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Energy justice and controversies: Formal and informal assessment in energy projects☆

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ABSTRACT

In this paper we develop a framework for understanding how justice-related claims play a role in the dynamics of controversy in energy projects. We do so by distinguishing two interacting trajectories of assessment: a formal trajectory that is embedded in the legal system and an informal trajectory that is mainly embedded in public discourse. The emergence of an informal assessment trajectory can be seen as a response to a (perceived) lack of attention to particular concerns or values in the formal trajectory, i.e. *'overflowing'*. The emerging informal assessment may subsequently lead to adaptations in the formal trajectory, which we refer to as *'backflowing'*. Based on insights from case studies on Dutch energy projects and literature on energy justice we identify three justice-related attributes that facilitate understanding of the emergence of controversies. These attributes are based on differences between the two trajectories in terms of 1) the way in which values are expressed, 2) the dimension of energy justice that is taken as a starting point, and 3) the democratic legitimization of assessment trajectories. In order to allow for legitimate and effective energy policy, overflowing and backflowing need to be addressed as interrelated rather than as separate processes.

1. Introduction

Systems for the production, distribution and consumption of energy are subject to technological and institutional change. This is considered necessary, firstly, to avoid global warming by reducing the emission of CO_2 by the current fossil fuel-based energy system and, secondly, to anticipate the foreseen depletion of non-renewable resources and growing energy demands. For at least two reasons such changes come with moral repercussions. Firstly, sociotechnical systems embody public and social values and any change may affect these values (Correljé et al., 2015; Taebi et al., 2014). Secondly, changes in energy systems may affect different groups of people to a different extent and bring about a redistribution of risks, rights and responsibilities. When changes to energy systems are proposed there is often the tendency to instrumentally focus on its *social acceptance*, while the ethical implications of such change remain generally unexplored (Taebi, 2016). We argue that many recurrent controversies are a consequence of ignoring or underestimating these moral implications in the planning and development of energy projects, which especially seem to relate to the fact that different project-owners and affected publics articulate divergent *justice claims* (Gross, 2007; Simcock, 2016). In this paper, we develop an empirically grounded framework to understand how these justice claims play a role in the emergence of controversies.

We will examine these justice claims within the framework of *energy justice*, which is a fairly new concept that has its roots in *environmental justice* (McCauley et al., 2013). Environmental justice emerged in the 1970s and focussed on the consequences of environmental degradation and measures to resolve such degradation from a social justice point of view (Dobson, 1998). More specifically, the issue of equal environmental protection and the discriminatory, hence, *unjust* imposition of environmental hazards on communities of colour and on low-income communities are recurring themes in the environmental justice literature (Pastor et al., 2001; Walker, 2009). But the literature also looks at the process of decision-making and "attempts to uncover the underlying assumptions that may influence environmental decision-making" (Bullard, 1994). As Schlosberg puts it, environmental justice should "also address the processes that *construct* the maldistribution [and] focus on individual and social recognition as elements of attaining justice" (Schlosberg, 2009: 3; emphasis in original). This broad understanding of justice – together with more recent discussions on climate justice (e.g. Page, 2007; Posner and Weisbach, 2010; Vanderheiden, 2008) – has led to the tripartite model as furthered in the energy justice literature, that incorporates justice as *distribution*,

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procedure and *recognition* (Jenkins et al., 2016; McCauley et al., 2013; Sovacool and Dworkin, 2014). So, while energy justice "shares the same basic philosophy" as environmental justice, as McCauley et al. (2013; 107) argue, it is different in that its focus is "firmly on energy policy and the key themes of energy systems". In this paper, we use the tripartite model of energy justice for our discussions on the justice claims in energy controversies. This is not the only way to research the role of justice in energy controversies but the energy justice model provides us with – as Sovacool and Dworkin (2014; 20) put it – "an appropriate orientation for considering, balancing and prioritizing various justice claims that arise in energy patterns and decisions".

It is the aim of this paper to describe how perceptions of (in)justice play a role in controversies on new energy projects. It has been reported in literature that perceptions such as an unfair identification and distribution of risks and benefits, an unfair division of responsibilities and accountability, the perceived lack of legitimacy of decisions, and the feeling of not being taken seriously drive protests against new projects (see e.g. Bullard, 1996; Gross, 2007; Simcock, 2016; Toke et al., 2008; Van der Horst, 2007; Wolsink, 2013). We will explore how such justice claims relate to the social dynamics, which include the mobilisation of new societal groups, of such controversies, upon the basis of two controversies in the Dutch energy system. Findings from these cases will be used to develop a framework that shows the underlying motivations for these claims as well as the social dynamics that are related to these.

The framework developed in this paper builds upon the notion of 'overflowing' as introduced by Callon (1998b) (also see Callon and Rabeharisoa, 2008). Overflowing occurs when societal concerns emerge that are not (perceived to be) sufficiently covered in the prevailing sets of rules that are part of dominant institutional practices. These rule-sets figure as 'frames' that provide alignment between a heterogeneous set of actors and indicate courses of actions that are considered appropriate, thus allowing for the coordination of their conduct in particular settings (Callon, 1998a). Frames will, by definition, exclude certain concerns to be taken into consideration. In new projects, or settings, or by new experiences, such concerns may be adopted by actor groups that will challenge both the prevailing frame and the actors that reproduce it. The core assumption of this paper is that this adoption is to a significant extent motivated by the injustices perceived by societal actors, which can lead to the mobilisation of groups that oppose intended projects.

We will expand on the notion of overflowing by introducing a perspective that distinguishes two trajectories of assessment in decision-making on energy projects; each trajectory being characterised by specific patterns of social behaviour and based on distinctive moral and ideological starting points. There is the *trajectory of formal assessment* in which a repertoire of (legal) procedures, standards, tools, and policy arrangements is used to establish a collective value appraisal of the new technology or a project. Overflowing, however, gives rise to an *informal trajectory* of assessment in which alternative value claims are presented. This informal trajectory is characterised by advocacy for public values that some actors consider to be underrepresented (or sometimes even missing) in the formal assessment trajectory. The informal trajectory materialises in the formation of new advocacy groups and media debates, all articulating new, or changes in public discourses (see e.g. Cuppen et al., 2016).

