eventuele opvolgende vragen
Belang-hebbenden		**8** Wat is jullie rol in het maatschappelijke debat en wat is volgens u die van andere actoren?	**8a** Voorbeelden van actorgroepen: EZ, Cuadrilla, EBN, Schaliegasvrij Nederland, BMF, gemeentes, provinciebesturen, onderzoeksinstellingen, bedrijven (zoals waterbedrijven en Rabobank) etc. **8b** Bent u uw rol anders gaan zien?
	9 Onderdeel van het debat zijn de onderlinge interacties tussen actoren. Met interactie doel ik op diverse vormen van communicatie (bijeenkomsten, brieven, debatten, persberichten, petities, posters, protestacties, etc.)	**9** Kan de onderlinge interactie tussen actoren discoursen beïnvloeden? Zo ja, heeft u of een andere actor het debat beïnvloed en op wat voor een manier?	**9a** Wat voor soort interacties zijn dat? Hoe gaat dat? **9b** Welke rol speelde de communicatievoorziening vanuit EZ? En die vanuit Cuadrilla?
		10 Bent u op informatieavonden of discussiebijeenkomsten geweest? Zo ja, hoe verliepen dezen?	
		11 Zijn er volgens u leermomenten geweest in dit debat en zo ja, welke?	
Media-analyse		**12** Wat was de rol van de media en is deze veranderd?	**12** Volgend? Actief? Is er een verschil tussen nationale en lokale kranten of bij de TV versus krant? Is de manier van schrijven veranderd?
		13 Waar kwam de media-aandacht vandaan?	**13** In het begin, waar kwam de aandacht van de media opeens vandaan? Lokaal protest? Gasland?
		Extra vragen aan Journalisten: **14** Wat zijn de criteria om over iets te schrijven? **15** Is uw mening over schaliegas veranderd en bent u over de tijd anders gaan schrijven? **16** Wat is volgens u de taak van de journalistiek rond nieuwe energie technologieën zoals schaliegas?	
Afsluiting	Bedankt! Toesturen verslag van het interview.	Heeft u nog vragen?	Toesturen van mijn scriptie?

Appendix E – Role and interests of the media according to interviewees

Table 24 Interview results, subject media. Abbreviations: CIEP (Clingendeal Insitute Energy Programme), EA (Ministry of Economic Affairs), UU (Utrecht University), UvT (University of Tilburg), NA (Not Available).

Role		Journalists			Media Total	Scientists		Research institutes			EZ	Cuadrilla
		Volkskrant	Telegraaf	Independent		UU	UvT	CIEP	TNO	IMSA		
No role			1		1							
(Temporary) Amplifier	General	1	1	1	3							1
	Social media											
	Newspapers											
	Radio/TV											
Polarise	General						1	1	1			1
	Social media											
	Newspapers											
	Radio/TV	1	1		2							
Nuance and inform	General						1				1	
	Social media											
	Newspapers	1	1		2							
	Radio/TV											
Adapt to emotions	General		1		1							
Newspapers cover debate		NA	-1	1	0	1	1	-1	-1	-1	1	-1

Task media on new energy technologies	Journalists		
	Volkskrant	Telegraaf	Independent
Explain situation	1	1	
Give an overview of the Pros & cons	1		1
Explain the complexity of the situation	1		
Timing		1	

Interest for the topic	Journalists		
	Volkskrant	Telegraaf	Independent
Conflicting interests and the societal unrest	1		1
Possibility of becoming national	1		
Possibility of coming in your backyard		1	

Appendix F – Cluster dendrogram showing cluster overlap

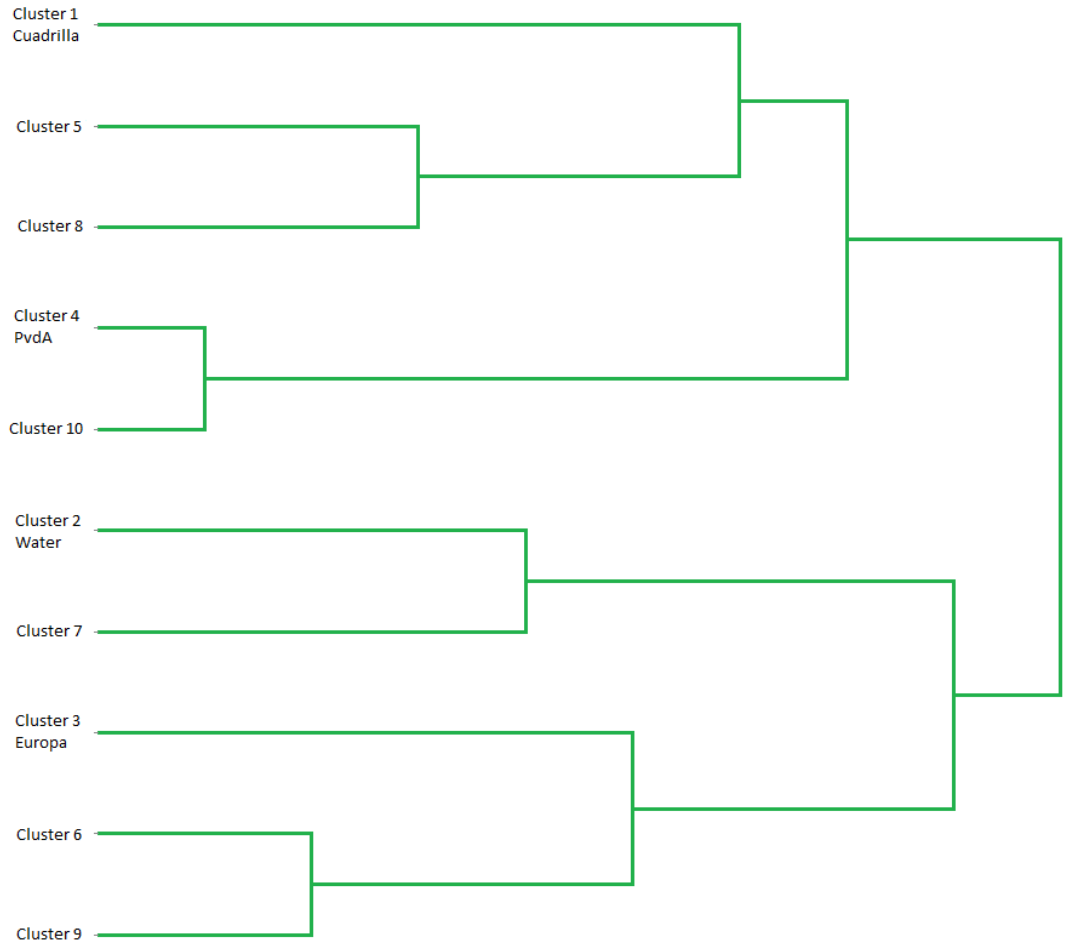

Figure 20 Dendrogram showing cluster closeness. The clustering of lemmas can be seen in Figure 12 and Figure 13. The analysis is based on a sample of 497 newspaper articles from regional and national newspapers retrieved from the LexisNexis database using the search term 'schaliegas.' The newspapers were selected from a time period of 30 months; from November 2010 to April 2013. Dendrograms of the analyses based on smaller time periods are available upon request.

Appendix G – Discourses according to Interviewees

Table 25 Discourses recognised by interviewees. Three main discourses were recognised by the interviewees. The sub-themes were examples given by the interviewees for the content of the higher level discourses. Mentioning sub-themes was interpreted as mentioning the higher level discourse, but not the other way around. Categorization was done by putting the sub-themes below the associated high level discourse. Interviews with other actor groups or at a different time could lead to a different categorization. Abbreviations: CIEP (Clingendeal Insitute Energy Programme), EA (Ministry of Economic Affairs), UU (Utrecht University), UvT (University of Tilburg).

Discourses	Journalists			Journalists	Scientists		Research Institutes					
	Volkskrant	Telegraaf	Independent	Total	UU	UvT	CIEP	TNO	IMSA	EA	Cuadrilla	Total
Mentioned sub-themes												
Safety and Environment												
Water pollution	1			1					1		1	3
Spatial impact	1			1			1		1			3
Traffic	1			1					1			2
Visual pollution	1			1					1			2
Noise	1			1					1			2
House prices				0				1				1
Earthquakes				0					1		1	2
Air pollution	1			1								1
Utility and Necessity												
Economy	1	1		2		1		1	1	1	1	7
Estimates of stocks	1	1		2								2
Public treasury				0	1		1					2
Affordability of gas				0					1			1
Competitive position				0					1			1
Sustainability				0	1	1	1		1		1	5
CO_2 emission				0					1			1
Transition to sustainable energy technologies				0	1	1	1		1		1	5
Resource depletion	1			0	1							2
Geopolitics				0					1		1	2
Security of supply	1			1								1
Independence from other countries				0							1	1
Procedural Justice												
Regulation			1	1	1	1		1				4
Distribution of costs and benefits	1			1	1				1			3
Decision-making process				0		1						1
Independence and Quality of research				0	1							1
Public debate				0		1						1
Mentioned discourses												
Safety and Environment	1	1	1		1	1	1	1	1	1	1	10
Utility and Necessity	1	1			1	1	1	1	1	1	1	9
Procedural Justice	1		1		1	1		1	1			6

