Understanding energy conflicts

From epistemic disputes to competing conceptions of justice

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DOI
10.1016/j.erss.2024.103809

Publication date
2024

Document Version
Final published version

Published in
Energy Research and Social Science

Citation (APA)
van Uffelen, N. (2024). Understanding energy conflicts: From epistemic disputes to competing conceptions of justice. *Energy Research and Social Science*, *118*, Article 103809. https://doi.org/10.1016/j.erss.2024.103809

Energy Research & Social Science 118 (2024) 103809

Contents lists available at ScienceDirect

Energy Research & Social Science

journal homepage: www.elsevier.com/locate/erss

Original research article

Understanding energy conflicts: From epistemic disputes to competing conceptions of justice

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ARTICLE INFO

Keywords:
Energy justice
Restorative justice
Energy conflicts
Underground gas storage
Normative uncertainty

ABSTRACT

Analysing energy conflicts is crucial to realise a successful and just energy transition. In doing so, it is insufficient to understand energy conflicts as epistemic disagreements about risk analyses and safety, as people often voice moral concerns beyond epistemic debates. To analyse grievances of social movements and citizens in energy conflicts, scholars often adopt a tenet-based energy justice framework that distinguishes between distributive, procedural, recognition and restorative justice. However, categorising claims into tenets does not shed light on disagreements within the tenets. As such, the existing conceptual toolkit is insufficient to understand the core of energy justice conflicts. This article proposes to shift focus towards capturing different conceptions of justice. This approach is illustrated by a qualitative analysis of the controversy around underground gas storage Grijpskerk and Norg in the Netherlands. The results show that the conflict is constituted by competing conceptions of restorative justice. The institutionalisation of one conception delegitimises and hides certain justice concerns and reduces the conflict to an epistemic dispute, which leads to misrecognition and possibly to the escalation of the conflict.

1. Introduction

The energy transition implies changes in energy systems, infrastructure, and policies, and as such, it is prone to induce resistance and conflicts amongst the publics. To realise a successful and just energy transition, it is crucial to analyse the core of energy conflicts, including the grievances of social movements and citizens. In doing so, it is insufficient to understand energy conflicts as epistemic disagreements about risk analyses and safety [1]. When a conflict is framed as epistemic in nature, public resistance is explained by imagining the publics – based on "deficit assumptions" – as "unknowledgeable, incapable, unwilling and irresponsible agents in governance" [2]. Following this narrative, people hold false beliefs based on emotions that impede the best course of action, which can be determined by science [3]. Energy projects and policies are more likely to succeed if the publics are well-informed about the truth.

Scholars have criticised such deficit models for explaining energy controversies, showing that people often voice moral concerns that go beyond epistemic debates [4–6]. Such concerns mirror political and ethical values, mostly related to justice. Perceptions of (in)justice play a major role in the social (community) acceptance of energy technologies and infrastructures [7] and in explaining energy conflicts and controversies [8,9]. More specifically, Pesch et al. describe how formal institutions and processes can give rise to moral claims of injustice in the informal sphere [5]. Given these insights, energy controversies cannot be reduced to clashing epistemic assumptions about truth, and it is vital to analyse energy conflicts in terms of justice.

When analysing energy conflicts, the energy justice tenet framework that distinguishes between distributive, procedural, and recognition justice is often used to better understand claims of injustice [10–12]. In this, distributive justice refers to just distributions of burdens and benefits; procedural justice refers to just decision-making procedures; recognition refers to just relations of recognition through love, law, and status order; and restorative justice refers to the just restoration of past injustices. However, categorising claims into tenets does not shed light on disagreements within the tenets about what (procedural, distributive, restorative, or recognition) justice is [13–16]. Nor do such categorisations help understand how claims of injustice relate to the epistemic side of controversies. As such, the existing conceptual toolkit is insufficient to fully understand the core of energy justice conflicts.

This paper proposes to analyse energy controversies not on the level of tenets, but on the level of competing *conceptions* of (distributive, procedural, recognition, and restorative) justice that might lie at the basis of the disagreement. Following Rawls, the concept of justice can

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https://doi.org/10.1016/j.erss.2024.103809
Received 2 October 2023; Received in revised form 8 October 2024; Accepted 18 October 2024
Available online 24 October 2024

have different conceptions: "The concept of justice I take to be defined, then, by the role of its principles in assigning rights and duties and in defining the appropriate division of social advantages. A conception of justice is an interpretation of this role" [17]. In other words, while there might be agreement on the importance of energy justice, it is disputed what a just distribution of burdens and benefits is, or what good procedures entail. Distinguishing between concepts and conceptions helps strengthen the energy justice scholarship's ability to analyse energy controversies, as there is often *normative uncertainty* (e.g. philosophical and social disagreement) about how to interpret justice [18]. So, the core of the controversy can best be described in terms of conflicting conceptions of justice.

This paper aims to explore how competing conceptions of justice can constitute and possibly escalate an energy controversy. To identify the underlying justice conceptions of an energy controversy, this paper studies the conflict about underground gas storage (UGS) Grijpskerk and Norg in the North of the Netherlands. Realising just energy transitions requires insight into technical and social challenges, including those of ethics and justice. Although understanding the source of societal unrest is essential for a just heat transition in the Netherlands, the social aspects of UGS Norg and Grijpskerk have not yet been studied. This paper studies the conflict qualitatively and draws inspiration from literature on harm and compensation.

The difficulty here is that members of the publics often do not express well-structured positive conceptions of justice. Instead, they often voice negatively formulated injustices that are fragmented, uncoordinated, and unsystematic [19]. Warner described how counterpublics emerge as a response to injustices that "lack the power to transpose themselves to the generality of the state" [20]. Similarly, Callon describes how institutionalisation can cause processes of overflowing, giving rise to critical discourses that are often conceptually inconsistent [21]. As a result, there is a methodological challenge in understanding which conceptions of justice are being held by counterpublics. Yet, expressions of disapproval contain implicit moral standards that can be indirectly grasped through interpretation [19,22]. Evaluating something as unjust assumes an idea about what is just that acts as a yardstick. So, a more positive conception of justice can be derived from negatively formulated statements of injustice.

