How do network companies seek legitimacy for public value trade offs? The case of injecting biogas

Steenhuisen, Bauke; de Bruijne, Mark

Publication date
2016

Document Version
Final published version

Published in
Competition and Regulation in Network Industries

Citation (APA)
Steenhuisen, B., & de Bruijne, M. (2016). How do network companies seek legitimacy for public value trade offs? The case of injecting biogas. *Competition and Regulation in Network Industries*, *17*(2), 181-201.

HOW DO NETWORK COMPANIES SEEK LEGITIMACY FOR PUBLIC VALUE TRADE OFFS?

THE CASE OF INJECTING BIOGAS

Bauke Steenhuisen and Mark de Bruijne*

Abstract

Network companies fulfill a critical role in the energy transition. This article provides an empirical study of this role of a Dutch national gas network company connecting a biogas producer. This project requires choices about many intertwined technical and institutional variables. Choices involve multiple, potentially competing public values like safety, cost-efficiency, sustainability and non-discrimination. A formal governance structure provides generic guidelines for network companies about how to act in the public interest, but we argue that unclarity remains on how to trade-off public values. In these instances, a network company seeks legitimacy for the choices that are made. Via an in-depth case study on the injection of biogas we explored how a network company interpreted its public role and how public value trade-offs were made. We conclude that legitimacy is sought and found in a mixture of formal and informal ways both inside the network company as well as outside. Although the governance regime allowed the network company to take a leading role in the innovative project, it failed as a starting point to claim legitimacy. These findings provide food for thought on how to institutionally embed the role of network companies in the energy transition.

Keywords: governance; network companies; biogas; public values; legitimacy

JEL-codes: O32, O380, L980, L950, Q420, Q550, Q480

* Multi-Actor Systems Department, Faculty of Technology, Policy and Management, Delft University of Technology, P.O. Box 5015, 2600 GA, Delft, the Netherlands, email: B.M.Steenhuisen@tudelft.nl.

1. INTRODUCTION

Biogas is generally considered a sustainable alternative to natural gas. Its use may also accommodate other sustainable energy sources because of its flexibility in use. For this quality, biogas has been referred to as the 'joker of the energy mix' (Böttcher *et al.* 2012). And so, biogas can be considered an important product that might facilitate the transition to a more sustainable energy supply system, although the nature of its contribution to sustainability remains disputed (e.g. Boulamanti *et al.* 2013).

In the Netherlands biogas is considered a valuable contribution to the energy transition. Its role is envisioned and broadly accepted in national policy designs, albeit in a rather generic and imprecise way (Ministry of Economic Affairs, Agriculture & Innovation 2016). Exploring, realizing and optimizing the potential of biogas requires a collective effort of many actors in the entire value chain in a variety of sectors, e.g. farming, waste processing, energy and transport. Main actors are biogas producers, providers of biomass, end users of gas, a variety of governmental bodies and gas network companies. The role of network companies in considering whether and how to inject biogas in the existing networks has our special attention in this paper. More specifically: how is legitimation sought by network companies when their responsibility and task can be contested (cf. Steenhuisen and De Bruijne, 2015). What role should network companies have in the development of biogas? How big should this role be and how do network companies make decisions when choices among conflicting public values need to be made?

What happens when a biogas producer requests permission to inject biogas in the existing network of a network company? Such a request may raise difficult questions. Should a network company treat the request as any other connection request because it is not allowed to discriminate? Or should the network company favor and support biogas because of the apparent sustainable character and inherent innovative nature of such a project? How should the network company weigh existing interests against new interests, and deal with new risks? How conservative should the network company be with respect to safety risks? Indeed, biogas may introduce new safety risks, as gas quality may differ from natural gas. For example, bacteria in biogas may cause health risks for end users. Manifestations of these risks may constrain the development of biogas and require scarce resources such as research and investments. To what extent should network companies be flexible towards experimenting with new safety standards? What if the axiom 'not to compromise safety at any time' does not have one uncontested but many contestable operationalizations among experts? What if 'safe' biogas is a contested concept? How strict should network companies minimize costs when injecting biogas would require significant investments in research, innovation and precautionary measures in the network? When should biogas be facilitated at the expense of other promising projects or technologies?

This paper addresses these questions, dilemmas and concerns based on an in-depth case study research. In the case, a network company connects a first biogas producer

to its existing high pressure gas transport network, which was originally designed for natural gas. We first describe a framework to study the topic and then explain our research method. Next, we describe, analyze and discuss the case. We conclude with a discussion and a reflection on the role of network companies in the energy transition.

2. THEORY: HOW DO NETWORK COMPANIES LEGITIMIZE PUBLIC VALUE TRADE OFFS?

We distinguish three drivers in literature that explain how network companies cope with dilemmas of competing public values, see Table 1. The decision-making behavior we want to understand may be intentional or non-intentional (March 1994, Steenhuisen 2009). Furthermore, intentional behavior may be driven by either private interests or the public interest (Jacobs 1992, Reynaers 2014).

Table 1. Drivers for behaviour

Drivers		
Intentional	Private interest	'Because we want to'
	Public interest	'Because we ought to'
Non-intentional		'Just because'

If an actor is driven by public interest, we assume the actor has or seeks a rationale to claim why its behavior serves the public interest. Next, we distinguish between three possible sources of legitimacy: following formal rules, following shared beliefs and following consent via decision-making (Beetham 1991, Sanders 2013), see Table 2.

Table 2. Three sources of legitimacy

Sources		
Rules	Legitimacy follows formal governance	'Because it is the law.'
Shared beliefs	Legitimacy follows norms and values	'Because it is considered fair.'
Consent	Legitimacy follows decision-making	'Because we agreed to do so.'

Classic public administration literature claims that these explanations of behavior (Table 1 and Table 2) can be observed in a mesmerizing variety of combinations (cf. Jensen 2001, Crozier 1964, Lipsky 1980). Private interests often align with the public interest. Shared beliefs may become codified in formal rules. Formal rules require interpretation, based on either shared beliefs or consent. Behavior is often partly intentional and partly non-intentional. Many combinations are indeed possible.

