Universiteit Utrecht

Innovation Studies Utrecht (ISU) Working Paper Series

How mismatching institutional logics frustrate sustainability transitions

Magda Smink, Simona O. Negro, and Marko P. Hekkert

ISU Working Paper #14.01

How mismatching institutional logics frustrate sustainability transitions

Magda Smink*[1], Simona O. Negro*, and Marko P. Hekkert*

* Utrecht University,
Copernicus Institute of Sustainable Development and Innovation
Department of Innovation Studies
Heidelberglaan 2
3584 CS Utrecht
The Netherlands

[1] Corresponding author: Tel.: +3130 2537308; fax: +3130 2532746. E-mail address: m.m.smink@uu.nl (Magda Smink)

Abstract

Despite the centrality of niche-regime interaction in the Multi Level Perspective, scant attention has been paid to how exactly this interaction unfolds at the micro-level. This article sets out to deepen insights in niche-regime interaction by focusing on the confrontation between niche and regime rule-sets. We draw on the concept of 'institutional logics' to identify divergent types of practices and underlying belief systems in the case of biomethane injection in the Dutch natural gas grid. Based on interviews and background documents we find diverging logics for network operators and biomethane producers, which hampers cooperation due to trust and communication issues. We observe that 'boundary bridging' organizations step in to connect and translate between the different groups to bridge this gap. This research shows that we cannot ignore the social dimension of transition processes: transitions do not only depend on the well-known technical, economic and regulative dimensions, but also on the ability of people to change their belief systems and practices and thus open up new avenues for change.

Keywords

Sustainability transitions
Niche-regime interaction
Institutional logics
Boundary bridging
Biomethane
Gas sector

1. Introduction

The interaction between niches and regimes is central to the process of societal transitions (Geels, 2002; van den Bergh et al., 2011). A niche is supposed to expand to the point where it is strong enough to break through and substitute or transform parts of the regime. A niche's potential is increased by landscape pressures and tensions within the regime (Geels, 2002). However, several authors have pointed out that the exact form of this interaction between niche and regime has received insufficient attention (Smith, 2007; Elzen et al., 2012a; Elzen et al., 2012b; Diaz et al., 2013). As Diaz et al. (2013) state: 'initiating a transition is not a matter of simply 'scaling-up' a technology that has been developed in a niche, but is a complex and often messy process' (p. 63). This knowledge gap at the heart of transition theory needs to be urgently addressed. Interestingly, this issue is not among the seven criticisms on the multi-level-perspective (MLP) addressed by Geels (2011).

So far, most multi-level-perspective case studies are characterized by a description of the growth and internal dynamics of the niche as well as developments in the regime and landscape. The focus tends to be on advancement of the technology at hand as well as relevant regulations and market developments (e.g. Geels, 2002; Geels, 2005a; Geels, 2006a; Geels, 2006b; Raven, 2006; Verbong & Geels, 2007; Geels & Kemp, 2007). Niche-regime interaction is analyzed in terms of these processes at the three levels. The interaction described is of an *indirect* nature, e.g. through changes in relative prices or policy (e.g. Raven, 2004; Raven & Verbong, 2009). Few case studies focus on niche-regime interactions where actors have to cooperate directly, bringing about a real confrontation (cf. Raven, 2007 on symbiotic multi-regime interaction). This indirect interaction is also expressed by the fact that niche, regime and landscape developments are often presented in separate sections (e.g. Geels, 2002; Geels, 2005b; Geels, 2007; Geels, 2006a; Verbong & Geels 2007).

A key problem for the uptake of niches in the regime is that they each operate according to a different set of rules and routines (Rip & Kemp, 1998). In the above-mentioned case studies, specific analysis of a confrontation of these rule-sets and their underlying culture differences is

often lacking and requires more conceptual development. Raven (2004) already pointed out that biomass technology projects were slowed down due to a mismatch between formal and informal rule-sets of the electricity and waste regime. Moreover, Raven (2004) emphasizes the importance of informal rules: 'the mismatch between the informal rules […] will be much more difficult to deal with than the formal rules embedded in legislation' (p. 38).

A number of recent studies have addressed this gap by taking a micro-perspective on examples of more *direct* interaction between niche and regime: Smith (2007) provides an analysis of niche-regime interaction in the housing sector, Elzen et al. (2012a) study innovation in the horticulture sector, whereas Elzen et al. (2012b) and Diaz et al. (2012) investigate transitions in farming. Each of these studies focus on the social interaction between niche and regime, on how niches manage to establish links with and influence the regime and thus show the complexity of upscaling. In addition, Wirth et al. (2013) specifically address the culture-gap by studying the role of regional professional cultures in explaining spatial variety in diffusion of biogas installations. An important phenomenon in these studies is the presence of actors that actively facilitate communication and cooperation between niche and regime actors (Elzen et al., 2012a; Elzen et al. 2012b; Diaz et al., 2013).

Despite the fact that some work is done on this issue, a deeper insight in how niches interact with regimes is necessary. A specific knowledge gap remains with regard to physical infrastructure: a core element of regimes. Certain niches depend on existing infrastructure, such as electricity and gas networks, for their operation. As niches grow, access to infrastructure becomes increasingly important (van der Vooren et al., 2012; van der Vooren & Alkemade, 2012). However, the material and long-term nature of regime infrastructure make accommodations extremely difficult (cf. Markard, 2011). Therefore, focusing on niche interaction with a regime characterized by rigidity will teach us about a core element of the transition problem: how the most stable arrangements can or cannot be transformed (cf. Fuenfschilling & Truffer, in press).

Niches and regimes can be characterized as different types of rule-sets (Geels, 2004; Fuenfschilling & Truffer, in press). Thus, a transition process means the confrontation of these rule-sets. For this paper we therefore draw on insights from Institutional Theory and Cultural Theory, which provide detailed knowledge on such processes. They teach us that people do not just have different interests; they actually think and operate on the basis of different values, goals, and assumptions (Scott, 1987). We use the concept of 'institutional logics' (e.g. Thornton & Ocasio, 2008) to study this package of guiding principles (Thompson, 2013; Fuenfschilling & Truffer, in press). Institutional logics are defined as 'the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality' (Thornton & Ocasio, 1999:804). Institutional logics help to understand why actors behave in a certain way and how they perceive their interests (cf. Bosman et al., forthcoming). Two people can perceive the same situation very differently due to different institutional logics. We will argue that this mismatch of institutional logics is an important feature in transition processes. Likewise, a mismatch of rule-sets (Raven, 2004) and a sector's particular narrative and value-set (Diaz et al., 2013) are said to limit technological change. We argue that an institutional logics perspective can explain why some actions are based more on a kind of intuitive resistance than on objective interests.

The aim of this paper is to explore the difference in institutional logics in niches and regimes and analyze to what extent they can help explain transition dynamics. Empirically, we apply the institutional logics lens to an in-depth case study of the Dutch gas sector. More specifically, we study how the niche of biomethane interacts with the natural gas regime. Since 2008, large government subsidies (AgentschapNL, 2012) encourage the food and agricultural sector to produce biogas, upgrade it to biomethane and inject it into the natural gas infrastructure. Thus, biomethane producers are pushed into a relationship with network operators. This leads to the following research question: *How do interacting institutional logics influence the development of biomethane injection into the Dutch natural gas grid?*

Several types of actors may supply biomethane, e.g. farmers, the waste sector, and large food production companies, but we zoom in on the interaction between *farmers* and network operators, because there the difference in institutional logics is most outspoken. This research therefore is an extreme case study (Yin, 2003). We will show the interaction between the 'hierarchy logic' of the network operator and the 'entrepreneur logic' of the farmers. We think that insight in this clash of logics will teach us about an essential issue in transition processes: the cumbersome interaction between parties coming from different backgrounds. Focusing on the underlying institutional logics brings us to the heart of the problem. Understanding actors' institutional logics may create insight into whether actors' institutional logics are incompatible, and whether and where opportunities for connecting them exist.