The results show that the conflict can be understood as two clashing conceptions of restorative justice regarding compensating for damage induced by an energy project. One set of stakeholders adheres to a *Reactive Conception* of restorative justice: a good compensation system organises that X compensates Y only if X caused harm to Y. This conception automatically centres science-based knowledge and epistemic processes due to the necessity to establish whether the actor caused the harm. Other stakeholders voice experiences of injustice that can be translated into an alternative conception of restorative justice, namely the *Proactive Conception*: a just compensation system consistently compensates individual households proactively for fears of harm, risks of harm, and actual harm, and compensates the region for gas-related distributive injustices. In this, causality and scientific knowledge are still important, but less so than for the Reactive Conception, because stability, equality, and well-being can override causality concerns in decisions on who receives compensation. The institutionalisation of the Reactive Conception explains why this controversy is primarily viewed as an epistemic dispute on a societal level. Moreover, it delegitimises the justice concerns of the other parties and deems them irrelevant, which might lead to the escalation of the conflict in the future.

The article proceeds as follows. First, the methodology for the Underground Gas Storage Grijpskerk and Norg case study will be explained (Section 2). Second, the case study will be introduced (Section 3). Then, the controversy will be analysed regarding competing conceptions of restorative justice (Section 4), followed by a discussion (Section 4). The paper closes with some recommendations for policy and further research on understanding energy justice conflicts in which normative uncertainties are key (Section 6).

2. Methods

This paper studies the nature of the conflict about underground gas storage (UGS) Norg and Grijpskerk in the Netherlands. A total of 30 interviews were conducted with various stakeholders involved in the controversy between March and May 2022 [see Table 1]. Ethics approval has been received for this study, and all participants have given written prior and informed consent. Most interviews took an hour and were conducted online, yet nearly all interviews with citizens were conducted face-to-face in either the UGS Grijpskerk or Norg region. The interviews were one-on-one, but four interviews were conducted with multiple stakeholders, and in two cases, two interviewers were leading the conversation.

To highlight both "sides" of the controversy, half of the participants were (activist) citizens from the UGS Norg and Grijpskerk regions. In contrast, the other half are stakeholders from different governmental levels or organisations related to mining and compensations in the Netherlands. Initially, a key participant (an activist citizen) was recommended by the researcher and proactively approached. Most other participants were sought via snowballing as the interviewees were asked to provide recommendations for other relevant stakeholders after each interview, and some participants were proactively contacted to maintain a balance between different organisations and geographical locations. A saturation point was reached when additional interviews brought little additional perspectives and when stakeholders started recommending other participants.

The interviews were semi-structured and focused on the interviewee's expertise, experience, or organisation; the recent developments at UGS Grijpskerk and/or Norg; and the compensation system. For each topic, an in-depth conversation followed about what people meant, why, and what other things were on their minds that they associated with the topic. Therefore, most of the time, the interviews covered topics that occupied interviewees. After each interview, the interviewees were asked to send the interviewer documents they deemed relevant. The documents that the interviewees sent ($N = 96$) were treated as supplementary to the interviews, and they included web pages, scientific reports, recommendations and advice, legal documents, newspaper articles, images and maps, manifestos, opinion articles, and policy documents.

The interviews were transcribed and analysed inductively using thematic analysis [23]. First, the topics on which participants had conflicting perceptions of opinions were coded (subthemes). Next, the subthemes were clustered into six themes, namely (1) (problems with) the compensation system; (2) changes in the contours around UGS Grijpskerk and Norg; (3) effects from mining activities; (4) participation in decision-making procedures; (5) attitudes towards (management and measurements of) gas infrastructures; and (6) perceptions about regional and national identities. A full list of themes and subthemes can be found in Appendix 1. Lastly, participants' distinct positions towards each subtheme were distinguished and coded, thus breaking down the subthemes into separate codes.

Uncovering the conceptions of justice underlying both sides of the debate, however, contains a methodological challenge because many interviewees mainly articulate experiences of injustice rather than well-formulated conceptions of justice. To tackle this challenge, special attention was paid to the implicit moral standards in expressions of disapproval. This is because evaluating something as unjust assumes an idea about what is just that acts as a yardstick. So, interpreting negatively formulated statements of injustice allows for formulating the conceptions of justice underlying both sides of the debate.

Table 1
Overview of interviewees.

Stakeholder category	Location	Affiliation/organisation	Number of interviewees	Number of interviews
Citizens	UGS Norg	TWME (Tijdelijke werkgroep mijnbouwschade Een)	5	5
		Steenbergen Barst	1	1
		No organisation	1	1
	UGS Grijpskerk	SOGG (de Samenwerkende Omwonenden Gaslocatie Grijpskerk)	3	3
		No organisation	1	1
	Groningen Field	Ons laand ons lu	1	1
		GGB (Groninger Gasberaad)	1	1
		GBB (Groninger Bodem Beweging)	1	1
Government organisations	UGS Norg	Provincie Drenthe	1	1
		Municipality Noordenveld	3	3
	UGS Grijpskerk	Municipality Westerkwartier	1	1
		Province of Groningen	1	1
	Groningen Field	Commissie/Vangnet Bijzondere Situaties	2	1
	The Netherlands	Mijnraad	1	1
		SodM (Staatstoezicht op de Mijnen)	4	2
		EZK (Ministerie van Economische Zaken)	1	1
		EBN (Energiebeheer Nederland)	2	1
		IMG (Instituut Mijnbouwschade Groningen)	1	1
Research institutes	The Netherlands	TCBB (Technische Commissie Bodembeweging)	1	1
	Groningen Field	Kennisplatform Leefbaar en Kansrijk Groningen	2	1
Independent process advisor	UGS Norg + UGS Grijpskerk	Omgevingstafels	1	1
Total			35	30

3. The conflict above UGS Grijpskerk and Norg

3.1. Background

Natural gas will play an important role as a transition fuel towards decarbonisation: before it can be fully phased out, it will still be needed for energy security in many countries [24]. This also goes for the Netherlands, a country in which natural gas has played a key role in the Dutch economy and culture. In 1961, a gas field with an estimated 2.740 billion cubic meters of extractable low-caloric[1] natural gas was discovered in Slochteren, Groningen. Two years later, the NAM (Nederlandse Aardolie Maatschappij, owned by Shell and ExxonMobil) started extraction. As a result, the Netherlands became one of the largest producers of natural gas in Western Europe [25].

