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New future perspectives through constructive conflict: exploring the future of gas in the Netherlands

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Abstract

This paper reports on the refinement of constructive conflict methodology (CCM) combining Q methodology and stakeholder dialogue workshops for gas futures for the Netherlands. Since the end of the 1950s, natural gas exploration and exploitation has been a major focus of the Dutch energy policy. Discussions about the future of energy in the Netherlands tend to focus either on pro-gas or pro-renewable energy. Using Q methodology we have constructed more nuanced perspectives on the future of energy in the Netherlands. We used these perspectives in a stakeholder dialogue, in which the participants further detailed the perspectives and discussed future policy options. Analysis of the outcomes of this process teaches us that the Netherlands remain gas-focused, that renewable energy sources are as much a dogma as nuclear power was in the 1960s, and that the prospect of an austere future is a non-debatable issue. From a methodological perspective it can be concluded that the refined methodology contributed to diversity in views, opened up the dominant discourse and led to learning among participating stakeholders.

Keywords

Energy futures; Q methodology; stakeholder dialogue; constructive conflict methodology; explorative scenarios; the Netherlands

Highlights

- Constructive conflict methodology is relevant for policy making, future visioning, and backcasting
- 6 diverse perspectives on the future of gas have been developed which go beyond the usual high, middle, low scenarios
- Stakeholder dialogue workshops clarified underlying assumptions, strategies and policy options
- In cases of presumed groupthink, CCM can clarify positions and emphasise differences of opinion
- Gas is largely uncontested by Dutch energy stakeholders and economic growth an unchallenged assumption

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Introduction

Foresight helps organisations to develop strategies that are capable of dealing with a complex and uncertain future. Within the field of futures studies a vast array of methods and approaches has been developed to support foresight. Scenarios form a central concept in this literature; a concept that has different meanings and operationalisations (Börjeson et al., 2006; Bell, 1997). Börjeson et al. (2006), as well as Author (2011) distinguish three types of scenarios: predictive (*what will happen?*), explorative (*what could happen?*) and normative scenarios (*what should happen?*). In this paper, we investigate explorative scenarios because they show a range of possible futures, extend the thinking and solution space of stakeholders, and contribute to awareness and learning among stakeholders. Explorative scenarios contribute to the anticipation of unexpected rather than expected futures. Such scenarios are especially useful when an 'official' expected future dominates policy discourse. In our case, we explore the Dutch energy debate that is dominated by a future vision in which the Netherlands remains a major international player in natural gas. Despite the expected depletion of Dutch natural gas stocks by 2030, a national strategy persists in which the Netherlands maintains its central position as a supplier of natural gas.

The ideas that people have about the future will always be biased or bound by their, values, preferences and current way of thinking. Predictive scenarios, commonly based on scientific models and knowledge and presumed to be value-free (Kloprogge et al., 2011), often neglect the fact that models and knowledge reflect dominant values. Our frames of reference thus shape how we (can) think about the future. Although the future is inherently uncertain and ambiguous, it is not empty but rather influenced by thinking and strategies of today.

Frames are often taken for granted, which means that people may not be aware of how their frames shape their understandings of the future. There is a tendency to reinforce one's frame, as people tend to focus on information that 'fits' within a frame and to neglect deviating information (Runhaar et al., 2010; Author et al., 2008; Slater, 2005). As a result, it is very difficult for people to 'step beyond' their frame. Frames of reference determine what we see, and thereby, what we *don't* see.

Not seeing is problematic, as it leads us to ignore areas for improvement. According to Mitroff and Emshoff (1979), organisations fail to consider systematically and explicitly different policy alternatives to their current ways of doing things. Furthermore, organisations tend to become immune (self-sealing) to effective challenges of their preferred policies and their traditional ways of policy-making (which is similar to the concept of groupthink (Janis, 1971). Also, most internally addressed criticisms and challenges of a particular policy are directed towards the surface or structural characteristics of the policy and not at critiquing and challenging its underlying assumptions (which is in line with approaches such as causal layered analysis (Inayatullah, 1998).

The challenge for exploring the future is thus to devise explorative scenarios that challenge actors to go beyond their frames of reference and to scrutinize underlying assumptions, or at least become aware of them. In other words, explorative scenario approaches are needed that open up the thinking space (Stirling, 2008). This fits with the aim of policy-oriented foresight, which is to "raise awareness among policy-makers, politicians and the general public about alternative perspectives on future needs and the implications hereof for present-day actions" (Kunseler et al., 2015, p. 1). Additional challenges in scenario methods have been summarised by Cairns et al. (2016), including how to involve busy senior staff and decision makers, how to handle different and marginal

perspectives as well as different degrees of participation, and how to relate expert and stakeholder opinions to lay people and citizen opinions.

We address the challenges described above with a methodology for participatory exploratory scenario analysis that we conducted in a research project on the future of gas in the Dutch energy system which was part of a large Dutch public-private research program on gas (EDGaR)[2]. We aim to contribute to the toolkit of foresight and policy (analysis) researchers with this methodology that involves and articulates a diversity of perspectives on the future thereby bridging a gap recognized in foresight research (Kunseler et al., 2015). We build on a participatory approach developed by one of the authors, in which *constructive conflict* is the primary design principle (Author et al., 2010; Author, 2012). Constructive conflict in this context refers to an open exploration and evaluation of competing ideas about the future to learn about uncertainties, potential future states or developments, and anticipatory strategies. We choose to follow an inductive approach and thus start from the diverging ways in which stakeholders think about the future. To assess this diversity empirically, we use Q methodology which has been applied widely in the field of policy and planning to analyse stakeholder perspectives. Our preferred methodology deviates from conventional scenario techniques in which salient external trends are taken as a starting point and the analyst rather than the participants identifies the dimensions (usually two, represented as axes) as a structure for defining scenarios (Gordon, 2013). Methodologically, we aimed to help participants to reflect on their own future perspectives and those of others to develop better strategies. Therefore, we chose for a methodology in which the scenarios emerge from participants' perspectives rather than from pre-defined structures.

Before we detail our methodology (section 3), we sketch the cultural and institutional context of this analysis, gas in the Netherlands (section 2). Section 4 presents six different stakeholder perspectives on the role of gas in the future Dutch energy system that emerged when stakeholders further articulated and critically assessed dominant assumptions, and tried to develop strategies for a number of key actors. In section 5 we discuss our findings and the conclusions we draw from them on the role of constructive conflict for exploring new (energy) futures.