Seeking consent via a decision-making process which results in legitimacy can further be unpacked analytically. If a decision-making process leads to consent, this consent may have been reached in either a content-based or a process-based way (De

Bruijn *et al.* 2003). A purely content-based trade off would typically take place at one moment in time in one fixed arena and requires a well-informed, rationalized choice between clearly identified and specified alternatives. This type of decision-making tends to be associated with a hierarchical setting, or a clearly articulated way of working, i.e. a positivistic and legalistic setting. A purely process-based trade off takes place over a period of time with many moments for decision-making resulting in decisions and also non-decisions. The arenas may change. Circumstances may change. The process is finished when there is consent. This type of decision-making tends to be associated with more participatory approaches, stakeholder engagement and 'networked' contexts. Both of these ideal types have their built-in risks. A content-based process of trading off in decision-making and seeking consent significantly reduces its chances of success when the leading actor is ill-informed or fails to generate sufficient support within the network. A multi-actor process of seeking consent on a trade off can become less transparent, less tenable outside the confines of the process and those involved and more vulnerable to strategic behavior.

In this study, our interest is not just in any trade off. Our object of investigation concerns public value trade offs. Public values have a special nature. Norms never fully encompass the underlying public values they seek to represent. In other words, public values are structurally ambiguous, relative, subjective and dynamic (De Bruijn and Dicke 2006), even if the law specifies them or economic models seek to monetize them. This structural incompleteness of norms for public values has been a breeding ground for scholars criticizing the market-driven reforms in utility sectors generally supporting the long-standing axiom in principal-agent literature that agents may shirk their responsibility any chance they get (cf. Reynaers 2014). Consequently, competing definitions and the reconsidering of definitions are anathema to public values. A fluid and constant process of defining and redefining the public interest may occur at many levels of society either subsequently or simultaneously: in the public debate, at the political level, at the policy level, at the operational level (Veeneman *et al.* 2009).

A second, even more puzzling feature of public values is their incommensurability – safety first – whereas they in fact always require trade offs (cf. Thacher 2001, Chang 1997, Beck Jorgensen 2006, Viscusi 1992). This puzzling and paradoxical feature seems to resonate in practice. Across infrastructure sectors, i.e. national rail transport and regional energy distribution, we observed that the formal governance structure consists of many mono-value oriented rules and norms. Consequently, operational processes hardly receive guidance on dealing with multi-value trade offs (Steenhuisen and Van Eeten 2013). This observation seems to resonate in literature on public policy and decision-making (Bozeman 2007, Thacher and Rein 2004, Tetlock 2000).

This case on injecting biogas may advance our understanding in this matter further, as the case is situated in a sector and concerns a network company we have not studied yet (cf. Steenhuisen, 2009; Steenhuisen and Van Eeten, 2013). Next, the case is not about the general status quo in common operational processes – the main

focus of our previous inquiry – but about the introduction of new, innovative operational processes, i.e. injecting and transporting biogas. In the case, a relatively new and underspecified public value, sustainability, enters the stage. Stimulating the innovative development of biogas may enhance the sustainability of our energy system but also creates conflicts among other 'indigenous' public values. Based on this succinct literature review, we would expect conflicts between public values to be an appropriate unit of analysis to understand how a network company seeks legitimacy within a given governance context.

3. METHOD

In a real world setting, we seek to understand how a network company, possibly in interaction with its stakeholders and within a formal governance structure which identifies and dictates multiple roles and responsibilities for specific public values, interprets its ultimate role and responsibility in connecting a biogas producer. The study aims to provide insight in how the network company copes with potential public value trade offs and dilemmas inherent in complex large-scale developments such as the energy transition and how this affects formal and informal relations between network companies with key stakeholders. For this research agenda we need to gain an information position that allows us to investigate a decision-making process about an innovation project and synthesize how certain trade-offs between public values came about in this project. The research question and knowledge about the issue (i.e. the process of decision-making and how legitimacy was sought by the network company) demands a specific research method to elicit data which is not normally provided in research on green gas innovations. Since this is a data-demanding ambition, we focused on a well-defined case with clear dilemmas and a relatively small number of key decision-makers and stakeholders to elicit this data. We selected the injection of biogas case in the transmission network as a case.

Our focus lies on how the network company identifies and legitimizes its role and responsibilities. Although informal aspects potentially also play a role here, they are less easily identified in such a case and therefore only taken into account when research data provided overwhelming support of their existence and importance within the case.

We include four substantial public values in our analysis. Besides the public interest of biogas for its contribution to sustainability, we include three dominant and broadly accepted public values that have formally been assigned to network companies in the Dutch Gas Law (1965, 2000): safety, cost efficiency and non-discrimination. Furthermore we use a broad notion of public value, not strictly as specified and operationalized by law but as articulated and experienced by the respondents in this research (cf. Steenhuisen and Van Eeten 2013).

We used three data sources. First, numerous reports and formal documents regarding biogas and biogas injection in the Netherlands (cf. Netbeheer Nederland

2011, 2013, Arcadis, Kema and Kiwa 2011, Ministry of Economic Affairs, Agriculture & Innovation 2011, 2016, Sanders 2013). Second, interviews and group discussions with various stakeholders in the Dutch gas industry, which included gas transmission system owners, a gas trading company (GasTerra), a gas industry consultant and a biogas producer. In total, we held eight semi-structured interviews. In each interview we tried to establish a basis of trust (Weiss 1995) and asked respondents to reconstruct from their perspective the decision-making process with regard to the realisation of the biogas injection project. On a handful of occasions, we tested our intermediate findings in group discussions with respondents and experts.

The respondents were selected via the snowballing technique. We did not select all respondents in advance. We started with two key respondents and as our understanding of the case grew, new respondents were identified and approached with interview requests. We followed this snowball sampling technique, as the case unfolded and new questions or gaps in our understanding of the decision making process arose.