Since 1997, the NAM has also deployed two former gas fields for gas storage, namely UGS Norg in Drenthe and UGS Grijpskerk in Groningen. Both storage units lie approximately 3 km below the surface. UGS Norg is utilized for the seasonal storage of low-caloric natural gas from the Groningen field, to avoid high extraction peaks in the winter. The field has a maximum storage capacity of seven billion Nm^3 of natural gas. UGS Grijpskerk, on the other hand, has always been used for the storage of high-caloric[2] natural gas imported mainly from Norway, Russia, or Alger. The maximum storage capacity of UGS Grijpskerk is two billion Nm^3.

The extraction of the Groningen Field led to a series of induced seismic events. On January 1st 2021, a total of 1396 seismic events have been registered as caused by the Groningen gas field since 1986 [26]. The amount of induced seismicity increased significantly between 2000 and 2013, culminating in the Huizinge earthquake on 16 August 2012 with a magnitude of $M_L = 3.6$ [26]. These induced seismic events contributed to material and immaterial damage and increased public resistance [25]. In January 2018, another seismic activity occurred ($M_L = 3.4$) led, besides an enormous increase of damage claims, to fierce policy responses: a month later, the SodM advised to reduce gas extraction by 50 %, and in April the EZK decided to end the extraction of the Groningen field altogether as soon as possible, preferably in 2022/2023 and in 2030 at the latest.

Given the expected closure of the Groningen Field, UGS Norg and UGS Grijpskerk become vital for Dutch energy security. To fulfil this role, three steps were outlined. First, the operating envelope of UGS Norg ought to increase from five billion Nm^3 to six billion Nm^3. Second, the low-caloric natural gas from the Groningen Field will be replaced by *pseudo-G-gas* (high-caloric natural gas with added nitrogen), which will be made in a nitrogen factory that is being built in Zuidbroek.[3] Third, UGS Grijpskerk ought to be converted from storing high-caloric gas to low-caloric gas.[4] These three measures would imply that extraction from the Groningen field can be finally closed down between 2025 and 2028.

3.2. Compensations for damage

In the regions above UGS Grijpskerk and Norg, material damages caused by mining activities are mostly 'cosmetic'[5] fractures in buildings that do not yet pose safety hazards (as opposed to the damage above the Groningen Field). Most interviewees accept the storage units but under certain conditions. Interviewees mentioned that the storage units need to be safe and regulated responsibly and that there should be appropriate compensation for damage. As such, most societal unrest in the region pertains to the compensation system for damage due to mining activities.

[1] Low-caloric gas is mainly used for consumption by households in the Netherlands and several other North-West European countries, as these appliances for heating and cooking have been calibrated for low-caloric natural gas since the 1960s.

[2] High-caloric natural gas is used for industrial consumption and electric power plants in the Netherlands and therefore the injection and extraction of natural gas occurs more consistently throughout the year.

[3] At the time of writing, the estimated start of production will be early 2023, see https://www.gasunietransportservices.nl/nieuws/stikstofinstallatie-zuidbroek-operationeel-begin-2023.

[4] In 2019, the NAM decided to close UGS Grijpskerk for gas storage in 2021 due to low profitability, but the developments at the Groningen Field impeded with the plans for closure.

[5] In some cases, the fractures have practical consequences, such as leaking or broken windows. Some interviewees claim that the damage above Norg and Grijpskerk is becoming more structural, leading to tilted walls or damaged foundations. For example, one interviewee discovered water in the basement and cracked foundations, causing the kitchen to tilt. Another interviewee inhabits a 100-year-old farm that has structural damage as it was built without proper foundations.

Since 2019, the IMG (Instituut Mijnbouwschade Groningen) has been responsible for compensating for damage caused by UGS Norg and the Groningen Field. The IMG is an independent organisation in charge of compensating for material and immaterial damage (such as decreases in the value of buildings and lost enjoyment of living). The NAM and the Dutch state pay the compensations, given their respective percentages of ownership. The exact mission of the IMG is "to deal with mining damage in an independent, just, generous, and decisive manner" [27]. After receiving a claim, the IMG enlists an engineering agency to investigate the damage and its potential causes; the agency advises the IMG on how much the compensation ought to be.

Before 2017, it was difficult for citizens to receive compensation because the burden of proof was upon the citizens who had to prove that mining activities caused damage. To address this issue, in January 2017 the *legal presumption of proof*[6] was instated, meaning that it will be assumed that the damage above the Groningen field is caused by mining unless proven otherwise. In January 2019, UGS Norg was added to the legal presumption of proof as UGS Norg was used to store gas from the Groningen field. A contour of 6 km around both UGS Norg and the Groningen Field was drawn to demarcate the area where the measure was applicable [see Fig. 1]. As a result, citizens within the UGS Norg contour could submit compensation claims for damage to the IMG, often leading to positive results. So, the criterion for the legal presumption of proof became: "The legal presumption of proof is applicable in cases of damage to buildings situated above the Groningen Field or gas storage Norg and until six kilometres outside it. It concerns damage caused by subsiding, rising, and (vibrations caused by) earthquakes" [28]. At the time of the interviews, the IMG had no jurisdiction over UGS Grijpskerk, as the area falls outside the criterion for the legal presumption of proof, except when earthquakes from the Groningen field or UGS Norg reach the area.

Yet, in February 2021, a research report concluded that there is "no direct effect of subsiding and rising of the deep surface in UGS Norg on damage to buildings" [29]. The gas storage fields cover a large surface area, and the cyclical movement of 3 cm happens over 2 km in total; the whole surface goes up and down in the shape of a large dish, making damage within the area extremely unlikely. As a result, in May 2021, the IMG decided to redraw the contours around UGS Norg in which the legal presumption of proof is applicable. Consequently, most areas around UGS Norg that previously enjoyed this legal protection have now lost it. The IMG started to decline compensation claims in those areas.

To confirm the areas where the UGS Norg might indirectly cause damage, the IMG issued another research report to Deltares that focused on ground and surface water [30]. This report concluded that indirect effects might occur via underground water dynamics in two distinct zones, leading to another redrawing of the contours around UGS Norg to include these areas [see Fig. 2]. These two moments of redrawing caused major societal unrest around UGS Norg.

