EUI SCHOOL OF TRANSNATIONAL GOVERNANCE

Municipality-Led Approaches to Addressing Energy Poverty

Energy Justice Lessons from the Dutch and Danish Heating transition

Fee Helen Kirsch

Thesis submitted for assessment with a view to obtaining the degree of Master of Arts in Transnational Governance of the European University Institute

Florence, 15th of May 2022

European University Institute
School of Transnational Governance

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Student **declaration to accompany the submission of written work**
School of Transnational Governance

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Abstract

The Dutch government is aiming at following the Danish example and transform the municipal heat sector by switching from natural gas and individual heating systems to district heating and renewable energies. The research analyses selected municipality-led projects under the Dutch national programme for natural gas-free districts by applying an energy justice analytical framework. This comprises not only injustices related to distributional aspects, but also to the intergenerational dimension, injustices with respect to procedures and the recognition of energy poverty. The same analysis was be done with respect to the historic case of the Danish municipal transition. These two cases teach us ways in which energy poverty can be addressed during a municipal energy transition and what factors explain a country's capacity to do so. As a result, four general approaches are discussed to fight energy poverty, each very much dependent on the legal and financial framework. The case studies show that the Dutch municipalities favour projects that focus on the improvement of public acceptance via participation processes. This is not a deliberate choice, but due to the fact that the approaches that were chosen in Denmark – for instance the municipality as an important economic operator in the heat market - are not yet an option.

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1. Introduction

Heating systems are one of the most difficult (Hansen 2018, Royston 2014) and most neglected sectors (IEA, 2012 &2017, Connoly, 2014) to decarbonize. Since the futile energy price crisis and the growing energy insecurity in Europe, there is a pressing need to better understand how low-carbon heat transitions can be constructed fast and in a way that addresses pre-existing and potential injustices.

With the aim to add to this growing body of research on 'just transitions', I focus on two case studies that have committed to a decentralised municipality-led transition away from fossil fuels. These particular case studies from Denmark and the Netherlands are not independent comparative cases. The main focus of the analysis is on the national pilot programme Natural Gas Free Districts of the Netherlands (2018-2027) which explores how the Netherlands can move away from natural gas in the next 30 years. It is contrasted with the shadow case of the Danish district heating transition, as the current Dutch programme cannot be understood separately from the paradigmatic success of Danish transition.

Both countries also share one of the lowest levels of energy poverty in Europe (Rodriguez-Alvarez, 2021). This means they have a low percentage of inhabitants that "cannot secure a socially and materially necessitated level of energy services in the home" (Kottari et Cornelis, 2022, p. 4). By generating and comparing findings from these two cases, I am hoping to find good practises for municipality-led transitions. So, I ask (1) what can these cases teach us on how energy poverty can be addressed during a municipality-led transition and (2) what factors explain a country's capacity to do so.

In the literature review I elaborate on how the energy justice framework reserves to represent the inequalities experienced by energy poverty best and therefore becomes my lens through which I answer the research questions. In the next chapter, I elaborate on my "energy justice" framework consisting of four distinct dimensions – distributional, procedural, recognitional, and intergenerational justice. With secondary sources for the paradigmatic case of Denmark and a diverse collection of primary data and expert interviews on the Dutch pilots, I then examine both cases through this critical lens. After a presentation of the results, I contrast the most important

findings and offer an analysis of four different approaches on how energy poverty can be addressed. I make this distinction based on 'ownership' and 'participation burden' preferences.

This matrix reveals that the more market-based thinking and the current weak national regulation of the Netherland generates different options, than the one pioneered by the Danish success case. In the discussion, I reflect on what this means for the Dutch case specifically and for municipality-led transitions in general.

2. Literature Review

2.1 Examining Energy Poverty

What approaches have past studies taken to analyse energy poverty? What constitutes a socially and materially necessitated level of energy services and how can it be traced? The Energy Poverty Advisory Hub (EPAH) of the EU writes that "its causal multidimensionality, the variability of its expression over space and time, and its private nature make measurement a challenging procedure, with experts divided over the best indicators and metrics for measuring energy poverty" (2022, p. 4). Taking the indicator of unpaid energy bills, for example, to quantify energy poverty fails to capture the phenomenon adequately. This approach neglects to document a large group often labelled the 'invisible energy poor' that consists of people who choose not to turn on their heating to save costs or are disconnected from the grid altogether (Karpinska and Smiech, 2020). These groups and others with damp or poorly insulated houses tend to suffer serious health consequences due to the lack of heating or cooling (Oliveras, 2021). This indicates the complexity of the problem of energy poverty which is characterised by multiple inequalities. To simplify this multicomplex problem, I have summarised the three most agreed on interacting inequalities and their potential solutions in Table 1.