We realize that our final synthesis of what happened is essentially a messy product of intersubjectivity, but we do not mind for two reasons. First, we believe subjectivity disqualifies neither our data nor our interpretation, as long as we are transparent about this and about underlying arguments in our reporting. The historical analysis of a decision making process is no exact science. Second, we believe that what we aim to understand in this paper actually *is* a mess which is perhaps in need of enlightenment, but may essentially remain a mess, just as Law claims (2004). After all, we are interested in public value trade offs within a project, not in the meticulous chronological description of decision making in the project itself. Our synthesis, therefore, does not aim to be a factual reconstruction of the process per se. Instead, the research focuses on the reflection on a coherent series of impressions about how decision making in public value trade offs took place. We focused particularly on safety as this value seemed to elicit the most clear and relevant examples from respondents. We will return to the operationalization of the public value safety in the next section.

To ensure the quality of our synthesis, we followed two rules. First, we merged the accounts of all respondents together into one coherent 'mess' that would allow us to 'understand' the decision making process at a systemic level ('verstehen'). We tried to sort out why accounts seemed inconsistent, if they did. If we could not sort them out, we report it as a controversy. Second, we made sure that each element in our final account of what happened is backed up by at least more than one stakeholder. We only used first-hand experiences of people who participated in the project. We did not rely on what respondents said about others.

4. BACKGROUND ON THE CASE

The network company Gasunie Transport Services (GTS) is the Dutch gas transport system operator (TSO). GTS is a state-owned monopolist, the only TSO for gas

transport in the Netherlands. In 2008, the public waste processing company ROVA (in Dutch: Regionaal Orgaan Verwijdering Afvalstoffen), based in Zwolle and owned by twenty shareholding municipalities, enquired about the possibility to feed biogas directly into GTS's high pressure gas transmission network.

To sketch the size of the project, ROVA built a new waste processing plant to ferment 45,000 tons of organic waste per year, producing compost and biogas. The initial ambition, unique in Europe at that time, was to produce 250 m^3 of biogas per hour and feed most of it into the GTS 40 bar high pressure gas transmission network (Gasunie 2009). Before the gas can be fed into the network, it requires preprocessing. This includes among others the extraction of CO_2 and H_2S, the elimination of bacteria by drying, filtration and sterilization and the odorization of gas to give it a so-called 'gas smell'.

4.1. BRIEF HISTORY OF EVENTS

In 2008, ROVA approached GTS to ask whether the network company was willing to connect a projected biogas production facility to its high pressure transmission network. In addition, ROVA mobilized some political pressure. The network company showed willingness to cooperate. The board of the gas transmission network company offered the biogas producer a contact person with direct links to the board level to work out a partnership agreement.

In January 2009, a partnership agreement was signed. Other actors joined the process, among which were Enexis (a distribution system operator), Gasunie (the holding-company of GTS), HVC (a waste processing company), the Province of Overijssel and several other partners. KEMA, currently known as DNV GL, also joined the process as a technical consultant.

During the entire process, the network company, the technical consultant and the biogas producer regularly met to discuss the issues of preprocessing and injecting biogas. Parallel to that, the network company and the technical consultant were involved in an intensive process to discuss safety issues *inside* the network company and lobby for internal support and a decision before communicating definitive specifications to the biogas producer.

The network company decided to frame the connection request as a sustainability pilot project. This focus on learning interested many other actors. Several were even prepared to invest in this pilot, among others, Gasunie and Enexis. Another advantage was that the pilot project had a clear temporary nature with a set start and finish date. This condition also helped to obtain support for the project inside the network company. Afterwards, a grid connection agreement (GCA) was signed.

The biogas production facility became operational in July 2010. However, it took an additional year to stabilize the performance of the facility in accordance with the agreed upon specifications that had been negotiated with the network operator.

4.2. THE FORMAL GOVERNANCE STRUCTURE

The formal governance structure for injecting biogas in the network of GTS includes multiple aspects. The Gas law (1965, 2000) specifies a number of tasks for network companies in the public interest, among which are the balancing of the network, managing gas quality, connecting regional and international networks and ensuring sufficient transport capacity. Some public values are mentioned in particular. The gas network company is legally entrusted to ensure the safety, reliability, sustainability and cost efficiency of the entire transport system, as further specified by the Minister, and to do so in a transparent, non-discriminatory and fair way, overseen by a regulatory agency.

In this case, we focus on safety, and in particular the specifications for gas quality and the legal responsibility to meet them. The Gas law (1965, 2000) specifies the Wobbe index among a handful of other elements as gas quality norms in the Netherlands. These norms provide sufficient guidelines for natural gas producers. However, biogas potentially contains unknown varieties of trace elements that require additional specifications. The source of biogas is of vital importance. In the ROVA case, biogas was the product of (human) waste recycling and not produced from manure or agricultural waste. More elaborate specifications for biogas were formalized in October 2014 via ministerial rules. In the case study, which was set before this date, however, the network company had to identify and articulate quality specifications without this formalized framework.

In the Netherlands, it is the producer's responsibility to meet the quality specifications set by the TSO. By law, the producer is liable for any quality issues, not the network company. But when the gas exiting the network does not meet the required specifications, it can be hard for the network company to prove whose gas is actually causing the problem. The network company thus monitors whether producers meet the specifications when their gas enters the network. Specific responsibilities of producers are formalized in bilateral grid connection agreements between the network company and producers, including references to a variety of ISO standards for gas quality monitoring.

4.3. THREE POTENTIAL TRADE OFFS

From 2008 to 2011, a decision-making process took place in which the network company dealt with, among others, four potentially competing public values: sustainability, safety, cost-efficiency and non-discrimination. We focus on the potential trade offs between safety and these other three public values. We want to understand how the network company sought a legitimate way to maneuver in the context of these potential trade offs and why this process ended where it ended. Based upon our interviews, we consider the following three trade offs most relevant to the network company.