Appendix H – Event History Analysis

Events September 2008 - April 2013																	
Event information							Internal event	External Intended event			External Unintended events			Outcome		
Event #	Event name	official date	First pub. date	Last pub. date	# of newsp. articles	Duration (Days)	EBN	EA	Cuadrilla	Other Actors	Natural	Economic	Dev. Abroad	-	+	O
x	KNMI reports on relation gas production and earthquakes		1-1-1995*	30-4-2013*	0	0	0	0	0	KNMI	1	0	0	0	0	1
1	Cuadrilla requests exploration permit Noord-Brabant	2-9-2008	2-9-2008*	2-9-2008*	0	0	0	0	1	0	0	0	0	0	0	1
2	TNO and SodM give advice to EA	6-4-2009	6-4-2009*	19-5-2009*	0	0	0	1	0	TNO, SodM	0	0	0	0	0	1
3	EBN positive on possibilities shale gas, 'kleisteengas'	23-6-2009	23-6-2009	24-6-2009	3	2	1	0	0	0	0	0	0	0	1	0
4	EA grants permit (follow up event 1)	31-8-2009	31-8-2009*	31-8-2009*	0	0	0	1	0	0	0	0	0	0	0	1
5	Report Inventory non-conventional gas and focus on Dutch gas	3-9-2009	3-9-2009*	3-9-2009*	0	0	1	0	0	0	0	0	0	0	0	1
6	ProvNB does not take opportunity for input in permit process	14-9-2009	14-9-2009*	14-9-2009*	0	0	0	0	0	ProvNB	0	0	0	0	0	1
7	EA informs about granted permit (follow up event 4)	26-10-2009	26-10-2009*	26-10-2009*	0	0	0	1	0	0	0	0	0	0	0	1
8	Cuadrilla requests permit Haaren	11-6-2010	11-6-2010*	11-6-2010*	0	0	0	0	1	0	0	0	0	0	0	1
9	1st newspaper on shale gas (US produces more gas than Russia)	16-7-2010	16-7-2010	16-7-2010	1	1	0	0	0	0	0	0	1	0	1	0
10	Poland positive towards shale gas (mainly in May and June'11)	30-7-2010**	30-7-2010	30-4-2013	23	709	0	0	0	Poland	0	0	1	0	1	0
11	Technical experts start to get involved in the debate	6-8-2010**	6-8-2010	30-4-2013	42	996	0	0	0	Media	0	0	0	0	0	1
12	Negative environmental effects US, (results research)	6-8-2010**	6-8-2010	30-4-2013	35	1028	0	0	0	0	0	0	1	1	0	0
13	Boxtel agrees to leave zoning plan temporary.	17-8-2010	17-8-2010*	17-8-2010*	0	0	0	0	0	MunB	0	0	0	0	0	1
14	Cuadrilla requests permit Boxtel (follow up event 13)	30-9-2010	30-9-2010*	6-11-2010	1	0	0	0	1	0	0	0	0	0	0	1
15	Report land use Oranjewoud	30-9-2010	30-9-2010*	30-9-2010*	0	0	0	0	1	OranW	0	0	0	0	0	1
16	Boxtel informs community (follow up event 13)	1-10-2010	1-10-2010*	1-10-2010*	0	0	0	0	0	MunB	0	0	0	0	0	1
17	4 newsletters Boxtel to community (oct&nov'10, jan&jul'11)	1-10-2010	1-10-2010*	1-7-2011*	0	0	0	0	0	MunB	0	0	0	0	0	1
18	Haaren agrees to leave zoning plan temporary	7-10-2010	7-10-2010*	7-10-2010*	0	0	0	0	0	MunH	0	0	0	0	0	1
19	Information meeting Boxtel	20-10-2010	20-10-2010*	20-10-2010*	0	0	0	0	1	MunB	0	0	0	0	0	1
20	First newspaper article on shale gas Boxtel and Haaren	26-10-2010	26-10-2010	26-10-2010	3	1	0	0	0	Media	0	0	0	0	0	1
21	Information meeting Boxtel	22-11-2010	22-11-2010*	22-11-2010*	0	0	0	0	0	MunB	0	0	0	0	0	1
22	Questions on risks CDA & D66 on meeting city council Boxtel	23-11-2010	24-11-2010	24-11-2010	1	1	0	0	1	MunB	0	0	0	0	0	1
23	1st newsp. Turmoil in Haaren (showing Gasland at meeting)	10-12-2010**	10-12-2010	10-12-2010	1	1	0	0	0	ComH	0	0	0	1	0	0
24	Haaren announces first info-meeting (follow up event 18)	21-12-2010	21-12-2010*	21-12-2010*	0	0	0	0	0	MunH	0	0	0	0	0	1
25	Boxtel grants permit (follow up event 14)	11-1-2011	11-1-2011*	11-1-2011*	0	0	0	0	0	MunB	0	0	0	0	0	1
26	GL(prov council) asks provNB to check risks (follow up 6)	15-1-2011**	15-1-2011	15-1-2011	1	1	0	0	0	GL	0	0	0	1	0	0
27	Info-meeting Haaren (Cuadrilla dismisses stories Gasland)	18-1-2011	9-2-2011	9-2-2011	0	0	0	0	1	MunH	0	0	0	0	0	1
28	Rabobank speaks against shale gas in Boxtel	22-1-2011**	22-1-2011	11-5-2011	8	110	0	0	0	Rab	0	0	0	1	0	0
29	Founding 'Schaliegas Vrij Haaren'	9-2-2011**	9-2-2011	9-2-2011	1	1	0	0	0	ComH	0	0	0	1	0	0
30	National newspapers start writing about shale gas	9-2-2011	9-2-2011	28-2-2011	2	20	0	0	0	0	0	0	0	1	0	0
31	Online petition against shale gas.	23-2-2011	23-2-2011	15-4-2011	2	52	0	0	0	SGVrijH	0	0	0	1	0	0
32	BMF critical (worries for 'Groene Woud' + water use)	24-2-2011	24-2-2011	24-2-2011	1	1	0	0	0	BMF	0	0	0	1	0	0
33	EPA files published (waste water contains radioactive matter)	27-2-2011	28-2-2011	28-2-2011	1	1	0	0	0	NY Times	0	0	1	1	0	0
34	EA explains SodM inspections (response event 33)	28-2-2011**	28-2-2011	28-2-2011	1	1	0	1	0	0	0	0	0	0	0	1
35	Official complaints permit to MunB (follow up event 25)	28-2-2011**	28-2-2011	1-3-2011	3	3	0	0	0	Rab, ComB	0	0	0	1	0	0
36	EA asks SodM for stricter inspection	2-3-2011**	2-3-2011	4-3-2011	1	3	0	1	0	0	0	0	0	0	0	1
37	National Sustainability report'10 shows no need shale gas	10-3-2011**	10-3-2011	10-3-2011	1	1	0	0	0	ComB	0	0	0	1	0	0
38	Brabants Dagblad uses Dutch law on openness of governmental documents until EA more open on chemicals	19-4-2011**	19-4-2011	11-4-2012	7	357	0	0	0	Media	0	0	0	1	0	0
39	Moratorium France (prolonged)	11-3-2011	30-4-2011	13-4-2013	44	715	0	0	0	France	0	0	1	1	0	0
40	Alderman Haaren disapproves goodwill payment Cuadrilla	19-3-2011**	19-3-2011	19-3-2011	1	1	0	0	0	MunH	0	0	0	1	0	0
41	Alderman Haaren wants to know what happens when Haaren does not grant permit, province will follow EA, EA yet to reply	19-3-2011**	19-3-2011	19-3-2011	1	1	0	0	0	MunH	0	0	0	1	0	0
42	Contract signed (rent and goodwill)	30-3-2011	30-3-2011*	30-3-2011*	0	0	0	0	1	MunB	0	0	0	0	0	1