In public controversies, the formal and informal trajectory strongly interact. As the notion of overflowing implies, the formal assessment trajectory may 'flow over' and can give rise to the advocacy for new issues in the informal assessment trajectory, such advocacy. The informal trajectory can also result in changes or adaptations in the formal trajectory (e.g. the decision to include new issues in an environmental impact assessment). We refer to the latter as '*backflowing*'. It is this dynamic cycle of interactions between the formal and informal trajectories of assessment that we want to understand better (see Fig. 1).

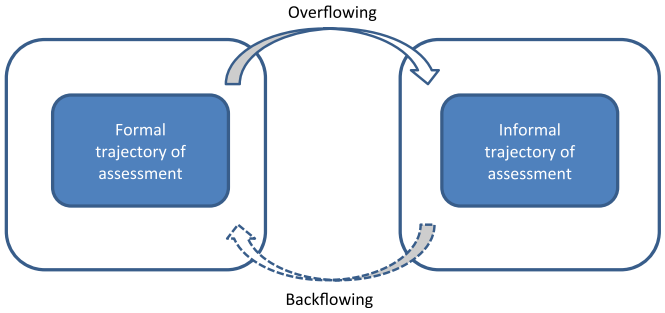

Fig. 1. Overflowing and backflowing in formal and informal trajectories of assessment.

Each of the two assessment trajectories recruits a different way to express, rank and legitimise justice claims. This observation is key for understanding the interaction between the formal and informal assessment trajectory. In other words, in order to understand controversies and their dynamics, it is essential to elaborate the *justice-related attributes* of the two trajectories. We will identify these attributes based on empirical studies conducted by us on energy controversies in the Netherlands. The attributes will be derived from the notion of energy justice that includes justice as distribution, procedure and recognition. We will illustrate this on the basis of empirical studies conducted by us on energy controversies in the Netherlands that will be presented in the following section. Section 3 will then continue with the analysis of over- and backflowing in these cases, on the basis of which we will identify the justice-related attributes of the formal and informal assessment trajectories in Section 4. This will result in the framework for understanding the role that justice-related claims play in the emergence of controversy in decision-making on energy projects. Section 5 will conclude on the analysis and discuss the implications for policymaking.

2. Cases and method

The two studied cases are: 1) the project of storing captured CO_2 in an empty gas field under the town of Barendrecht in the West of the Netherlands and 2) the exploration of shale gas in the towns of Boxtel and Haaren in the South of the Netherlands. These cases provide insight in the typical Dutch context and the energy system in which natural gas plays a very important role. In Barendrecht, CO_2 captured at the petrochemical industry nearby Rotterdam was to be injected in an empty gas field; shale gas was reckoned to be a potential alternative for conventional natural gas, compensating declining indigenous gas availability. These controversies are strongly influenced by the given national and cultural context, which involves a prevalent set of institutions and values (see Correljé, 2018).[1] Moreover, they have led to adjustments in national policy arrangements (as will be discussed in Section 3.3). As such, an examination of these cases allows us to learn how formal and informal trajectories interact and influence each other; i.e. the processes of overflowing and backflowing. More specifically, they allow us to understand how existing legal and regulatory contexts not only enable but also *challenge* energy justice.

This paper is a result of reflections on and ongoing collaborations between the authors in several research projects on controversial energy technologies. For the case of carbon capture and storage (CCS) in Barendrecht we draw upon Cuppen et al. (2015) and Feenstra (2012); for the case on shale gas exploration in Boxtel we draw upon Dignum et al. (2016) and Cuppen et al. (2016). Both case studies were focused on understanding the process of controversy, i.e. how it came about and why it developed as it did. The two studies took

[1] Correljé, 2018. The Netherlands: Resource Management and Civil Society in the Natural Gas Sector, in: Overland, I. (Ed.), Public Brainpower: Civil Society and Natural Resource Management. Pallgrave/Macmillan.

place sequentially and insights from our analysis of the case of CCS in Barendrecht were used to develop the case study focus and methods for the shale gas case. From the Barendrecht case we learned that frames played a key role in shaping interactions between project actors and local community, and thereby, the dynamics of the controversy. For this reason, we decided to study in more detail the temporal changes of frames for the shale gas case. This new study showed that the dynamics of the controversy on shale gas were shaped to large extent by the divergent ideas of proposing and opposing actors about what is considered just when it comes to local planning of shale gas as well as the wider energy transition context. These findings were used to reflect on our earlier study on CCS in Barendrecht, where we could identify similar justice-related dynamics. The justice concept thus did not feature as a starting point for the two case studies, but rather came out as a concept that helped us to compare and explain the dynamics of controversy in the two cases. This paper can be understood as a next step in iteratively refining our conceptual understanding of the dynamics of controversy.

2.1. Carbon capture and storage in Barendrecht

At the time the plans for this project were made, CCS was considered one of the promising options for CO_2 emission reduction and a demonstration project was considered necessary. Early 2006 the oil company Shell had started preparations for a project to capture CO_2 from the Shell refinery site in Pernis, just south of Rotterdam, and to store it in two empty gas fields located under the nearby municipality of Barendrecht. The Dutch government announced a tender procedure for onshore CCS demonstration projects in 2007 and in November 2008 Shell was awarded 30 million Euros. This tender procedure brought together the Ministry for Economic Affairs, the Ministry for Housing, Spatial Planning and Environment and Shell. It soon became clear that the citizens of Barendrecht had many questions about the project, and also the municipality of Barendrecht and the Province of Zuid-Holland voted against the plan. Yet, by a change in the legislation the national government managed to overrule the local governments, and proceeded with the project regardless of persistent local public resistance. Local opposition grew and the project and the risks of CO_2 storage generated a lot of media attention. Finally, after a change of government, the new minister of Economic Affairs announced in November 2010 that the project in Barendrecht would not be continued because of 'lack of support'. In February 2011, it was decided to abandon the idea of onshore CO_2 storage in the Netherlands.

Data were collected in the period from early 2007 until December 2009 by means of extensive desk study (covering websites, local newspapers and radio and communication materials of stakeholders), several visits to local meetings in Barendrecht and the project location, and nine in-depth interviews with key stakeholders (as reported in Feenstra et al., 2012). Data were used to construct a detailed storyline of the project and the public debate it gave rise to. This storyline was used to identify key interactions – legally required, as well as orchestrated and ad hoc organised ones – between project stakeholders and public stakeholders. We then conducted an analysis of how the project initiators' frame shaped the interactions and thereby the way the controversy over this project evolved over time (see Cuppen et al., 2015). This analysis formed the basis for understanding the interaction between formal and informal assessment trajectories and the role of justice-related claims in this interaction.