The last 50 years of natural gas in the Netherlands

Of all the challenges that modern nations face, ensuring a steady supply of energy ranks extremely high. This is understandable, as access to affordable, high quality energy sources is often directly or indirectly related to wealth creation and political acumen (Manners, 1966; Cleveland et al., 1984; Gagnon, 2008; Lambert et al., 2014). Conversely, a lack of access would mean loss of opportunities, loss of welfare, (geopolitical) power, and general economic decline. It is therefore not surprising that nations have historically pursued access to energy (Debeir et al., 1991). For the last 50 years, the Dutch pursuit has been strongly influenced by its position as large gas producer and exporter.

Since the end of the 1950s – when the vast Slochteren/Groningen gas field was discovered – gas exploration and exploitation have been a major focus of the Dutch energy policy. At the time, nuclear energy promised to be a source of cheap and abundant energy thus the value of gas resources was expected to dwindle in the future. With the help of oil multinationals Shell and Esso, the national gas grid was adapted for increased household consumption and within a decade connected to all

[2] http://www.edgar-program.com/

households (Stewart and Madsen, 2007). This rapid development of the gas sector not only changed household energy patterns but also severely impacted the Dutch mining and industrial sectors – a condition that has become known among economists as the "Dutch disease" (Corden and Neary, 1982). On the positive side, the significant revenues that gas added to the government coffers allowed the Dutch to create a generous welfare state (Correljé and Verbong, 2004).

Although the Netherlands is an open, diversified economy, the importance of natural gas can hardly be understated: it currently provides about 42% of the final national energy consumption while an even larger amount is exported to Germany, Belgium, and the UK.[3]. At about 11 billion Euros, the income from gas production comprises roughly 7% of governmental income. It is therefore not surprising that many dominant scenarios about the future of energy in the Netherlands emphasise the continuing roles of both gas and the Netherlands as a gas trading country for which the strategy of the gas roundabout has been developed. However, the gas reserves face significant decline within the next decade (Weijermars and Luthi, 2011). Furthermore, public opinion with regard to gas has changed, in particular because of earthquakes linked to gas production and debates about shale gas and carbon capture and storage (CCS) (Author et al., 2015).

A meta-analysis of energy scenarios (Kiewiet et al., 2015) suggests that there are generally three future energy flavours: renewable (large share of renewables with declining *growth* in energy use), business as usual (growth and energy mix), and increased gas (high growth fulfilled with natural gas). The aim of our project was to expand the vistas of expert stakeholders on the future of gas and thus of the entire energy system in the Netherlands. To do so, we required the input of both conventional and unconventional experts on the energy system.

A Participatory Exploratory Scenario Analysis Methodology

Constructive Conflict Methodology (CCM)

Constructive Conflict Methodology (CCM) has been developed as a participatory problem-structuring approach (Author, 2012), i.e. an approach that fosters learning about the diversity of perspectives on unstructured policy issues that involve disagreement about relevant knowledge and values at stake (Hisschemoller & Hoppe, 2001). Constructive conflict means that stakeholders with different perspectives engage in a structured process in which they articulate and confront each other's ideas to learn about the diversity of perspectives. This should aid participants to develop new strategies or adjust existing ones. CCM builds upon literature in the field of organisational psychology, which shows that conflict in teams can lead to more creativity and better decision-making processes (Hoffman, 1959; Hoffman and Maier, 1961; Brodbeck et al., 2002). In our case, constructive conflict serves as a mechanism to explore creatively divergent future perspectives.

CCM consists of four steps: 1) stakeholder identification and selection; 2) articulation of divergent perspectives; 3) confrontation of divergent perspectives; 4) synthesis (see Figure 1 for a depiction of the steps). These steps take place in an iterative fashion. The critical, and perhaps most elaborate, step in CCM concerns the selection of stakeholder participants following the rationale of constructive conflict. Specific (social science) methods are needed to identify empirically the variety of

[3] http://www.compendiumvoordeleefomgeving.nl/nl020119

perspectives and to link stakeholders to those perspectives. We used Q methodology in the preparation phase (step 1) of a stakeholder dialogue (steps 2,3 and 4), which is an organised series of meetings bringing together stakeholders with different perspectives, knowledge and backgrounds to deliberate on, in this case, the future of gas in the Netherlands. The meetings are structured by specific methods, tools, or techniques (Author et al., 2010): CCM builds on Q methodology in combination with assumptional analysis of Mitroff and colleagues (Mitroff and Emshoff, 1979; Mitroff et al., 1979) that aims at structuring ill-defined policy issues and coming to strategic decision making. Below we describe Q methodology, how we used it to prepare the stakeholder dialogue, and the approach followed during the dialogue itself.

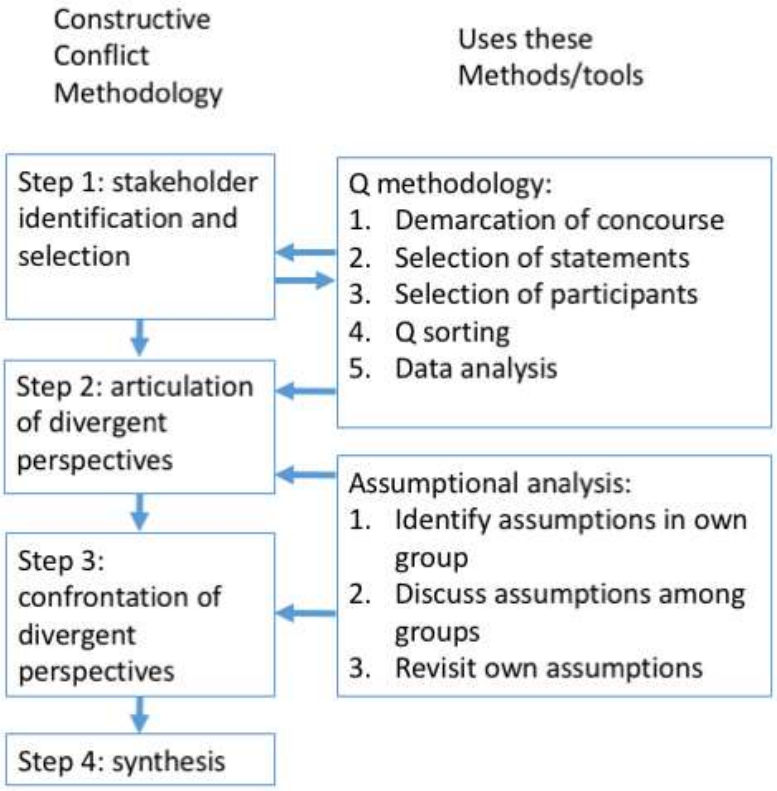

Figure 1 Overview of steps in the CCM, combining Q methodology and assumptional analysis

Q methodology

Q methodology aims to analyse shared perspectives in a structured and statistically interpretable form. It was developed by the psychologist William Stephenson in the 1930s, and until recently most applications of Q methodology have been within psychology (Stephenson, 1953). Increasingly, Q methodology has been used in other disciplines including political science (Brown, 1980) and environmental science (Barry and Proops, 1999). Q methodology researchers aim to establish patterns within the network of answers (the set as a whole) rather than compile individual answers. Furthermore, it is not the respondents who are the focus of the approach, but the “constructs” of

their minds. In other words, what Q methodology attempts to elicit are the variety of accounts or discourses about or around a particular discourse domain, theme, issue, or topic (Barry and Proops, 1999).