	Inequality	Problem	Solution
Inequalities in access to adequate level of energy services	Inequalities in income	Insufficient available financial resources	Subsidies, vouchers, access to (better) compensated employment
	Inequalities in Energy prices	Price of energy	Stable energy sources, fair energy tariffs
	Inequalities in housing and technology efficiency	Amount of energy needed to achieve level of service	Insulation, home fixes, know-how on smart meters and appliances

Table 1. Energy poverty interacting distributional inequalities summarised in problems and solutions. Source: author's own compilation with the first 2 categories based on Walker and Day's framework (2012)

Yet, this framework is a very simplified version that only covers the tip of the iceberg of the complexity of this problem. Newer research focuses for example on how gender, race and age dimensions play a role in who experiences these distributional inequalities listed in Table 1 (e.g., Middlemiss et al, 2019, Bouzarovski and Simlock, 2017). Alleviating energy poverty is also about access to information and procedures and recognition of struggles. This is especially true in times of transitions to low-carbon energy systems, as these bring disproportionately higher risks for lower income households despite their significantly lower carbon impact (Jacobson et al., 2015). Kottari and Cornelis summarise the current status quo of energy poverty policy efforts in the EU as the following:

> *The EU approach towards energy poverty cannot be considered systemic and directly linked with infrastructure and accessibility issues. Besides, there is still a lack of a credible framework acknowledging and evaluating the differences and barriers that individual or household-level consumers face other than inadequate income, such as racial, gender, age, physical ability barriers, to name a few. The acknowledgement of those barriers would*

> *make the transitions just and fair in absolute terms and assist the better alignment of technological solutions and infrastructure upgrades with the real needs of energy-poor consumers.*
>
> (Kottari and Cornelis, 2022, p. 13)

It is for this reason I have decided to follow the approach of Sovacool et al. (2019). They argue that to analyse energy poverty alleviating strategies, we must move away from the "inherently politically contested concept" and "free ourselves of the trappings of the current system and the current definition of who is or is not [energy poor]." (p. 497). Instead, they advocate for following the energy justice framework. This widely used framework evaluates energy justice by looking at the distributional, recognitional and procedural (in)justices of the energy system (Jenkins et al, 2016). By using the energy justice framework, I will be able to explore not only distributional (Table 1) but also recognitional and procedural injustices that recent literature deems important barriers to alleviating energy poverty (Sovacool et al, 2019).

2.2 Designing a just transition

For the second part of the review, I turn to my independent variable. When is a transition considered just? How can a just transition be designed? What empirically tested methods and favourable conditions have worked in the past? Especially this last question is hard to find answers to because the practical applications of just transitions are few and often fragmented into local case studies rather than country-based approaches. In this second part of this literature review, I examine my independent variable in three steps. First, I position this study in the current just transition literature. Second, I review the existing literature on climate change mitigation and energy poverty alleviation and lastly, I reflect on the literature gap that prompted my case study selection.

Wang and Lo have mapped out the development of the concept of just transition and I want to explain how these developments within the vast just transition literature are relevant for this study

on addressing energy poverty (2021). Table 2 highlights the different aspects. My research fits best within the just transition as a 'governance strategy' category. Its literature agrees that in democracies, a successful just transition would need a broad coalition of actors and strong alliances with non-state actors to overcome political trade-offs (Newell, 2013, Winkler, 2020 via Wang and Lo, 2021). Healy and Barry go as far as to say that the just transition should morph itself into an 'energy democracy" to limit inequalities and exclusion (2017). Newer studies on low-carbon heating transitions confirm the need for a broad coalition, they call this polycentric energy and climate governance (Sovacool and Martiskainen, 2019). Coined by Ostrom, the term "polycentric systems" moves away from the monocentric unit and sees governance at multiple scales by multiple authorities (2010). The Dutch and Danish heating low-carbon transition add to this research by bringing in country case study results. They lay bare what it means to remove the national government as the central driver for transitions and instead govern through local municipal leadership. In doing so, they add to the empirical findings on what decision-makers can learn from the complexities of non-state and sub-state actor involvement in governing transition policy (Sovacool and Martiskainen, 2019).