2. Theory

In this section we introduce the concept of institutional logics, describe different types of logics and discuss how institutional logics relate to interests. Then we elaborate on conflicting logics and on how the gap between different logics can be bridged.

At the heart of the regime we find institutions: the equivalent of rule-sets from the field of Institutional theory (Elzen et al. 2012a). Institutions can be both 'hard' regulative institutions (e.g. laws, regulations, technical standards) and 'soft' normative and cognitive institutions (e.g. binding expectations, common beliefs) (Scott, 1995). Institutions structure behavior by enabling and constraining certain types of activities. Therefore, institutional change is an essential part of transitions and merits our attention.

Institutional logics focus on the less tangible aspect of institutions and its relation to institutional change. Institutional logics is a relatively new and growing body of literature within Institutional Theory. It is similar to the concepts of logics of action (Bacharach et al., 1996), cognitive schema (Seo & Creed, 2002), and logics, forms, and practices (Sine & David, 2003). Institutional logics (in short: logics) are defined as 'the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality' (Thornton & Ocasio, 1999:804). In other words, the concept includes both practices (the typical way of operating) for a certain sector or organization, and the underlying belief system (ideas and guidelines). This concept offers a comprehensive understanding of why and how actors behave the way they do. Moreover, '… institutional logics determine what answers and solutions are available and appropriate in controlling economic and political activity in organizations' (Thornton & Ocasio, 1999:806). However, while institutional logics condition actors' choices, 'they also have the capacity to innovate and thus transform institutional logics' (Thornton et al., 2012:3). Furthermore, Thornton & Ocasio (2008) emphasize that institutions develop and change as a result of the interplay between their material and cultural foundations (p. 105). So while logics have a cognitive dimension, they are also constrained by material artifacts.

In relation to transition processes, the logics concept enables us to observe more closely how niche and regime behavior differs as well as what the underlying motivations for this behavior are. The concept includes both cultural and material aspects and acknowledges the duality of agency and structure. As such it is able to capture the complexity of transition phenomena. We believe it to be a suitable concept that will increase our understanding of why transition processes tend to be slow.

2.1 Different groups of logics

Logics also enable us to characterize different types of organizations. Existing research on institutional logics focuses on the different institutional orders of society, i.e. family, religion, state, market, profession, and corporation (Thornton et. al., 2012). Each of these orders is characterized

by a set of 'ideal-type' institutional logics. Depending on their particular opportunities, restraints and resources, organizations or sectors are shaped by field-level specific logics which are combinations of the ideal-type logics mentioned above (ibid.). The six institutional logics provide a yardstick to analyze and explain sector-specific logics. Here we will highlight the main goal and operating principles for the relevant ideal-type logics. The *state* aims to increase the community good and does so by bureaucratic mechanisms. Under the *profession* logic, people strive to increase personal reputation and by relying on personal expertise and quality of craft. The *family* is geared towards increasing family honor by mechanisms of loyalty, household position, and patriarchal domination. The *market* logic dictates a focus on increasing profit through the mechanism of transaction. Finally, the *corporation* aims at increasing the size of the firm and operates according to actors' status in the hierarchy.

The idea that people as well as organizations have different social preferences, different ways of organizing and perceive the world differently is also recognized in Cultural Theory. Despite differences in theoretical backgrounds, this approaches shares with institutional logics the idea that a rational-choice perspective misses out on the social and cognitive aspects that influence what is perceived as rational. For example, in their highly influential book on Cultural Theory, Schwarz & Thompson (1990: 6-7) distinguish three ideal-type 'rationalities' related to three groups: the individualists, the hierarchists and the egalitarians.

In the individualists' market culture (similar to the market logic), people strive to exploit opportunities by engaging in market transactions. They focus on optimization of the end-product and on generating profit: they have a substantive rationality. In contrast, hierarchists operate according to orderly and fixed procedures (resembling the state and corporate logic). Following these procedures is more important than obtaining the most efficient outcome: they are guided by a procedural rationality. Moreover, since people are organized in orderly and ranked relationships there are differences in status. Finally, the egalitarians provide a critical rationality: they 'reject both the individualism of the market and the inequalities of the hierarchy' (p. 7). Instead they '[stress] the importance of fraternal and sororal cooperation, and therefore [strive] for social relationships that are voluntaristic and egalitarian' (p. 7).

When confronted with new developments, each rationality has a distinctive 'engineering aesthetic': its own definition of the 'good, the beautiful and the socially desirable' (ibid. p.11). Schwarz & Thompson (1990) argue that each actor is perfectly rational within its own rationality (p. 6). However, the different rationalities are not compatible with each other. This poses a challenge for (policy) debates, because the argumentations do not fit with one another. In terms of transitions, where different actors of the niche and the regime meet, we can see now why it is difficult to agree on a common problem definition, let alone select a solution.

It is exactly this problematic fit between rationalities that, according to Schwarz & Thompson, the rational, interest-based model fails to take into account. More attention should be paid to these social and cognitive dimensions. Alternatively, they state that interests are 'contingent upon the culturally induced biases in perception of policy actors who are operating within a social arena that they themselves collectively shape and maintain' (Schwarz & Thompson, 1990:62). To summarize: people and organizations have different views of how the world works and how it should look like: in this paper we refer to these views as logics. Based on these logics, interests are formed. So, not only opposed (perceived) interests can slow down a transition process (Smink et al., in press), also divergence in preferred ways of thinking and acting can create delays in the necessary cooperation process.

2.2 Conflict between logics

While the logics of each organization or sector provide a (semi-)coherent package of practices and belief systems, two different sets of logics are not necessarily aligned. Contradictions in logics between organizations 'form the bases of political conflicts' (Thornton & Ocasio, 1999:805). Such a situation is called 'institutional contradiction': a misalignment of institutional logics creates

pressure on the existing arrangements. Several studies show how organizations that used to work under logic A, are pushed to work under logic B (e.g. Reay & Hinings, 2009; Thornton & Ocasio, 1999). In other words: 'Some of the most important struggles between groups, organizations, and classes are over the appropriate relationships between institutions and by which institutional logic different activities should be regulated' (Friedland & Alford, 1991: 256).

A specific form of institutional contradiction is 'structural overlap', in which 'individual roles and organizational structures and functions that were previously distinct are forced into association' (Thornton & Ocasio, 2008:116). For instance, Reay & Hinings (2009) describe how health care professionals in Alberta, Canada had to move away from the dominant logic of 'medical professionalism' towards 'business-like health care'. Instead of the physicians using 'their professional knowledge to determine appropriate care for their patients', they now had to start working based on the principles of 'cost-effective treatment, lowest-cost provider and customer satisfaction' (p. 630). When niches need existing infrastructure, niche and regime actors are forced into association and structural overlap occurs.

2.3 Boundary bridging

When organizations with diverging logics are forced into association, how do they make things work (to some degree)? Institutional literature mentions that certain actors actively engage in 'boundary bridging': a function performed by organizations that (can) operate between different types of settings and that can bridge between these settings (Greenwoord & Suddaby, 2006). Thus, 'actors moving between fields "transpose ideas"'. These boundary bridgers '[lessen] institutional embeddedness by exposing actors to interinstitutional incompatibilities, increasing their *awareness* of alternatives' (Greenwood & Suddaby, 2006:38, emphasis in original). Seen from the logics angle, skillful boundary bridgers are an essential ingredient to enable the successful cooperation between previously unrelated organizations.
This phenomenon is also recognized in transition studies: 'pragmatic system builders [are required] who make compromises and help translate some niche practices into forms amenable to actors in the regime' (Smith, 2007:447). Such translation activities in a face-to-face setting provide 'stepping stones' between niche and regime. Other transition studies speak of 'intermediaries' (Elzen et al., 2012b) and 'hybrid actors' (Elzen et al., 2012a; Diaz et al., 2013; Kivisaari et al., 2013).