Q operates on the assumption of a finite diversity of discourses. It allows the researcher to see if there are patterns (factors or discourses) shared across individuals, and what the diversity of accounts are. It is, therefore, particularly suited to study social phenomena around which there is much debate and contestation. Its aim is to elicit a range of voices, accounts, and understandings. A further methodological advantage is that the researcher does not need to apply any predefined categories to identify the shared perspectives. The points of view emerge from the data, rather than from fixed axes of main drivers (as happens in many standard 2x2 scenario approaches, which are pre-determined by researchers), or other assumptions about categorisation e.g. in terms of institutional affiliation.

Below we describe the steps necessary for a Q study and illustrate them with our case study of the future of gas in the Dutch energy future.

Definition and demarcation of the concourse

The first step of a Q study is to capture the flow of communication with respect to the research topic. This is referred to as the concourse. In our study on the next 50 years of gas in the Netherlands, we were interested in remarks about possible long-term futures. A broad set of about 270 statements was collected from a range of sources including interviews, journal and scientific papers, working papers, conference presentations, newspapers, and workshops. Furthermore, we conducted interviews with several experts on energy developments and asked participants of an energy conference to engage in a workshop on wild card discovery to generate out-of-the-box statements. As indicated above, the aim was to find statements reflecting the wide range of diverging viewpoints.

Selection of the sample of statements

The next methodological step is to reduce the broad set to a manageable number while including a diversity of viewpoints. In this way, the full breadth of visions should be able to emerge through the statements. The sample of statements is used by the participants to construct their vision, similar to the way in which a small variety of Lego pieces can be used to assemble different constructions. In our case the initial 270 statements were first categorised in ten relevant dimensions that emerged from scrutinizing the 270 statements, such as “sector growth versus sector decline” or “green versus non-green development”. Next, a limited sample of statements reflecting the diversity of viewpoints for each dimension was selected to cover the whole topic in a balanced way. Furthermore, redundancy was removed, and similar statements were merged. This resulted in a final sample of 40 statements (see appendix A) that were translated into both English and Dutch and used in the interviews.

Selection of the respondents

The selection of the respondents (i.e. those who will construct the perspectives) is as important as the selection of the sample of statements. The respondents should be selected based on variety of

viewpoints. The mere fact that a particular person is expected to provide a different viewpoint from the other respondents is enough reason to include him/her in the set of respondents. Q methodology works with a reversed data matrix in which the respondents are the variables rather than the cases; as a result, the number of respondents is smaller than in conventional survey research (McKeown and Thomas, 1988).

In our study, we focused on people who professionally or semi-professionally (e.g. in representative councils) are involved in energy or gas in a variety of positions, based on their place in the value chain (production-distribution-consumption or upstream-midstream-downstream), organisation/actor type (government, industry, academia, NGOs, SMEs, interest group), and level of establishment (incumbent-newcomer or regime-niche). See Table 1 below. Not surprisingly, a range of actors is intimately involved in the Dutch *Gasgebouw* ('Gas building' – the unofficial name for the institutional arrangements between government and large producers (see e.g. Van der Voort and Vanclay, 2015)). In order to include social aspects and citizen positions in the research, we included public interest groups and NGOs in the sample. In total, 57 respondents were interviewed.

Table 1 List of stakeholder categories and organisations

Upstream exploration companies	Nederlandse Aardolie Maatschappij – joint venture between Shell and Exxon, Nogepa – association of oil and gas producers, Cuadrilla – shale gas exploration company
Distribution and storage companies	National gas grid operator Gasunie, National electricity grid operator TenneT, Distribution system operators Enexis, Alliander, and Stedin, Vopak – storage facilities
Energy producers	Vattenfall/Nuon and Eneco – electricity producers, Greenchoice – electricity and gas sellers
Consumers	VEMW – commercial energy users' association
Industry	DSM, Suiker Unie
SMEs	Greenhouse owner, LTO Glaskracht – association of greenhouse owners
Consultants	DNV-GL/KEMA, KIWA
Academia and knowledge institutes	Technical Universities of Delft and Twente, University Groningen, Erasmus University, Energy Center of the Netherlands ECN, Rathenau Institute
Government	Ministry of Economic Affairs, Mining Authority SodM, governmental agencies EBN and AgentschapNL, competition authority NMa, provinces of Groningen and Gelderland, municipality of Haaren
NGOs	WWF, Natuur & Milieu, Milieu Centraal, Milieudefensie
Interest groups	Shale gas free Netherlands, Sustainable Energy Association DEK, CHP association Cogen, Energy Transition Foundation, ODE
Innovative niche stakeholders	Green Energy Technologies, Carbiogas, Biogast, CNG Net, Enova, Hiteq, Nedstack, Groen Gas

	Mobiel, and the association of green gas producers

Q sorting

In the interviews we asked the respondents the following question: “when thinking of the future of gas in the Netherlands in the next 50 years, on a scale from -3 (strongly disagree) to +3 (strongly agree) what is your opinion on the following statements?” The respondents were asked to sort the statements in a predefined grid shaped as a normal distribution (i.e. with limited spaces for the values -3 and +3). In this way they were forced to set priorities within the 40 statements, distinguishing the more salient statements from the less relevant issues. While sorting, the reactions of the respondents to the statements (such as comments, explanations, and remarks) were collected to help the interpretation of the data (see below).

Data analysis

The outcomes, 57 Q sorts, were subjected to quantitative statistical analysis (factor analysis) using the dedicated software program PQMethod that led to a set of factors. Extraction and selection of factors is an interpretative and iterative process in which one goes back and forth between the quantitative and qualitative data to find coherent and meaningful clustering of Q sorts (Watts & Stenner, 2013). Although it relies on statistical factoring techniques, Q analysis is essentially both qualitative and quantitative. The factor solution depends on the specific goal of the Q analysis (Watts & Stenner, 2013). In this case we aimed to open up the space of ideas on the future of gas therefore chose a factor solution with a relatively high number of factors (six, as compared to around three in most Q studies) Each resulting factor represents a typical way of ordering the statements and can be expressed by an “ideal type” Q sort that captures the common essence of that factor. Based on the qualitative data (e.g. comments from the interview) and the defining statements (those scoring the highest positive and highest negative scores) and distinguishing statements (statements that are sorted very differently, e.g. much more positive in one factor compared to all other factors) for a factor, each factor is interpreted as a shared perspective on the future of gas. Each perspective is explained in a narrative. The writing of the narrative for each perspective needs to be precise (reflecting the intention of the statements in combination with the comments made), distinct, and evocative (it should be recognisable as different from other perspectives), as well as concise (not adding more information than is provided by the data and keeping the amount of text to be read to a minimum).