2.2. Shale gas exploration in the Netherlands

In September 2008, the British company Cuadrilla Resources Ltd. requested an exploration permit for shale gas in the Dutch province of Noord-Brabant in the South of the Netherlands. After the permits for exploratory drilling had been awarded by the State and local spatial and environmental planning procedures were set in motion, local public opinion turned against this initiative. Over time, the local resistance evolved into a broad, nation-wide, anti-shale gas movement, supported by NGOs and several political parties (Metze, 2014). With this, the debate went through a discursive shift from shale gas as a local safety and risk issue, towards a national debate on the utility and necessity of shale gas exploitation (Cuppen et al., 2016). Attempts by the Dutch government to make concessions to the opposition failed; e.g. the research on the risks of shale gas that was commissioned by the government in response to objections was heavily criticised for not being objective, for ignoring important environmental effects and for not including a discussion on the need and necessity of shale gas. The state imposed a moratorium on exploratory drilling in 2011, which has been extended up till now.

For this case newspaper articles published between November 2010 and April 2013 were collected containing the Dutch word for shale gas. In addition, semi-structured interviews were conducted with ten experts knowledgeable on the Dutch societal debate on shale gas. Based on a (simplified) event history analysis (Van de Ven and Poole, 1990) a detailed chronological storyline of the controversy was constructed (Remmerswaal, 2013). In addition, a longitudinal thematic cluster analysis of newspaper articles was conducted with the help of the software package T-Lab (Remmerswaal, 2013). This analysis was used to identify normative conflicts and to find out to which extent these normative conflicts resulted in discursive shifts (i.e. change in the meaning collectively attached to shale gas and/or the socio-technical system of which it is part) (Cuppen et al., 2016). This analysis helped to understand the emergence of controversy and which specific justice-related claims play a role in that.

3. Overflowing in Barendrecht and Boxtel

In both cases we observe several instances of overflowing emerging as responses to characteristics or activities within the formal assessment trajectory. We also observe that, sometimes, these responses lead to an adaptation in the formal assessment, i.e. backflowing. In this section, we will discuss the formal assessment characteristics and activities, their overflowing to informal assessment, and the potential backflowing from the informal to the formal assessment. We will do this first for the CCS case (Section 3.1) and then for the shale gas case (Section 3.2). In the third part of this Section (3.3), we discuss higher-level overflowing, by which we denote the adjustments in national policy arrangements that followed from these projects.

3.1. The case of CCS in Barendrecht

At the beginning, the formal trajectory of assessment in the CCS project was characterised by the formation of a network, in which Shell and the Ministry for Economic affairs played a leading role. The partners in the network found each other by formulating a goal-rational frame that set out clearly circumscribed 'ends', that could be achieved by the right 'means', i.e. a demonstration that underground storage of the CO_2 in an empty gas field would be a feasible solution. The 'end' at stake was motivated by the national policy aspiration to attain national emission targets and by the objective of Shell to reduce the CO_2 emissions from its refinery complex. The actors gathered in the new network became the 'project-owners', and their cooperation relied on the frame they shared. This common frame specifically focused, from a technical and legal perspective, on local safety risk as a key value to be attended. Moreover, this focus on risk was also part of the environmental impact assessment that can also be seen as an intrinsic part of the formal trajectory of assessment.

The focus on risk was also taken as a starting point for the engagement with residents of Barendrecht. In a series of public hearings and meetings, it was emphasised that the project was 'completely safe'. This message was communicated in a number of scientific reports and via a local information centre. Nevertheless, the

municipality and residents became increasingly displeased with the emphasis on risk. They felt that it did not take their specific interests and concerns into consideration. The direct social and economic impact of the project on the lives of local stakeholders was ignored.

As Noordegraaf-Eelens et al. (2012) argue, the issue was not that citizens did not want to avoid risk, but they had *moral* questions about the acceptability of imposing risk upon specific groups. These questions evolved not only from the nature of the project, but also from the decision-making process in which it had been embedded. The people from Barendrecht felt they were defenceless recipients of a new technology of which the safety could neither be proved nor refuted. Moreover, for the local residents risk implied much more than mere technical and geological risks, but also included for instance the financial risk regarding the price of houses. If one would live above a 'CO_2 bomb', as some media interpreted the project,[2] what would it mean for the value of your property? In short, the values and concerns that were included in the formal assessment trajectory left little room for the values and concerns of the citizens of Barendrecht. These values and concerns gave rise to an informal trajectory of assessment, the formation of advocacy groups and media attention. It also gave rise to a growing distrust of the local actors towards the project-owners.

3.2. The case of shale gas in Boxtel

The formal trajectory in the case of shale gas in the South of the Netherlands followed the prescribed procedures in the Dutch Mining Law and local planning procedures. The energy company Cuadrilla submitted a report on the technical aspects of the drilling process and on the economic viability of their business and approached the municipality of the town of Boxtel to allow exploratory drilling. An environmental impact assessment is not required for exploratory activities and no protests from local actors arose. Hence the project could take off.

Unlike natural gas, shale gas layers have to be 'fracked' by injecting fluids and chemicals under high pressure so that the rock is fractured and the gas is released. In the US, this led to direct environmental and health risks (see for instance Dodge and Lee, 2017; Rahm, 2011; Small et al., 2014), which were also reported in Dutch media. Inspired by these reports, local actors came to point at how the permitting and siting procedures ignored the effects for the local environment and safety, giving rise to a first moment of overflowing. It is important to emphasise that in spite of the local nature of these initial concerns, the overflowing later also came to pertain to national issues. A first point of debate related to the appropriate level of authority to decide upon policy dossiers that had both national and local impacts, a second point related to the overall desirability of shale gas exploration, given the need to reduce CO_2-emissions.