4. Mapping the justice conflict

4.1. More than an epistemic dispute

What bothers people is not that they have damage: the problem is that they face a huge administrative and legal wall. It's a very long trajectory, especially when it is combined with the feeling – and I am afraid that that feeling is justified in many cases – that they are not being taken seriously, or that there are people on the other side that try their best to keep the compensation as low as possible or to dismiss it altogether in other ways. That feeling causes great misery, depression, or a significant decrease in quality of life. I think that is the main problem in areas affected by earthquakes. – Groningen Province.

The epistemic conflict around UGS Grijpskerk and Norg revolves around whether damage to buildings can be caused by cyclical surface movements induced by the filling and emptying of the gas storage fields, without the occurrence of earthquakes. On the one hand, the views of the SodM, scientists, the IMG, and the provinces of Groningen and Drenthe align with the scientific reports. As such, they argue that cyclical movements cannot lead to damage to buildings, except in distinct areas outlined in the Deltares report. As a result, the IMG can only compensate for damage by earthquakes induced by UGS Norg and the Groningen field, and for damage within designated areas around UGS Norg where gas storage might indirectly lead to fractures. All other damage claims are explained through other factors: interviewees mention water dynamics, settlement damage, thrust forces, temperature changes, droughts, passing trucks, plants, and trees close to the walls, taking long showers, and ill-constructed outbuildings.

On the other hand, citizens and interviewees from the municipalities Noordenveld and Westerkwartier claim that UGS Norg and Grijpskerk can result in physical damage. Several reasons were given to argue for this position: (1) damage to buildings also appears in moments unrelated to earthquakes; (2) the subsurface movements are not insignificant but quite disruptive to buildings; (3) the subsurface is complex, and there are many unknown unknowns, for example, it might be possible that a building is damaged because it is located at an intersection multiple gas fields, and therefore, more research has to be done; and (4) the conclusions drawn in the reports by TNO / TU Delft and Deltares are invalid or false because (a) the study is too theoretical: fieldwork and an actual study of the subsurface are lacking; (b) the assumptions of the model are limited, outdated, problematic, or too deterministic, because they are based on data from smaller gas fields and standard soil parameters, while the subsurface around UGS Norg is much more complex and in a way unique as it interacts with other fields; (c) the initial research question given by the IMG to only consider direct effects were too narrow, and therefore the conclusions drawn from the studies are not justified; and (d) the researchers were not independent and biased.

To sum up, the epistemic dispute concerns the causation between gas storage and damage to buildings. If cyclical surface movements can cause damage to buildings, then the IMG's redrawing of the areas in which the legal presumption of proof is applicable was not justified. If there is no such causal link, then the redrawing based on the reports was justified and the IMG was right not to hand out compensations in those areas. The media coverage and parliamentary debates on UGS Grijpskerk and Norg focus primarily on this epistemic dispute.

Although the epistemic dispute seems prominent at a societal level, many stakeholders – especially citizens and municipalities – expressed distributive, restorative, procedural, and recognition injustices that cannot be reduced to purely epistemic concerns. This paper argues that the core of the controversy can best be described in terms of conflicting conceptions of justice. *Restorative justice* refers to the just restoration of injustices. Depending on the injustice, a just restoration might entail the acknowledgement of wrongdoing, forgiveness, apologies, compensation, recognition, a more thorough redistribution of burdens and benefits, or (monetary or in-kind) compensation [31]. It is widely acknowledged that the tenets of justice are analytical tools that are interconnected in empirical realities [13,32]. In the case of UGS Grijpskerk and Norg, restorative justice is realised institutionally through a compensation system, and thus it is intrinsically connected to procedural justice (e.g., how decisions about the compensation system are made), distributive justice (e.g., the distributions that result from the compensation measures), and recognition justice (e.g., the values and norms that are institutionalised in the compensation system). In this paper, the controversy is interpreted in this paper as a conflict about restorative justice instead of procedural justice, mainly because it is not contested how decisions are being made, but rather how compensation should be organised, which includes dispute about when and for what harms compensation should be handed out. This is a conceptual, analytical choice made to fit best the empirical reality. In the case of UGS Grijpskerk and Norg, different stakeholders have different ideas about how and when compensation should be organised, which falls under the

[6] Wettelijk bewijsvermoeden

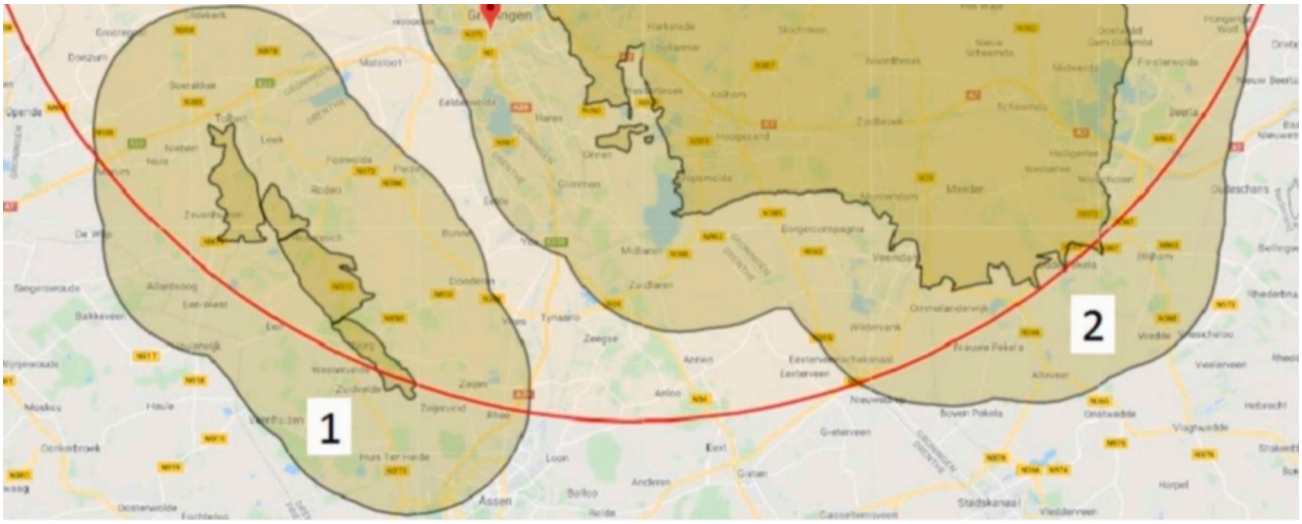

Fig. 1. Effect areas around UGS Norg (1) and the Groningen Field (2), source: TNO-report 2021 R10325, original source: https://www.schadedoormijnbouw.nl/nieuws/advies-klaar-over-indirecte-effecten-diepe-bodemdaling