In this study we will identify the sector-specific logics of network operators and farmers; analyze how these different sets of logics 'meet' and whether some boundary bridgers manage to close the gap.

3. Method

For this extreme case study several data sources have been used: First a database of over 250 news articles related to biomethane injection in the Netherlands during the period 2003-2012 served to identify the most important actors and activities that occurred in this period. In addition, relevant policy documents, annual reports, and research reports were analyzed to get an overview of (unsolved) technical and regulatory issues with regard to biomethane injection, and to prepare for the interviews. One researcher visited the 2011 and 2012 editions of the Energy Delta Convention in Groningen. This industry and science congress largely focuses on gas issues and provided insights into the current topics and culture of that sector.

Furthermore, 14 semi-structured interviews were conducted with relevant organizations in the field of biomethane injection. Interviewees were those people in the organization that worked closely on the issue of biomethane injection. Interviews were conducted with the national network operator (3 interviewees) and the three major regional network operators (4 interviewees). Five interviews were arranged with biomethane producers and intermediaries. Since producers mostly hire an intermediary to organize part of the biomethane production, these intermediaries could tell us

most about the interaction with the network operators. Due to this close connection between producers and intermediaries we mention them as one group. We interviewed all intermediaries that were identified in the news articles. Finally, interviews were conducted with the two principal government representatives on the issues of biomethane injection and gas quality. These groups will be indicated in the results as 'Nat. network', 'Reg. network', 'Intermediary', and 'Government', respectively. Some interviewees have a double role, e.g. being network operator and participating in an intermediary organization.

The interviews took place between September 2012 and March 2013 and mostly lasted one to two hours each. Interviewees were asked to describe how their organization dealt with the introduction of biomethane injection, what their motivations are to work on it, and what issues have to be solved (and how) to make biomethane injection successful. Interviews were fully transcribed and analyzed in NVivo to create a description of the different types of sector-specific institutional logics, and for examples of competing logics, as well as boundary bridging activities. We checked for intercoder reliability as a co-author also analyzed part of the interviews in NVivo. Interview quotes have been translated to English. We aimed to conscientiously convey the meaning and speech style of the interviewees, while staying as close to the original text as possible (Bryman, 2008:454).

4. Background on gas sector and biomethane

The lion's share of Dutch gas comes from the large *Groningen* field, in the northern province of Groningen. The composition of Groningen gas is: 81% methane, 14% nitrogen, a small percentage of higher hydrocarbons, and finally some CO_2. Compared to natural gas from other sources, it has relatively low methane content and therefore is called 'low-calorific gas'. The calorific value of gas indicates how much energy one unit of gas contains. The calorific value is related to the Wobbe index: a measure to compare energy content for gases with different density. Gas from so-called 'small fields' in the North Sea and on land as well as imported gas (e.g. from Russia) has a higher methane content and is therefore blended with nitrogen to match the composition of Groningen gas (Gas Transport Services, 2013:17).

Biomethane is produced from biogas, which is the product of a co-digestion process of manure and other organic materials (e.g. corn). By extracting CO_2 from the biogas, the relative percentage of methane increases and the Wobbe index of natural gas is met (Platform Nieuw Gas, 2009). However, chemically, it does not have exactly the same composition. For instance, biomethane can contain some biological components related to the resources from which it is produced, which need to be filtered out (Platform Nieuw Gas, 2009).

The organizational structure of the gas sector is as follows. The Groningen field serves as the starting point in terms of physical infrastructure as well as in legal terms. Natural gas is 'produced' by the NAM (*Nederlandse Aardolie Maatschappij*). It enters the network of the Gasunie, which transports the gas to the regional network operators. One can compare the gas network with the roads of a country. The highways transport large quantities of gas at high pressure (80, 67, and 40 bar), whereas the regional and local grids transport smaller quantities at lower pressure (maximum 8 bar) (KEMA, 2010:5-6). Gas traditionally flows only one way, from Groningen to the customer, and therefore supply and demand should be in balance at all times (KEMA, 2010:7).

The Dutch Gas Law has been built on this arrangement and is therefore quite simple: it contains very little specifications about the gas quality (most notably the Wobbe index and the pressure; Government 1, 2012), because there used to be only one source (the Groningen field). Gasunie is responsible for the gas quality (which involves some blending and fine tuning), whereas regional network operators transport it to the customer. Gasunie is used to deal with large energy intensive industrial players that are directly connected to the 80 bar network (Schippers & Verbong, 2000:215) and not with small parties. Conversely, regional network operators have more local contacts, but have limited knowledge about gas quality (other than Groningen gas). In this

monopoly arrangement everything was relatively simple. "In case there were any questions, Gasunie was the answer" (Government 1, 2012).

The introduction of biomethane injection to the gas system represents a fundamental change. It means that the gas no longer flows exclusively from upstream to downstream, but that gas can be added into the downstream 'nerves' of the system, and, by new and different parties. This practice breaks the monopoly of Gasunie on supplying the Netherlands with gas. Moreover, it raises many technical, legal, administrative, and safety related questions. While the government pushes biomethane injection by allocating to it a large part of the renewable energy subsidy, no final rules or agreement exist on a few essential issues (Platform Nieuw Gas, 2007:22, 25; *Boerderij Vandaag*, 2009a; AgentschapNL, 2011). These are firstly, the gas quality: what should be its calorific value (energy content) and what should be its composition to ensure flame stability in boilers and furnaces? Secondly, who is responsible in case of damage or accidents due to biomethane injection: the producer or the network operator? And finally, the Gas Law does not contain provisions that allow network operators to invest in infrastructure adjustments to facilitate biomethane injection. This is relevant, because farms are usually located near the most downstream part of the network, where gas consumption is relatively low. This limited injection capacity could be increased by connecting this particular network to a network with higher gas consumption, or by making adjustments to the network to enable the gas to flow upstream.

A number of landscape changes influence the relation of network operators with biomethane. Firstly, due to the EU and Dutch liberalization agenda, in 2005 Gasunie was separated into a network operator (called Gasunie) and a sales company (called GasTerra) (*Eerste Kamer der Staten-Generaal*, 2012:345). The same happened with the regional network operators in 2008-2009. As a consequence, network operators were in principle free to transport gas from any producer. This opened up new possibilities for other types of sources. Secondly, gas extraction from the Groningen field is expected to decline sharply in the next two decades (Gas Transport Services, 2013:14-15). This supply needs to be substituted. Imports will increase, which means that gases with a different composition (high-calorific gas) will be transported (e.g. from Russia). In the long run, the gas quality standard needs to be adapted (Ministry of Economic Affairs, 2012). Thirdly, and related to the second point, societal concerns about the impact of gas on CO_2 emissions as well as the eventual depletion of fossil resources force the network operators to consider more sustainable types of gases to maintain their 'license to operate'. For network operators to remain a viable business, it is essential that their network continues to be used for gas transport. Fourthly, the liberalization program allowed network operators to set up a business development section that executes activities in the commercial domain. Such activities include the building of pipelines, upgrading gas, monitoring gas quality etc. The business approach of the business development unit now starts to cause friction with the regulated part of the network operator. As a result of these new incentives, pressure on the network operator to accept biomethane injection increased.

5. Case description and analysis

Firstly, we will describe the sector-specific institutional logics of the network operators and the producers, which we will summarize under the heading of 'hierarchy logic' and 'entrepreneur logic', respectively. These two logics will be compared to the ideal-type institutional logics as well as the three rationalities. Secondly, the mismatch of the institutional logics will be described in detail. Thirdly, we will show how various actors try to bridge the gap between the institutional logics. Quotes are used to show remarkable differences in logics.

5.1 Network operators' logics

The most basic institutional logic influencing network operators is their operation according to the Gas Law and all its subsequent *codes and norms*. Since network operators are public entities, these documents prescribe whether they are allowed to undertake certain activities as well as how

and with which type of materials they should do it. The codes and norms also need to safeguard non-discriminatory access to the network: all parties need to be treated uniformly. For new developments, prescriptions are often lacking and leave the network operator without guidelines about how to proceed. New developments either have to meet existing norms, or new norms have to be decided upon. In short, network operators are governed and constrained by a legal framework.