43	EA believes permit cannot be pushed through, but will investigate the legislation. (response event 41)	13-4-2011**	13-4-2011	13-4-2011	1	1	0	1	0	0	0	0	0	0	0	1
44	Local opposition parties in Boxtel organise information meeting (defining strategy against shale gas)	13-4-2011	13-4-2011*	14-4-2011	1	1	0	0	0	BMF	0	0	0	1	0	0
45	European committee believes current legislation is sufficient	14-4-2011	14-4-2011	19-4-2011	3	6	0	0	0	EC	0	0	1	0	1	0
46	Brabant Water critical towards shale gas (follow up event 38)	19-4-2011**	19-4-2011	14-9-2011	9	149	0	0	0	BrabW	0	0	0	1	0	0
47	Gasland documentary is used in newspapers	27-4-2011**	27-4-2011	30-4-2013	35	735	0	0	0	0	0	0	1	1	0	0
48	Provincial parliament of NB speaks against shale gas	11-5-2011**	11-5-2011	28-5-2011	4	18	0	0	0	ProvNB	0	0	0	1	0	0
49	Movie night Gasland in Boxtel	18-5-2011	18-5-2011*	18-5-2011*	0	0	0	0	0	SGVrijB	0	0	0	1	0	0
50	Involvement PR-agency and replacement of English director	18-5-2011**	18-5-2011	23-5-2011	6	6	0	0	1	0	0	0	0	0	0	1
51	Plans Shell (Karoo, South Africa) lead to protest	25-5-2011**	25-5-2011	19-9-2012	5	484	0	0	0	Shell	0	0	1	1	0	0
52	Information meeting/public debate in Boxtel (with representatives national parties GroenLinks and PvdA)	25-5-2011	25-5-2011	28-5-2011	3	4	0	0	0	MunB, GL, PvdA	0	0	0	1	0	0
53	Province of Brabant and municipality of Boxtel asks EA for a moratorium and an independent research	31-5-2011**	31-5-2011	4-6-2011	2	5	0	0	0	ProvNB, MunB	0	0	0	1	0	0
54	Earthquakes Blackpool (Cuadrilla stops drillings)	1-4-2011	15-4-2011	20-12-2012	18	616	0	0	0	0	1	0	1	1	0	0
55	Report on environment, health and safety EP: impact on environment, economy and regulation issues	1-6-2011	30-9-2011	27-9-2012	2	362	0	0	0	EP	0	0	0	0	0	1
56	Permits, moratorium and research in Germany	8-6-2011**	8-6-2011	13-3-2013	12	642	0	0	0	0	0	0	1	1	0	0
57	EA beliefs current legislation and experience is sufficient, opponents disappointed by his response (reaction event 53)	8-6-2011	8-6-2011	18-6-2011	6	11	0	1	0	Multiple ac.	0	0	0	1	0	0
58	ProvNB apologizes for not taking the opportunity to give input in permit process (follow up event 26)	8-6-2011**	8-6-2011	8-6-2011	1	1	0	0	0	ProvNB	0	0	0	0	0	1
59	Cuadrilla admits that positive results from UK cannot be used for The Netherlands and translates results to Dutch situation	8-6-2011**	8-6-2011	8-6-2011	2	1	0	0	1	RoyalH. &Oranjew.	0	0	0	0	0	1
60	Anti-shale-gas picnic in Boxtel, Gasland was shown	20-6-2011	18-6-2011	27-6-2011	2	10	0	0	0	Groenfr.	0	0	0	1	0	0
61	Milieudefensie gets involved	~ 21-6-2011	21-6-2011*	21-6-2011*	0	0	0	0	0	Milieud.	0	0	0	1	0	0
62	Minister of EA asks Cuadrilla to perform more research and promises no irreversible decisions will be taken (event 57)	20-6-2011	21-6-2011	22-6-2011	4	2	0	1	0	0	0	0	0	0	1	0
63	Warning water pollution (mainly jul,sept'11, jun'12, apr'13)	23-7-2011**	23-7-2011	30-4-2013	29	648	0	0	0	Vitens	0	0	0	1	0	0
64	Range of 'Shale gas free' declarations municipalities	30-8-2011	31-8-2011	30-4-2013	33	610	0	0	0	Protest gr.	0	0	0	1	0	0
65	Alderman Haaren annoyed (follow up event 41)	10-8-2011**	10-8-2011	10-8-2011	1	1	0	0	0	MunH	0	0	0	1	0	0
66	Shell and Ukraine reached agreement (MNE's go for large scale production and Ukraine's potential independence from Russia)	1-9-2011	2-9-2011	17-4-2013	10	593	0	0	0	Shell, Ukraine	0	0	1	0	0	1
67	Gasland documentary on Dutch television (Tegenlicht)	4-9-2011	10-9-2011	10-9-2011	1	1	0	0	0	Media	0	0	0	1	0	0
68	Conclusions study Royal Haskoning (event 59) + earthquakes Blackpool linked to shale gas extraction	13-9-2011**	13-9-2011	15-9-2011	3	3	0	0	1	RoyalH.	0	0	0	1	0	0
69	Milieud. asks Lower House to put a stop to shale gas	13-9-2011	14-9-2011	14-9-2011	1	1	0	0	0	Milieud.	0	0	0	1	0	0
70	Rabobank & family go to court (follow up event 35)	13-9-2011	24-8-2011	20-4-2013	20	604	0	0	0	Rab, ComB	0	0	0	1	0	0
71	Hearing Lower House Sept. 14th (follow up event 35)	14-9-2011	9-6-2011	15-10-2011	35	129	0	0	0	Multiple ac.	0	0	0	0	0	1
72	EA announces permits Noordoostpolder	22-6-2010	10-9-2011	23-4-2013	25	536	0	1	0	0	0	0	0	0	0	1
73	Dialogue Cuadrilla and Brabant Water (follow up event 46 and 71, end marked by two letters of Cuadrilla and Brabant Water)	14-9-2011	14-9-2011	24-9-2012	6	375	0	0	1	BrabW	0	0	0	0	1	0
74	German study published by European parliament: too little shale gas to prevent energy shortage (same study as event 56)	1-6-2011	14-9-2011	14-9-2011	1	1	0	0	0	Germany, EP	0	0	1	1	0	0
75	Cuadrilla more open about chemicals (follow up event 38)	19-10-2011	19-10-2011	19-10-2011	1	1	0	0	1	0	0	0	0	0	1	0
76	Advisory report RLI: Interests oil&gas industry delay energy transition in The Netherlands	19-10-2011	19-10-2011*	19-10-2011*	0	0	0	0	0	RLI	0	0	0	0	0	1
77	Schaliegasvrij Boxtel gathers signatures to be presented to the minister of EA (preparation event 81)	21-10-2011	22-10-2011	26-10-2011	6	5	0	0	0	SGVrijB	0	0	0	1	0	0
78	Dutch administrative court decides Boxtel did not follow right procedures and annuls permit in Boxtel (follow up event 70)	25-10-2011	25-10-2011	25-4-2013	31	549	0	0	0	Rab, ComB	0	0	0	1	0	0
79	Cuadrilla (and the municipality of Boxtel) consider(s) to appeal to a higher court (follow up event 78)	26-10-2011**	26-10-2011	26-10-2011	1	1	0	0	1	MunB	0	0	0	0	1	0