In our analysis we found six distinct perspectives of which two were each other’s opposite. Each factor was translated into a coherent perspective based on the defining statements (those scoring +3, -3, -2, and +2), most distinguishing statements (see above) and the comments collected during the interviews. For each perspective a narrative was written, which was summarized in a short title capturing the essence of that perspective. The perspectives can be found in section 0. Each of the 57 participants will find their point of view more or less near these perspectives.

Stakeholder dialogue

We invited the original 57 respondents and 50 additional experts and community representatives on gas and energy to a stakeholder dialogue: two full-day workshops in the fall of 2014 in the centre of the Netherlands (which means that the location was reachable within two hours' travel time). The goal of the stakeholder dialogue was to open up the thinking space of participating stakeholders concerning the future of gas. We did this by helping them to articulate their own perspectives and those of others, with the goal to help them develop better strategies to cope with the uncertain future. To achieve this, we needed more than one day but at the same time we did not want to stretch our request for (volunteered) time of the participants. The workshops attracted about 20 participants each.

Table 2 Program of the two workshops

Workshop 1 (9 September 2014)	**Workshop 2 (24 October 2014)**
9.30-10.15: Welcome, explanation of research 10.15-12.00: Getting to know "own perspective" 13.00-13.45: Confronting other perspective (1) 13.45-14.30: Confronting other perspective (2) 14.45-15.30: Review of own assumptions 15.30-16.30: Plenary debate	9.30-10.30: Welcome, explanation of research 10.30-12.15: Getting to know one perspective 13.15-14.15: Grouping of actors and confrontation of actors' stances under different perspectives 14.45-15.45: Formulation of strategies per actor 15.45-16.30: Plenary debate

Workshop 1: articulation and confrontation (CCM steps 2 and 3)

First of all, we wanted the participants to become familiar with one of the six perspectives. Taking into consideration that learning seems to benefit more from authentic conflict than from artificial conflict (devil's advocates are less effective than true devils (Nemeth et al., 2001; Nemeth et al., 2004)) participants started off in small groups of like-minded individuals to reach a detailed understanding of the perspective that corresponded most with their own image of the future. To that end, we had the invitees fill in a questionnaire in which they divided 10 points over the six perspectives, providing most points to those perspectives that are "in line with their vision of the future". The participants were appointed to the perspective to which they assigned the most points. Because we wanted to balance the number of participants in each group, in some cases, they were appointed to their perspective of second choice; in the case of perspective four (austerity, see below), participants were selected that had at least given this perspective some points. Furthermore, a cartoonist made images for each perspective, so that participants had some visual cues on the constituting elements of the perspectives (see appendix B for an example).

In the first round we used a large poster reminiscent of the business canvas model (Osterwalder and Pigneur, 2010) to address different elements of each perspective (actors' power, means, networks and knowledge; technology for production, distribution and consumption; economic, ecological, societal, political trends; institutions, policies and rules; other). The participants were invited to name for each of the elements the assumptions that they deemed essential for the perspective to hold; in other words: without these assumptions the perspective would lose its unique character. They were asked to write these assumptions on sticky notes on the poster and next they rated all assembled

assumptions in terms of importance and certainty or uncertainty (following Mitroff and Emshoff, 1979; Mitroff et al., 1979).

In the next two rounds the groups were confronted with each other's assumptions in a dialectical debate. They shortly described the perspective (of which all participants had received descriptions) and the assumptions that they deemed most important. The opposing group was then allowed to critically question the assumptions without the need for coming to an agreement.

At the end of each round, groups were allowed to review their initial assumptions, which some did by reevaluating the importance or certainty/uncertainty of some assumptions or slightly adjusting the description of the assumption.

The final round consisted of a plenary debate in which each group presented (changes to) assumptions and other general observations concerning their perspective. All participants were asked to fill out an evaluation form.

Workshop 2: confrontation and strategy synthesis (CCM steps 3 and 4)

The second workshop of the dialogue focused on strategic decisions to be made by (current) major stakeholders in the Dutch gas sector: government, gas industry (primarily Gasunie and GasTerra), energy industry (production and distribution companies), and energy-intensive industry. The participants were given the descriptions of the perspectives including the outcomes of the first workshop. In the first round, they were appointed randomly to one perspective and asked to discuss the possible strategies that each of the major stakeholders may adopt given a future described by that perspective. Although in each group one participant was asked to focus on one particular set of stakeholders, we did not use role playing (as some participants would either play "themselves" or be faced with themselves in role play) but rather an open exchange of ideas. Each stakeholder was discussed and possible strategies given the perspectives were noted.

In the second and third round, the participants who had focused on the same stakeholder in the first round were asked to form groups and to discuss the strategies developed in the perspective groups. Thus, in the first round groups were formed around a *perspective* and members in the group focused on different stakeholders (one perspective, multiple stakeholders). In the second and third round, groups were formed around major *stakeholders* and members in the group gave input from the different perspectives (one stakeholder, multiple perspectives). The aim was to find strategies that were considered applicable and effective in more than one perspective and these strategies could thus be considered robust.

In the final round, all groups presented their strategies to each other and discussed the outcomes. Furthermore, in a plenary discussion the dialogue was evaluated. Later, the participants were provided with a transcript and analysis of both workshops.

Outcomes

Q methodology results: Six perspectives

Below we summarize the six perspectives that resulted from the Q analysis and were used to structure and inform the stakeholder dialogue. The descriptions include the statements numbers (see appendix A) most defining for the perspectives (negative numbers indicate strong disagreement with the statement). A full description of the perspectives, assumptions, and strategies is well beyond the scope of this article – this can be found in Author et al. (2015).

P1 In Gas We Trust: The Netherlands was a gas country, and in the future it will be even more so (35). The Dutch have a continued belief in and support for natural gas (-24,-30); this stance is not hindered by potential accidents (-30). The Dutch gas industry is strong and well-prepared for contingencies (-31). Greenhouse gas emissions are not considered a major cause of concern nor a reason for abandoning fossil fuels, in particular gas (-32). (which is the opposite of perspective 2)

P2 In Renewables We Trust: The main driver in this perspective is the reduction of fossil fuel emissions to avoid disastrous climate change (32,17). Change is driven by popular demand for sustainable solutions (5,18,20). The means to achieve this is a radical switch to an all-electrical society with a minor role for gas (3,-26). With such a minor role for gas, the Netherlands will not maintain its position as a gas producing and distributing country (-35). However, there is a bright future for the gas sector with its offshore knowledge: it can transform itself to be a provider of wind, tidal, and wave energy solutions (34).