> A network company is driven by codes and norms. So, very simple, if something is not mentioned in a norm, people don't know it. (Regional network 1, 2013)

In terms of decision-making, network operators are organized *hierarchically and formally*. Starting with the technician that checks the pipelines in a certain area, via the administrative middle management layer, to the top management. Procedures tend to be extensive and relatively slow. Interactions with other parties have a formal character.

Secondly, network operators traditionally deal with *large-scale arrangements*, for infrastructure as well as administrative systems. They are tuned to work with large quantities of gas. Any change to the system is bound to come with (extremely) high overhead costs.

> A connection to the national network has a fixed price of 300.000 euro. You actually have nothing then. You only have somebody making a hole in the pipeline where you can connect, but all the rest you need to do yourself. … For this we are engineering for months to see what are the consequences for the transport network. All sums, plusses, minuses are made three times. Everything that happens needs to meet all standards. (National network 1, 2012)

Network operators are also characterized by their preference for *order and control*. This is closely linked to their preference for large-scale operations. They like to keep both the infrastructure and the administrative system simple, attempt to perfectly manage this system and tend to resist changes to it. A telling illustration is that network operators battle with each other for a yearly 'operational excellence' prize, awarded to the most smoothly and efficiently operating organization.

Thirdly, for network operators, it is of utmost importance that the gas supply meets the highest standards for *safety and reliability*. For instance, occurrences of odorless gas or incorrectly burning flames are unacceptable for them, due to the risk of explosions. This concern partially stems from the network operators' responsibility for the gas quality. From the preoccupation with safety and reliability follows a strong tendency of risk-averse behavior. Network operators prefer to know and cover all possible risks of new activities before getting started.

Finally, network operators are pledged to make decisions that are *optimal from a societal perspective*. Given that their costs will be divided over energy users, network operators need to consider whether activities are efficient from a societal point of view.

These elements of the sector-specific logics under which network operators function are a combination of the ideal-type state logic and profession logic as characterized by Thornton et. al. (2012). Network operators are influenced by state logic because they are state-owned. This results in a high degree of regulation and bureaucratic decision-making, and a prescribed focus on the increase of the community good (e.g. optimal and safe supply of gas for all). Moreover, network operators also draw on the profession logic, which shows in the high value that is being placed on expertise and quality of craft in managing the gas infrastructure.
We also recognize the profile of a hierarchist as described by Schwarz & Thompson (1990). Network operators operate on the basis of 'orderly and ranked relationships' (p. 6) and follow a 'procedural rationality' (p. 7), meaning that the procedure is the guiding principle more than the outcome. Moreover, the preference for large-scale and centralized arrangements matches the typical 'engineering aesthetic' (p. 11) of the hierarchist. We summarize the sector-specific logics of the network operators under the heading of 'hierarchy logic'.

5.2 Biomethane producers' logics

The institutional logics biomethane producers operate under are quite different from the hierarchy logic. First of all, for farmers, biomethane production is a *supplement to their core business*: their hearts really are with their cows and crops. Secondly, producers are private organizations and therefore only invest in a project if they expect it to be profitable. This is an essential condition for their involvement. They *strive for efficiency* and therefore share an interest in making optimal use of their resources. They try to create value from the waste streams they have. For farmers, biomethane production is a piece in a larger puzzle of closing nutrient cycles. By digesting manure they reduce surplus manure (which is expensive to get rid of) and turn it into a valuable product that can be used as fertilizer.

> And for these farmers, it is not about the gas, it is about the minerals. From that moment on we have always emphasized it is about the link between minerals and gas (Intermediary 1, 2012)

Third, the farmers and related intermediary organizations are *focused on regional development*. They believe their activities can be a stimulus for the local economy.

> A simple example: we are now busy to think of a new green economy for regions in decline, because that's where you want a new economy. (Intermediary 1, 2012)

Fourth, producers wish to *contribute to the production of renewable energy* and more generally, sustainability. They are intrinsically motivated.

> Certainly, it was an economic opportunity, but if it hadn't been for sustainability, we wouldn't have taken the initiative. So sustainability was our priority, that was absolutely clear, reasoned purely from the heart. (Intermediary 2, 2012)

Finally, the operating style of producers is to *decide quickly and act pragmatically*. For instance, they do not participate in biomethane related organizations or platforms unless they all pursue the same concrete goals.

In sum, producers are influenced by both the market and family logic as described by Thornton et. al. (2012). Increasing efficiency and thereby profits ia one of the main concerns of farmers, fitting the commercial market logic. Elements of the family logic are visible in pragmatic, family-based decision-making (see also section 5.3.1) and an extension of the family loyalty to their region. Farmers also have much in common with the individualists' market rationality as depicted by Schwarz & Thompson (1990). Their main concerns are the results on the ground; procedures are only the means to that end. Moreover, the producers share some of the egalitarian logic too: it shows in their emphasis on contributing to the local community and their more small-scale and regional engineering aesthetic. We summarize the sector-specific logics of the biomethane producers under the new heading of 'entrepreneur logic'.

5.3 Institutional logics mismatch

From 2008 onwards, a large subsidy creates a boost in the number of biomethane projects and, as a consequence, network operators are confronted with requests for injection of this gas into their grid. This is an example of 'structural overlap': previously unrelated organizations are forced into association (Thornton & Ocasio, 2008). Below we describe how the mismatch of logics unfolds in practice for three clusters of competing logics: hierarchical vs. pragmatic decision-making; large-scale vs. small-scale arrangements; and safety vs. efficiency focus.

5.3.1 Hierarchical vs. pragmatic decision-making

A first clash of logics happens between the operation of network operators according to codes and norms on the one hand, and the quick and pragmatic operating style of the producers on the other. Network operators have to explain to producers the rules that govern the gas sector.

> Welcome to this world, you are now a gas producer. That also means you now need to have an emergency service, you need to properly settle payments, monitor quality, have a standby service for Sunday morning 4 am. Somebody needs to sit there who can take action. (Nat. network 2, 2012)

From the network operators' first reactions to biomethane injection, it shows that the current system is taken as a given. This means that any new development should meet the standards of this current system.

> Biomethane needs to be equal to grey gas. So in the beginning, colleagues wanted to demand that biomethane could only contain those elements that are present in natural gas. (Reg. network 1, 2013)

Initially, employees of network operators respond to the idea of biomethane injection by pointing out all the possible problems it could create.

> An enormous mountain of objections emerged, of why we shouldn't get involved in all of this. (Reg. network 1, 2013)

This rather conservative way of reasoning leads to statements such as: "It is not possible";" It is not allowed"; "We have always done it this way"; "We do not do things that way"; "I do not have personnel for that" (Reg. network 1, 2013). Moreover, new opportunities are at first not taken seriously. Employees expected the interest in biomethane injection to "go away" (Reg. network 1, 2013). At the national network operator it was practice for a long time to "hold off biomethane injection". People were afraid biomethane would corrode the pipelines (Nat. network 2, 2012).

> There was a time that when you said we were going to inject biomethane, you would pretty much be shot here in the hallway. "We don't want this; it is dangerous for our network." (Nat. network 2, 2012)

Once a number of biomethane injection projects were running, network operators turned to create protocols and guidelines to standardize this new development. Biomethane had to be completely integrated into the current system and should be treated as any other 'commodity' (this does not mean that from the farmer's perspective all problems have been solved). This could be seen as a form of the 'centralized direction' that characterizes the hierarchist's profile.

> Together with Netbeheer Nederland [branche organization of Dutch network operators] we state that the demands we make, we formulated them in such a way that in terms of calorific value and safety, biomethane is no more or less than natural gas. In this way, our people on the ground can just do their job with standard decisions and standard safety equipment, they will not notice anything. (Reg. network 2, 2013)

> So now we are in 2013 and it has been accomplished. Biomethane injection has become a standard process. (Reg. network 1, 2013).