(Follow up) Events September 2008 - April 2013																	
Event information					# of newsp. articles	Duration (Days)	Internal event	External Intended event			External Unintended events			Outcome		
Event #	Event name	official date	First pub. date	Last pub. date			EBN	EA	Cuadrilla	Other Actors	Natural	Economic	Dev. Abroad	-	+	O
80	Local community protests against shale gas (The Hague)	27-10-2011	22-10-2011	28-10-2011	4	7	0	0	0	ComB	0	0	0	1	0	0
81	Lower House debate	27-10-2011	27-10-2011	1-11-2011	7	6	0	1	0	0	0	0	0	0	0	1
82	Dutch moratorium and commitment for independent research	27-10-2011	28-10-2011	30-4-2013	39	551	0	1	0	0	0	0	0	1	0	0
83	Requests to EA for independence & broadening of research	7-11-2011	10-11-2011	7-12-2011	2	27	0	0	0	Protest gr.	0	0	0	1	0	0
84	EA narrows down research to risks & safety (follow up 83)	9-11-2011	10-11-2011	23-12-2011	2	43	0	1	0	0	0	0	0	0	0	1
85	Cuadrilla no appeal to higher court (follow up event 79)	2-12-2011	3-12-2011	11-1-2012	2	39	0	0	1	0	0	0	0	0	0	1
86	Shell has positive results in the exploration drilling in China	6-12-2011**	6-12-2011	8-12-2011	2	3	0	0	0	Shell	0	0	1	0	1	0
87	Interview FD Jan Dirk Bokhoven	7-12-2011**	7-12-2011	7-12-2011	1	1	1	0	0	0	0	0	0	0	0	1
88	EA promises to consult several stakeholders for the set-up of the research questions. (Follow up event 83)	19-12-2011	15-2-2012	8-3-2012	5	53	0	1	0	0	0	0	0	0	0	1
89	Municipality of Haaren rejects permit request Cuadrilla.	19-1-2012	19-1-2012	6-3-2012	3	48	0	0	0	MunH	0	0	0	1	0	0
90	'Shale gas free' declaration Haaren (Follow up event 87)	16-2-2012	16-2-2012*	16-2-2012*	0	0	0	0	0	MunH.	0	0	0	1	0	0
91	'Shale gas free' declaration municipality of Boxtel	5-3-2012	1-3-2012	16-5-2012	7	77	0	0	0	MunB	0	0	0	1	0	0
92	China starts producing shale gas (contract shell and CNPC)	21-3-2012	17-3-2012	10-8-2012	8	146	0	0	0	0	0	0	1	0	0	1
93	Founding 'Schaliegas Vrij Nederland'	3-4-2012	3-4-2012*	3-4-2012*	0	0	0	0	0	Protest gr.	0	0	0	1	0	0
94	Minister of EA promises to be more open about the chemicals used for fracking (follow up event 38)	19-10-2011	19-10-2011	19-10-2011	1	1	0	1	0	0	0	0	0	0	1	0
95	English study earthquakes Blackpool concludes fracking safe. Cuadrilla responds to be glad with news (follow up event 54)	17-4-2012	18-4-2012	18-4-2012	1	1	0	0	1	0	0	0	1	0	0	1
96	IEA speaks of the potential of an 'Golden Era' for gas	2-5-2012**	2-5-2012	30-5-2012	2	29	0	0	0	IEA	0	1	1	0	0	1
97	Shell (and Chevron) invest in Ukraine (follow up event 66)	14-5-2012**	14-5-2012	20-3-2013	6	310	0	0	0	Shell	0	0	1	0	0	1
98	Town board of Boxtel keeps shale gas as possibility and does not return goodwill payment Cuadrilla (Follow up event 91)	15-5-2012	16-5-2012	19-5-2012	2	4	0	0	1	MunH	0	0	0	0	0	1
99	The municipality of Boxtel asks Cuadrilla to withdraw the permit request (Follow up event 78)	16-5-2012	19-5-2012	19-5-2012	1	1	0	0	0	MunB	0	0	0	0	0	1
100	Meeting about shale gas exploration in South-Africa (follow up event 51)	12-6-2012	11-6-2012	11-6-2012	1	1	0	0	0	Milieud.	0	0	0	1	0	0
101	First 'klankbordgroep' meeting	25-6-2012	25-6-2012*	25-6-2012*	0	0	0	1	0	Klankb.	0	0	0	1	0	0
102	Political parties write about shale gas in election manifesto's	19-7-2012	19-7-2012*	19-7-2012*	0	0	0	0	0	GL, PvdD, CU, SP	0	0	0	0	0	1
103	Cuadrilla withdraws request (follow up event 99)	19-7-2012	28-2-2012	28-2-2012	1	1	0	0	1	0	0	0	0	1	0	0
104	Gas prices US decline	1-8-2012**	1-8-2012	30-4-2013	41	273	0	0	0	0	0	1	1	0	1	0
105	Shale gas production in US appeals to have low profitability (BP, bhp)	1-8-2012**	1-8-2012	26-4-2013	8	270	0	0	0	0	0	0	1	1	0	0
106	US starts thinking of exporting gas	10-8-2012**	10-8-2012	20-3-2013	10	224	0	0	0	0	0	1	1	0	1	0
107	Schaliegasvrij NL draws attention for possibilities of shale gas exploration in the middle part of The Netherlands	24-8-2012	20-6-2012	25-9-2012	5	97	0	0	0	SGVrijNL, BNK	0	0	0	1	0	0
108	Schaliegasvrij NL links uses earthquakes Groningen as example of what could happen	27-8-2012	27-8-2012*	27-8-2012*	0	0	0	0	0	SGVrijNL	1	0	0	1	0	0
109	European tender for the research of EA causes delay	5-9-2012	5-9-2012	6-9-2012	1	1	0	1	0	0	0	0	0	1	0	0
110	Disappointment Cuadrilla about delay (follow up event 109)	5-9-2012	5-9-2012	5-9-2012	1	1	0	0	1	0	0	0	0	0	0	1
111	Congress NOGEPA 'public acceptance of new technologies'	12-9-2012	12-9-2012*	12-9-2012*	0	0	0	0	0	NOGEPA	0	0	0	0	0	1
112	Global Anti-Frackdown-Day at Moreelsepark, EBN (draw attention for event 113)	22-9-2012	22-9-2012	24-9-2012	1	1	0	0	0	SGVrijNL	0	0	1	1	0	0
113	Doubts on independence of the research EA (1st complaints)	22-9-2012	24-9-2012	24-9-2012	1	1	0	0	0	Protestgr.	0	0	0	1	0	0
114	Schaliegasvrij NL points out wastewater regulations changed	6-10-2012	6-10-2012*	6-10-2012*	0	0	0	0	0	SGVrijNL	0	0	0	1	0	0
115	China has large shale gas stocks & stimulates production	13-10-2012**	13-10-2012	9-11-2012	3	26	0	0	0	0	0	1	1	0	0	1
116	New minister of EA	28-10-2012	28-10-2012*	28-10-2012*	0	0	0	1	0	0	0	0	0	0	0	1
117	High gas supply in US leads to coal export to Europe, gas is explained to be more sustainable than coal	29-10-2012**	29-10-2012	30-4-2013	10	183	0	0	0	0	0	1	1	0	1	0
118	Several large industry players complaint about the competitive position of Europe due to shale gas revolution in US	12-11-2012	12-11-2012	30-4-2013	16	170	0	0	0	E-Intensive Industry	0	1	1	0	0	1
119	EU Parliament asks European committee to improve legislation	21-11-2012	20-11-2012	24-11-2012	3	5	0	0	0	EP	0	0	1	0	0	1
120	European Parliament believes a framework for regulation is necessary (mainly related to Poland)	21-11-2012	20-11-2012	24-11-2012	3	5	0	0	0	EP	0	0	1	0	0	1
121	Survey European Commission	20-12-2012	21-12-2012	21-12-2012	1	1	0	0	0	EC	0	0	1	0	0	1
122	Tender research EA goes to W+B (follow up event 109)	20-12-2012	20-12-2012	20-12-2012	1	1	0	1	0	W+B	0	0	0	0	0	1
123	Fracknation documentary on American television	22-1-2013	22-1-2013*	22-1-2013*	0	0	0	0	0	0	0	0	1	1	0	0
124	'Groene Amsterdammer' publishes 'Land van gas en kolen' (follow up event 117)	23-1-2013	23-1-2013	23-1-2013	0	0	0	0	0	Media	0	0	0	0	1	0
125	Province of Flevoland sends letter to EA to express concerns about uncertainties environmental risks, EA replies to await research, provFl adopts this argument	29-1-2013**	29-1-2013	1-3-2013	2	32	0	1	0	ProvFl	0	0	0	0	0	1
126	Explanation geopolitical changes at Bilderberg conference	9-2-2013	8-3-2013	20-4-2013	2	43	0	0	0	HCSS	0	0	1	0	0	1
127	Earthquakes Groningen are linked to shale gas in newspapers	11-2-2013**	11-2-2013	30-4-2013	10	79	0	0	0	0	1	0	0	1	0	0
128	Cuadrilla explains shale gas exploitation will not lead to soil subsidence (follow up event 127)	12-2-2013	12-2-2013	19-2-2013	2	8	0	0	1	0	1	0	0	0	1	0
129	2nd 'Klankbordgroep', presentation concept research plan	18-2-2013	18-2-2013*	18-2-2013*	0	0	0	1	0	Klankb, W+B	0	0	0	1	0	0
130	Again doubts on research quality, concept plan is argued to be insufficient (second time complaints) (follow up event 129)	19-2-2013	19-2-2013	19-2-2013	1	1	0	0	0	Protest gr.	0	0	0	1	0	0
131	CDA en TNO want public debate & present argumentation map	19-2-2013	16-2-2013	19-2-2013	3	4	0	0	0	CDA, TNO	0	0	0	0	0	1
132	Dutch Premiere Promised land movie	28-2-2013	23-2-2013	24-4-2013	6	67	0	0	0	0	0	0	1	1	0	0
133	Cuadrilla announces locations Noordoostpolder	1-3-2013	1-3-2013	22-3-2013	19	22	0	0	1	0	0	0	0	0	0	1
134	'Een Vandaag' broadcasts surprised farmer from the 'Noordoostpolder' and Rob de Wijk (HCSS) explains potential geopolitical changes (follow up event 133)	1-3-2013	1-3-2013*	1-3-2013*	0	0	0	0	0	Media	0	1	1	0	1	0
135	Municipality of Boxtel sends letter to EA and asks about earthquakes Groningen. They also miss their questions from the consultation rounds in research plan (follow up event 127)	4-3-2013	5-3-2013	9-3-2013	2	5	0	0	0	MunB	1	0	0	1	0	0
136	Founding 'Schaliegasvrij Noordoostpolder' (follow up 133)	7-3-2013	2-4-2013	2-4-2013	1	1	0	0	0	SGVrijNL	0	0	0	1	0	0
137	Info-meeting 'Schaliegasvrij NL' in the Noordoostpolder	11-3-2013	6-3-2013	15-3-2013	5	10	0	0	0	SGVrijNOP	0	0	0	1	0	0
138	Minister Kamp (EA) explains the research of W+B will cover the risks of earthquakes as well (follow up event 135)	12-3-2013**	12-3-2013	12-3-2013	1	1	0	1	0	0	1	0	0	0	0	1
139	ComNOP was surprised (follow up event 133)	13-3-2013**	13-3-2013	13-3-2013	1	1	0	0	0	ComNOP	0	0	0	1	0	0
140	3rd meeting 'Klankbordgroep' on 2nd concept research plan	20-3-2013	20-4-2013	20-4-2013	1	1	0	1	0	Klankb, W+B	0	0	0	0	0	1
141	Doubts about the independence of the research of EA (third time complaints) (follow up event 140)	1-4-2013	1-4-2013	30-4-2013	8	30	0	0	0	Klankb	0	0	0	1	0	0
142	'Brandpunt' broadcasts documentary on shale gas revolution in the US and explains potential geopolitical changes	7-4-2013	7-4-2013*	7-4-2013*	0	0	0	0	0	Media	0	0	0	0	0	1
143	EU Energy Conference on Shale Gas	16-4-2013	16-4-2013*	16-4-2013*	0	0	0	0	0	0	0	0	1	0	0	1
144	Beer brewers critical towards shale gas	17-4-2013**	17-4-2013	26-4-2013	11	10	0	0	0	Media	0	0	0	1	0	0
145	Cuadrilla presents report research Royal Haskoning that calculates that the CO2 impact of gas import from Russia is higher than the impact from shale gas	23-4-2013	24-4-2013	24-4-2013	1	1	0	0	1	0	0	0	0	0	0	1
146	Debate Lower House about the research of EA (follow up event 113, 130 and 141)	24-4-2013	12-4-2013	25-4-2013	39	24	0	1	0	0	0	0	0	0	0	1
147	PvdA sees shale gas as option	24-4-2013	24-4-2013	25-4-2013	24	2	0	0	0	PvdA	0	0	0	1	0	0
148	Minister of EA says the research will be reviewed by a MER committee (event 146)	24-4-2013	25-4-2013	25-4-2013	1	1	0	1	0	0	0	0	0	0	0	1
149	Protest action near the Lower House	24-4-2013	23-4-2013	25-4-2013	2	3	0	0	0	SGVrijNL	0	0	0	1	0	0
150	PvdA promises to consult their members about shale gas (follow up complaints about event 147)	30-4-2013**	30-4-2013	30-4-2013	2	1	0	0	0	PvdA	0	0	0	1	0	0