4.3.1. Sustainable versus safe

Before the project started, the network company was confronted with the question whether to inject biogas at all given possible additional safety risks. With 'safety first' as a leading principle, possible trade offs between safety and sustainability would theoretically never raise any doubt. In practice, however, 'safety first' does not always have one clear operationalization. In the case at hand, for example, several business-as-usual safety procedures could not be simply copy-pasted from a natural gas to a biogas context. New safety risks emerged as the network operator acquired more knowledge of the biogas project and this particular type of biogas connection. These risks needed to be studied and new measures needed to be thought out, experimented with, tested and accepted. Could the injection process be designed in a way that it would be safe enough? Ensuring and convincing the network operator that risks were 'controlled' also required research and knowledge to be produced by other project partners. The network operator as well as other project partners invested during the project in knowledge with regard to various safety dimensions of biogas. The network company eventually concluded: yes, biogas can be injected, but under specific conditions set by the abovementioned research findings. So, the biogas producer could inject its biogas in the network, but only under strict specifications and agreeing that the connection would be treated as a pilot project. If the pilot project would prove unsafe, in the eyes of the network company, the connection would not be allowed at all or only be allowed temporary for the duration of the agreement. This is, in short, how the network company in this project reconciled the interdependency between the 'safety first' principle and the chance to explore more sustainable energy applications.

4.3.2. Costs versus safety

A second issue was how to ensure safety for this experimental project in an affordable and cost-efficient way. Complying with all the specifications eventually made the entire project much more costly than anticipated and economically unaffordable for the biogas producer. The trade off had two sides. First, the basic outcome was that the network company kept prioritizing safety and did not deal with the extra costs this might cause. The biogas producer paid most costs. Second, later in the process, the network company helped to actively mitigate the costs for the biogas producer in several ways. In doing so, the project remained affordable. Safety remained non-negotiable.

4.3.3. Non-discrimination versus safety

By law, the TSO is required to set fair, transparent and non-discriminatory rules and conditions. A third issue was how not to discriminate between ROVA, other biogas producers and regular gas producers, despite the fact that specific safety risks require

a special treatment. This may seem straightforward when the case clearly talks of a pilot project. However, although the ROVA connection was deliberately framed as a pilot project, the initial assumption was that this biogas connection could be the first of many and had to be treated as such. The network company envisioned to follow an approach that would suffice in the eyes of the regulator who vigorously upheld the non-discrimination clause in various other dossiers as well. In the end, as the possibility of 'safety first' and rigorous non-discrimination happened to exclude each other, the formal governance structure did not provide the network company sufficient guidance to create a blueprint on what to do if these values remained in conflict and could not be resolved. Particularly the obligation not to discriminate, given the different circumstances, required discussion within the network operator and invoked contestation.

5. OUR SYNTHESIS OF WHAT HAPPENED

In the case under study, safety has never been explicitly sacrificed at the expense of other public values. One could, thus, with a birds' eye perspective claim that the network operator acted conservative and, perhaps, risk-averse. We, however, would like to scrutinize this first impression and deepen our analysis. In this section, we provide our synthesis of how a network company seeks legitimacy in the face of potential public value trade offs.

5.1. SAFETY VERSUS SUSTAINABILITY

An initial choice was already made at the network company *before* ROVA applied for a connection. The board had theoretically already considered the pros and cons of injecting biogas in the network and considered it a good idea to gain some experience with biogas as a network company. Important motives for the board were the presumed societal importance of biogas in light of the energy transition, the green image of gas in general, and Gasunie in particular. Moreover, it was considered threatening that, up to the ROVA-request, the injection of biogas via regional network companies had nothing to do with GTS, while in the long-term, its effects could influence GTS operations. Serving the direct public interest was embedded within these motives. The formal governance structure was no driver for this decision but a constraint. The decision to seriously explore the possibilities of injecting biogas was driven by consent and shared beliefs.

At that time, the board was aware that some professionals working for the network company did not share, or even rejected, the ambition to experiment with biogas. 'The volume was extremely low, the risk extremely high,' says an insider involved recalling some critical opinions of professionals working for the network company at that time. 'Why do you think gas pipes are protected with a coating? It is to keep bacteria out.

Why, then, would we deliberately inject bacteria *in* our pipes?' The perceived value of injecting biogas was even plainly considered 'nonsense' by some working for the network company at that time. Biogas clashed head-on with many values the network company and its professionals had stood for, for decades.

Yet, the ambition at the board level was to sign a partnership agreement with ROVA. This milestone, however, was only the start of a delicate, incremental process aimed at gaining full support for the experiment inside the network company. Inside the network company, the project still had to be 'sold', as some respondents depicted. The biogas producer could not directly start after signing the agreement, but ran up against many issues that still needed to be sorted out by various units and departments within the network company all dealing with particular aspects of the biogas connection. The network company indicated it could not yet oversee the entire situation. Indeed, the formal governance structure did not provide applicable specifications at the time. Not all risks were known. This needed sorting out first.

Initiated by the board level, a small project team was formed inside the network company. This team collaborated with the external technical consultant. The main strategy of this project team was to patiently allow everybody to investigate and articulate the issues surrounding biogas injection and voice their concerns with respect to this first biogas connection. Significant worries and unknowns were raised and subsequently studied. Measures were thought out to deal with risks that were deemed significant. When worries proved persistent, even if they were considered hardly significant on a company-wide basis, the project team would go at least 'an extra mile', to suggest, for example, extra measures or conduct more research.

Apparently, the overall resolution of the tension between safety and sustainability took place neither at one moment in time nor in a very integrated way. Instead, the decisions made resulted from a lengthy, fragmented process constrained by existing legal rules, guided by specifications in-the-making, driven by shared beliefs of professionals in the company and aiming for consent.

This subtle, meticulous, step-by-step, redundancy-oriented approach took away much resistance inside the network company, but did not lead to complete consensus among professionals on whether biogas, in this case, might or might not be safe enough, i.e. as safe as natural gas.