To achieve changes in the formal trajectory – or, in our words, backflowing –, the opponents to shale gas explorations followed different routes. First, local actors, including citizens and a major bank with a data storage facility near the test site, started a lawsuit against the municipal decision, as they were not satisfied with the way in which the town board had included the objections they had put forward. Second, NGOs and advocacy groups were mobilised to broaden societal and political support. As more requests for shale gas exploration permits in other places in the Netherlands were made, environmental NGOs successfully convinced quite a number of municipalities to declare themselves 'shale gas free'.[3] The provincial parliament of Noord-Brabant got concerned and sent a letter together with the municipality of Boxtel to the minister of Economic Affairs to ask for a moratorium and an independent study on the pros and cons of shale gas exploration and production.

The pressure upon the authorities induced by this overflowing led to a number of policy actions that can be seen as backflowing, as they involved changes in formal arrangements. First, the Dutch administrative court decided in October 2011 that the municipality of Boxtel had not followed the right procedures and as a result the exploration permit was withdrawn.[4] Second, the Ministry responded to requests made by NGOs and lower-level authorities by announcing an independent study. As long as the research was not finished, no exploration wells would be drilled, and no new permit applications would be taken into procedure.[5] Later the minister announced another study that would focus on all potential interesting locations so that local interests could be involved as well. Third, the minister also announced that he wanted to involve local policy makers and the local communities of the potential locations.[6] Moreover, the research would be used to investigate the technical options for risk mitigation together with water companies and the mining industry. The moratorium was prolonged, so for the time being – at least as long as the current cabinet is in charge – no important decisions will be taken.[7]

3.3. Higher-level backflowing: changes in national policy

The processes of backflowing identified in the previous two subsections relate to adjustments of the decision-making processes directly related to the projects themselves, in the sense that municipal and national permits were withdrawn. More important perhaps is the adjustment of the Dutch Mining Act,[8] which is a law that plays a decisive role in the formal assessment trajectory, which will be shortly described here.

The controversies of Barendrecht and Boxtel had already raised doubts about the adequacy of the Mining Act, which were increased by a series of serious earthquakes near the huge Groningen gas field which damaged buildings on a substantial scale in 2012 (Aoun and Cornot-Gandolphe, 2015; Van der Voort and Vanclay, 2015).[9] In all, this created a general feeling of distrust in the Ministry of Economic Affairs and the Dutch gas industry and in the permitting procedures for underground activities in the Mining Act. These sentiments were recognised and taken seriously by an extending number of 'formal' institutions, like the State Supervision of Mines[10] (SoDM), the Council of Security[11] (AVV), the State Council of the Netherlands[12] and also by the minister of Economic Affairs himself. Moreover, both local and national political parties began to articulate the 'natural gas issue' as a problem of national proportions in respect of local safety, sustainability, and even international stability. In response to this rapid decline in trust, a substantial revision took place in the Mining Act, effectively from the 1st of January 2017 onwards, which puts much more emphasis on safety issues and on the involvement of the citizens and local authorities affected by mining activities. For new permits for gas exploration and production and for the regular renewal of the production plans of the existing concessions, citizens and other interested parties can now comment on draft decisions. Mining companies must identify all safety risks for the residents and the

[2] https://zembla.vara.nl/nieuws/co2-bom-onder-barendrecht (consulted 10-6-2017).
[3] https://www.schaliegasvrij.nl/.
[4] http://www.volkskrant.nl/binnenland/rechter-verbiedt-proefboring-schaliegas-boxtel~a2989042/ (consulted 10-6-2017).
[5] http://www.binnenlandsbestuur.nl/financien/nieuws/voorlopig-nog-geen-proefboringen-schaliegas.7288536.lynkx (consulted 10-6-2017).
[6] https://milieudefensie.nl/nieuws/pers/berichten/kamp-kiest-opnieuw-voor-omstreden-onderzoeksbureau-schaliegas.
[7] https://www.rijksoverheid.nl/documenten/kamerstukken/2015/07/10/kamerbrief-schaliegas.
[8] http://wetten.overheid.nl/BWBR0014168/2017-03-11.
[9] Also see: http://www.tudelft.nl/en/research/thematic-cooperation/dossiers/aardbevingsproblematiek-groningen/.
[10] https://www.sodm.nl/.
[11] https://www.onderzoeksraad.nl/uploads/phase-docs/844/972d8bf7f1d1summary-gaswinning-groningen-en.pdf.
[12] https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=89909 & summary_only= & q=gaswinning+Groningen.

environment and indicate how they can reduce this potential impact. Local authorities such as municipalities, provinces and water boards are asked for an opinion on the submitted plans. Independent regulators and experts, like the SoDM and TNO (a main Dutch knowledge institute), review the plans and publish their findings and assessments. In addition, the Mining Council, an advisory body, informs the minister how to deal with the permission or production plan and he or she eventually will have to formulate reactions to all these comments. The new law not only brings about a functional separation between authorization and supervision, it also includes local safety and environmental and spatial planning explicitly in the permitting procedure, with direct involvement of the stakeholders and/or local public authorities. It moreover requires a more thorough scientific evaluation of the above ground effects of activities in the deep underground.

Already in 2016, mining permits and production plans have been awarded according to the new law, which led to a substantial increase of the requirements that mining companies had to fulfil regarding production volumes, safety precautions, environmental care and the monitoring of soil inclination and tremors. Should actual damages occur as a consequence of mining activities, citizens and businesses can apply to a National Desk Mining Damage, which supports them to file their compensation claims. Recent court cases, in first instance, have also awarded claims involving psychological stress, while laying the burden of proof with the gas industry instead of with the claimants as was the practice until recently.

4. Justice-related attributes in energy controversies

The formal and informal assessment trajectories invoke justice claims in which, as shall be argued in this section, the three dimensions of energy justice can be recognised (Bulkeley et al., 2014; Jenkins et al., 2016; Sovacool and Dworkin, 2014). However, our cases reveal that justice-related claims also allude to other elements. Firstly, the Boxtel and Barendrecht cases showed how the two assessment trajectories deployed different rationalities and, secondly, how all actors were seemingly convinced that their actions and motivations were democratically legitimate. This suggests that a comprehensive understanding of the nature of justice claims in controversies is served by adding to the dimensions of justice considerations about the way in which values are expressed and about the democratic legitimizations that are used to pursue or contest intended energy projects. As such, we have identified the following three justice-related attributes of the formal and the informal trajectory of assessment. The order of these attributes is based on their increasing level of abstraction:

1. The two trajectories differ in terms of the *logics* through which concerns are articulated and values are expressed. In the formal trajectory, values are expressed following a judicial rationality, whereas the informal trajectory takes a 'narrative' rationality. These different logics result in mutual denial of justice claims forwarded by the other trajectory.
2. The trajectories take different dimensions of energy justice as their *starting point*. In the formal trajectory, procedural justice is the starting point from which the dimensions of distributive justice and justice as recognition are considered. In the informal trajectory, the dimension of justice as recognition is taken as the starting point from which the other dimensions are considered.
3. The moral authority of the claims in both trajectories is based on different *democratic principles*. In the formal trajectory, the authority of claims is based on institutionally and legally established procedures that are effectuated by delegated actors, whereas the authority of the informal trajectory is derived from the moral autonomy of the citizens that make up a community.