P3 Adaptive Gas Sector in an Uncertain Future: This perspective is characterised by uncertainty (33) and the resilience of the gas sector to cope with this uncertainty. Citizens are concerned over climate change and the role of fossil fuels (32). Nevertheless, the gas sector will prevail (-18). By adapting to the new circumstances, through the pro-gas export (roundabout) policy (35) and preparedness of the gas sector (-31), the Netherlands will be able to maintain the 2013 living standards (-7). Curtailing gas consumption has been achieved by a pro-active policy on households, refurbishing old buildings for increased energy efficiency, and building new energy neutral houses (23).

P4 Gas in Times of Austerity: Due to economic crises current living standards cannot be maintained in the future (7), even with lower energy demand and more efficient technologies. People are concerned with the climate effects of fossil fuels (32) but under the circumstances favour gas as a relatively clean fossil fuel. No new technological shifts take place and electricity will not take the role of gas. Gas will play a more prominent role in the transport sector (16).

P5 We Need All Energy Sources: This perspective focuses on the fact that we need energy to keep our economy running. Basically, energy equals quality of life. Therefore, all means to ensure access to energy will be pursued: this certainly includes gas (35,-1,-24). Not only as a primary energy source, but also as a backup or transition fuel to alternative, renewable energy resources (27). Due to the focus on energy needs, and the continued gas policies on the roundabout and decentralised gas (2), the Dutch standard of living can be maintained (-7).

P6 Entrepreneurs Serve the Market Better: In this perspective, entrepreneurs and local/regional energy companies become increasingly important (20). They provide a welcome change to vested interests and the *old* institutions that are considered too large, too slow, and too ineffective. Entrepreneurs are driven by a desire to do better and to improve technology – “because they can”. As they operate at a smaller scale, they are more tuned in to consumer needs and are better in

dealing with public opinion (5). The transition towards a more sustainable energy system is not the main priority in this perspective (-32), rather innovation (20) and cost reduction (-6). With the focus on innovation and efficient technology, the 2013 living standards can be maintained (-7).

Stakeholder dialogue results: Assumptions

For each perspective, the participants in workshop 1 voiced a number of assumptions that were challenged in several confrontation sessions. Table 2 below summarises the main assumptions that the participants deemed certain or uncertain:

Table 2 List of certain and uncertain assumptions of each perspective

Certainties	Uncertainties
P1 In gas we trust	
Consumers remain uninterested in energy Gas is preferred above solar/wind Gas is clean enough Climate change is not important	Europe is an interesting gas market Gas is cheaper than coal There is ample gas that enters the NL through a global market Geopolitical stability
P2 In renewables we trust	
Sense of urgency because of incidents Awareness of ecological side-effects Much optimism because of successful demonstrations of alternatives Fossil actors and their story fall apart	Energy cooperatives play a large role Media focus more on positive news Strong government Two degrees climate heating is a safe boundary
P3 Adaptive gas sector in an uncertain future	
Politics/policies remain important, but are whimsical Three pillars of energy policy (affordable, sustainable, reliable) keep on shifting Citizens get more power, but the power is divided	All companies need new business models Sustainability is not a primary driver for policy Price of energy sources is uncertain
P4 Gas in times of austerity	
Gas production decreases Costs of energy increase Choices have to be made	The Netherlands becomes less international
P5 We need all energy sources	
Industry requires central feed-in Citizens may use decentral sources Geopolitical tensions drive policy	Limited effects from climate change No dominant technological break-through Government takes the lead
P6 Entrepreneurs serve the market better	
Entrepreneurial mind set – entrepreneurs seek opportunities Everything is dynamic Small scale technologies compete with large scale	Continued liberalisation / small government Active citizens and aware consumers

Many of these assumptions seem compatible but emphasise different aspects of the future. In other

words: the perspectives do not negate each other (except P1-P2). The perspectives could actually describe different periods in time. Below we highlight the most salient topics that were discussed.

Role of gas

Although the role of gas is different in each perspective, it seems that our Dutch stakeholders expect gas to play a role for quite some time. Even in the renewable perspective (P2), gas plays a role as a storage medium through power-to-gas technologies. The gas perspective (P1) sees a bright future for gas as a clean and affordable alternative to coal and oil but also in the austere perspective (P4) the position of gas in the energy mix is strong. In the uncertain perspective (P3) gas is phased out from households but still used for industrial purposes.

Gas sector

Regarding the role of the (current) gas sector, the perspectives lead to split assumptions. The gas, energy, and uncertain perspectives (P1,P5,P3) assume a strong gas sector or a sector that is capable of adapting to the situation.

The other perspectives expect a change because of multiple suppliers (entrepreneurs P6) or a downsize and shift towards transport (austerity P4). In the renewable perspective (P2) the gas sector is marginalised.

Climate change

In the gas perspective (P1), climate change is either unimportant or non-existing, while in the energy perspective (P5) the effects of climate change are assumed to be small. In the renewable perspective (P2) climate change is a driver of change while in the remaining perspectives it is seen as a point of concern but not a “game changer”.

Citizens, consumers, and their awareness

Whereas in the gas perspective (P1) citizens are expected to be uninterested in energy, the renewable perspective (P2) assumes active, involved citizens who are aware of the importance of energy and climate change. In the entrepreneurs perspective (P6) the involvement is clear in the shape of energy cooperatives and other local initiatives that are against large institutions. The other perspectives speak of increased power of citizens, but they are unorganised (uncertain P3) or cannot afford energy alternatives (austerity P4). In the energy perspective (P5) citizens are willing to pay for environmental-friendly solutions.

Government and politics

This is an important diverging theme in the perspectives. Government is portrayed as the *director* of an energy transition in the renewable perspective (P2). The energy and uncertain perspectives (P5,P3) assume a government that is somewhat in charge but driven by geopolitical forces (P5) or constantly changing its goals (P3). Due to decreasing gas revenues, the government is weak in the austerity perspective (P4), while it is only assumed to create a level playing field in the entrepreneurs perspective (P6). Although government is not specifically mentioned in the gas perspective (P1), it seems that a continuation of the *status quo* is expected.

Geopolitics

The gas perspective (P1) assumes a global gas market that serves European buyers (through a Dutch energy "roundabout"). Geopolitical stability is necessary for this perspective. In the energy perspective (P5) geopolitics is assumed to drive national policy. Only in the austere perspective (P4), a more regional focus is chosen due to a retreat from international affairs. Other perspectives do not mention geopolitics specifically.