What made the professionals, in the end, change their minds, i.e. reduce their initial reluctance towards biogas? The acceptance of this biogas project was a rather subtle process. A professional who was initially critical about the biogas experiment but changed his mind along the way, described his considerations as follows: 'You search for your breaking point.' He refers to the virtually exact point between unsafe and safe enough. He continued: 'If you cannot sleep peacefully anymore, but nevertheless you claim a practice to be legally in order. Then you are wrong.' The formally specified safety requirements at times have not proven specific enough to decide on the injection of biogas. In these instances, informal, professional judgment, as depicted by this professional, has been the way forward. We continued asking how

he came to agree that this biogas connection can be considered safe enough. 'We did it together,' he finally answered. In his account, the decision to consider the biogas connection to be legitimate eventually emerged in relatively informal conversations among few experts inside the network company in cooperation with DNV GL, the technical consultant.

In the account of the project team, two strategic choices proved decisive in finding consent for the biogas connection in the project. First strategic choice was to consider biogas from the outset as equal to natural gas. In other words to assume uniformity in what should be transported through its network: 'gas is gas'. If the biogas producer could fulfill the same specifications as producers of natural gas did, it would be discrimination to refuse the biogas producer. This was a deliberate choice that was made at the outset, more or less determined by the network itself, which cannot operate in different 'modes' and backed up by a strong regulatory framework. Second strategic choice was that all the risks, even unforeseen ones, could be dealt with, since the project merely had pilot status. If the project proved unsafe, the network company could unilaterally decide to shut down the connection, temporarily but also permanently if necessary.

Our observation is that the trade off process exclusively concerned professionals working for the network company and the technical consultancy. The biogas producer, end users and other stakeholders did not appear a relevant factor in the process, although in particular the biogas producer and end users did eventually bear significant consequences and risks. If the pilot project would not prove safe enough, when risks would manifest themselves, the end user would learn only afterwards that their network company was doing 'an experiment'. If the network company would stop the connection after the pilot, the biogas producer would face high sunk costs. In other words, the balancing of safety versus other interests, such as sustainability or the business case of the applicant, took place *inside* the network company, a fact that could easily have influenced the support for these trade-offs in a negative sense.

Bottom line is that the network company decided to discreetly explore whether realizing this connection could be considered safe enough in order to allow for the added value of biogas. In this process, consent among professionals inside the network company was the main benchmark to eventually follow up on the board's initial ambition.

5.2. COSTS VERSUS SAFETY

The biogas producer gets connected but under conditions. Specifying these conditions touches upon a second potential trade off: costs versus safety. The more demands and measures for safety, the more direct costs. From the perspective of the network company, as can be expected, the legitimacy of safety measures was not a puzzle or even considered part of a trade off at all. Accordingly, the network company

incrementally articulated specifications and took measures, treating safety as a non-negotiable value, principally disregarding the costs.

The costs were not clear in the beginning, but resulted from an incremental process similar to the previous trade off. The virtual key question 'how much safety' is gained when making 'how much costs', was not considered relevant to the network operator. Most costs and financial risks were, indeed, externalized to the biogas producer and other stakeholders who had to gain knowledge and convince the network operator. These externalized costs and risks were considered a necessary consequence of safety and, therefore, not a legitimacy issue for the network company.

At a certain moment, the biogas producer confronted the network company with the consequence of this approach and explicitly stressed that complying with all specifications was not affordable. 'The books couldn't be balanced. The sum did not add up anymore,' an insider recaps. The network company took this alarm signal seriously and changed its attitude towards costs.

The network company financially helped the biogas producer in several ways. Some minor specifications could, on second thought, be eliminated from the list. Some costs for pipelines and other assets could be shared among a broader group of participants for learning purposes. Gasunie was induced to invest approximately half a million euro. The network company GTS did not directly pay the biogas producer, but did significantly help in kind, mostly by doing research and advising. 'If you would wait for the biogas producer to find out how they can eliminate all the bacteria from their gas, you may have to wait for a very long time,' an insider explains.

So, reducing costs for the biogas producer indirectly became an issue for the network company. The solution, backed up by the board level, was to be generous with spending hours on the project and to organize extra means with the help of other participants in order to compromise neither safety nor the realization of the project as well as the opportunities this could bring for similar projects in the future.

The trade off costs versus safety had two main sources of legitimacy. The 'safety first' principle dominated as a shared belief. Perhaps the trade off was also driven by seeking consent, as professionals at the network company kept discussing whether the entire project was worth it. 'The total costs did not outweigh the gains,' one professional said. An external expert reflects on the way the network company arrived at a list of specifications: 'You could contest the idea to literally copy the specifications for natural gas to biogas, but they [the network company] didn't.' These possible reflections, however, have not been raised by any respondent inside the network company.

5.3. NON-DISCRIMINATION VERSUS SAFETY

Non-discrimination has also been a major issue of concern in the project. The network company has a clear legal duty to prevent discrimination. Biogas producers should be treated equal to natural gas producers. So, a small biogas producer should be treated

in the same way as the NAM, the biggest producer of natural gas for the Dutch network company. A professional at the network company explains it as follows: 'A small biogas producer can of course say: *Sorry, but I'm much smaller than the NAM.* Alas, the rule is that we treat you the same as the NAM.'

In practice, the non-discrimination principle only appears to hold if injecting biogas does not cause additional safety risks. Specific safety risks seem to legitimize some kind of discrimination. The network company assessed the operational competences of the biogas producer by taking a look behind the scenes. The biogas producer appeared to be not experienced at all in gas treatment, as their core business is waste processing. The network company concluded it was necessary to articulate a range of additional specifications and introduce special measures to counter this lack of experience. This included an extra elaborate monitoring protocol. The network company also arranged that remote controls were installed at the plant so that it could shut down its operation when biogas quality proved 'off spec'. A range of extra measures and specifications were put in place that, for reasons as stated, did not exist for other producers, e.g. the NAM.