However, the formal decision making style of network operators is at odds with the informal way of operating of producers. The large culture difference really hampers progress on the projects, because it creates distrust among the parties. A farmer usually uses his family capital to set up his activities and therefore needs to trust his partners before he will invest.

> I am at the kitchen table and try to get a taste for what are the issues. At a certain moment, the wife comes in with coffee and the agrarian says "come sit here with us". Then you know this is a very important moment, because he is putting his private money into this initiative. I have learned this is a very important moment, because somebody talking on behalf of a large company, talks about the company's money. But a small entrepreneur speaks about his own money. So, if Mother doesn't want it, it won't happen. (Reg. network 1, 2013)

> If the network operators, those energy guys visit the farmer, they arrive with three big lease cars on the property, all three in grey suits. No way the farmer will do business with them. He really doesn't feel like it. (Intermediary 2, 2012)

Both parties' decision-making system show a mismatch too. Producers like quick decisions on the basis of concrete numbers. However, network operators have extensive structures and protocols to follow, before taking a decision. So producers complain about the complicated and slow, or even ineffective way of decision-making.

> They were all enthusiastic and next we got a bedlam[2] and then it wasn't fun anymore. Network operators are really strong in this; whenever you make an appointment with one person, you will get six of them. (Intermediary 2, 2012)

> For example, [reaching agreement about] contracts and prices with energy companies takes months. Whereas for a farmer it is like "shall we do this, yes or no?" (Intermediary 2, 2012)

In contrast, this is how a network operator describes their procedures:

> We have an account manager who takes care of client contact and the offer trajectory. And we have a technical team. Every once in a while I discuss the progress with them. Next to that there is a judicial specialist to monitor especially the legal side of the issue. Furthermore, the technical people are also in a national group to help establish coordination in the sector. Also Netbeheer Nederland [branche organization for Dutch network operators] engages in coordination on this issue. (Reg. network 3, 2012)

Meanwhile, network operators prefer to work with a professional organization, instead of a farmer whose core business is not biomethane production.

> I find the agricultural sector more difficult and more challenging. For example, in the waste sector organizations have a business development department with a manager. And the manager will come by some time, ask for an offer, you discuss what you are going to do, and what you are not going to do, everybody organizes their own thing. But these small entrepreneurs, for them it is much more difficult to deliver. They are not so organized, or they are organized, but well, during the day he is working with his cows. So you need to help them a bit more, they need more attention. (Reg. network 1, 2013)

To improve the interaction, network operators appoint someone as "account manager" (Reg. network 3, 2012). This person specializes in biomethane projects so that the network operator can learn faster. Moreover, biomethane producers have a clear contact point.

5.3.2 Large-scale vs. small-scale arrangements

Network operators are used to dealing with large scale infrastructure and large quantities of gas. Biomethane projects produce relatively small amounts of gas. This is where a lot of resistance to biomethane injection comes from: "It is much work for very little quantities with potentially many risks" (Nat. network 3, 2012). This is especially true for the national network operator. The focus on large scale operations precludes fitting in biomethane projects easily and efficiently.

> When we step into this type of projects, it just gets too expensive. Whenever we make something according to our standards, it is always meant to be very large, very big quantities, and meant to last for a very long time. (Nat. network 1, 2012)

> We had a discussion with the NAM. The idea was to use their pipelines of the small fields for biogas. Can't we transport biogas through those pipelines? "What are you talking about concretely?" Well, about 30 million cubic meters. Answer of the NAM: "Per day?" No, per year. Just to indicate the difference in order of magnitude. That is also what we see with these farmers. (Nat. network 1, 2012)

Moreover, the administrative systems of the network operators are also extensive, especially for the three large regional network operators. Incorporating the physical changes of the gas flow into these systems is another hurdle for biomethane injection.

> Same for billing. It sounds simple, gas is being injected and somebody buys it. Easy peasy. Just add and deduct. But when you speak about systems with 3 million clients, such a change is not only very

[2] In Dutch: *Poolse landdag*

> expensive, but also very vulnerable for mistakes. You have to do it right for all your clients at once. That is not so easily done. It is a disadvantage of large companies. You cannot forget anything. So the colleagues who deal with this, these changes caused them quite some stomach aches. (Reg. network 1, 2013)

This section shows how the large-scale infrastructure and its accompanying practices influence people's ideas about what is possible or not. The physical infrastructure of the gas sector determines to a large extent the scope of the network operators' logics. But apart from the physical possibilities, this section also displays a more personal dislike for small projects and diversity, and conversely, an attachment to large-scale systems. We see here how the material and cultural aspects of the logics are interrelated.

Biomethane projects not only produce relatively small quantities of gas, they are also dispersed geographically. Furthermore, most projects feed into the smallest, local grid. For network operators, this means that their carefully streamlined physical and administrative systems are disturbed. Gas used to flow from the *Groningen* field all the way down to the customer. Biomethane breaks the monopoly of Gasunie by injecting at the downstream level and by introducing new producers to the system. As a consequence, the traditional gas transporter (Gasunie) no longer wants to be responsible for the gas quality.

> Gasunie's sole responsibility for the gas quality could no longer be maintained. Because Gasunie says "well, if farmer Johnson is going to mess around, we are no longer responsible. You know, gas is a craft". (Reg. network 1, 2013)

If all biomethane could be injected upstream in the gas grid, there would be no problem. This is what happens with the natural gas from small fields, that also has a different composition than the Groningen gas. It is really the local element that clashes with the current large scale and one-way character of the system. This is a clear example of how logics determine the type of answers and solutions that are perceived by the actors (cf. March & Olsen 1976 quoted by Thornton & Ocasio, 1999: 806).

> I think the big difference is that [small fields] happens upstream, so at the beginning of our network. Then it doesn't matter so much, because you put everything together, it mixes partially and then finally it passes our treatment facilities. … So that is completely part of our network. And it is also very manageable, those small fields. Whereas [biomethane] happens somewhere in a back alley, so to speak. (Nat. network 3, 2012)

> If all biomethane producers would just upgrade the gas and would hand it over at 67 bar in Ommen [upstream point in the grid], there would be no problem whatsoever (Nat. network 2, 2012)

Given their preference for order and control, it seems they intuitively resist changes that make their system more complicated. This is true for both the number of grid connections and the (natural) variability of biomethane.

> Then you also get statements here like "we don't want to make a porcupine of our network". In other words, our gas network only has a limited number of connections. And if we have to make a connection for everyone that wants to inject in or draw from [the network], that requires a totally different way of managing the gas network. (Nat. network 1, 2012)

Biomethane projects also require the planners of the gas flow to think differently. Whereas their biggest challenge used to be ensuring maximum gas supply on a cold winter day due to very high gas demand for household heating (avoiding a shortage), they now have to ensure the grid does not blow up on a hot summer night (avoiding a surplus) due to too much biomethane injection in combination with too little demand.

This section shows that apart from infrastructural and economic limitations for biomethane injection, employees of network operators feel (or felt) resistance against biomethane injection on a more intuitive level. They seem to dislike new things, having to change their ways, to disturb the current order or streamlined system. This rather intuitive resistance is very well served by the

bureaucratic decision making (Thornton et al., 2012) or procedural rationality (Schwarz & Thompson, 1990), which naturally slows down new developments.

5.3.3 Safety vs. efficiency focus

One of the most important goals for network operators is to guarantee the safety and reliability of the grid. Biomethane is perceived as a threat to these principles. The national network operator seems most concerned about the integrity of the grid, i.e. the prevention of damage to their infrastructure (Gasunie, 2006; *Leeuwarder Courant*, 2007), whereas the regional network operator seems to be most concerned about the safety of customers.