Central/decentral or large/small infrastructure

Decentral, innovative renewable solutions play a role in the renewable and entrepreneurs perspectives (P2,P6). The energy perspective (P5) mentions a central solution for industry, while citizens may opt for more decentral solutions. Also the uncertain perspective (P3) allows for decentral solutions that are backed up by central networks and thus do not lead to local autonomy. In the gas perspective (P1) the *status quo* of the centralised infrastructure is assumed, while the austerity perspective (P4) actually envisages a decline of existing structures.

Living standards

Only the austerity perspective (P4) assumes a decline in living standards – several of the other perspectives (uncertainty P3, energy P5, entrepreneurs P6) are strongly opposed to this notion. The participants in workshop 1 tried to recast this notion in a more positive light, by adding that this partially may be due to a voluntary movement towards *degrowth*.

Stakeholder dialogue results: Strategies

The discussions in the second workshop led to the formulation of future strategies for four major stakeholders: government, gas industry, energy industry (production and distribution companies), and energy-intensive industry. Interestingly, where for other stakeholders it was possible to define robust strategies that were meaningful in several perspectives, this did not appear possible for the government. Due to different assumptions based on political preferences, the government would take a different role in most perspectives.

Government

The participants indicated that Dutch government currently does not play a consistent role in energy policy. Moreover, the different perspectives assume different roles and responsibilities for the government--ranging from "leaving it to the market" to "considering energy security as a public task"--complicating the identification of robust strategies. However, in all perspectives security of supply is an important government task, e.g. through diplomatic interventions. In some perspectives (P2,P3,P5) this task should be coordinated at the EU-level. Government could play a strong role in forcing an energy transition (P2) or at least orchestrating the energy landscape (P5) or a weak role due to limited revenues (P4), or when entrepreneurs take the lead (P6). Raising energy awareness among the population was also identified as a relevant strategy.

Furthermore, the government should support innovative research on technologies that are still in their pre-competitive stage. This could be coal gasification (P1), offshore energy sources (P2), or a

whole host of pre-competitive technologies (P5). In all perspectives investing in energy efficiency research is deemed prudent.

Gas industry

For these actors the future is highly uncertain, due to the different roles of gas. In terms of infrastructure, there is room for expansion on the main grid, if LNG terminals are built and shale gas production is commenced (pro-gas perspectives P1,P5). Also, the grid needs to be converted to host gas of differing qualities, including power-to-gas and green gas, to allow for a more flexible use of gas sources. However, the grid may be split and governed more regionally (P6), or used for different purposes (P2). In an uncertain future, it would be wise to improve the sector's reputation, thus its license to operate (P3).

Energy production and distribution companies

In particular, the distribution companies will have to focus on facilitating and orchestrating local initiatives (P2,P6). The right size for these initiatives is not clear, and therefore small and large scale projects will need to be rolled out. Experimentation will take place with renewable (P2,P6) and non-renewable or non-conventional (P5,P6) technologies, which would lead to a concentration of organisations (P5) or a patchwork of smaller and larger firms (P6). To maintain flexibility for different gas qualities, the infrastructure and end user installations needs to be adjusted (P1,P3,P5).

In case gas remains the most important focus (P1), these organisations will decrease their investments in electricity production and grids. In the uncertain and entrepreneurs perspectives (P3,P6), the continuity of all gas, electricity, and heat networks is not guaranteed, differing per locality.

Energy-intensive industry

Of the stakeholders discussed here, these are the least bound to the Netherlands. They compete in an international market and can move production facilities overseas (although at significant costs and only if it will lead to sufficient comparative advantages). They will always attempt to convince government of the need for low energy tariffs. However, other robust strategies that would be attractive in several perspectives were also identified.

For instance, as energy use in these industries remains a significant cost factor, investment in research and development for the efficient use of energy and materials, as well as including renewable sources in their energy demand might be an increasingly viable strategy. Alternatively, if the Netherlands turns into a low-fossil, electric society (P2) or if security of supply cannot be guaranteed in high quantities (P6), energy-intensive industry may relocate thus causing significant economic consequences for the Netherlands.

Evaluation

The written evaluation forms indicated that the participants valued the first workshop (average score: 7.6 out of 10). 10 of 15 participants indicated that they learned about their own assumptions. This learning concerned the factual basis (e.g. the fact that "a wide range of factors plays an important role", the importance of "new technological developments" and "political preferences") as

well as how their assumptions shape their perspective (e.g. “thinking about my own implicit underlying motivations“ and “the need to make assumptions explicit”). 14 of 15 indicated that they learned about the assumptions of others (e.g. “what assumptions others take for granted”, “the role of emotions in argumentation”). Six of 15 indicated new insights in their thinking about the future (e.g. “new vision on geopolitical relations”), while 11 of 15 indicated new insights in the thinking of others (e.g. “much focus on renewables”, “optimism about sustainability”, “apparently most people think that the world will only get better“).

The positive learning outcomes were confirmed in the oral evaluation after the second workshop. Participants generally considered the dialogue useful. One observation discussed was that the need for renewable energy is largely uncontested and is present in all future perspectives although in different ways and shares. This raises the question whether the participants – even though they represented different interests – were diverse enough to critically assess the future role of different renewable energy sources. More generally, it leads to the question whether a group of stakeholders professionally involved in strategic planning of energy futures represents the disparity needed to truly challenge actors to go beyond their frame of reference.

Conclusions and discussion

Conclusions

The integration of Q methodology and stakeholder dialogue into constructive conflict is a successful approach to open the space of “official futures” and to confront stakeholders with more nuanced possibilities for the future. In our study it has led to the development of six diverse perspectives for the future of gas in the Netherlands as well as discussions about underlying assumptions, uncertainties, and potential strategies and policy options. In addition, learning among participating stakeholders took place. Critique of the scenario method often focuses on the fact that scenarios differ according to one axis (e.g. high-middle-low percentage of renewable energy (Kiewiet et al., 2015) or two axes (e.g. high/low centralisation versus high/low technology development (see e.g. Gordon, 2013)). These scenarios often turn out to be rather “flat” in their description of complex reality. Q methodology allows for an alternative approach to exploratory scenario analysis.

The resulting perspectives are multidimensional and emphasise different elements thus highlighting the fact that there is not one correct way of looking at the future. In our perspectives we indeed found a divergence from the traditional renewable versus fossil debate through elements such as entrepreneurship (P6 – incorporating a dislike of large corporations), austerity (P4 – incorporating a fear of economic or environmental collapse), and adaptivity (P3 – as a response to deep uncertainty over future developments and policy responses). Perspectives 1 and 2 (“gas” and “renewable”) represent the more traditional dichotomy as indicated above, while perspective 5 focuses on a more *realpolitik* approach where human need for energy is the most important driving factor.