Conceptual review	Five identified themes by Wang and Lo (2021)	Summary of their literature collection
1.	Just transition as a labour-oriented concept	At the start the biggest risk factor and most tangible direct consequence of the transition was considered the job loss in fossil fuel industries. Indeed, the contestation around the term that remains, and has only grown in the context of multi-actor policy networks, is between the need for equally well-paying replacement jobs and the need for sustainable ecological outcomes.
2.	Just transition as an integrated framework for justice	In this conceptualisation, scholars try to cut across the historical meaning, and instead integrate them with more established justice literature in the fields of environmental, energy and climate justice. This is crucial for designing a robust framework through which to analyse the opportunities for a just transition. Current research on distributional, recognitional, and procedural justice is still rather normative and theoretical in nature.
3.	Just transition as a theory of socio-technical transition	This framework deals with the complexity and uncertainty of transitions and argues that radical shifts are necessary for technological transitions and that they bring about deep structural changes that impact society's configurations long-term. It highlights the disruptive nature of transitions and analyses the sociotechnical regimes, niche-innovations, and sociotechnical landscape.
4.	Just transition as a governance strategy	Literature on governance strategies highlights that the political context shapes just transitions. Its leading question is how to balance the need for rapid action and the inclusion in and

		deliberation of decision-making? Keeping in mind the future injustices associated with global warming. Often, transitions in authoritarian regimes are compared with governance strategies in democracies. The contested trade-off is policy efficiency.
5.	Just transition as public perception	Just transition can also be defined by the perspective of the individuals and communities' perception, support and acceptance of an energy transition. The literature finds that public attitudes can be influenced by many factors, including employment rates, environmental sensitivity and connection to green or fossil fuel industry.

Table 2: Just Transition conceptualisation (*Source: Author's own composition of Wang and Lo 2021).*

So, what existing policy design lessons in energy poverty alleviation in transitions have thus far been drawn? First, energy efficiency improvements have remained a popular solution throughout the scholarship. Ürge-Vorsatz and Tirado Herrero first examined the synergies and trade-offs between climate change mitigation and energy poverty alleviation (2012). To outbalance (future) carbon pricing schemes, they advocate for targeted efficiency measures, such as insulation. By reducing consumption levels, deep energy efficiency would prevent the internalisation of external costs of emissions to increase energy poverty levels. Secondly, and more recently, subsequent studies have focused on how to remove barriers to grant vulnerable households access to efficiency improvement measures and put this advice into practice. With the surprising empirical conclusion that efficiency efforts often yield little to no emission reduction in energy poor households (Hong et al. 2006 in Sovacool, 2019). This is known as the rebound effect when the improvements allowed residents to choose more thermal comfort for the same price. These unexpected real-life

results reveal that there is still a long way to go before the theoretical outlines for eco-social policy-integration can be transformed into practice (Dryzek 2003, Gough 2013). The exact requirements of just eco-social policies or a way to measure success are still missing (Koch, 2018).

Less attention has been paid to what the choice of technology and its transition requirements mean for a just transition. Only recently has district heating gained traction as a potentially positive factor for energy poverty alleviation. District heating "consists in a central facility designed for heat production, with a pipe network that is responsible for its distribution for the different structures and services." (Alonso et al., 2022). It has high fuel flexibility, meaning it can be both fossil fuels driven or with low carbon sources, such as biofuels, green electricity, and access heat (ibid.). District heating has the potential to mitigate all three main energy poverty conditions (see table 1) (Austin, 2010). It has higher efficiency to other heating systems, its prices are more stable, and it provides local economic opportunities (Alonso et al., 2022). However, while such a centralised system is mostly an advantage, there are cases where district heating can lead to more energy poverty, because it can leave households with no control over their consumption (Grevisse, 2011).