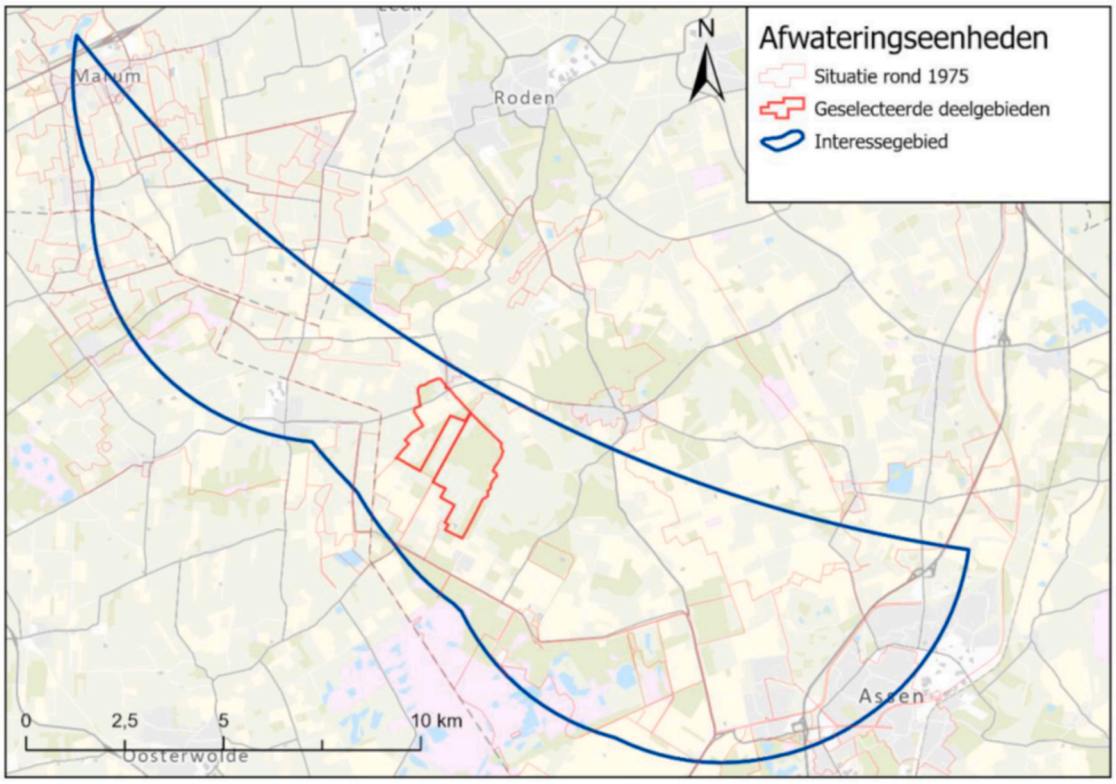

Fig. 2. Overview of the areas where according to the analysis indirect effects of deep surface movement cannot be ruled out. Source: Deltares report 11207096-002-BGS-0001, original source: https://www.schadedoormijnbouw.nl/nieuws/advies-klaar-over-

category of a just restoration dispute [33,34]. From the data, two conceptions of restorative justice can be deducted.

The first set of stakeholders (that include institutions such as the IMG, Mijnraad, SodM, EBN, and the TCBB) adhere to a *Reactive Conception of restorative justice*, meaning that compensation is due after the harm was caused. In other words, a good compensation system organises that X compensates Y only if X caused harm to Y. This matches the mission statement of the IMG, which is the "independent, generous, and just execution of compensating damage *caused by* surface movements *that result from* mining activities at the Groningen field or UGS Norg" [27]. Causality is central to this conception because X should compensate Y only if X caused the damage. As a result, the reactive conception automatically centres scientific knowledge and epistemic processes that establish the cause of the harm.

Other stakeholders (mainly the citizens above UGS Grijpskerk and Norg and the related municipalities and provinces) voice claims of injustice, revealing that they oppose the Reactive Conception of restorative justice. To further define which conception of restorative justice is being held by these stakeholders, the most prominent claims of injustice are analysed through the following three topics of controversy:

whether it was justified to reduce the areas in which the *legal presumption of proof* goes; (4.2); whether the current design of the compensation system is just (4.3); and what harms or injustices ought to be restored (4.4). From this, a positive formulation of restorative justice can be deduced (4.5).

4.2. Should the contours around UGS Norg be changed (back)?

The first topic of conflict pertains to whether the contours around UGS Norg (that delineate the area in which the legal presumption of proof is applicable) should have been changed and whether this ought to be reversed. Before the IMG decided to redraw the contours, the whole area of 6 km around UGS Norg fell under the legal presumption of proof. The IMG decided to reduce this area significantly after the publication of several scientific reports that debunk a causal relation between UGS Norg and damage to buildings.

On the one hand, the Reactive Conception of restorative justice justifies redrawing the contours around UGS Norg. According to this conception, the IMG has no mandate to compensate if there is no causation. So, if scientific reports state that UGS Norg without seismic activity – in other words, by merely subsiding and rising – cannot cause damage, then no compensation is due and the contours in which the legal presumption of proof is applicable ought to change. Following the Reactive Conception, the contours ought to change as scientific knowledge on causation progresses. The interviewee from the IMG stated: "*You have new knowledge, and it shows something different. In that case, the law says, you must correct this, so you cannot allocate compensations here.*" As such, the IMG decided to change its contours along with the insights from scientific reports.