Additional Event list May 2013 - September 2013

Event information					Internal	External			Unintended			Outcome		
#	Explanation	Official date	First newsp. Article	Next newsp. Article	EBN	EA	Cuadrilla	Other Actors	Natural	Economic	Dev. Abroad	-	+	O
1	PvdA will follow members opinion on shale gas (follow up 150)	2-5-2013	2-5-2013		0	0	0	PvdA	0	0	0	1	0	0
2	Shale gas exploration Poland has disappointing results	9-5-2013**	9-5-2013	22-5-2013	0	0	0	0	0	1	1	1	0	0
3	Publication research on procedural manners to block shale gas exploration (follow up event 41)	16-5-2013	16-5-2013*	16-5-2013*	0	0	0	Milieud.	0	0	0	1	0	0
4	TNO comes with a new shale gas map	9-4-2013	25-5-2013		0	0	0	TNO	0	0	0	0	0	1
5	BNR Radio debate	23-5-2013	23-5-2013*	23-5-2013*	0	0	0	Media	0	0	0	0	0	1
6	German Brewers against shale gas	25-5-2013**	25-5-2013		0	0	0	0	0	0	1	1	0	0
7	Planned meeting 'Klankbordgroep' cancelled (follow up 146)	3-6-2013	3-6-2013*	3-6-2013*	0	1	0	0	0	0	0	1	0	0
8	Milieudefensie and the municipality of Boxtel complaint about the research of EA, it is just a literature study	13-6-2013	13-6-2013		0	0	0	Milieud, MunB	0	0	0	1	0	0
9	Professors speak against shale gas in a manifest	24-6-2013	24-6-2013		0	0	0	Scientists	0	0	0	1	0	0
10	EA asks 'Klankbordgroep' to sign confidentiality agreement (follow up event 113, 141 main list and 8 additional list)	25-6-2013**	25-6-2013		0	1	0	0	0	0	0	1	0	0
11	Several members of the 'Klankbordgroep' refuse participation and do not sign confidentiality agreement (follow up event 10)	25-6-2013	25-6-2013		0	0	0	Klankb	0	0	0	1	0	0
12	ProvNB sends a letter to EA and say they want a public debate on the utility and necessity of shale gas (follow up event 11)	25-6-2013	28-6-2013		0	0	0	ProvNB	0	0	0	0	0	1
13	EA wants an open and transparent debate with the W+B research and the government's response (follow up event 12)	28-6-2013	28-6-2013		0	1	0	0	0	0	0	0	0	1
14	UK has more shale gas than expected	1-7-2013	1-7-2013		0	0	0	0	0	1	1	0	1	0
15	The environmental impact assessment committee (MER) asses the W+B study and criticises that it is incomplete	1-7-2013	1-7-2013		0	0	0	ComMER	0	0	0	1	0	0
16	The Rabobank does not grant loans to shale gas projects anymore. The statement mainly focuses on the US	1-7-2013**	1-7-2013		0	0	0	Rab	0	0	1	1	0	0
17	Map of overlap of water collection areas and shale gas zones	2-7-2013**	2-7-2013		0	0	0	TNO, Vitens	0	0	0	0	0	1
18	Vitens is critical towards shale gas since water zones overlap shale gas zones (follow up event 17)	2-7-2013**	2-7-2013		0	0	0	Vitens	0	0	0	1	0	0
19	Agreement several parties main issues future energy supply	12-7-2013	12-7-2013		0	0	0	SER	0	0	0	0	0	1
20	British government implements tax incentives for shale gas	20-7-2013	20-7-2013		0	0	0	0	0	1	1	0	1	0
21	E.on and Nuon (Vattenfall) make losses on past investments in gas due to low coal prices (follow up event 117 from main list)	14-7-2013**	14-7-2013	24-7-2013	0	0	0	0	0	1	0	0	1	0
22	The municipality of Boxtel sent a letter to the province of NB and asks the province to make a 'Shale gas free' declaration	23-7-2013	25-7-2013		0	0	0	MunB	0	0	0	1	0	0
23	Petition against shale gas	30-7-2013	30-7-2013		0	0	0	SGVrijNL	0	0	0	1	0	0
24	Shell makes losses on shale gas investments in the US	1-8-2013	1-8-2013		0	0	0	0	0	1	1	1	0	0
25	Conflicts in city council of Boxtel caused by shale gas debate	2-8-2013	2-8-2013		0	0	0	MunB	0	0	0	1	0	0
26	Fake Shell drilling-operation in Sonsbeek by Greenpeace	7-8-2013	8-8-2013	10-8-2013	0	0	0	Greenpeace	0	0	0	1	0	0
27	Several protests in Poland and England	3-8-2013	19-8-2013		0	0	0	0	0	0	1	1	0	0
28	Milieudefensie says the research of W+B is a botched job	22-8-2013	22-8-2013		0	0	0	Milieud.	0	0	0	1	0	0
29	'RTL' news reports they have versions of the report of W+B and that it concludes shale gas exploration can be done safely	23-8-2013	23-8-2013		0	0	0	Media	0	0	0	1	0	0
30	NOGEPA urges the minister of EA to calm societal unrest and advises to gain public support by being more transparent	19-8-2013**	26-8-2013		0	0	0	NOGEPA	0	0	0	0	1	0
31	EA publishes research report and concludes risks can be mitigated, no decision will be taken yet	26-8-2013	26-8-2013		0	1	0	0	0	0	0	1	0	0
32	EA explains the environmental impact assessment committee (MER) will assess the report on quality	26-8-2013	26-8-2013		0	1	0	0	0	0	0	0	0	1
33	Several responses to the research (follow up event 31)	26-8-2013	26-8-2013		0	0	0	Multiple ac.	0	0	0	1	0	0
34	PvdA wants hearing shale gas in Lower House (follow up 31)	26-8-2013	26-8-2013		0	0	0	PvdA	0	0	0	0	0	1
35	Water companies want to be involved (follow up event 31)	31-8-2013	31-8-2013		0	0	0	Water comp.	0	0	0	0	0	1
36	Milieudefensie suspects EA to have forced the outcome of the report and wants to investigate the communication between EA and the researchers (follow event 31)	4-9-2013	4-9-2013		0	0	0	Milieud.	0	0	0	1	0	0
37	EBN publishes Halliburton study which estimates the profitability and impact of shale gas	26-8-2013	4-9-2013	7-9-2013	1	0	0	0	0	0	0	1	0	0
38	Publication book on the lessons to be learned in the shale gas debate by the Rathenau Institute	5-9-2013	5-9-2013		0	0	0	Rathenau Institute	0	0	0	0	0	1
39	Several parties reach agreement on the future energy supply	6-9-2013	6-9-2013		0	0	0	SER	0	0	0	0	0	1
40	Provincial Council of NB receives letter that explains a ban on shale gas exploration will not endure if EA uses forcing	13-9-2013	13-9-2013		0	0	0	ProvNB	0	0	0	1	0	0
41	PvdA (and several other political parties) visit Boxtel (preparation event 46)	14-9-2013	12-9-2013		0	0	0	PvdA	0	0	0	0	0	1
42	Shell and Ukraine sign agreement (follow up 97 from main list)	14-9-2013**	14-9-2013		0	0	0	Shell	0	0	0	0	0	1
43	The environmental impact assessment committee (MER) assess the research of EA as to narrow	18-9-2013	19-9-2013		0	0	0	comMER	0	0	0	1	0	0
44	EA postpones decision and announces new research will be done to all shale gas locations in The Netherlands	18-9-2013	18-9-2013		0	1	0	0	0	0	0	0	1	0
45	PvdA expects to remain negative about shale gas in one and a half years (follow up event 147 from main list)	19-9-2013	19-9-2013		0	0	0	PvdA	0	0	0	1	0	0
46	Hearing on shale gas in Lower House	19-9-2013	19-9-2013		0	1	0	0	0	0	0	0	0	1
47	German 'Energiewende' is debated on	19-9-2013**	19-9-2013		0	0	0	0	0	1	1	0	0	1
48	5th IPCC report on climate change	21-9-2013**	21-9-2013		0	0	0	0	0	0	1	1	0	0
49	'Schaliegasvrij' declaration Province of Noord-Brabant	27-9-2013	28-9-2013		0	0	0	PS NB	0	0	0	1	0	0
50	Province of Brabant is going to make a regional agreement on a (more sustainable) future energy supply	27-9-2013	28-9-2013		0	0	0	PS NB	0	0	0	0	0	1
51	US becomes largest oil and gas producer (instead of Russia)		4-10-2013		0	0	0	0	0	1	1	0	0	1
52	AIVD warns for the impact of activism on safety		7-10-2013		0	0	0	0	0	0	0	0	0	1
53	Shell warns for high expectations from shale gas		8-10-2013		0	0	0	Shell	0	1	0	0	0	1
54	NAM employee accuses NAM from withholding information		9-10-2013		0	0	0	0	0	0	0	1	0	0
55	'Fossiel vrij' declaration by the municipality of Boxtel		29-10-2013		0	0	0	MunB	0	0	0	1	0	0
56	Meyer Committee advises on compensation Groningen		2-11-2013		0	0	0	0	0	0	0	1	0	0
57	Province of Brabant speaks against geothermal energy project		7-11-2013		0	0	0	ProvNG	0	0	0	1	0	0
58	'Shale gas free' declaration province of Groningen		7-11-2013		0	0	0	ProvG	0	0	0	1	0	0
59	Milieudefensie accuses Cuadrilla from not being financially able to compensate in case of failures		12-11-2013		0	0	0	Milieud	0	0	0	1	0	0

Legend

Note: neutral can refer to either neutral use in newspapers or both positive and negative
* not found in newspaper database, but from other source. Therefore duration 0. Date does not cover the first or last publication date, but the official date provided by the source.
** No official date found, so the first publication date in the newspapers was used.
red is minimal 25 times in newspaper and duration higher than 100 days
orange is minimal 5 times in newspapers and duration higher than 100 days
blue is important event for shorter period (either before or after time period of analysis or mentioned in the interviews as important)