While district heating is seen as a centralised energy source, it paradoxically gives citizens and municipalities the option to further decentralise energy systems and explore ownership of small-scale heating sources (Kottari and Cornelis, 2022). The potential impact of such energy communities, defined as "collective citizen action and intervention in the energy system" (ibid, p. 7) is met with much enthusiasm in the energy justice literature (e.g. Hanke et al, 2021). Their potential to redistribute resources and empower local and citizen-led action could be instrumental in ensuring a just transition.

There is a clear need to look at the potential of technological solutions and their implementation, more specifically district heating. While most European research into energy poverty alleviation deals with Eastern and Southern European cases because of the prevalence and severity of the issue here. I will focus on Denmark, a landmark case in district heating and the Netherlands, a country in transition to more district heating. Both Northern European countries enjoy low energy poverty rates and a strong welfare system. To learn how to design just transitions, I argue it is imperative to look at the as-close-to-optimal cases and learn from their mistakes.

3. Analytical framework

3.1 Energy Justice lens

To provide lessons learnt about addressing energy poverty in a transition, I analyse my two case studies through an energy justice lens. I turn to the work of Walker and Day (2012) operationalizing the concept of energy justice. To understand and evaluate the presence of energy injustice among the current population, three questions suffice: Where are the injustices? Who is ignored? And is there a fair process? (Jenkins et al., 2016).

This pays diligence to the gaps in the use of the concept energy poverty as pointed out by the literature. The analytical framework builds on a holistic understanding of both energy poverty and a just transition. For the former, the dependent variable, it moves beyond a merely distributional approach to inequality and incorporates neglected injustices related to procedure and recognition. For the latter, the results generated from the framework provide lessons for what can constitute just transitions. That is why this analysis will mostly focus on the subsequent normative questions arising from the framework: How should we solve these injustices? How should we recognise? And which new processes? (Jenkins et al. 2016) By looking at the ways the Netherlands and Denmark have already solved and recognised energy injustices and created inclusive procedures, I draw lessons. My specific attention goes out to the subsequent effect or non-effect of different approaches. From here, I develop an overview of different governance strategies taken by the Dutch and Danish municipalities.

For clarity, I chose to highlight and analyse a fourth dimension that is in most recent conceptualisations of energy justice already embedded within the three dimensions.[3] Intergenerational justice deals with the future price of current policies and the future costs and benefits from current decisions. I argue that for this particular case study analysis, it is beneficial to single out the ‘ecological impact’ of both countries’ transition efforts in order to better assess the real-life trade-offs between ecological and social costs.