> Network operators sometimes state very boldly, "well, my CEO says: rather go to court 10 times than one dead body". (Government 2, 2012)

In order to facilitate biomethane projects, the network operators came up with a preliminary list of criteria (NMa, 2009) based on knowledge available at that point. These criteria are rather strict, so as to be 'on the safe side'. These are the criteria that the current projects operate under. In the meantime, the network operators continued to research and fine tune this list of criteria. Some parameters will be relaxed, whereas others are likely to be narrowed down. Also the current projects will have to meet this new set of criteria. This fine tuning is an annoyance to the producers, who object to this moving target.

> We decided to play it safe. We demand sterilization of the gas and also a biological filter. Now we are busy checking a number of these filters to see how much bacteria they catch and whether all this is necessary or whether we could be a little bit more relaxed about it. (Nat. network 3, 2012)

Interesting to observe is that for 'safety' no objective measure or threshold exists. This makes it a very difficult concept for negotiation. However, it is a central concept in this case.

Moreover, producers and network operators disagree on who is responsible for the gas quality at the customer (called 'exit specs'). Network operators want entry specs for biomethane to be equal to the exit specs the customer is used to. Producers think it is the responsibility of the network operator to balance potential differences between entry and exit specs. Moreover, they also explain that gas flows blend and therefore entry specs can be broader than exit specs. Here we see very clearly the mismatch between operation according to codes and norms and applying the strictest criteria versus a type of pragmatic reasoning aiming to secure efficient operations. As Friedland & Alford (1991) wrote, it is a struggle over 'by which institutional logic different activities should be regulated' (p. 256).

> A very simple example. The gas from my installation has a temperature of 30 degrees. That is easy, because like this I don't have to cool it down. Then I put it in the network, which is under the ground, and 100 meters later the gas is no longer 30 degrees but 5 degrees. The norm at the customer is, [the temperature] has to be below 20 degrees. So I say, "I can easily inject the gas at 30 degrees, because 100 meter later it has already cooled down". What does the network operator say? "No, not allowed, 20 degrees". (Intermediary 2, 2012)

> In the end the injection requirements needs to be such that the gas can be transported ***directly*** to the people who use it. (Nat. network 2, 2012, emphasis added)

Finally, network operators have difficulties trusting the measurements that farmers share with them (*Boerderij Vandaag*, 2009b). They are very much aware of the different goals they each pursue and fear that the profit driven producer will jeopardize their own dedication to safety and reliability.

> What is difficult is that the whole surveillance mechanism is with the producer and that we need to trust the blue eyes of the producers that all is well and that he works neatly according to the rules. Well, this is quite hard, especially when the producer has a strong financial drive. (Reg. network 2, 2013)

5.4 Boundary bridging

Despite the incompatible logics, the pressures to make biomethane injection work are still present, e.g. in the form of a 1 billion euro subsidy grant. We observed that various organizations related to biomethane and the gas sector try to bridge the gap. They do so in different ways and based on different assumptions. Intermediary 1 focuses mainly on moderating the interaction between producers and network operators while Intermediary 2 starts a new type of organization to mediate between producers and network operators.

Intermediary 1 describes what happened when the farmers and network operators first met each other.

> The first thing I did,[...] I will never forget. On the right were all the people of the network and energy companies and on the left were the farmers. I could have done my complete presentation naked[3]: they totally didn't see me. They thought, "well, those are the men that have to produce the biogas. Well, and if they don't produce, we don't have a business case. So we need to trust them that they will produce and do it right". And the farmers thought, […] "well, they need to pay us, otherwise we have a problem". […] It was not distrust, but they both have such a different focus, such a different core business. And with such a focus it is difficult to sympathize with somebody else's core business and focus. (Intermediary 1, 2012)

First thing to remedy the gap between the two parties is to literally translate the communication.

> We were hired to keep everybody together, […] because an energy man can speak the same language as a farmer, but they don't always understand each other. (Intermediary 1, 2012)

> In some cases, literally being the translator, really. The farmer talks to me and I translate it into energy language for the energy company, and the other way around. In most cases I was the person overseeing the letters and the communication of the energy company to the farmer. And during conversations, when the energy company worked with abbreviations like specs and Wobbe, then I would translate like "they are talking about this and that". (Intermediary 1, 2012)

Secondly, as described earlier, trust is a very important issue if the parties are to invest millions of euros. The same goes for good personal relationships across the different organizations. Successful cooperation may depend on experiencing a click with the other party.

Intermediary 1 also has a very clear vision of their role and the roles other organizations should take on. Each should stick to their trade and when cooperating these organizations should openly share information and make sure they constantly communicate.

> It is also a matter of every man sticking to his trade. A dairy farmer is not a gas guy. That's a very big difference there. And a gas guy is not a dairy farmer, you shouldn't have him hug a cow. It won't work out, so stick to your trade and involve the others. (Intermediary 1, 2012)

Intermediary 2 has a different, but also very clear, vision of what its role should be. From the start, they intended to be a bridge between the large-scale arrangements that characterize the energy sector on the one hand and small scale energy projects on the other. Moreover, they believe this organization should have a commercial basis, given that it operates between commercial parties.

> The core of our business plan is that we start a company which will fill the void between biomass and the big energy world; a link between the small scale and the large scale. And moreover, it needed to be a commercial firm. Energy is a commercial world, so you shouldn't put something like the State in between the commerce of biomass and the commerce of energy. (Intermediary 2, 2012)

Whereas Intermediary 1 aims to bring the various parties together and engages in translating to smooth the process, Intermediary 2 stands between the parties and jumps back and forth between them (not aiming at bringing them together physically). The boundary bridging consists of very

[3] Original quote: *in m'n blote kont*

down-to-earth things such as matching clothing style and car brand as well as knowing how the farmer makes his calculations. It is also about breaking the ice.

> What I enjoy very much, when I go to our customer, to our farmers, then I look like this [comfortable pullover]. When I go talk with the network operator, I get my grey suit out from the closet. (Intermediary 2, 2012)

> I have a space wagon, a Chrysler Voyager, and that is a big car, but luckily a bit indefinable for people, it is not a Mercedes. I have experienced a farmer passing by my car, looking, and saying "Chrysler". And I had seen his car and said "Mercedes". That was all we needed to say about this topic. Just those two words. Energy firms don't have this understanding of the agricultural sector. You need to be willing to connect these two worlds. You need to be able to turn the switch: now I am like this and now I am like that. (Intermediary 2, 2012)

Both Intermediary 1 and Intermediary 2 operate between different settings, one of the main characteristics of boundary bridging (Greenwood & Suddaby, 2006). Moreover, by presenting the network operators with the entrepreneur logic of the producers, they challenge them to reconsider their practices or at least provide arguments for these practices. They are indeed 'exposing actors to interinstitutional incompatibilities' (Greenwood & Suddaby, 2006: 38). In addition, they are very aware, and skillfully work the cultural and language barriers that exist between producers and network operators.

In addition to the boundary bridging discussed above, we also found boundary bridging activities *within* the network operators' organization. For two network operators it proved crucial to work closely with their technicians on the ground to make the implementation of biomethane injection successful. Whereas in one network operator the innovation department designed top-down instructions for their employees, another started by interviewing all kinds of people in the organization to gather a bottom-up view of all issues to be tackled. The first network operator eventually had to make that step too, to guarantee a successful incorporation of biomethane injection in the organization. Interestingly, while network operators are a very male-dominated technical environment, in both cases the 'change managers' were women.

> I really sat down next to people to see how things are being done. And ask: how do you do that, how does it work, why can't we do it this way? It was not sufficient to ask: hey, organize that for me. I went to get coca cola many times. I really visited these people, sat next to them. Until the point they would do what I asked of them. (Reg. network 1, 2013)

> I think it works when you emphasize the soft side, I think that is the key. If people don't feel like it, they won't do it; when people feel trust, they will do it. That's why I put a lot of attention to this soft side. I mean, anybody can find numbers. (Reg. network 1, 2013)

Moreover, the help of a senior expert is necessary. Someone who believes in the new development and will convey the story to the employees. Finally, the change manager helps people to see alternative options, to get out of the static thinking described in the previous section.