NB: Event source and the search terms used are available upon request

Abbreviations Titles

dev	development
newsp	newspaper(s)
pub	publication

Abbreviations Actors

BMF	Brabantse Milieu Federatie	Klankb	Klankbordgroep	Rab	Rabobank
BrabW	Brabant Water	Milieud	Milieudefensie	RoyalH	Royal Haskoning
ComB	Community of Boxtel	Multiple ac.	Multiple actors	SGVrijB	Protest group Schaliegasvrij Boxtel
ComH	Community of Haaren	MunB	Municipality of Boxtel		
ComMER	Environmental Impact Assessment Committee (Commissie MER)	MunH	Municipality of Haaren	SGVrijH	Protest group Schaliegasvrij Haaren
		MunNOP	Municipalities of the locations in the Noordoostpolder	SGVrijNL	Protest group Schaliegasvrij Nederland
ComNOP	Community of the Noordoostpolder	Oranjew	Oranjewoud		
EA	Ministry of Economic Affairs	Protest gr.	Multiple protest groups	SGVrijNOP	Protest group Schaliegasvrij Noordoostpolder
EC	European Commission	ProvFl	Province of Flevoland		
EP	European Parliament	ProvNB	Province of Noord-Brabant	SodM	Staatstoezicht op de Mijnen
GL	GroenLinks	PS	Provincial Council (Provinciale Staten)	W+B	Witteveen & Bos
Groenfr	Groenfront			Water comp.	Water companies

Appendix I – Important events according Interviewees

Table 26 Interview results, Events. During the semi-structured interviews, the interviewees got the opportunity to mention several events that had been, in their perception, important in the societal debate. After that the interviewees were asked to point out the events that they thought to be most important from a list that was set up prior to the interviews based on the event history analysis. Important events were marked with one point and events that were thought to be most important were assigned an extra point. Abbreviations: CIEP (Clingendeal Insitute Energy Programme), EA (Ministry of Economic Affairs), UU (Utrecht University), UvT (University of Tilburg).

Events	Journalists			Media Total	Scientists		Research institutes			EZ	Cuadrilla	Total
	Volkskrant	Telegraaf	Independent		UU	UvT	CIEP	TNO	IMSA			
Developments abroad - Economy												
Shale gas revolution US	1	1		2	2							4
Divestments US				0		2				2		4
Disappointing outcomes exploration Poland				0				1				1
Successful outcomes exploration and production UK				0				1				1
Developments abroad - Geopolitics												
Poland positive on shale gas				0								0
Developments abroad - Safety and Environment												
Contaminations US	1		1	2			1		1		1	5
Earthquakes Blackpool	2		2	4	1	2	2	1	2	1	2	15
Developments abroad - Other												
Moratorium France	1			1								1
Shale gas activities Shell				0	1							1
US Exports of coal to Europe		1		1	2							3
Developments abroad (general)				0				2				2
Research – Utility and Necessity												
Report estimates of stocks by EBN and TNO	1		1	2								2
Downwards adjustment of estimates				0		1						1
Research - Safety and Environment												
Studies from abroad (US)				0	2	1	2	1				6
Natural events - Safety and Environment												
Earthquakes Groningen			2	2		1		1	2	2	2	10
Procedural Issues												
Location permit request	1		1	2	1	2			1			6
Negotiations Municipalities and Cuadrilla				0					1			1
Boxtel agrees to leave the zoning plan temporary				0					1			1
Information meeting Haaren (Community not allowed to show Gasland)			1	1								1
Course of proceedings Rabobank + cancelation of location permit			2	2		1			1	2	1	7
Commitment for a study by EA	2	1	2	5		2		1	2		2	12
Tender for the research of EA goes to W+B				0					1	1		2
Delay research (general)				0							1	1
Issues with the 'Klankbordgroep'	2		2	4				2	2	1	1	10
Collapse of the 'Klankbordgroep'				0	1	1			1	1	1	5
Confidentiality agreement				0					1	1	1	3
Cuadrilla announces locations Noordoostpolder	2	1	1	4				1			1	6
Release research EA[4]	NA	NA	NA	0		1	NA	NA	1	NA		2

[4]Note: Some interviews took place after the occurrence of this event

Events	Journalists			Media Total	Scientists		Research institutes			EZ	Cuadrilla	Total
	Volkskrant	Telegraaf	Independent		UU	UvT	CIEP	TNO	IMSA			
Politics												
Lower House debate September 2011				0						1		1
Hearing Lower House				0					2	2		4
Disagreement within the PvdA			2	2	1	1			1	1	2	8
Lower House debate 2013 (Minister accidentally says the 'Klankbordgroep is done)				0						1		1
Conflicts in the city council of Boxtel (summer'13)				0		1						1
Actors												
Local protests			2	2		1			1	2		6
Letters sent to EA by several stakeholders				0		1			1			2
Official complaints		1	2	3					2			5
Meeting in Boxtel with representatives of two national political parties				0		1		2				3
Milieudefensie gets involved	1			1					1			2
Scientists that give their opinion	2		2	4			2	2	1			9
Brewers and soft drink manufacturers speak against shale gas				0				2	1	2	2	7
55 professors speak against shale gas				0	1			1	1			3
'Shale gas free' declarations municipalities			2	2					1		2	5
Energy-intensive industry puts emphasis on their competitive position	2			2	2				2	1	1	8
New minister EA (October 2012)				0						1		1
New director communication, EA				0						1		1
Environmental impact assessment committee (commissie MER) criticises the research of EA				0	1					1		2
Letter NOGEPA				0					1			1
Media												
Gasland	2		2	4	1	1	2	2	2	2	2	16
BNR debate (23 May 2013)				0				1				1
Brabants Dagblad uses Dutch law on openness of governmental information (chemicals)				0		1						1
Article Groene Amsterdammer 'Het land van gas en kolen' (23 January 2013)				0					1			1

Appendix J – Thematic Cluster Analyses of the eight separate time periods

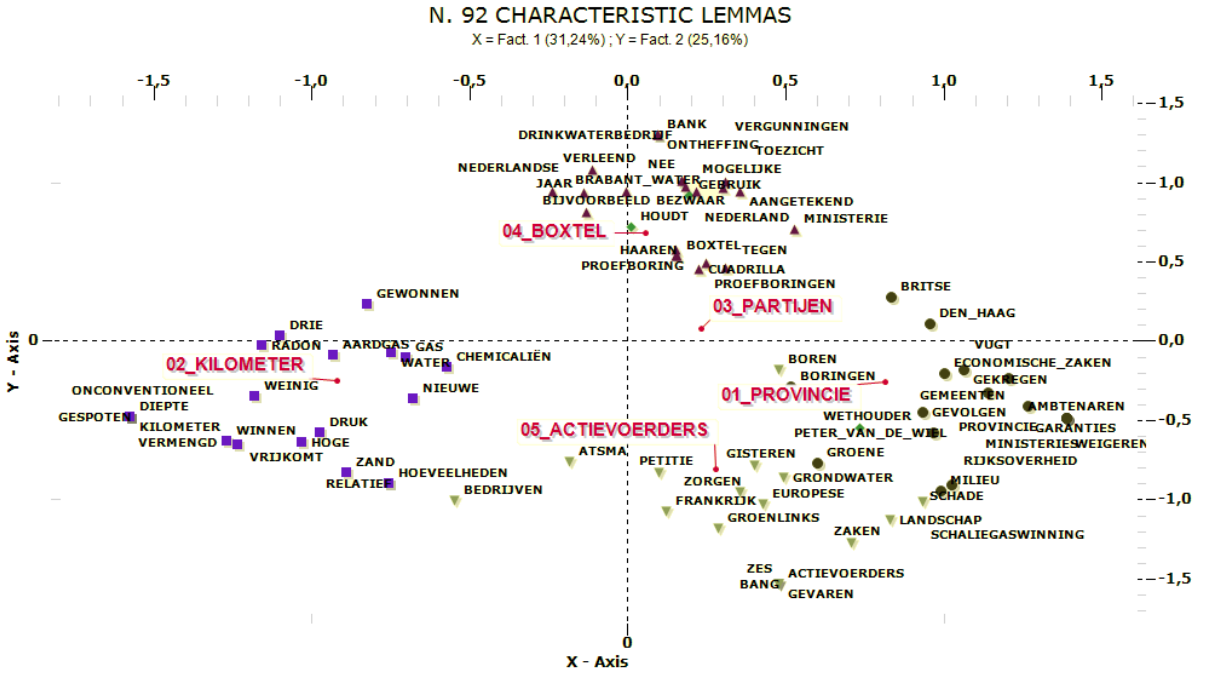

Figure 21 Clusters of an Elementary Context Analysis (November 2010 to April 2011) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 4D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 4D-graph are often used together in the elementary contexts.