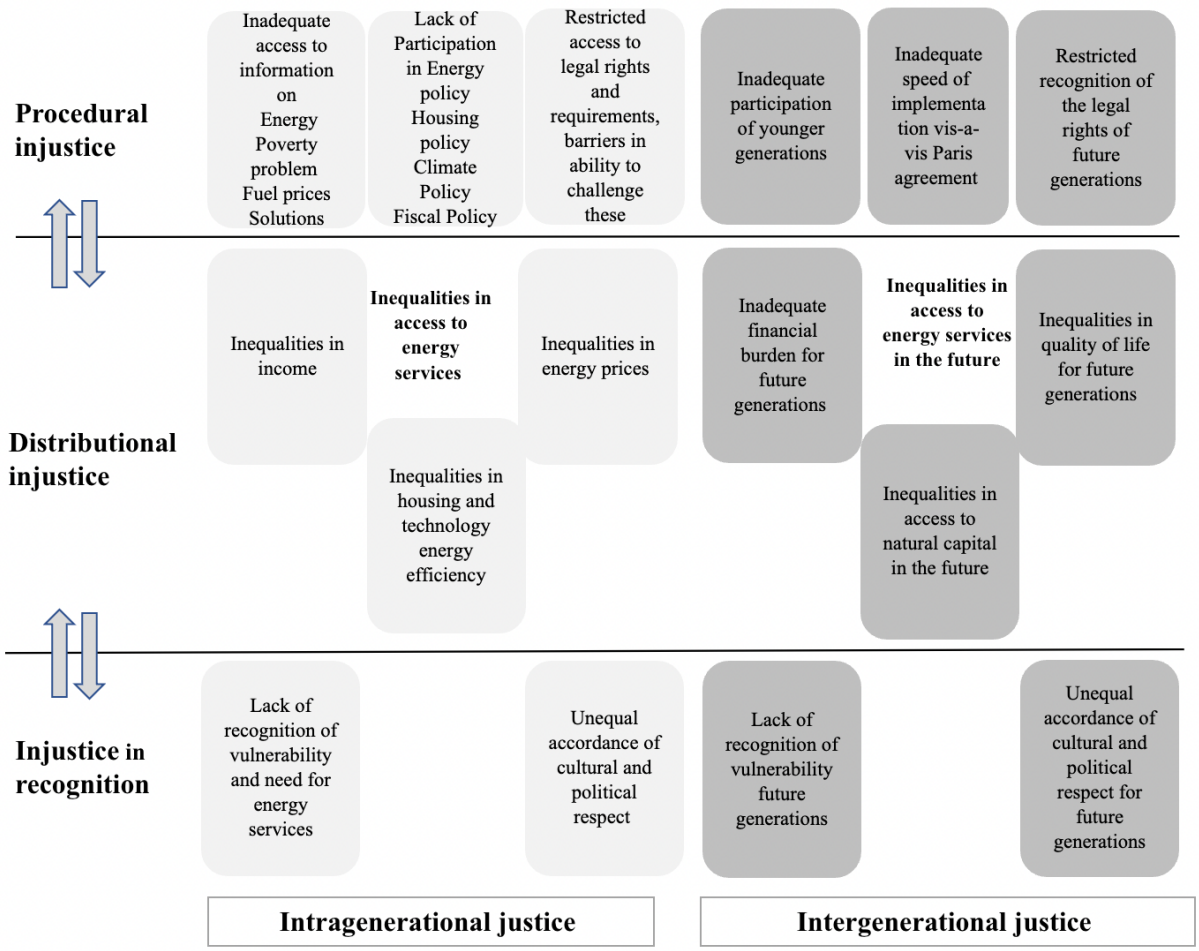

Figure 1: Analytical framework of Energy Justice (Source: Own composition *with the intrageneration category completely based on Walker and Day (2012)'s framework)*

3.2 Intergenerational justice

I start my analysis with this tenet because I want to contextualise the ecological benefits of a certain transition attempt before I look into the three classic energy justice tenets. If a transition is weak or delayed, it reduces the values of the findings of the intragenerational efforts because it moves away from the concept of a low-carbon transition. The dark grey bubbles in Figure 1 above intergenerational justice all represent potential energy injustices that could be inflicted upon the next generation if our current system does not meet its emission reduction targets. This conceptualisation follows the idea that the needs of future energy precarious households are not

adequately protected in the current policies focusing on today's injustices that households are subjected to (Sovacool et al., 2019).

This model neglects emissions that are produced beyond the borders of the country studied for simplicity's sake and for being able to hold the analysed government accountable. In simple terms I ask, is the speed of the transition appropriate and does it complement the national climate goals? There is disagreement on the scope for fast low-carbon transitions (Roberts & Geels, 2019). Those that argue for the possibility of speed believe that today's transition can gain traction because of the policy push and direction that is missing from the slower historical transitions examples (Sovacool and Geels, 2016). I thus also ask what conditions were provided by policymakers in the face of intergenerational (in)justice.

3.3 Distributional justice

Distributional justice looks at how distributional inequalities, listed in Figure 1 under intragenerational distributional injustices, are treated in the two case studies. Its main focus will be on the inequality of prices. This also extends to the costs of transitioning to low carbon technologies. The literature review has demonstrated that there is an "uneven spread of burdens with regards to affordable access to energy services" (Jenkins, 2016). In a transition, the price for changing from one to another energy source often hits the most vulnerable, those prone to energy poverty, disproportionally harder. But this can be prevented with good policy design. Thus, I look for answers in both cases for the normative questions: how should we solve these injustices? Transitions can also be beneficial when they manage to redistribute power and resources. This can range from vouchers and subsidies to regulation to ensure ownership over energy cooperatives. To answer the second part of my research question, I also ask: what conditions were of importance to these developments.