Fig. 2 shows how these justice-related attributes play a role in the interaction between formal and informal trajectories of assessment. In this section we will subsequently discuss these attributes by emphasising how narrative structures, institutional arrangements, and ideas about democracy play a constitutive role in the anatomy of a controversy. Although these attributes are strongly interrelated and show a lot of overlap, we have analytically separated them to highlight specific aspects of the formal and informal trajectories of assessment.

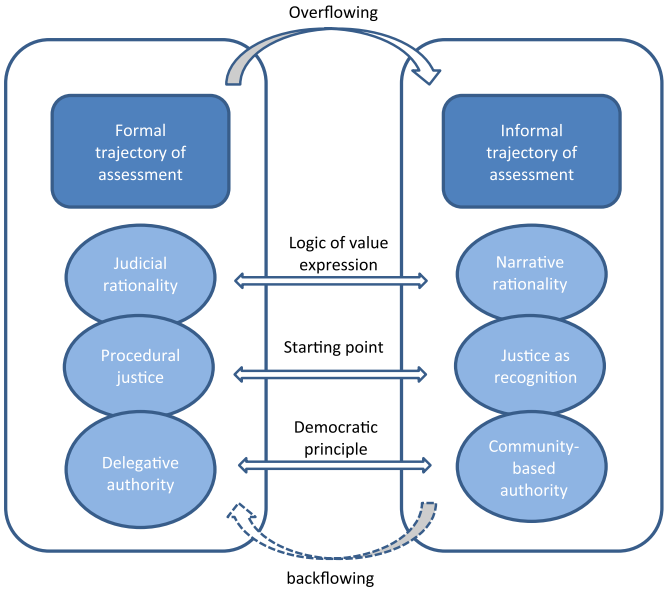

Fig. 2. Three justice-related attributes shaping the interaction between formal and informal trajectory of assessment.

4.1. Logic of value expression in both trajectories

While the formal trajectory relies on a judicial rationality, the informal trajectory can be said to rest on a narrative rationality. The presence of these contrastive rationalities may lead to deep mutual distrust. From the point of view of actors central in the formal trajectory, protesting citizens and groups are often assumed to reason upon the basis of self-interest, opportunism or nimbyism (Devine-Wright, 2011; Van der Horst, 2007; Wolsink, 2006). Moreover, the arguments protestors put forward are often discredited because of their emotional content. From the side of the informal trajectory, the acts of institutional actors are often perceived as technocratic or elitist, ignoring the needs and 'rights' of the specific local community, which perceives itself to be suffering most from the intended decisions.

As said, the logic of the formal trajectory is based on a judicial-rationalist approach, in the sense that actors take decisions based on a known body of standards and procedures that have been established by democratic consent (Weber, 1972). The formal trajectory is characterised by the explicitness by which accountability is specifically arranged. Furthermore, it is based on the formal institutionalization of processes and parameters for quantification. Both our cases testify this logic: in Barendrecht by the development of a frame that assumed a technical risk definition; in Boxtel by following the standard permitting procedures for gas exploration activities.

Although there is no strict distinction between the formal and informal trajectory of assessment in terms of the actors participating in both trajectories, most often the formal trajectory is taken up by institutionalised actors like governmental authorities, firms, and expert organizations, and the informal trajectory by residents, citizens and NGOs. The former actors usually embed their assessment in institutionalised and predetermined procedures, recurring practices and routines. Examples of such assessments are spatial planning guidelines, (societal) cost-benefit analysis, and environmental impact assess-

ment. Generally, residents and NGOs get access to this trajectory by means of participatory procedures, or via their influence in the democratic (local) policy-making process.

The formal trajectory allows for a shared understanding among a range of actors from different institutional backgrounds, such as policy and industry, so that decisions in multi-actor settings can be made effectively. Such a shared understanding allows the mutual adjustment and alignment of expectations between actors and a certain level of predictability and stability necessary to coordinate actions. This shared understanding is usually based on a goal-rational frame in which arguments are articulated in terms of means and ends, and in an objectified and generalised manner. This is illustrated in our account of the case of CCS in Barendrecht, in which the risks and other impacts were phrased as factual calculable units, and in Boxtel in which standard permitting procedures were applied to a type of gas exploitation about which little was known in the Dutch context; formally as well as informally.

In the informal trajectory of assessment, the actors are usually individual members of a population, but, as our description of shale gas exploration in Boxtel showed, actors may also include local businesses and semi-public organizations. In some cases these actors and groups organise themselves as ad-hoc civil society organizations that may be joined by NGOs, and (local) political parties. Their advocacy can be regarded as an assessment, because they forward values and concerns that may have not been taken into consideration in the formal trajectory (cf. Cuppen et al., 2016; Rip, 1986). Since most new energy technologies have benefits on a national scale, decisions on the desirability of such technologies are made on that level. Yet, the risks associated with applying such technologies are likely to have a local impact.

In contrast to the detached disposition that typifies the formal trajectory, the informal assessment trajectory is predominantly based on a common identity of a(n emerging) societal collective. This common identity is constituted by the maintenance of a narrative which bestows the community with a continuity, based on a shared origin and a common future. These narratives are also maintained by emotional attachment (Nussbaum, 2001; Roeser and Pesch, 2016). Especially in Barendrecht, emotions ran high in reaction to the decision of national authorities to not change their position. When the two responsible ministers visited Barendrecht in December 2009 and, in front of a large crowd, repeated their claim that the project was completely safe, the public reacted hostile and interrupted the ministers by many boos, whistles, cries of disapproval and insults. Speeches of community members frequently raised the point that the decision-making process had been unfair and that they would not allow the project to take place (Feenstra et al., 2012).