One respondent mentioned 'the fear in the basement' as a main driver for special treatments, referring to the fear of operators in the control room located in the basement of the main building of the network company. In that basement, operators monitor and control the overall gas quality in the network in real-time. The concern of these operators was that operators working for the biogas producer had a different safety culture and did not know much about gas, yet they were responsible for the gas quality which would directly affect the gas in the GTS network. The implication of direct injection by ROVA into basically the GTS network, due to the local network characteristics, meant no controls whatsoever were available to stop or influence what was fed in the network, if it was not decided to implement extra measures. Not having these extra measures clearly was a bridge too far for operators who had been used for decades to control whatever entered this key part of the GTS network. Following up on these fears was a matter of professional judgment or perhaps simply routine at the side of the network company.

So, how did the network company assess whether a 'special treatment', not necessarily discriminatory in a legal sense, was legitimate and 'worth it'? This process was, like most of the other processes described in this analysis, not driven by formal rules. Perhaps surprisingly, we did not even come across any cause for discussion on this issue inside the network company.

5.4. INTERMEDIATE CONCLUSION

What is the overall pattern in how this network company dealt with public value trade offs? When we look at the drivers behind decision-making underlying (potential) trade offs and the sources of legitimacy sought, we encounter mixed patterns of formal and informal ways.

The drivers appear largely intentional. Despite the absence of formal prescriptions, the intentions still seem largely public. Some distinctively more private intentions can be identified. For example a green image, self-preservation and credibility for the network company did play a role in the consideration of the network company to become engaged in the pilot.

Non-intentional drivers, though harder to determine in the scope of this study, have also been suspected, comparable to patterns in previous studies (Steenhuisen 2009). For example, the added value of safety requirements was generally assessed and operationalized without weighing the impact on other public values and stakeholders, possibly producing relevant trade offs but as if none were there.

As a source of legitimacy, the law provided relevant constraints, but apart from that hardly proved directive when arranging trade offs between safety, non-discrimination, cost-efficiency and sustainability in this case. In the interviews, the process of seeking consent among professionals has revealed itself as the dominant source of legitimacy. Shared beliefs also appeared to be influential, in several instances.

6. DISCUSSION

Looking at this search for legitimate responses when confronted with competing public values, we notice two fundamental assumptions that require further discussion. First of all, our case revealed that legitimacy was based on the network company as an authority in this matter. Second, legitimacy was based primarily on an incremental and mainly internal decision-making process.

A Janus-faced picture presents itself with a hard and a soft side. On one hand, we see a reconfirmation of conservative hierarchy. The network company appropriates the trade offs and deals with them unilaterally. On the other hand, outcomes emerged within a non-hierarchical context mainly inside the network company through an essentially informal process.

6.1. THE NETWORK COMPANY AS AUTHORITY

The network company was de facto and unanimously considered the legitimate authority to arrange the reported trade offs. But on the basis of what? Respondents gave two reasons.

First, the network company is seen as the right authority in this matter, since it serves by far the most significant public value, i.e. the safe and reliable functioning of a national gas network in general. 'The network company could practically prescribe anything it wanted, because its interests were of a higher order,' a respondent at the biogas producer explained, referring to the importance of safe use of gas.

Second, the network company is seen as a 'knowledge authority' in this case. 'The network company had the lead, because we knew little about gas,' a respondent at the

biogas producer explained. Though the network company also lacked experience with and knowledge on injecting biogas, somehow this didn't matter much. 'In the country of the blind, the one-eyed man is king,' a professional at the network company reflected.

If we draw parallels with cyber security, flood safety or military defense, being a guardian of and expert on the most important public value in the game, is not automatically a conclusive reason to be granted such a power position in prioritizing safety over other public values, as depicted in this case. And not in all sectors do institutional legacies provide comfortable 'shades' that allow for the gradual accumulation of knowledge on potential risks to public values. In many other domains, similar trade offs are known to be constantly political and not unilaterally delegated to a task-oriented organization like GTS. In this biogas case, the pain, i.e. the consequences of safety requirements for other public values, is considered inferior and accepted by all key stakeholders, virtually without conditions or complaints. But difficult questions can be raised here. What if some stakeholder would *not* underwrite the inferiority of their interests and values to this extent? What if the expertise of the network company would be contested by stakeholders? What if the biogas producer would not have been a local, semi-public company but an aggressive multinational with its roots in another culture, say the United States? It is, indeed, possible to challenge the traditional way this network company realizes safety – emphasizing robustness, redundancy and precaution – on a fundamental level (Wildavksy 1988, Taleb 2012). Accordingly, instead of seeking legitimacy using predominantly internally developed rule-based processes, other avenues of legitimation could have been pursued.

An insider illustrated, in a simplified way, how the network company in general convinces its stakeholders to accept its authority on prioritizing safety. 'When talking to biogas producers, we say: *imagine that people get sick because carbon monoxide is released in their homes due to the use of biogas*. Biogas producers may for example respond: *but this risk has been non-existent in the past decades!* Then we say: *that's right, because we kept going about it. If there will ever be an incident that relates a carbon monoxide intoxication to biogas, that will be the end for biogas. That is not what you want*.' Despite the noble intentions to prevent health risks, the argument alone as provided is vulnerable in the sense that it is insensitive to big or small risks and to the costs and gains of the other stakeholders in the process. Some precautionary measures may, others may not be considered worth a certain sacrifice for other public values or private interests. Moreover, the contribution to safety of precautionary measures may be uncertain and contested. When and where is a network company called to account for the proportionality of its safety requirements? We did not come across an organized space in the process for stakeholders to question this proportionality.

Being an authority as network company in this matter may seem a comfortable position. It provides means and relatively stable conditions to control trade offs, but by the grace of a thing as changeable as reputation and the absence of politicization. If a network company, at the same time, would be confronted with the critique of being sensitive to private interests and lacking knowledge, this comfortable position of a

network company may be hard to sustain, at least in any fair and transparent way. Undermining the authority of a network company may radically tip the playing field. If a network company would need to seek legitimacy for trade offs in a highly politicized external environment, e.g. as threatened to happen in the case of designing a new gas balancing regime (De Bruijne *et al.* 2011), completely different dynamics and outcomes are to be expected.