On the other hand, many regional stakeholders, including municipality Noordenveld, lobby for the restoration of the old contours of 6 km around the gas field, based on two claims of injustice. First, many interviewees classify the changing contours as unjust because "*the rules of the game have been changed during the game*", a metaphor that was used nine times by different interviewees.[7] The legal presumption of proof was perceived by citizens as a promise, leading to certain expectations about where the burden of proof lies. After the publication of the scientific reports, certain areas lost this legal protection, which was perceived as a broken promise: "*Promises were made in 2018 and they were simply reversed in 2021. […] Yes, that does not feel fair*." Based on this frustration, stakeholders demand the return of the legal presumption of proof in the original area.

Second, changing the contours resulted in equal cases receiving unequal compensation. For example, a member of municipality Noordenveld testifies: "*People are living in the same street, practically neighbours, where one gets thousands of euros in compensation and someone who happens to file a claim recently* [e.g., after the contours have changed] *gets nothing. But has the same damage to his house*." These inequalities are exacerbated because receiving at least 4.000 euros of compensation comes with a voucher that can be spent on solar panels. This leads to a very visible marker in a street: everyone knows who received compensation – the households with solar panels – and who did not. Most citizens describe that such inequalities can harm social cohesion in the neighbourhood because of frustrations, jealousy, and secrecy. To sum up, the changing contours are perceived as arbitrary, which can be considered the opposite of justice: "It [justice] requires that where two cases are relevantly alike, they should be treated in the same way" [35].

To summarise, municipalities and citizens perceive the redrawing of the contours as unjust, for two reasons. One, promises ought not to be broken. Two, changing the contours led to unequal treatment of equal cases, giving rise to arbitrary inequalities between households unrelated to the actual damage. As such, these stakeholders propose to restore the original contours even though a causal relationship between the gas storage and damage to buildings might be lacking, because of two reasons about fairness. In other words, concerns of equality and well-being trump concerns of causality when delineating the area in which the legal presumption of proof is applicable. These stakeholders opt for a stable compensation system that does not regularly change its rules when scientific knowledge progresses so that all equal cases are treated in the same way.

4.3. Is the compensation system just?

The second point in this controversy revolves around the question of whether the compensation system is just or not. On the one hand, the Reactive Conception justifies the current compensation system. Following this conception, it is vital to know whether a fracture was caused by UGS Norg or the Groningen Field or not. Determining the cause of a specific fracture requires insights from (engineering) experts. As such, the method of determining whether a specific fracture was caused by UGS Norg or not is often quite complex, and lengthy, and sometimes leads to court cases. Showing whether a certain fracture is caused by mining or not is also very costly: it requires hiring engineers who draft reports to study the damage case-by-case. In 2021, paying 1 euro compensation for physical damage required 0,74 cents in execution costs [36]. Following the Reactive Conception, these costs are justified because compensation is appropriate only if there is causation.

On the other hand, citizens and municipalities consider the compensation system as unjust based on two reasons that relate to justice. First, according to some citizens the current compensation system "*hurts more than the actual fractures*" because it can cause sleepless nights, tension, stress, and an overall decrease in quality of life.[8] These negative effects are the consequence of intrinsic features of the system, such as its length and complexity, but also its design. The compensation system is designed to investigate whether the fractures are caused by UGS Norg or Grijpskerk or not, and thus a lot of money is spent to prove that the citizens submitting the claims are wrong. An active citizen states: "*It is completely unacceptable that a government victimises citizens and then that same government hires lawyers against all these victims to prove them wrong.*" As a result, citizens feel abandoned by the government. So, the compensation system has negative consequences by design. These consequences are considered unfair because the reason why citizens have to go through that process is inflicted upon them: they did not ask for the gas storage. So, the complex compensation system causes additional immaterial harm that was wrongfully incurred upon citizens, on top of the gas storage and the fractures.

Second, it is claimed that the current compensation system is not inclusive enough. Interviewees claim that the system is insufficiently accessible to the most vulnerable as the anticipation of stress and hassle causes some (especially elderly) people to refrain from reporting damage. Moreover, if people disagree with the IMG's assessment they can go to court, yet such measures are prone to exclude groups that do not enjoy a certain amount of education, money, and psychological resilience. Some citizens even suspect that elderly people are more prone to having their compensation claims denied as they are less likely to object in court. So, the current system is perceived as unjust because not everyone who deserves compensation gets it.

Based on these two claims of injustice, interviewees dismiss the epistemic nature of the compensation system as unjust altogether, and thereby also the Reactive Conception. Two types of suggestions were mentioned by the interviewees. One, the money would be better spent

[7] This implies that there is a group of stakeholders that are actively lobbying for changing back the contours, and that this is an argument that clearly resonates amongst citizens.

[8] Many participants testify that they do not fix the cracks, paint their walls and window frames or redo their garden because they are waiting to receive compensation or because they believe that it has no use as new cracks will soon appear anyway.

by just paying the compensations in case of doubt, not only because citizens claim that scientific models often fall short when proving with 100 % certainty that the storage caused damage to a particular house (as the epistemic discussion highlights), but mostly because it would avoid the unfair amounts of stress that the compensation system now brings. Two, it was often suggested that the compensation system should be thoroughly revisited with Norway as a best practice, as "*they just created a pot of money*", and that "*the citizens immediately get compensation*". This latter suggestion hints towards an imperative to not only compensate for damage that already occurred but also potential damage. As such, there is also a disagreement about what ought to be compensated.

4.4. What should be compensated?

The third main point of controversy pertains to what injustices ought to be compensated. On the one side of this disagreement, compensation is required for (material and immaterial) damage caused by mining activities, in other words, compensation should be reactive. Other than that, the current distribution of burdens and benefits is considered more or less just. The assumption here is that the North is not entitled to profits from mining any more than the other provinces in the Netherlands. Stakeholders refer to the many benefits that the North has already received from natural gas that the regions should be grateful for. Examples that were mentioned are theatres, pools, and cafes that were once sponsored by the NAM; the fact that the NAM provided employment opportunities in the region; and the pride and feelings of ownership that the Dutch once had (and still should have, according to some interviewees) to provide gas to half of Europe. These things are referred to by stakeholders as gifts, not as things the region had a right to. As such, the only thing that the Netherlands is due to the North is the compensation for the damage that was caused *ex-post* by the mining activities, and this compensation is to individual households, not to the region as such.