The dialogue and assumption clarification part of our approach was designed to let the participants reflect on their own assumptions and those of others. Both the evaluation forms of the first workshop and informal discussions in the second workshop confirmed that participants learned new ways of looking at the future from the other participants and perspectives’ descriptions. To a lesser

extent, approximately half of the participants indicated that they also learned about the (hidden) assumptions in their own perspectives on the future. According to Mitroff et al. (1979) this clarification of one's own assumptions is necessary for one to weigh strategies. Illustrative is the remark by one of the participants who thought that he was a "gas-man" (P1), but on second thought felt much more comfortable defining himself as an "uncertainty-man" (P3).

Discussion

Although we believe that the constructive conflict approach and workshops were successful, there are several remarks to be made about the process.

First, Q methodology is a rather lengthy process if one wants to capture diverse and diverging points of view. It requires careful selection of the statements, the Q sort respondents, and the interpretation of the factors that result from the statistical analysis. If one looks for quick scenario inputs, the high-middle-low and 2x2 matrix approaches are more suitable. Our approach certainly contrasts with, for example, well-known scenario exercises such as Shell's, that deliberately limit the choices to two. Our experience suggests that the participants actually enjoy the more detailed and "difficult" perspectives over the simple ones.

As with all methodological choices, there are trade-offs involved. Whereas the Q methodology leads to more subtle and rich descriptions of the future, the formation of the perspectives is very much determined by the choice of statements for the Q sort. For example, statement number 40 on wood gasification is too detailed for the purpose of this particular research. While interpreting the perspective descriptions we found statements on institutional arrangements ("Who is in charge? What are the rules?") lacking. Thus, these elements were missing in the perspectives. And, of course, such exercises represent the mind-set at the time they are executed. When the interviews were held, between 2010 and 2012, there was no public outrage about exploitation-related earthquakes. Two years later, after several earthquakes and much damage attributed to gas exploitation, this situation had changed completely. One would expect respondents today to choose a different selection of statements.

During the stakeholder dialogues the initial thought was to combine participants with like perspectives in order to strengthen their arguments for the confrontation later during the workshops. In the feedback we received, we learned that especially the participants not assigned to their highest scoring perspective enjoyed the challenge of defending positions that were not their own. One explanation could be that the selection of participants focused on people who were interested in strategic questions about the future and thus more keen to learn about other positions. Also, the participants may have been less emotionally attached to their positions or did not see themselves as representing their organisation; for example, an employee of one of the big gas organisations suggested that his organisation may not exist in 30 years' time. Thus, the success of constructive conflict depends on the willingness of participants to take a position. The fact that some marginal perspectives, such as "austerity", were not truly represented, also makes it hard to claim that we completely avoided the devil's advocates.

In the dialogue, renewable energy resources were present in all perspectives although at different levels. Also, the need for economic growth seems uncontested – or at least there is no clear answer for situations in which economic decline takes place. Finally, it is surprising to see that citizens are

unidimensionally described as consumers, ignoring their roles as voters, prosumers, activists, employees, among other conceivable roles (Walker and Cass, 2007). Given the observed convergence in thinking, it would have been fertile to have more extreme positions on board as these provide additional food for thought and challenge conventional thinking. This may have required the involvement of stakeholders who do not think about energy strategies on a daily basis. The balance is to stretch participants' thinking far enough to introduce new ideas, but to avoid a total disconnect – what Nooteboom et al. (2007) call optimal cognitive distance or in popular futures literature leads to notions of "future shock" (Toffler, 1970).

One of the aims of the stakeholder dialogue was to develop new strategies. While the dialogue successfully contributed to learning about perspectives and assumptions, the strategies that were developed were rather generic. They do, however, provide an insightful overview of crucial elements that should be part of any future-proof policy: preparing for gas of different qualities, diversification of sources, investing in R&D for gas alternatives for energy-intensive industry, preparing for low-energy households, more leeway for local governments.

A final remark can be made on the broader relevance of the Constructive Conflict Methodology using Q methodology and stakeholder dialogue workshops. There is substantial potential for including this approach in policy analysis for the early stages of policy processes. This would help to open up rather than to close down (Stirling, 2008) the policy process in order to arrive at more robust policies and programs. Furthermore, it can be included in existing methodologies for developing (sustainable) future visions, for instance backcasting (Author, 2006; Author et al., 2011). As such, CCM is an important addition to the toolkit of futures researchers.

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Appendix A: Q statements and scores per perspective

		Perspectives z-score and factor q sort values											
#	Statement	1 Gas		2 Renewable		3 Uncertainty		4 Austerity		5 Energy		6 Entrepreneurs	
1	A disruptive innovation (cheap photovoltaic, solution to nuclear waste problem, etc.) will make energy from gas obsolete.	-0,87	-1	0,60	1	0,13	0	**-1,26**	**-2**	**-1,66**	**-2**	1,01	1
2	After the depletion of the Slochteren field two strategies will be necessary: the gas roundabout and decentralized gas production.	**1,56**	2	**-2,02**	**-3**	-0,19	0	0,29	0	1,07	2	**-1,65**	**-2**
3	An all-electric society based on renewables should be achieved and gas should play a minor role.	**-1,30**	**-2**	**1,78**	**3**	**-1,96**	**-3**	**-2,14**	**-3**	-0,91	-1	-0,68	-1
4	As the current large exploration companies will be withdrawing from active exploration, there is a need to attract smaller firms to engage in that part of the industry.	0,07	0	0,06	0	0,23	0	-0,27	0	-0,11	0	0,60	1
5	Consumer power increases, consumers will unite; therefore public opinion will be one of the major challenges for the gas sector to deal with.	-0,21	0	1,13	2	-0,24	0	0,45	1	**1,20**	**2**	**2,16**	**3**
6	Consumers will be willing to accept increasing energy costs in order to enable a transition to a more sustainable gas sector.	**-1,41**	**-2**	-0,02	0	-1,07	-1	-0,76	-2	1,03	1	**-1,74**	**-3**
7	Current living standards cannot be maintained in the future, even with lower energy demand and more efficient technologies.	0,04	**0**	-0,32	-1	**-1,39**	-2	**1,69**	**3**	**-2,32**	**-3**	**-1,24**	**-2**
8	Due to rising gas prices the public opinion on unconventional gas will change, leading to higher acceptance of unconventional gas from the Netherlands.	0,92	1	-1,27	-2	0,98	1	1,18	2	0,22	0	-0,48	-1
9	EU policies and international treaties restricting the release of CO2 emissions will be the major driver for the sustainable transition of the Dutch gas sector.	0,40	1	0,52	1	0,52	1	-0,42	0	0,79	1	0,10	1
10	Even industrial users of high quality gas will find renewable energy sources to replace natural gas.	-0,47	-1	0,44	1	0,46	0	0,24	0	0,11	0	1,08	2
11	Even with decentralized gas production and local grids, most regions will not become autonomous in their gas production and use.	0,88	**1**	0,05	0	**1,15**	2	1,02	1	0,59	1	-0,11	0
12	Excess electricity supply from fluctuating sources (such as wind and solar) will be converted into gas, for example hydrogen or methane (power-to-gas).	-0,39	0	**1,15**	**2**	-0,01	0	0,95	1	**1,53**	**2**	-0,35	0
13	Existing gas infrastructure will play a key role in the development of a CO2 transportation network.	0,21	0	-0,92	-1	-0,32	-1	**-1,55**	**-2**	-0,58	-1	-0,18	0
14	Foreign companies will become dominant players in the Dutch gas sector.	0,68	1	0,03	0	0,17	0	0,22	0	-0,08	0	**1,20**	**2**
15	Fuel Cells will be the preferred choice for electricity and heat generation at the household level.	-0,25	0	-0,14	0	-1,09	-1	-0,71	-1	0,57	1	-0,40	-1
16	Gas will replace oil in a large part of the mobility sector.	-0,42	-1	-0,73	-1	**-2,06**	**-3**	**1,22**	**2**	0,36	0	-0,05	0
17	Greenhouse gas emission reduction will be low on the political agenda. Developments in renewable gas technologies will be slow.	0,67	1	**-1,54**	**-2**	0,21	0	-0,66	-1	-0,91	-1	0,75	1
18	In a hydrogen economy, natural gas will only be used in centralized hydrogen production plants.	-0,41	-1	-0,31	-1	**-1,39**	**-2**	-0,65	-1	-0,73	-1	-0,46	-1