3.4 Recognitional justice

Here I use the lens of the framework to unravel; if energy poverty is recognised; second, if there are any ways that decision-makers are improving recognition of energy poverty barriers and vulnerabilities; and thirdly, under what conditions do these energy just developments in recognition occur? Fraser (2000) and Young (2000) were one of the first theorists to adamantly fight for this aspect of justice to be equally important as and separate from the distributional and procedural tenet(s). A lack of recognition also lays the foundation for more distributional injustice, due to a lack of knowledge of these sections of society (Schlosberg, 2004). In the heating sector, it is about whether energy poverty is seen as a real problem, in other words, whether it is respected. A question that the energy poverty scholarship has centred around for years. Recognising energy poverty in a governance context means being able to define it, measure it, and register it? For Young (2000) and Fraser (2000), lack of respect and recognition had a direct impact on the access to participation in the community and institutional systems. Thus, no recognition meant no procedural justice.

3.5 Procedural justice

With the procedural justice lens, I look at how much access to decisions is given to vulnerable households and what conditions made this possible. I use the three potential procedural injustices described in figure 1 to analyse the case studies. Procedural justice calls for non-discriminatory engagement in procedures and concerns itself with challenging the "closed geography of information, access and power" (Walker, 2009). Another helpful theoretical concept for the analysis is Arnstein's ladder (1969). This framework ranks procedural justice solutions from no participation, to several forms of tokenism, to citizens control. This model is especially relevant to the heating transition. As discussed in the literature review, 'energy communities' and other citizen ownership models are gaining traction as solutions for more just and inclusive transitions. According to the ladder, these are projects that transfer legal and institutional power to citizens (Walker and Day, 2012). This can create bottom-up and self-organised change. In the context of energy poverty, however, it is important to also consider other forms of procedural justice that do not add more 'work' and 'responsibility' on vulnerable members of society. Or to explore how ownership models can be designed to be burden free. Municipal cooperatives are one solution,

because they leave the management with the local government. Of course, the analysis will also consider softer power procedural justice, which includes behaviour influences and norm-setting (Hall, 2013). Interesting will be the timing of procedural access to low-carbon transition decision-making.

4. Methodology

4.1 Case study selection: The paradigmatic and the dynamic case study

This study sets out to compare approaches to addressing energy poverty in an energy transition. Its primary function is not to offer a comparative case study between the Netherlands and Denmark but rather an explorative study of municipality approaches from these countries. It nonetheless follows a structure that divides the findings into the two country cases. First, I present the energy justice lens results for the paradigmatic shadow case of Denmark, whose transition to district heating started about 40 years ago. Then I elaborate more extensively on my main case study, which represents a more diversified municipal approach, the national pilot programme Natural Gas Free Districts of the Netherlands (2018-2022). And lastly, I deduce specific municipality approaches unique to the Dutch and Danish findings.

There are multiple reasons why a pure comparative case study between the Danish and the Dutch low-carbon energy transition is not possible and moreover at the moment not the desirable approach to the research question. First, Denmark and the Netherlands are not independent case studies. Dutch municipal officers interviewed for this study, mentioned study trips and collaborations with their Danish colleagues. They are not the only ones; the Danish heating transition has become a foundational case for rapid energy transitions and the Danish Energy Agency is eagerly exporting the model around the world (See for example their website). This makes the internal validity of its research body's claim strong, and the available within-case analysis is vast. That is also the reason why another extensive review of the Danish case will not offer a contribution to the existing literature. The Dutch pilot case programme however is brand-new and offers a new perspective on municipal heating district transitions. It is furthermore

designed to gather information on good practices for upscaling and therefore, enjoys a rich documentation process.

There are multiple reasons why the biggest part of the analysis is still divided by country, not by municipal approach. These countries were also chosen for their most similar cases design. They share their municipal approach to the energy transition, their Northern European mentality and welfare system, their country size and their high levels of trust, stable institutions and welfare systems and relatively low energy poverty rates compared to other EU countries (Rodriguez-Alvareza et al., 2021). It is therefore more significant when similar approaches produce different results. In this case, keeping an eye on the national legislative realities for municipal planning is one reason to separate into country case studies. Moreover, the municipal approaches are a product of this analysis and providing an overview of the results that prompted their conceptualisation, will help to build more extensive overviews in future research.