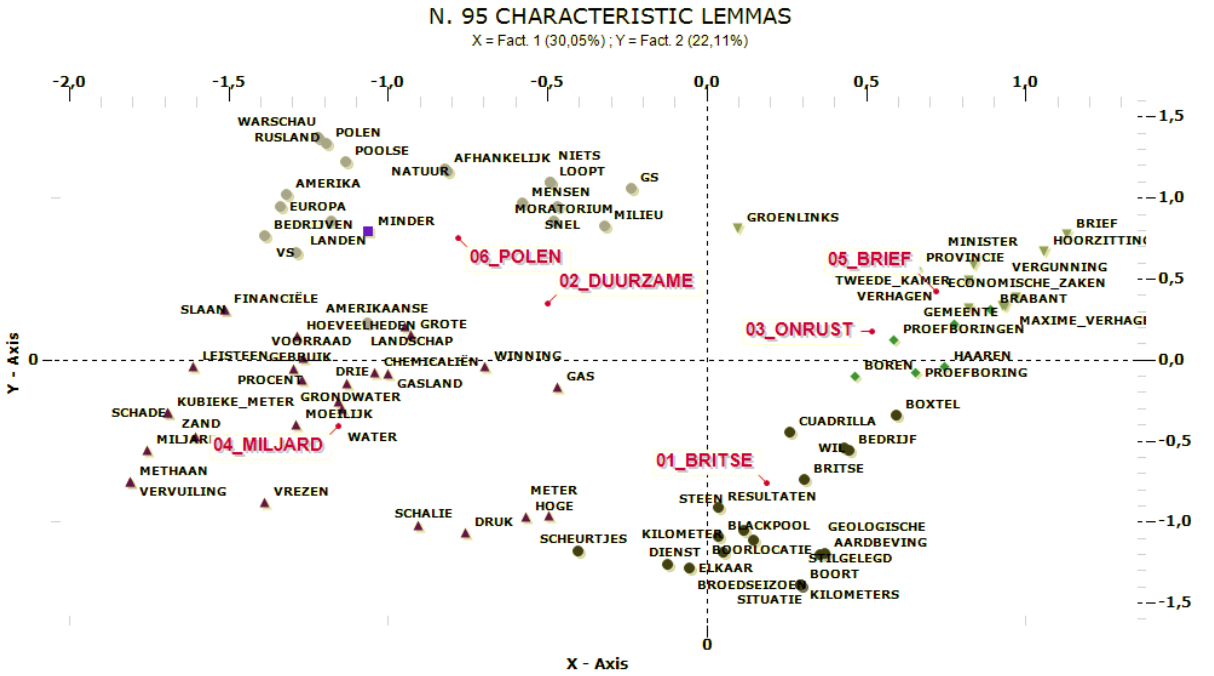

Figure 22 Clusters of an Elementary Context Analysis (May to June 2011) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 5D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 5D-graph are often used together in the elementary contexts.

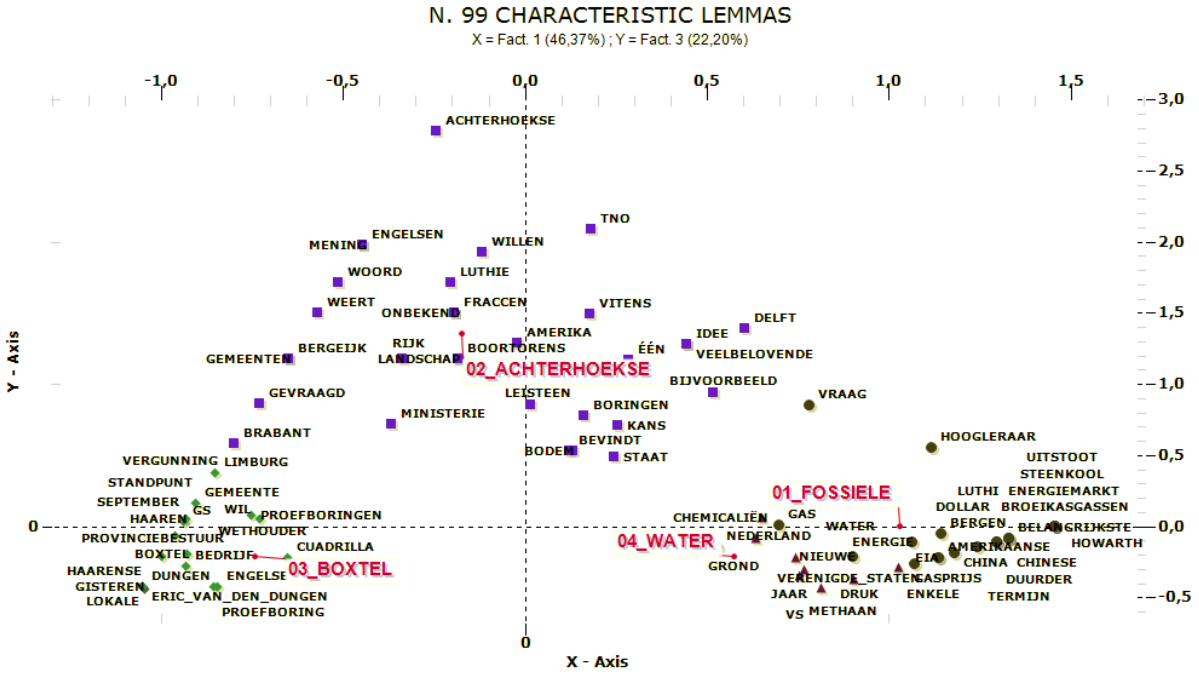

Figure 23 Clusters of an Elementary Context Analysis (July to August 2011) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts.

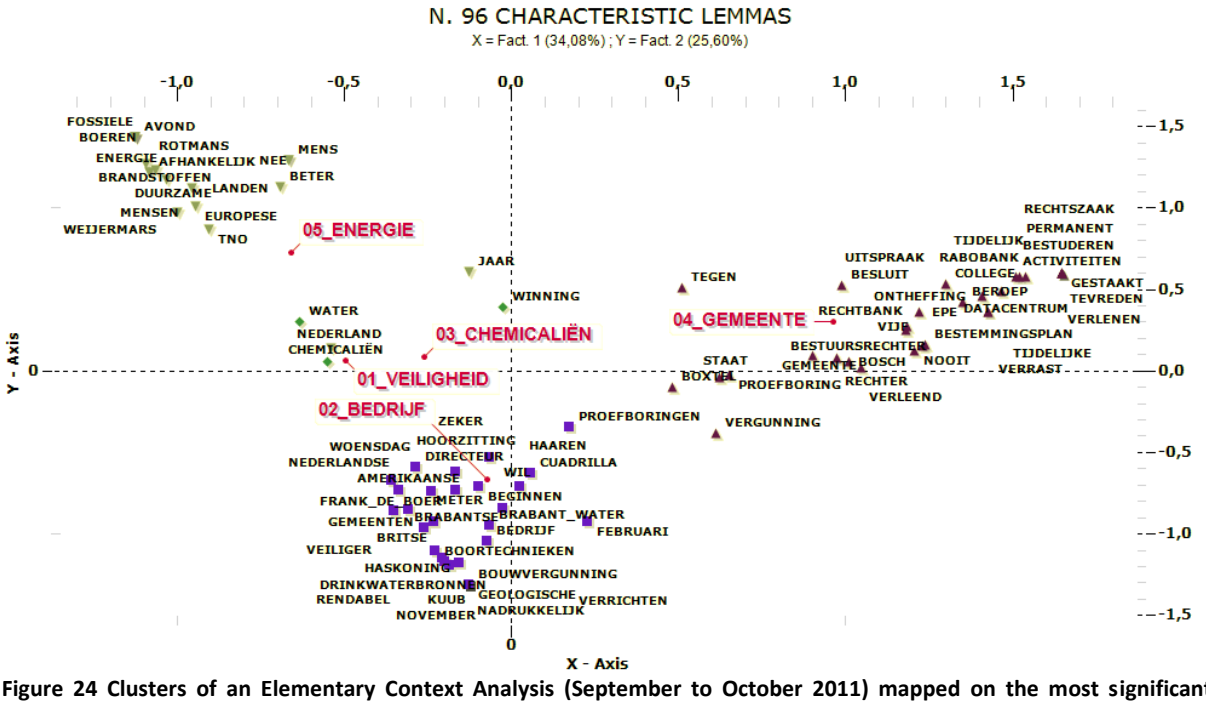

Figure 24 Clusters of an Elementary Context Analysis (September to October 2011) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 4D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 4D-graph are often used together in the elementary contexts.

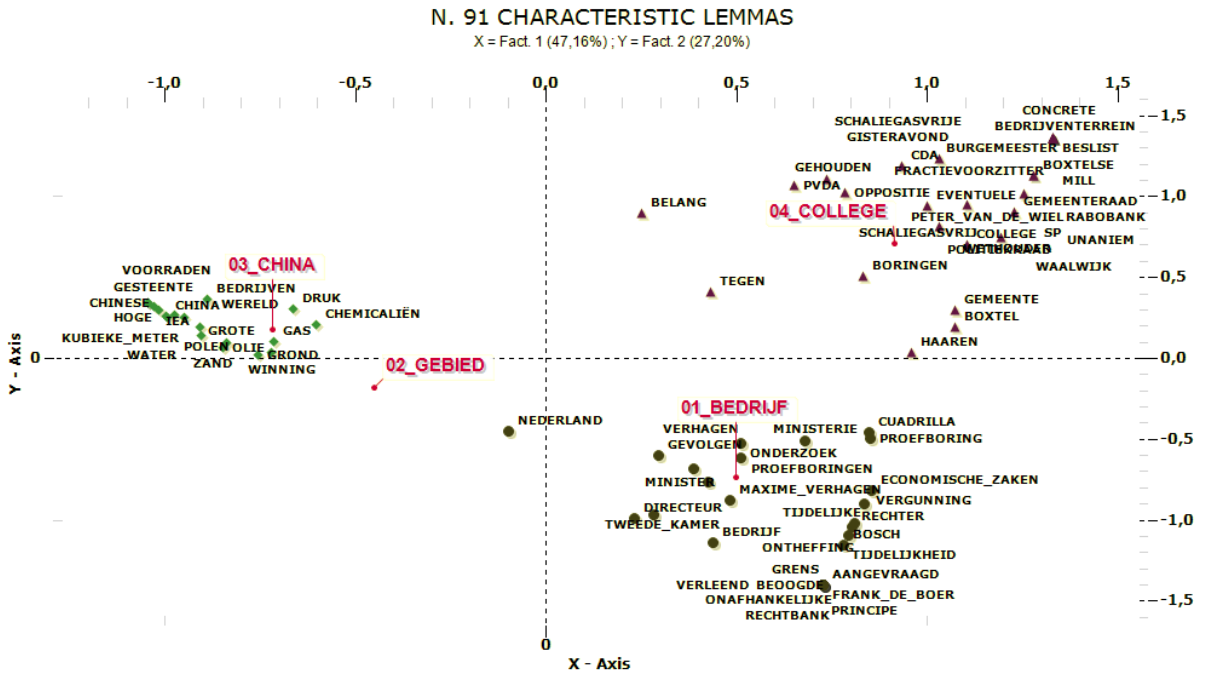

Figure 25 Clusters of an Elementary Context Analysis (November 2011 to July 2012) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts.