19	Liquefied Natural Gas (LNG) imports will increase, contributing to security of supply.	1,28	2	0,40	0	0,58	1	**1,32**	**2**	0,66	1	1,01	1
20	Local or regional energy companies and cooperatives will become increasingly important for the utilization of locally available energy (e.g. biomass, wind, solar), local system integration and optimization.	0,42	1	**1,73**	**2**	0,96	1	1,17	1	**1,41**	**2**	**1,93**	**3**
21	Micro-CHP (Combined Heat and Power) systems using gas will replace boilers at the household level, producing both heat and electricity.	0,40	1	0,24	0	-1,24	-2	0,10	0	0,60	1	-0,20	0
22	Most available biomass is needed for compulsory fuel blends by the European Union. This hardly leaves biogas for stationary use.	-0,48	-1	-0,77	-1	-0,34	-1	-0,15	0	**-1,09**	**-2**	-0,15	0
23	Natural gas at the household level will be substituted by electricity and district heating networks.	-1,29	-2	0,24	0	1,07	2	-0,53	-1	**-1,34**	**-2**	-0,49	-1
24	Natural gas for energy use will be phased out; it will mainly be used as chemical feedstock.	**-1,56**	**-2**	0,88	1	-0,51	-1	**-2,16**	**-3**	**-2,13**	**-3**	-1,16	-2
25	Natural gas power plants in combination with Carbon Capture and Storage (CCS) will be a major means to comply with carbon reduction targets.	0,47	1	-0,60	-1	0,52	1	-1,73	**-2**	**0,69**	1	-0,82	-1
26	Natural gas will go from a transition fuel to a destination fuel.	-0,30	0	**-1,79**	**-3**	-0,85	-1	-0,52	-1	-0,24	-1	0,00	0
27	Natural gas will remain important, as it is necessary as a back-up for the fluctuating renewable electricity production, matching supply and demand.	**1,75**	**2**	0,01	0	**1,25**	**2**	**1,91**	**3**	**2,08**	**3**	0,10	0
28	Rather than upgrading biogas to natural gas specifications, end-user's equipment should be adjusted to multiple gas qualities.	0,19	0	-0,03	0	0,25	0	-0,38	0	-0,20	0	**1,59**	**2**
29	Renewable gas and the increase of imported gas of different qualities will lead to the development of different quality regions.	-0,41	-1	-0,21	-1	-0,20	0	-0,09	0	-0,61	-1	-0,75	-1
30	Societal support for natural gas can't be taken for granted. Accidents (gas leakage, explosions, natural disasters etc.) will inevitably erode public support.	-1,13	-1	0,71	1	0,56	1	0,07	0	0,06	0	**1,68**	**2**
31	The Dutch gas industry is not prepared for unforeseen events (e.g. a geo-political crisis), therefore it will be severely affected if one occurs.	**-1,77**	**-3**	0,09	0	**-1,24**	**-2**	-0,20	0	-0,81	-1	0,04	0
32	The effects of fossil fuels use are so harmful that we can't wait until we can no longer extract them. If we wait, the world temperature will increase more than 2 °C and we will have to deal with a disaster.	**-1,60**	**-3**	**2,04**	**3**	**1,93**	**3**	**1,46**	**2**	-0,23	0	**-2,31**	**-3**
33	The future is too uncertain to make specific predictions, but the gas sector will look significantly different from today.	0,22	0	0,68	1	**2,34**	**3**	1,04	1	0,68	1	0,94	1
34	The gas sector with all its offshore knowledge should make a transition to renewable offshore technologies such as wind, tidal and wave energy.	-0,14	0	**1,18**	**2**	0,46	0	-0,62	-1	-0,52	-1	0,37	1
35	The Netherlands will stay an important gas country. We already have the infrastructure and the gas roundabout will become even more important in the future.	**2,24**	**3**	-1,26	-1	**1,26**	**2**	0,37	1	**1,62**	**3**	-0,49	-1
36	The transition towards a hydrogen economy will be hindered by the public because of safety risks.	-0,01	-1	0,02	0	-0,46	0	-0,50	-1	-1,00	-2	-0,05	0
37	There will be more competition, smaller parties, liberalization and decentralized generation; similar as we have seen in the electricity market.	-0,47	-1	0,78	1	0,39	0	0,72	1	-0,14	0	0,53	1
38	To maintain the independence of the Netherlands from foreign gas supply, unconventional gas needs to be exploited.	**1,61**	**2**	**-1,70**	**-2**	-1,05	-1	0,34	1	0,05	0	-0,10	0
39	We have to make sure to extract more from existing fields. Exploration has to stay on a high level and we have to make sure that new sources will be developed and exploited.	**1,76**	**3**	**-1,61**	**-2**	0,49	1	-0,56	-1	0,40	0	-0,02	0
40	Wood will replace an increasing share of natural gas by producing Bio Synthetic Natural Gas (Bio SNG).	-0,87	-1	0,50	1	-0,31	0	0,09	0	-0,10	0	**-1,21**	**-2**

Appendix B: example of cartoon – austerity perspective (P4)


4 GAS IN SOBERE TIJDEN
GAS
GAS
LNG
LNG
LNG
LNG
NXT50