4.2 Data Collection

Data-collection knew three stages. For the Danish case study an extensive literature review was conducted. Then, for the data collection for the Dutch case study (henceforth the NFD-programme), I derived primary and secondary data from policy documents, reports from NFD conference presentations, podcasts and public seminars and interviews all available to the public eye via government websites, external (news) articles. During the data-collection period, special attention was paid to the vulnerable neighbourhood pilots. Specifically, municipality information was collected from seven municipalities that were simultaneously part of the NFD-programme of the Netherlands pilot projects and the 3-year long experimentation project following 18 ‘vulnerable neighbourhoods’ from 2018-2021. The seven neighbourhoods at this intersection demonstrate a diverse range of trajectories. Their documentation in both the NFD-programme and by the knowledge-and-network organisation Platform31 provides a rich but concise starting ground for exploring how a just transition is designed on a municipal level in the Netherlands. As a third step, I conducted seven semi-structured interviews with key actors of the NFD pilots as documented in the annex. This was done to validate findings from the desktop research, but also to gather information that had not yet been processed in reports and other sources. I sent out

interview requests to all 7 selected municipalities, involved citizens and other state-actors from the list of contacts from the annual conference and reached out to citizen initiatives mentioned in the selected pilot project data. My current sample includes municipal, ministerial, and external governmental actors, but also experts from housing corporations, citizen initiatives and technical electricity supply.

4.3 Limitations of the research

This case study of the NFD-Programme in the Netherlands is very much an analysis of a moving target. The programme has just started its third round of pilots and the two analysed pilot rounds are still running. The main limitation is that the data collected can only reveal a limited and often bias picture on its progress and success. The results from the seven neighbourhoods are a small and incomplete sample of the vulnerable neighbourhood variations that exist in the Netherlands. Moreover, the response rate to the interview request was low and this raises the question representativeness of the interview sample. The burn-out and stress rates among actors in this transition is known to be high especially among municipality leads (Platform 31, 2022). Their perspective is for obvious reasons missing from the interview base. The Danish case study literature suffers from a different limitation, it does not provide detailed accounts of in-transition vulnerable neighbourhoods. This leaves much to improve for the internal validity of each of the cases.

5. Results: Denmark

5.1 Introducing the paradigmatic example

While the transition to low-carbon alternatives is still ongoing, the biggest steps towards the Danish district that enables today's low-carbon heating system were taken from 1973 to 2010s (Sovacool, 2020). When the 1973 and 1979 oil price crises hit Denmark, the Danish government decided the transition from individual oil-based heating to district heating (Roberts and Geels,

2019). Significantly, the national government put the responsibility with the local municipalities for this transition (Sovacool, 2013).

The Danish Energy Agency, set up to be the national coordinating body, became the hub for technological insights and data relevant, which it shared with sub- and non-state actors (Roberts and Geels, 2019). "The cooperative mind-set, welfare state values, the global energy crisis, the consequent national economic crisis, and growing environmental awareness and concern" were instrumental for the speedy transition. (Johansen and Werner, 2022, p12) Most importantly, the de- and realigned of the Danish policy pathway was disruptive, efficient, and effective (Geels and Schot, 2007).

5.2 Intergenerational justice

What can we learn from intergenerational justice considerations in Denmark? Thanks to its district heating infrastructures, Denmark's energy system scores as one of the best on the 'World on the energy trilemma index' (World Energy Council, 2021). With about two-thirds of Danes connected to the grids, it has reached one of the highest market share levels of district heating provisions worldwide (Danish Heating Agency, 2022). In terms of intergenerational justice, its heating system is well on its way to protecting the next generations from burdens. The speed at which Denmark transformed a market-based and completely dependent energy system into a self-sufficient policy-led heating system was remarkable (Rüdiger 2014, Sovacool 2020). After the oil crisis of 1973, the Danish government introduced national regulation that stimulated decentralised municipality control over district heating and hereby managed to provide for 80% of the heating needs within just over 30 years (Sovacool 2020, Rüdiger 2014). From 1976 to 1981, with an aggressive Combined Heat and Power (CHP) policy, they managed to change the heating system for about 1 million households (Sovacool, 2013). Denmark invested 15 billion in CHP in the 15 years after the oil crisis which led to 350 district heating companies by 1990 (Sovacool, 2013). Figure 2 shows this development over time. Very quickly in the 1980s, with the Brundtland Reports, the newly established energy diversification regime was questioned and in 1990 replaced with a more environmentally friendly version (Rüdiger, 2014). So, at first "energy efficiency, heat supply stability, energy independence" were drivers and later "energy equity and sustainability" took over

(Johansen and Werner 2022, p12). Denmark still consumes a comparable amount of energy to 1970 levels, because of these early investments in energy efficiency (Sovacool, 2013).