Yet at the other end of the controversy, claims of injustice indicate that three forms of harm are not being compensated. First, harm can also be caused by mining activities *ex-ante*, disregarding the occurrence of fractures and earthquakes. This includes *fear of harm*, well-grounded or not, as fear, stress, and unhappiness can have a "detrimental impact on people's lives and well-being" [31]. The visible fractures in buildings, the machines and accompanying pipelines that regulate the gas storage, and the small possibility of earthquakes have been described by participants as causes of anxiety. Moreover, it can be argued that being exposed to a *risk of harm* is in itself a form of harm [37–39]. Hansson argues that "everyone has a prima facie moral right not to be exposed to risk", and this right can only be overridden if the risk is "part of an equitable system for risk-taking" that implies for example being compensated for taking the risk [38]. Both taking a risk and the fears that may result from it are considered by citizens and municipalities as forms of harm that are currently not being compensated.

Second, citizens experience misrecognition through law as they feel that their well-being and safety – or broader, their human dignity – do not weigh against the monetary and economic interests of the North. A citizen claims: "*We say it all the time, it [Groningen] is a big hole, bulldozers in front of it, everything that is Groningen, cover it in the sand. Make it a theme park with nuclear power plants. They put the well-being of Groningers aside.*" Misrecognition through law can be considered as hurt or harm [40], yet this remains unacknowledged and uncompensated.

Third, participants claim that the mining activities have a negative impact not only on individual households but also on the region and that this is an injustice that remains uncompensated. In this view, the current distribution of gas-related burdens and benefits between the North of the Netherlands (in this case, Groningen and Drenthe) and the Dutch government (or: the rest of the country) is considered to be unfair. The natural resources in the Netherlands are divided unequally over the country: most gas fields, salt caverns, and potential for wind and solar farms are in the north. As such, the North – and especially the province of Groningen – is often referred to as a colony (*"wingewest")* within the Netherlands. This has an impact on the future of the region, as many inhabitants move away, which leads in turn to fewer investments in the region. In other words, there are also two competing conceptions of distributive justice at play; one that assumes a Dutch-individualistic scale of justice, and one that adopts a regional-communal scale. Under the latter conception, there is an additional injustice that ought to be restored by redistributing gas-related burdens and benefits within the Netherlands.

When taking into account *ex-ante* damage, misrecognition through law, and a regional scale of justice, it follows that reactive compensation of damage to individual households does not go far enough. The interviewee from the EZK made a similar statement: *"(…) we see how the burdens come down. The whole operation is profitable. Perhaps there should be some general compensation from the state. (…) So, it's mainly, the way it is done right now where there is incidental compensation, I don't think that is enough.*" Such a view would imply that compensation is also due to risks and uncertainties *ex-ante*, and experienced misrecognition through law. Moreover, adopting a regional scale of justice leads to demands for a more thorough redistribution of the benefits from mining from the Netherlands to the region. A possible way to meet both demands would be nonmonetary compensations that benefit the region, such as counselling, improving infrastructure, investing in education, or developing high-status jobs [31].

4.5. The proactive conception of restorative justice

As described, a first set of stakeholders adheres to a Reactive Conception of restorative justice, while citizens and municipalities negate this conception through several claims of injustice. These claims of injustice have been described in the previous sections and they can be summarised as such:

- Changing the contours according to new scientific knowledge is unjust, because (1) promises ought not to be broken, and (2) equal cases ought to be treated equally.
- The current compensation system is unjust, because (3) it causes unfair amounts of stress, and (4) it excludes the most vulnerable.
- Only compensating damage *ex-post* is unjust, because (5) it fails to restore other injustices that occur, such as fear of harm, risks, and misrecognition through law.
- Only compensating individual households is unjust, because (6) there is a maldistribution of gas-related burdens and benefits within the Netherlands.[9]

From these claims of injustice, a positively formulated conception of restorative justice can be deduced, namely a *Proactive Conception of Restorative Justice*. This conception perceives a compensation system as just under the following conditions:

- The compensation system ought to be stable (e.g., 1).
- The compensation system ought to treat equal cases equally (e.g., 2 and 4).
- The compensation system ought to contribute to the well-being of the affected individuals (e.g., 3).
- The compensation system ought to also compensate for *ex-ante* harms such as fear, risks, and misrecognition through law (e.g., 5).
- There needs to be a redistribution of gas-related benefits from the Netherlands to the regions that bear the burdens (e.g., 6).

[9] This analysis shows intense connections between 'restorative justice' and other tenets of justice. Here, experiences of misrecognition in the compensation system, ill-distributed effects of the compensation measures, and unjust compensation procedures co-constitute the perception of the compensation system as unjust.

According to the Proactive Conception, a just compensation system consistently compensates individual households for fear of harm, risks of harm, and actual harms, and compensates the region for gas-related distributive injustices. In this, causality and scientific knowledge are still important, but less so than for the Reactive Conception, because stability, equality, and well-being can override concerns of causality in decisions on who receives compensation. The Proactive Conception, therefore, prescribes a compensation system that is less strict in terms of causality. For example, even though reports show that UGS Norg and Grijpskerk cannot cause damage to buildings, fractures should still be compensated in these areas for the sake of fairness.

5. The dominance of the reactive conception

In this controversy, two groups of stakeholders have different ideas about when compensation is due, what a just compensation system looks like, and what ought to be restored. These two positions can be traced back to two competing conceptions of restorative justice, namely the Reactive and the Proactive Conception. Yet, these conceptions do not have equal standing in the debate. The Reactive Conception shines through the formulation of the task given to the IMG: the organisation is only allowed to compensate *ex-post* harm when causation cannot be disproven. Because of this institutionalisation of the Reactive Conception, it has a higher standing than the other. This dominance has two main implications.

First, the Reactive Conception reduces the local debate on restorative justice to an epistemic dispute about causation. The conception implies that compensation is appropriate only in case of causality. As such, scientific reports and engineers define who should receive compensation and who should not. Given the institutionalisation of the Reactive Conception, there appears to be one single way to argue why more compensation is due: one must contest scientific insights and claim that the cyclical movements of UGS Norg and Grijpskerk do cause damage.