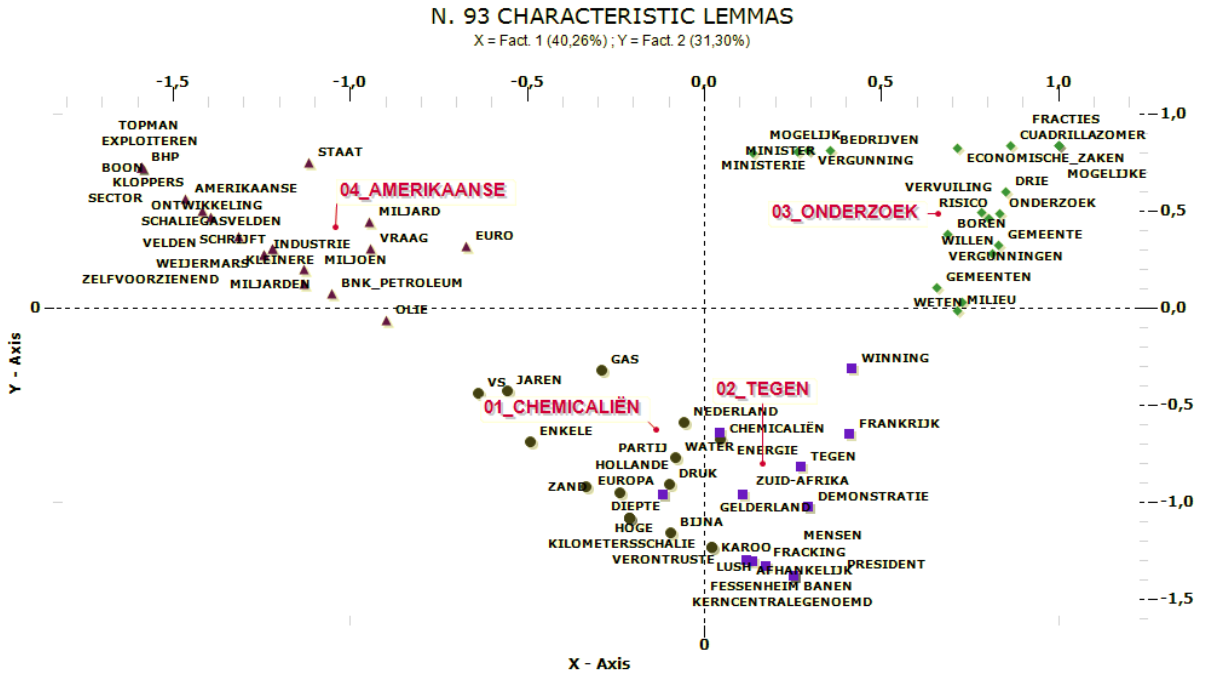

Figure 26 Clusters of an Elementary Context Analysis (August to September 2012) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts.

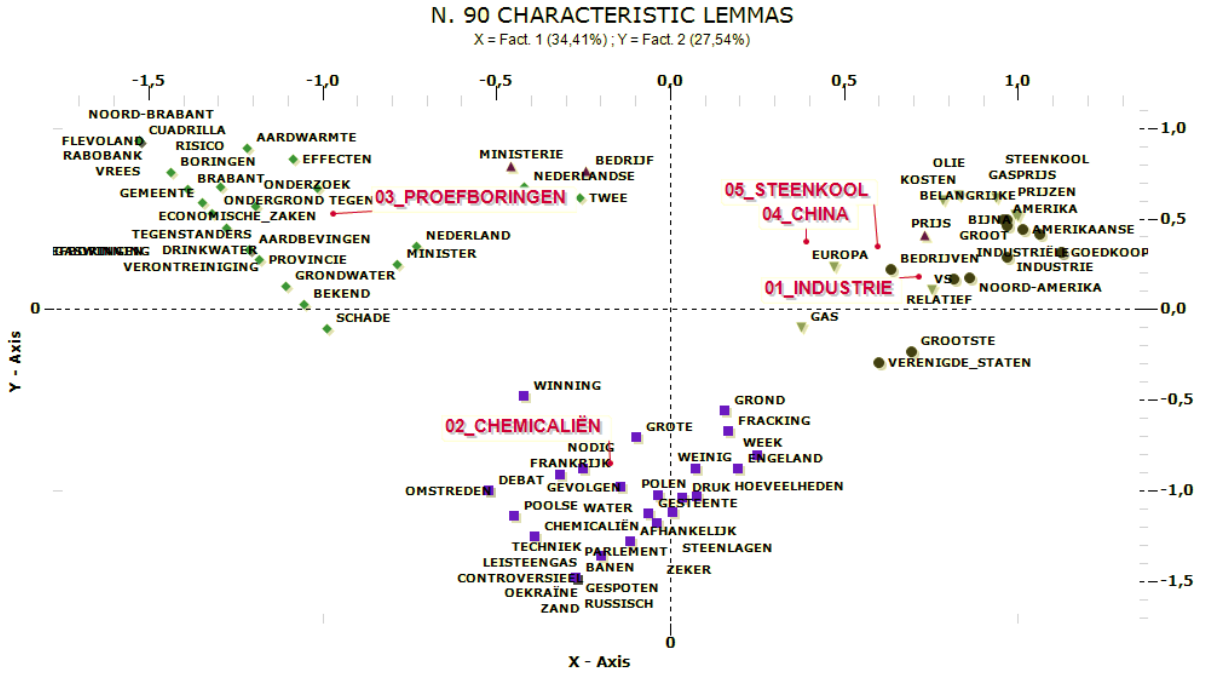

Figure 27 Clusters of an Elementary Context Analysis (October 2012 to January 2013) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 4D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 4D-graph are often used together in the elementary contexts.

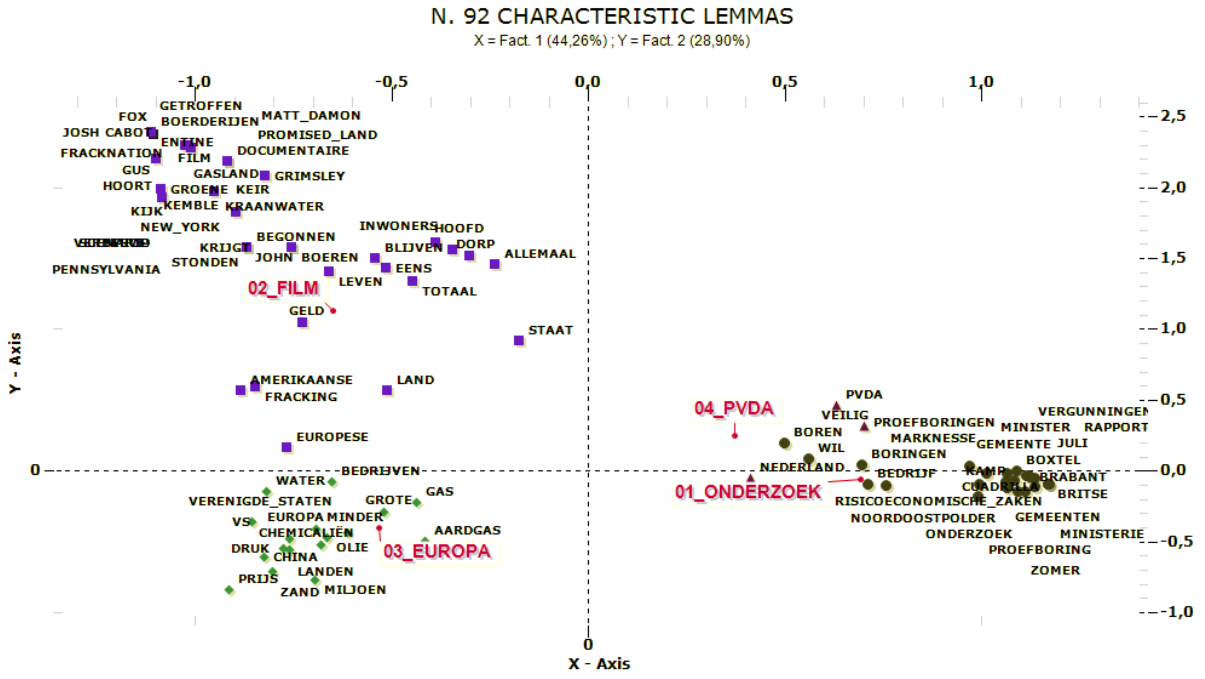

Figure 28 Clusters of an Elementary Context Analysis (February to April 2013) mapped on the most significant factorial axes. The clusters result from a Thematic Cluster Analysis with the software T-lab and were mapped in a 3D-graph. The Clusters are labelled with the lemma with the highest Chi-square value. Words that appear near each other in the 3D-graph are often used together in the elementary contexts.