6.2. INTERNAL DECISION-MAKING AS FOUNDATION

Internal decision-making has been a foundation resulting in the deduction of legitimate trade offs. The process the network company went through was lengthy, occurred in a non-hierarchical context and had an informal and incremental nature. The process was structured but essentially explorative, i.e. not predisposed but open. Participants in the process did not isolate trade offs to decide on each of them in an integrated way. Instead, the process focused on how to operationalize safety and non-discrimination in the (virtual) absence of trade offs.

Given the uncertainty and controversy in the beginning of the process, finding out how to safely inject biogas could have developed into a chaotic decision-making process within the network company, but it did not. The project team somehow managed to reconcile conflicts between safety and other public values in an orderly way. The process provided a safe, depoliticized environment so that professionals had plenty of opportunity to discuss and reflect on biogas injection. It provided sufficient time for the project team to convey skeptics. The process also allowed for learning about the many uncertainties and risks. Consent was reached in small, prudent steps at slow pace – first suggesting a biogas connection as a possibility, then discussing the desirability of a pilot, testing it and only much later, being well-informed on its actual performance, officially agreeing to a permanent biogas injection.

Process managerial skills in the project team seem to have been an important, if not decisive factor in seeking legitimacy for the design choices that the network company eventually made. Process management is about framing the agenda and structuring the decision-making process in such a way that it is easier to reach consensus with other stakeholders (De Bruijn *et al.* 2003). We argue that legitimization in this case, is in part achieved via the development of the experimental process. If the process would have been organized differently, less skillfully, less prudently, this could have created completely different dynamics and outcomes. Again we would like to point towards the fact that different approaches could have been taken to seek legitimacy by the network company. 'In the end, it's all about communication,' an insider said about how consent was reached. If critical trade offs for society are 'in the end' not about mathematically weighing pros and cons but more about being a skillful process manager inside network companies, doesn't that make the outcome of the process manipulatable and arbitrary? What makes the process managerial strategy used by a network company – top down or bottom up, research-based or negotiation-

oriented, open or closed, fast or slow – legitimate? If the network company deliberately tries to maximize its capacity to manage and control the process, how does this influence the outcome? Questions like these have neither been raised nor answered by the respondents. The underlying strategy how a network company seeks legitimacy, and why, generally remains implicit.

7. CONCLUSION

Since the liberalization of energy sectors in Europe in the 1990s, governments of Member States have been active institutional designers determining what network companies should and should not do. Roles and responsibilities have been formalized in laws, regulation, political decrees, policy memos and other arrangements. The central argument this paper makes is that this formal governance structure is not very clear on what network companies should do when competing public values require trade offs (Steenhuisen 2009). This in turn has repercussions for the formal and informal relations between network companies and their industries. This becomes most poignant in topics related to the energy transition (Steenhuisen and De Bruijne 2015) and even more so when innovations are considered. The unclarity reflects the ongoing debate at the national level on the exact role of national governments in the development of the transition. However, this unclarity contrasts sharply with the increasingly ambitious and activistic positions of Member States in multinational conferences on climate change.

What role should network companies have in the energy transition? A seemingly simple case like injecting biogas in a transport network displays that interpreting this role for network companies is not straightforward. Neither is it trivial to identify trade offs in this process from a legitimacy or public interest perspective.

At first sight, the network operator seemed to resemble a rather conservative, risk-averse company focusing on its legal task and technical obligations, unwilling to engage in innovative projects that would require public value trade offs. When the process is studied in more detail in our biogas case-study, we encounter different stories. We described three so-called trade offs in detail. We wanted to know to what extent trade-offs had been made and for what reasons. The key empirical question of this paper was how legitimacy of these trade offs among public values is sought and found by network companies.

The formal governance structure apparently did not provide much guidance for the network company. Seeking consent among professionals *within* the network company has been the major benchmark to make trade offs. Outside the network company, trade offs were mainly accepted as an outcome of what the network company decided. The network company could act as an authority. Within the network company, consensus on legitimate trade offs arose less hierarchically and, therefore, heavily relied on process managerial skills.

The major implication, we argue, is that this practice of seeking legitimacy, possibly representative for other cases, shows the implicitly unstable and dual nature of the legitimization process, consisting of an internal and external legitimacy seeking process. In the case at hand, both worlds, internal and external, are treated fairly separate, whereas they ultimately are highly interrelated.

In public debates, our findings are likely inspire two types of reactions. First, network companies are often urged to open up more. Second, governments or regulators are urged to regulate more. We conclude with some comments and nuances to these reactions. We feel, based upon our research, these reactions are not necessarily helpful and may even destabilize the process of seeking legitimacy.

Indeed, opening up and more transparent decision-making on sustainable innovations by actors engaged in the energy industry sounds not only promising but also as the 'right' normative policy. Our case-study, however, reveals that the current process of reaching consensus is more subtle and informal. Opening up might change the outcomes of sustainable projects like the green gas connection considerably and in unpredictable ways disrupting either the internal or the external processes through which legitimacy is sought. Transparency is not an end but a mean and wielding this norm in a responsible way in policy making, is quite an institutional design challenge; and who should be the main designer is not at all trivial.

A second common response in public debates to our findings would probably be the conclusion that there is a lack of formal guidance, and thus to regulate the role of the network company in more detail as soon as possible. Opponents of this solution may in turn react that injecting biogas is innovative and innovations are seldom helped by underinformed, micro-managing regulators. This study helps to think less dichotomous in this never-ending debate on the governance of network operators in the sustainability debate. We learnt that in accordance with public administration literature there is an intricate mixture of formal and informal sources of legitimacy at work during projects: formal rules, shared beliefs and consent both inside organizations and linked to wider networks of organizations. Emphasizing one of these sources or arenas without the other, would create a caricature of the governance structures that direct network companies to serve the public interest.