Rather paradoxically, such emotions and narratives do not always exist before the emergence of an informal trajectory of assessment. In fact, the assemblage of a group of people into a societal collective often is the result of overflowing itself. In such cases we may speak of 'issue-formation', a situation in which specific concerns become shared pivotal points, around which a social collective emerges that provides a shared identity to its members, possibly also attracting new (groups of) supporters (Jasper, 1998; Latour, 2004; Marres, 2007).

4.2. Starting points for considering justice in each trajectory

The formal and informal trajectories appear to legitimise moral claims about what is just or not by appealing to different sources. The tripartite approach to energy justice, distinguishing distributive justice, procedural justice, and justice as recognition, helps to characterise these sources (Jenkins et al., 2016; McCauley et al., 2013; Sovacool and Dworkin, 2014). First, *distributive justice* relates to the (re)distribution of benefits and burdens associated with changes in energy systems, and addresses the inequalities invoked by these changes, as well as the possible remedies to resolve the potential inequity that follows from these inequalities. Second, *procedural justice* concerns the timely access to decision-making processes and fair and transparent procedures that engage all stakeholders in a non-discriminatory way (Jenkins et al., 2016). Third, *justice as recognition* is based on the argument that certain groups have historically suffered, or are still suffering, from economic, cultural and symbolic inequalities. Recognising these inequalities helps to restore the respect and dignity of these groups should be respected by others (Honneth, 1992; Wolsink, 2013). The notion of justice as recognition has been mainly presented to point at the injustice experienced by deprived or vulnerable societal groups, such as women, the working class or particular racial or ethnic groups (Bulkeley et al., 2014; Fraser, 2000). Also in the energy domain, justice as recognition will play a role when projects come to threat the position of a local community or when they reinforce existing inequalities. The consideration of dignity and respect seems to be taken up by studies on the fairness of energy projects by integrating these as an element of procedural justice (Gross, 2007; Simcock, 2016). However, the separate use of justice as recognition helps to explain the formation and reactions of societal groups in the informal trajectory of assessment in a more detailed and profound way. Justice as recognition refers to the moral need of groups to define their own identity, which may be compromised by external definitions that are bestowed upon them by experts or policy makers (cf. Wynne, 2008). Such external definitions contrast with the right of these groups and communities to create and maintain their collective identity in an autonomous way.

With that, justice as recognition allows the focus on the hermeneutical elements that are connected to a specific context. Different groups of people have to be able to find out for themselves who they are and what binds them as a community. Usually the direct social and physical environment plays a strong role in this process of collective self-definition. This suggests that justice as recognition requires that attention for the specific practices and circumstances is added to the universal and general principles that characterise expert knowledge and policy categories used for collective, formal, decision-making.

The assessment trajectories employ divergent points of departure for justice: formal assessment assumes the primacy of procedural justice expressing this equality as abundantly prescribed in predetermined procedures, whereas informal assessment assumes the primacy of justice as recognition. In case of energy controversies with local impacts, both starting points serve the same moral question: how to justly *distribute* the local disadvantages and (often national) benefits. This implies that the formal trajectory *assumes* the equality of all people that are gathered under a jurisdiction and approaches distributive matters from a procedural starting point. In contrast, the informal trajectory often considers *explicit* recognition of the local sphere as a prerequisite for both procedural and distributive matters.

Justice as recognition appeared to have played an important role in the CCS project in Barendrecht. Both the municipality and residents became increasingly displeased with the emphasis on the technical approach to risks. To them, it was much more important that they had a real say in the establishment and implementation of the project, in the sense that they wanted be able to independently decide upon the issues that were important in the context of the project in 'their' environment and every-day life.

Appeals to recognition as a group are in many cases articulated in terms of redistribution, and not as recognition per se. Protestors might feel the need to adapt their vocabulary to dominant policy approaches, or they might have difficulty to express their genuine concern. This explains why a compensation scheme can be perceived as a form of bribery; i.e. it overrides the emotional bond that a local community might feel with the place they live (Devine-Wright, 2012; Drenthen, 2010). This suggests that a negotiation on compensation is more likely to succeed if it is acknowledged that the community or group has a unique identity, and if their specific understanding of the proposed changes to the energy system is respected.

The formal trajectory is usually based on an ascription of values and

interests to persons and groups, to facilitate decisions that pursue the maximization of general welfare. Such ascription of values and interests may contribute to the 'objectification' of the identity of the social group at stake. The ascription of values and interests may be justified by following egalitarian principles, as in that case no specific interest is favoured over another and decisions that are acceptable for the collective can be agreed upon. However, when the act of ascription results in the complete objectification of the identify of a group, it can be seen as contrastive with the notion of justice as recognition. In most cases, communities consent with the status quo of definitions externally bestowed upon them; yet changes or intended changes can give rise to protest. In such cases, descriptions that have been predetermined in the frames of formal assessment become discredited. Such overflowing is based on the community's desire to decide autonomously about its identity, the values that need to be secured, and the concerns that need to be addressed.

4.3. Democratic principles

Justice claims about energy projects are made against the background of an existing democratic system, which informs citizens and decision-makers about the procedural validity of decisions. A decision that is considered by a group of actors to contradict fundamental democratic standards, will create perceptions of injustice. The crucial problem here is that these standards are far from unequivocal. In fact, liberal democracy is intrinsically ambiguous, as it builds on different ideological traditions, namely *liberalism* which is based on the defence of human rights and the respect of individual liberty, and the *democratic* tradition which is based on popular sovereignty and collective self-determination (Berlin et al., 2002; Mouffe, 2000; Pesch, 2005). With regards to formal and informal assessment, these traditions are respectively articulated in terms of *delegative authority* versus *community-based authority* (cf. Callon et al., 2009), that appeal to contrastive forms of democratic legitimacy, which paradoxically are justifiable to a significant extent. With that, dilemma's and ideological tensions are inevitable. It is the impossibility to discriminate between the legitimacy of the contrastive appeals to democracy that creates pressures for multi-level decision-making. This section will present these contrastive democratic principles that give rise to different forms of justifying collective decisions, by outlining their theoretical and ideological points of departure.