> People say: I don't have personnel for that, or I first need to free time for that. And then I say: well, then you hire people. That is something people often don't think about. (Reg. network 1, 2013)

> Getting everybody along and moving towards pragmatic thinking instead of just mentioning all the risks and trying to cover them all. But really consider, which risks do we really face, what is the probability of that effect and which risks do we then need to tackle? (Reg. network 2, 2013)

Once the change process is completed (from the network operators' perspective that is), you can fully rely on the employees.

> If they go, they do it right. Then everything will be safe and they will be dedicated and organize it themselves. Then you don't need to look after it anymore. (Reg. network 1, 2013)

In sum, we have observed different types of attempts at bringing the different sectors and logics together. However, real results emerge from skillful, bottom-up, and intensive boundary bridging. As Smith (2007) also emphasized, 'face-to-face engagement' is important for successful communication. These ingredients help to create space for communication and mutual understanding or even learning. People allow themselves to become aware of and explore new or existing alternatives (cf. Greenwood & Suddaby, 2006; Smith, 2007) and in this way facilitate change. This shows that people's logics have some latent flexibility and that new initiatives can gain their enthusiasm. Through boundary bridging ideas can be transposed from one setting to another (Greenwood & Suddaby, 2006). In contrast, just bringing people together and exchanging 'factual' information seems not to produce these results. In short, 'pragmatic system builders' may indeed be necessary to create 'stepping stones' between niche and regime (Smith, 2007) by addressing both the content-related and the cultural differences.

6. Conclusion

In this research we set out to explore the role of institutional logics in the development of biomethane injection into the Dutch gas grid. A renewable energy subsidy forced biomethane producers and network operators into association. We found that these two parties have very different and even divergent institutional logics. Whereas farmers are driven by the optimization of resource use and follow an entrepreneur logic; network operators primarily work towards safety and reliability, while their behavior is tied to procedures of the hierarchy logic.

This mismatch of logics is relevant for the study of transition processes. Firstly, it causes friction and complicates the necessary decision-making. Constructive cooperation is very difficult when the two parties differ in both the ends they pursue and the means they prefer. Differences in culture and decision-making style alone can severely undermine the willingness to cooperate. This research shows that we cannot ignore this social dimension of change processes. Furthermore, incompatibility of logics poses a serious obstacle to exploiting the (technical) potential of an innovation, due to the embeddedness and stability of logics in both thinking, acting, and physical infrastructure. Apart from partial 'truces', it may very well be that contradictory logics are never completely solved.

Secondly, in our case-study we observed that the mismatch in logics is being addressed by so-called boundary bridgers. They take up the essential task of connecting or translating between people from different logics, both between and within organizations. Boundary bridgers help to overcome people's intuitive resistance and encourage them to consider alternative options, thus 'matching logics'. This in turn opens up opportunities for (regulative) institutional change. Boundary bridging will only become more important as the scaling up of innovations often brings them into contact with previously unrelated actors or sectors.

For policy makers, this research shows that a subsidy mechanism is not enough to bring different actors together. It is wise to make sure different organizations' logics are to some extent compatible, before forcing them into association through a subsidy.

This case study shows that apart from well-known technical, economic and regulative dimensions of transition processes, substantive attention should be paid to the 'people dimension'. Transitions may require people to get in touch with other logics, change their mind and practices, and so open up new avenues for change. Boundary bridging may be another essential ingredient to bring about a transition. More research into their activities, skills, and challenges will increase practitioners' ability to create and exploit transition opportunities.

Acknowledgements

We are grateful for constructive comments by Dr. Neil Thompson, Dr. Eva Niesten, and Lea Fuenfschilling on earlier versions of this paper. We would like to thank the Netherlands Organisation for Scientific Research (NWO) for financial support.

References

AgentschapNL (2011), Overzicht beleidsvraagstukken groen gas. Versnellerteam groen gas. Werkdocument december 2011). Available at: http://groengas.nl/wp-content/uploads/2011/09/beleidsvraagstukken-groen-gas-dec2011.pdf. Last accessed: September 23, 2013.

AgentschapNL (2012), Jaarbericht 2011, SDE+, SDE en MEP. Available at http://www.agentschapnl.nl/sites/default/files/Jaarbericht%202011%20SDE+%20SDE%20en%20MEP%20%5Bkleurenversie%5D.pdf. Last accessed: September 23, 2013.

Bacharach, S. B., Bamberger, P., & Sonnenstuhl, W. J. (1996). The organizational transformation process: The micropolitics of dissonance reduction and the alignment of logics of action. *Administrative Science Quarterly*, *41*(3), 477–506.

Boerderij Vandaag (2009a), Leveren op gasnet geeft veel rendement, maar is lastig, September 23, p. 4.

Boerderij Vandaag (2009b), Beursnieuws deel 2. Groen gas, November 13, p. 101.

Bosman, R., Loorbach, D., Frantzeskaki, N. and Pistorius, T. (submitted) Discursive Regime Dynamics in the Dutch Energy Transition. *Journal of Environmental Innovation and Societal Transitions.*

Bryman, A. (2008). *Social research methods*. Oxford; New York: Oxford University Press.

Diaz, M., Darnhofer, I., Darrot, C., & Beuret, J.-E. (2013). Green tides in Brittany: What can we learn about niche-regime interactions? *Environmental Innovation and Societal Transitions*, *8*, 62–75.

Eerste Kamer der Staten-Generaal (2012), Verbinding verbroken? Onderzoek naar de parlementaire besluitvorming over de privatisering en verzelfstandiging van overheidsdiensten. Deelrapport. Available at: http://www.eerstekamer.nl/behandeling/20121030/deelrapport_van_de_parlementaire/f=/vj41l7chfdzq.pdf. Last accessed: September 23, 2013.

Elzen, B., van Mierlo, B., & Leeuwis, C. (2012a). Anchoring of innovations: Assessing Dutch efforts to harvest energy from glasshouses. *Environmental Innovation and Societal Transitions*, *5*, 1–18.

Elzen, B., Barbier, M., & Cerf, M., Grin, J. (2012b). Stimulating transitions towards sustainable farming systems. In: Darnhofer, L., Gibbon, D., Dedieu, B. (Eds.). *Farming systems research into the 21st century: The new dynamic*. Springer, Dordrecht, pp. 431-455.

Friedland, R., & Alford, R. R. (1991). Bringing society back in: Symbols, practices, and institutional contradictions. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 232–263). Chicago: University of Chicago Press.

Fuenfschilling, L., & B. Truffer (in press). The structuration of socio-technical regimes. Conceptual foundations from institutional theory. *Research Policy*.

Gas Transport Services (2013), Rapport voorzieningszekerheid gas 2013. Available at: http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2013/07/18/rapport-voorzieningszekerheid-gas-2013.html. Last accessed: September 23, 2013.

Gasunie (2006), Biogas and others in natural gas operations (BONGO). A project under development. *23rd World Gas Conference, Amsterdam.* Available at *www.igu.org/html/wgc2006/pdf/paper/add11732.pdf*. Last accessed: September 23, 2013.

Geels FW. 2004. From sectoral systems of innovation to socio-technical systems: insights about dynamics and change from sociology and institutional theory. Research Policy 33(6/7): 897–920.

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. *Research Policy*, *31*(8-9), 1257–1274.

Geels, F. W. (2005a). Co-evolution of technology and society: The transition in water supply and personal hygiene in the Netherlands (1850-1930) - A case study in multi-level perspective. *Technology in Society*, *27*(3), 363–397.

Geels, F. W. (2005b). The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860-1930). *Technology Analysis and Strategic Management*, *17*(4), 445–476.

Geels, F. W. (2006a). Major system change through stepwise reconfiguration: A multi-level analysis of the transformation of American factory production (1850-1930). *Technology in Society*, *28*(4), 445–476.