If we would pragmatically settle for the currently described practice, presuming it to be a prevailing norm, at least for the time being, a clear challenge would be to institutionally embed this practice in a way that is less unstable and more stimulating for a network company to be open and clear about how it copes with competing public values. Under what conditions is there (no longer) a need for a thorough internal process to understand the impact of new challenges on key values? Under what conditions is it legitimate for network companies to be led by the broader public interest beyond legally specified tasks? How to organize for a broader dialogue on this in specific cases? If we do not understand and engineer this properly, future developments, events and sustainable innovations in the gas sector may change what we consider legitimate instead of the other way around.

ACKNOWLEDGEMENT

This research has been financed by a grant of the Energy Delta Gas Research (EDGaR) program. EDGaR is co-financed by the Northern Netherlands Provinces, the European Fund for Regional Development, the Ministry of Economic Affairs and the Province of Groningen.

REFERENCES

Arcadis, Kema and Kiwa (2011) *Gaskwaliteit voor de toekomst*. Den Haag, Ministry of Economic Affairs, Agriculture & Innovation: 075413712.0.5.

Beck Jorgensen, T. (2006) "Value consciousness and public management", *Organization Theory and Behaviour,* 9(4): 510–536.

Beetham, D. (1991) *The legitimation of power*, New York: Palgrave.

Böttcher, J. (2013) *Management von Biogas-Projekten*, Heidelberg: Springer Gabler.

Boulamanti, A., Donida Maglio, S., Giuntoli, J. and Agostini, A. (2013) "Influence of different practices on biogas sustainability", *Biomass Bioenergy*, 53(June): 149–161.

Bozeman, B. (2007) *Public values and public interest: Counterbalancing economic individualism,* Washington D.C.: Georgetown University Press.

De Bruijn, H., ten Heuvelhof, E. and in 't Veld, R.J. (2003) *Process Management: Why Project Management Fails in Complex Decision Making Processes*, Dordrecht: Kluwer Academic Publisher.

De Bruijn, H. and Dicke, W. (2006) "Strategies for safeguarding public values in liberalized utility sectors", *Public administration,* 84(3): 717–735.

De Bruijne, M., Steenhuisen B., Correlje A., ten Heuvelhof, E. and de Vries, L. (2011) "How to design a new gas bid price ladder? Exploring market design issues in the new Dutch gas balancing regime", *CRNI,* 12(1): 83–97.

Chang, R. (1997) *Incommensurability, incomparability and practical reason*, Cambridge, USA: Harvard University Press.

Crozier, M. (1964) *The Bureaucratic Phenomenon*. Chicago: University of Chicago Press.

Gasunie (2009) *Green gas to enter high pressure pipeline network for the first time*. Retrieved September 3, 2016, from https://www.gasunie.nl/en/news/green-gas-to-enter-highpressure-pipeline-network-for-the-first-t?press=on.

Jacobs, J. (1992) *Systems of survival: A dialogue on the moral foundations of commerce and politics*. London: Hodder and Stoughton.

Jensen, M.C. (2001) "Value maximization, stakeholder theory and the corporate objective function", *Journal of Applied Corporate Finance,* 14(3): 8–21.

Law, J. (2004) *After method: Mess in social science research*. London: Routledge.

Lipsky, M. (1980) *Street-level bureaucracy. Dilemmas of the individual in public services*, New York: Russel Sage Foundation

March, J. (1994) *A primer on decision-making: how decisions happen*, New York: The Free Press.

Ministry of Economic Affairs, Agriculture & Innovation (2011) *Energierapport 2011*. Den Haag.

Ministry of Economic Affairs, Agriculture & Innovation (2016), *Energierapport 2016*. Den Haag.

Netbeheer Nederland (2011) *Net voor de toekomst. Een verkenning.* Arnhem.

Netbeheer Nederland (2013) *De proeftuin 'decentrale duurzame collectieven'*. Arnhem.

Reynaers, A. (2014) *It takes two to tangle: public-private partnerships and their impact on public values*, dissertation, VU Amsterdam.

Sanders, M. (2013) *Publiek-Private Samenwerking in de Nederlandse energiesector*, proefschrift aan de Universiteit Twente, Amsterdam: BOOM|Lemma.

Steenhuisen, B. (2009) *Competing public values: coping strategies in heavily regulated utility industries,* NG*Infra* dissertation, Delft University of Technology.

Steenhuisen, B. and De Bruijne, M. (2015) "Reflections on the role of energy network companies in the energy transition", *Energy, Sustainability & Society,* 5(25).

Steenhuisen, B. and Van Eeten, M. (2013) "Patterns of coping with inconsistent demands in public service delivery", *Administration & Society,* 45(9): 1130–1157.

Taleb, N. (2012) *Antifragile: Things that Gain from Disorder*. Random House, New York.

Tetlock, P. (2000) Coping with trade-offs: psychological constraints and political implications, in: *Elements of reason*, A Lupia, M.D. McCubbins, S.L. Popkins (eds), Cambridge: Cambridge University Press.

Thacher, D. (2001) "Conflicting values in community policing", *Law and Society Review*, 35(4): 765–798.

Thacher, D. and Rein, M. (2004) "Managing value conflict in public policy", *Governance,* 17(4): 457–486.

Veeneman, W., Dicke, W. and De Bruijne, M. (2009) "From clouds to hailstorms: a policy and administrative science perspective on safeguarding public values in networked infrastructures", *International journal of public policy*, 4(5): 414–434.

Viscusi, W.K. (1992) *Fatal trade-offs: public and private responsibilities for risk*, Oxford: Oxford University Press.

Weiss, R.S. (1995) *Learning from strangers*, New York: Free Press.

Wildavsky, A. (1988). *Searching for Safety*. New Brunswick, NJ: Transaction Books.