Liberal democracy ideologically assumes the moral autonomy of the public-at-large as a social entity. Ideally, the public should be fundamentally free from external pressures to form and forward its opinions, desires and needs (Berlin et al., 2002; Pesch, 2005). This autonomy grants the public-at-large the legitimacy to independently formulate its own concerns, interests, and objectives, which means that in a democracy, communities have authority to decide over their own affairs. At the same time, it has to be acknowledged that there is no tangible group that can be said to be 'the public'. No party that claims to act as the legitimate representative of the general public has the *a priori* right to do so, because in the end such an ideal 'public' cannot exist as an empirical entity. This also holds for local communities of Barendrecht, Boxtel en Haaren. In the controversies discussed, they cannot be regarded as autonomous publics. This is because the nature and structure of the energy system implies that they are entangled in issues that also have strong (inter)national connotations, pertaining to other spheres and publics that exceed the limits of the locality. In the end, a 'public' is constituted by its issues, and not by a given constituency (cf. Dewey, 1927). This means that the boundaries of an affected public are fundamentally negotiable and contingent, and means that in energy controversies, different scales of publics need to be taken into account.

Moreover, to implement and enforce collective decisions, administrative bodies have been established, that exert authority that is delegated to them. As such actors are given delegative authority, they come to dispose over power, means or knowledge that can challenge the autonomy of individuals and societal groups (Stirling, 2014). This challenge is generally kept in balance by making institutional actors responsive and accountable with regards to their decisions; which is often done by establishing explicit and specific yardsticks and procedures and other controlling bodies (Pesch, 2014). Indeed, the judicial-rationalist form of accountability figures as a barrier against the threat of the abuse of power. Hence, institutional actors legitimately refer to the rules and procedures that grant them their institutional mandate. These actors generally only do what they have to do upon the basis of the responsibility that is delegated to them, and as such their activities are legitimised. Then again, if local stakeholders make counterclaims about the overall (un)desirability of a certain technological development, they may encounter distrust of institutional parties, who perceive such claims as a transgression of jurisdiction, so that the protests are considered to be unjustified by these institutional actors.

Though in many respects delegative authority and community-based authority can be respectively related to the formal and informal trajectories of assessment, it does not mean that actors have to stick to either one of these trajectories. To pursue their strategic goals, actors may follow both trajectories. This can be observed for instance in the shale gas controversy in which opponents deployed the formal route of going to court as well as the informal route of organising public protest groups. Moreover, they mobilised political resistance in the municipal, provincial and national political spheres. The result of this strategy was the 're-opening' of frames so that new concerns and values were given space to be recognised and attended, eventually leading to a termination of the projects, for the time being.

5. Conclusion and discussion

In our contribution to this special issue on energy justice (Jenkins et al., 2017), we have developed an empirically grounded, explanatory framework for understanding the role of perceptions of justice in the dynamics of controversy. For this, we distinguished a formal and an informal trajectory of assessment that interact through overflowing and backflowing. We acknowledge that this framework should be refined and further developed by analysing new cases, also from outside of the Netherlands. Moreover, alternative social dynamics that give rise to overflowing should be explored. Here, we have focussed on the role of new groups that have been triggered by perceptions of injustice, but by no means this focus is intended to exclude other mechanisms of overflowing. New research might, for instance, address the role of incumbent actors in forwarding new concerns or it might try to identify processes of overflowing and backflowing that do *not* evolve from public controversy. It might also examine the question if perceptions of injustice always figure as an instigator for overflowing.

The analysis we have presented pertains to a combination of empirical observations and theoretical reflections, it is on this combination that we would like to raise a number of issues in this final section. First, we will recap our findings by discussing them in light of the concept of energy justice. This will be done by emphasising the contributions to this new and rapidly expanding field of literature. Second, we will sketch the implications of our work against the backdrop of the democratic conditions that need to be considered in energy projects. Third, we will reflect on the implications for policy-making, especially regarding to development and application of participatory methods for citizens as well as a wider set of stakeholders in decision-making.

5.1. Implications for energy justice

In light of this special issue's theme of the exploration of the concept of energy justice, the analysis of overflowing in Dutch energy controversies has especially aimed to increase the understanding of how dynamic processes of assessment of energy projects take place in

concrete national policy contexts, with particular legal and regulatory arrangements. Our study shows that in such a context, controversies on energy projects have strong spill-over effects. The adjustment of participatory arrangements in Dutch decisions on underground activities in the new Mining Act is a direct consequence of the contestations that have taken place in Barendrecht, Boxtel and Haaren as well as in the case of Groningen, where gas extraction has led to earthquakes. Both formal and informal, as well as national and local actors appear to shape their expectations about, and their responses to, such projects based on similar earlier projects. As such, local forms of overflowing can give rise to national backflowing under particular conditions.

The framework that we have presented helps to analyse and understand the temporal dynamics of energy controversies. Our focus was on the role of the justice-related attributes that can be seen as drivers of controversies. In this, we have taken a broader account of justice than is usually done, by looking at the logic through which values are expressed, the assumptions about the hierarchy between the three dimensions of justice, and democratic principles. For each of these attributes, we observe a clear and decisive difference between the formal and the informal trajectory of assessment. This broadened account of justice stresses the fact that justice is not a mere theoretical notion, but has direct, real-life consequences. In other words, energy justice is not only a framework that can be used to evaluate the ethical desirability of certain policy measures, but also pertains to the ways in which people relate to decisions on changes in the energy system. Concerns of justice inspire people to actively think about how they relate, and want to relate, to each other, about how they unite in social collectives or want to split up in factions, and about what the democratic acceptability of collective decisions means to them. Justice is about the way in which societal actors and groups want to shape a common world, and motivates them to engage in collective action.

Another contribution of our framework relates to a reconceptualization of justice as recognition. This notion is mostly used to articulate moral intuitions that concern the justness of interaction of privileged and underprivileged groups (Bulkeley et al., 2014; Fraser, 2000; Wolsink, 2013). Here, we refer to recognition in relation to the capacity of social groups to define their own identity and their own terms. This hermeneutical approach helps to understand the way in which injustices are perceived, it also explains that controversies may occur even if both formal and informal assessment adhere to the importance of distributive and procedural justice. Such controversies are based on a fundamentally different understanding of how to arrive at these forms of justice and hence, how to *recognize* different parties that could make an appeal to justice. This difference also implies that there might be disagreement about the perceived fairness of procedures and compensation schemes that are offered – usually from the side of a formal trajectory of assessment. Moreover, it suggests that no procedural arrangement can be expected to be immune to contestation; i.e. any formal assessment can by definition give rise to overflowing.