Geels, F. W. (2006b). Co-evolutionary and multi-level dynamics in transitions: The transformation of aviation systems and the shift from propeller to turbojet (1930-1970). *Technovation*, *26*(9), 999–1016.

Geels, F. W. (2007). Analysing the breakthrough of rock "n" roll (1930-1970) Multi-regime interaction and reconfiguration in the multi-level perspective. *Technological Forecasting and Social Change*, *74*(8), 1411–1431.

Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, *1*(1), 24–40.

Geels, F. W., & Kemp, R. (2007). Dynamics in socio-technical systems: Typology of change processes and contrasting case studies. *Technology in Society*, *29*(4), 441–455.

Government 1 (2012), interview conducted in person on October 18, 2012.

Government 2 (2012), interview conducted in person on October 18, 2012.

Greenwood, R., & Suddaby, R. (2006). Institutional entrepreneurship in mature fields: The big five accounting firms. *Academy of Management Journal*, *49*(1), 27–48.

Intermediary 1 (2012), interview conducted in person on October 5, 2012.

Intermediary 2 (2012), interview conducted in person on October 16, 2012.

Intermediary 3 (2012), interview conducted in person on September 17, 2012.

Intermediary 4 (2012), interview conducted in person on November 30, 2012.

KEMA (2010), Groen gas invoeding in het gasnet. Scenario ontwikkeling. Available at: http://www.agentschapnl.nl/sites/default/files/bijlagen/Groen%20Gas%20Invoeding%20in%20het%20Gasnet%20-%20Scenario%20Ontwikkeling.pdf. Last accessed: September 23, 2013.

Kivisaari, S., Saari, E., Lehto, J., Kokkinen, L., & Saranummi, N. (2013). System innovations in the making: hybrid actors and the challenge of up-scaling. *Technology Analysis & Strategic Management*, *25*(2), 187–201.

Leeuwarder Courant (2007), Gasunie zet rem op groen gas om risico's, November 21, no page number.

Markard, J. (2011). Transformation of infrastructures: Sector characteristics and implications for fundamental change. *Journal of Infrastructure Systems*, *17*(3), 107–117.

Ministry of Economic Affairs (2012). Langetermijnbeleid over de gassamenstelling. March 12. Available at: http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2012/03/13/kamerbrief-over-het-langetermijnbeleid-over-de-gassamenstelling.html. Last accessed: September 23, 2013.

National network 1 (2012), interview conducted in person on November 22, 2012.

National network 2 (2012), interview conducted in person on November 19, 2012.

National network 3 (2012), interview conducted in person on November 19, 2012.

NMa (2009), Aanvullende voorwaarden RNB Groen Gas Invoeders. Available at: https://www.enexis.nl/Documents/algemene-voorwaarden/enexis-voorlopige-aanvullende-voorwaarden-rnb-groen-gas-invoeders.pdf. Last accessed: September 23, 2013.

Platform Nieuw Gas (2007), Vol gas vooruit. Available at: http://www.agentschapnl.nl/sites/default/files/bijlagen/Vol%20Gas%20Vooruit%20-%20De%20rol%20van%20Groen%20Gas%20in%20de%20Nederlandse%20energiehuishouding_0.pdf. Last accessed: September 23, 2013.

Platform Nieuw Gas (2009), Van biogas naar groen gas. Opwaarderingstechnieken en leveranciers. Available at: http://www.agentschapnl.nl/sites/default/files/bijlagen/Van%20Biogas%20naar%20Groen%20Gas%20-%20Opwaarderingstechnieken%20en%20leveranciers.pdf. Last accessed: September 23, 2013.

Producer 1 (2012), interview conducted in person on November 19, 2012.

Raven, R P J M. (2006). Towards alternative trajectories? Reconfigurations in the Dutch electricity regime. *Research Policy*, *35*(4), 581–595.

Raven, R P J M, & Verbong, G. P. J. (2009). Boundary crossing innovations: Case studies from the energy domain. *Technology in Society*, *31*(1), 85–93.

Raven, R. (2007). Co-evolution of waste and electricity regimes: Multi-regime dynamics in the Netherlands (1969-2003). *Energy Policy*, *35*(4), 2197–2208.

Raven, R.P.J.M. (2004). Implementation of manure digestion and co-combustion in the Dutch electricity regime: A multi-level analysis of market implementation in the Netherlands. *Energy Policy*, *32*(1), 29–39.

Reay, T., & Hinings, C. R. (2009). Managing the rivalry of competing institutional logics. *Organization Studies*, *30*(6), 629–652.

Regional network 1 (2013), interview conducted by phone on January 9, 2013.

Regional network 2 (2013), interview conducted by phone on March 6, 2013.

Regional network 3 (2012), interview conducted in person on November 28, 2012.

Regional network 4 (2012), interview conducted in person on November 28, 2012.

Rip, A., Kemp, R., 1998. Technological change. In: Rayner, S., Malone, E.L. (Eds), *Human Choice and Climate Change*, Vol. 2. Battelle Press, Columbus, OH, pp. 327–399.

Schwarz, M., & Thompson, M. (1990). *Divided we stand: redefining politics, technology, and social choice*. Philadelphia: University of Pennsylvania Press.

Schippers, J.L., & G.P.J. Verbong (2000), De revolutie van Slochteren. In Schot, J.W., Lintsen, H.W., Rip, A. & de la Bruhèze, A. (Eds.). *Delfstoffen, energie, chemie*. Zutphen: Walburg Pers.

Scott, W.R. (1987). The adolescence of institutional theory. *Administrative Science Quarterly* 32 (4), 493-511.

Scott, W. R. (1995). *Institutions and organizations*. Thousand Oaks: SAGE.

Seo, M.-G., & Creed, W. E. D. (2002). Institutional contradictions, praxis, and institutional change: A dialectical perspective. *Academy of Management Review*, *27*(2), 222–247.

Sine, W. D., & David, R. J. (2003). Environmental jolts, institutional change, and the creation of entrepreneurial opportunity in the US electric power industry. *Research Policy*, *32*(2 SPEC.), 185–207.

Smink, M. M., Hekkert, M. P., & Negro, S. O. (in press). Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. *Business Strategy and the Environment*.

Smith, A. (2007). Translating sustainabilities between green niches and socio-technical regimes. *Technology Analysis and Strategic Management*, *19*(4), 427–450.

Thompson, N.A. (2013). Institutional logics and entrepreneurship. Struggling for legitimacy in the emerging bio-energy field. PhD thesis. Utrecht University.

Thornton, P. H., & Ocasio, W. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. *American Journal of Sociology*, *105*(3), 801–843.

Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), *The Sage handbook of organizational institutionalism* (pp. 99–129).

Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective. A new approach to culture, structure, and process*. Oxford University Press, UK.

Van Den Bergh, J. C. J. M., Truffer, B., & Kallis, G. (2011). Environmental innovation and societal transitions: Introduction and overview. *Environmental Innovation and Societal Transitions*, *1*(1), 1–23.

Van Der Vooren, A. & Alkemade, F. (2012). Managing the diffusion of low emission vehicles. *IEEE Transactions on Engineering Management*, 59(4), 728-740.

Van Der Vooren, A., Alkemade, F., & Hekkert, M.P. (2012), Effective public resource allocation to escape lock-in: The case of infrastructure-dependent vehicle technologies. *Environmental Innovation and Societal Transitions*, 2, 98-117.

Verbong, G., & Geels, F. (2007). The ongoing energy transition: Lessons from a socio-technical, multi-level analysis of the Dutch electricity system (1960–2004). *Energy Policy*, *35*(2), 1025–1037.

Wirth, S., Markard, J., Truffer, B., & Rohracher, H. (2013). Informal institutions matter: Professional culture and the development of biogas technology. *Environmental Innovation and Societal Transitions*, *8*, 20–41.

Yin, R. K. (2003). *Case Study Research: Design and Methods.* Thousand Oaks, CA: Sage Publications.