Second, the dominance of the Reactive Conception and its ensuing epistemic focus cannot deal with the claims of (in this case, distributive and recognition) injustice that are implied by other conceptions of restorative justice, such as the Proactive Conception. Instead, it renders ensuing claims of injustice irrelevant or illegitimate. For example, when citizens feel unsafe, they are considered irrational, because they allegedly ignore scientific facts without adequate scientific justification and based on emotions only. Moreover, when citizens express feelings of arbitrariness because two alike houses are not treated alike and subsequently claim compensation as well, they are blamed to be opportunistic as they misuse situations for their monetary interests. Lastly, citizens who claim a more thorough distribution of burdens and benefits for their region are blamed to be spoiled or whiners who complain about every little thing. For instance, an interviewee stated: "*(…) the surroundings of the gas storage have become a park. (…) And people were worried, because if it were to close, who is going to pay that? Who is going to maintain the bicycle paths? Who will take care of the park? That was their main question, the thing that bothered people because there was no solution.*" In sum, institutionalising one conception of justice renders other conceptions illegitimate, and their ensuing claims of injustice as irrelevant.

The data shows that citizens experience such prejudices. Some inhabitants feel perceived as profiteers ("*It's not because we want the money that they can just do anything. It's a huge insult to the Groningers*"). Moreover, many citizens and municipalities feel they are often not taken seriously when voicing claims of injustice. A citizen describes being perceived as "*a couple of stupid farmers*", and others expressed that they felt perceived as incompetent, irrelevant, and not taken seriously. For example, an interviewee stated: "*We had an information day, and one of the NAM said, well little madam* [mevrouwtje]*, you have to see it as a corn starch porridge that comes and goes. That's how they look at us. (…) Those people don't know anything so we can just tell them anything.*" Furthermore, testimonials of citizens are discredited as unjustified by the media, by experts, and by the rest of the Netherlands. One interviewee described being laughed at. These phenomena can be described as misrecognition through status order, or more specifically as testimonial epistemic injustice [40–42]. So, failing to acknowledge the existence of legitimate alternative conceptions of justice quickly leads to misrecognition through status order, including testimonial epistemic injustice.

Previous studies have described how dismissing and labelling a vocal minority [43], depoliticisation [44], and avoiding meaningful engagement with protesters [45] can contribute to the escalation of policy conflicts. In this controversy, the institutionalisation of the Reactive Conception leads to dismissing many claims of injustice as irrelevant, irrational, or illegitimate [46]. Stakeholders voicing these claims subsequently experience misrecognition through status order, including epistemic testimonial injustice. As such, it could be expected that the institutionalisation of the Reactive Conception of restorative justice might contribute to further escalation of the controversy.

6. Concluding remarks

Justice is an incredibly intricate concept that can refer to many different conceptions. There is normative uncertainty on energy justice, making it difficult to make energy policies, technologies, and systems more just. Conversely, energy justice controversies are often reduced to epistemic disputes in which laypeople dispute expert scientific knowledge. This also goes for the conflict around UGS Grijpskerk and Norg. Although the conflict publicly plays out as an epistemic disagreement, this qualitative case study shows that many claims of injustice are voiced that transcend the epistemic domain.

Public responses to energy systems, projects, and policies are often negatively formulated, unsystematic, fragmented, and uncoordinated claims of injustice [47]. The tenet-based energy justice framework categorises claims of injustice into tenets (e.g., procedural, distributive, restorative, and recognition justice). Yet, such categorisations are insufficient to fully understand the controversy and energy controversies in general. Instead, this article recommends investigating an alternative avenue to understand energy justice conflicts, namely through analysing conceptions of justice. This study shows that it is possible to articulate claims of energy injustice in a more positive formulation. The UGS Grijpskerk-Norg controversy can be traced back to two clashing conceptions of restorative justice. The Reactive Conception is institutionalised through the mission of the IMG and thereby largely determines the public debate as an epistemic controversy about causality. Consequently, expressions of injustice that stem from the Proactive Conception, such as claims for redistribution or redesigning the compensation system, are dismissed as irrelevant. This leads to experiences of misrecognition through status order and possibly to the escalation of the conflict in the future.

To avoid injustices remaining hidden and to prevent escalation, it is vital to take claims of injustice seriously. This has several implications. First, it means acknowledging normative uncertainty, in other words, that claims of injustice might stem from alternative, non-institutionalised interpretations of justice that might nevertheless be justified. Second, justice conflicts should not be reduced to epistemic disputes, as this would almost inevitably delegitimise claims of injustice. Third, when a certain conception of justice is institutionalised, the broader discussion about what a just energy system is can get lost. So, in this case study, taking claims of injustice seriously implies opening up the discussion about how the compensation system ought to be designed, whether the contours should be changed back, and what harm is eligible for compensation. The interviewee from the EZK stated: "*My dream is (…) that I get to reject something once. (…) For the credibility of governance. (…) Yes, if it complies with all the legal demands then they [energy companies] get permission. (…) I just have a legal framework that says that, if it can be done safely and responsibly, then it is permissible.*" Although institutions and regulations may seem objective or universal, they are socially constructed and consist of institutionalised conceptions of justice that are, in fact, particular and can be questioned [48]. Lastly,

taking claims of injustice seriously implies flexible institutions that continuously adapt in the face of valid emerging moral concerns. Institutionalising conceptions of justice will continuously lead to novel claims of injustice, which may hold essential clues for making our energy systems more just.

In sum, understanding claims of injustice requires uncovering the underlying conceptions of justice and their related status in society. Which conceptions circulate, which are dominant or institutionalised, and which expressions of injustice are thereby excluded, rendered illegitimate, or even hidden? Such a research agenda adds to the conceptual apparatus of the energy justice scholarship, which enhances its ability to effectively analyse justice in energy controversies.

Funding

This project has received funding from the NWO-AES Crossover Programme under project number 17621. The content of this article does not reflect the official opinion of NWO. Responsibility for the information and/or views expressed in the article lies entirely with the authors.

CRediT authorship contribution statement

Nynke van Uffelen: Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.erss.2024.103809.

Data availability

The data that has been used is confidential.

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