5.2. The democratic importance of acknowledging overflowing

We would like to emphasise that overflowing is not a negative side-effect of energy projects, or that it evolves from bad management. Overflowing is inherent to decision-making on energy projects. Energy projects and systems involve a wide range of uncertainties that are not only technological, but also social and normative and that play out on different geographical, jurisdictional and temporal levels, as such increasing complexity and creating tensions. Formal trajectories of assessment are needed to support decision-making and will always imply demarcations in terms of problem definition, scope, rationality etcetera. They thereby naturally create the potential for overflowing. Importantly, this potential contributes to the democratic quality of decision-making processes. Firstly, the acknowledgment of overflowing is necessary not only to avoid the 'technocratic pitfall' of excluding arguments and sentiments of local populations, but also the 'populist pitfall' of presupposing that only voices from outside the institutionalised system are credible expressions of what the 'public' really wants. Giving in to the populist pitfall ignores the complexity of values, technologies and interests at stake in the energy sector (cf. Correljé et al., 2015; Roeser, 2011). Secondly, overflowing also secures the normative diversity that is essential for democratic processes and the mobilisation of new action groups that can be seen as a form of political engagement (Cuppen et al., 2016; Mouffe, 2000; Verloo, 2015). In a democratic political context, conflict resolution is based on the acceptance of normative diversity. Indeed, the quality of a democratic process is to be judged by "the extent to which different voices from diverse sections of the people can actually be heard" (Sen, 2011). The normative diversity of claims that are represented in a debate is a major indicator for its democratic level. Therefore, it is important that both the formal and informal trajectories of assessment are taken up in deliberations once a controversy has emerged. Indeed, a controversy can be seen as a token that the space for arguments and values needs to be (re)examined and possibly extended, so that a productive exchange between formal and informal settings can take place (Cuppen et al., 2016; Stirling, 2008). New and different moral demands have to be deliberated upon as to arrive at acceptable decisions on trade-offs. This is no straightforward task and it is obviously very time consuming; this goes against businesses' and authorities' demands for quick and effective decision-making and legal certainty.

Legitimate decision-making is to be based on a circular pattern established by overflowing and backflowing, in the sense that decision-makers have to be prepared that emergent concerns are incorporated in future decision-making frames. With that, a dynamic equilibrium transpires in which new concerns may be taken up over time as part of the 'official' institutional framework. Obviously, this leads to the formation of new frames that eventually may cause overflowing again (Callon, 1998a, 1998b). To cope with the complexity of modern society and its changing system of energy supply, the challenge lies in creating forms of governance that are adaptive enough to accommodate divergent voices and to learn from controversy, i.e. facilitate the dynamic equilibrium between the formal and the informal trajectory.

5.3. The policy implications of overflowing

The challenge is thus not how to prevent overflowing, but how to *govern* it. In the context of energy controversies, we may present two designated routes for improving the capacity to deal with overflowing in a constructive way. First, we have to think about the appropriate participatory methods that could help communities to express their concerns. Second, we also have to reflect on the way in which decision-makers can involve the different territorial levels that are affected by an energy project in a productive way. These two routes have been taken in the adjustment of the Dutch Mining Act (see Section 3.3), but as such they deserve much more investigation.

The typical approach to manage controversy is by creating the more or less sheltered environment of a participatory decision-making method, which helps to give dissenting actors a 'forum' to autonomously express their concerns (cf. Callon et al., 2009). Our study suggests that the establishment of truly symmetric processes of deliberation promises a smoother management of overflowing. Still, there are some puzzles to be addressed, as most participatory methods that are in use nowadays are ill-equipped to deal with the interaction between formal and informal assessment, particularly in 'hot', highly debated, situations (Callon, 1998a). First, participatory methods usually are aligned with the rationality of informal assessment, and give little advice on how to connect to the formal trajectory (cf. Huitema et al., 2008). The reason for the emphasis on the informal trajectory may have to do with the need to counterweigh the authoritative capacity of the formal trajectory. However, symmetry is not enough; effective participatory methods should also operationalise

backflowing, i.e. ways to incorporate newly emerging concerns and values into the official frames. Second, paradoxically, it is in the nature of emergent groups that they often are only established in reaction to the outcomes of ongoing decision-making processes. This implies that while such collections of individuals claim their right on autonomous self-definition, they may have not been identified by themselves and by society as a group. As such, *ex ante*, one cannot easily identify a group that endorses particular values and concerns, let alone a representative of that group. This is however what most participatory methods assume: clearly defined interest groups with clearly identifiable representatives. Moreover, it is never clear to which extent values and concerns that are found in a participatory setting are exhaustive or representative for the range of values held by the populations which the participants are thought to represent, or that may enter later on in the process.

Energy projects have an impact on different geographical scales. Different publics will be affected by the costs and benefits of changes in the energy system. Policy-making needs to account for a heterogeneous set of constituencies and jurisdictions (Devine-Wright et al., 2017). Such heterogeneity will easily increase the potential of overflowing, making it paramount to pre-empt on this. To do so, more anticipatory actions have to be undertaken earlier in the decision-making process. Governmental bodies at different scales and with different functionalities, as well as existing NGOs of a varied nature could be involved so to trigger 'resistance' and create awareness of the concerns that may arise – while, at the same time, acknowledging that it is perfectly possible that in the course of a project, new publics may emerge.

In all, we suggest that a more intrusive analysis of the nature of the controversies in energy systems would be helpful and policy arrangements that are adaptive to overflowing need to be developed. Generally, controversies are seen as frustrating the efficiency and effectiveness of collective decision-making processes on energy infrastructures. Yet, our analysis shows that controversies can be constructive, as they show the limitations of formal trajectories of assessment in incorporating relevant public concerns and values. As such, analysing and understanding societal conflict creates a potential for higher-order learning (Argyris and Schon, 1978; Sabatier and Weible, 2014), because the articulated normative conflicts can result in scrutinizing underlying presumptions and changed problem definitions. By acknowledging this faculty of controversies, they can be apprehended as constructive, instead of merely destructive processes (Cuppen et al., 2016).

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