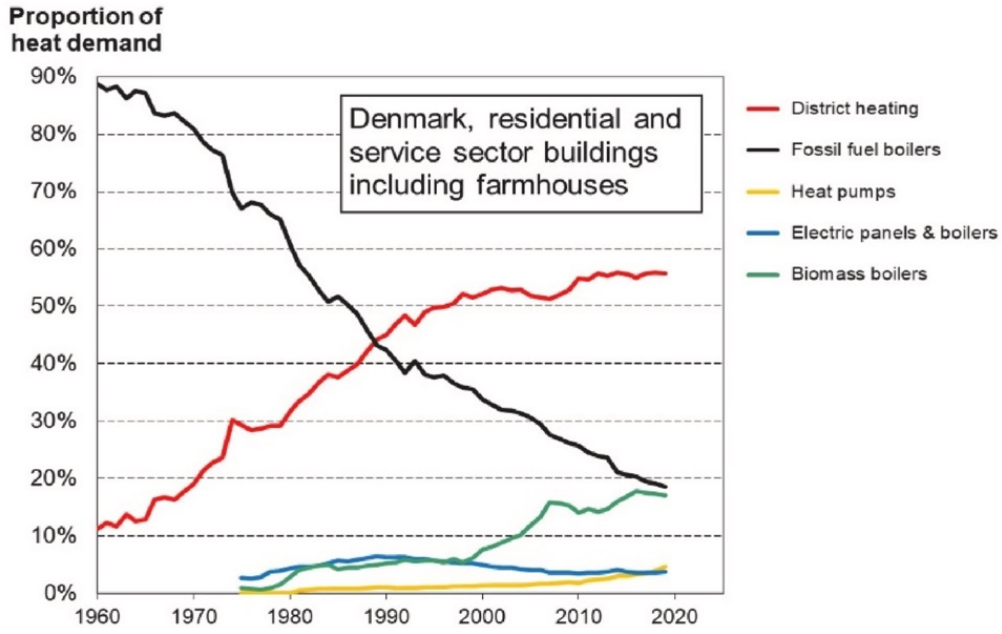

Figure 2, Heating methods in the total Danish building stock 1960–2019 by proportion of total heat (Source: Johansen and Werner, 2022)

How did the transition manage to be so fast and remain so stable over the years? The success of the district heating (DH) transition is attributed to: stable energy policies, which include a commitment to energy efficiency, a solid carbon tax system, incentives for Combined Heat and Power (CHP), but also municipal planning and a tradition of working together (Sovacool 2013, Chittum and Østergaard 2014). Municipal planning conditions were favourable because the Danish municipalities did not have to struggle against a domestic oil or gas industry and it greatly profited from polycentric governance (Roberts and Geels, 2019). District heating policies in combination with renewable energies contribute to a comparable high performance with respect to climate policy. Denmark remains the world-wide leading country on the Climate Change Performance Index 2022 (CCPI, 2021).

5.3 Distributional justice

From a distributional justice lens, the Danish transition tells the story of the introduction of strong welfare state mechanisms, that tasked itself with providing energy security for all its citizens. Most notably and concretely, the transition triggered the implementation of a non-profit principle for district heating companies that still exists today (Johansen and Werner, 2022). This rule forbids anyone from profiting in the DH business. By making DH unattractive to commercial parties, the Danish government ensured that municipalities and cooperatives had precedence over DH and that energy provision was in the hands of the state and the local citizens (Chittum and Østergaard, 2014). The energy insecurity caused by the oil crisis was seen as a severe market failure, that triggered the Danish state to become "directly involved in the creation of resources" (Rüdiger, 2014, 106). The policy driven transition led to a lot of energy security, which in term leads to energy price stability. The final costs to consumers of DH were kept low, not only with the non-profit rule, but also by providing extra-ordinary long-term financing schemes (20-50 years) and by allowing municipalities to charge a mandatory connection fee for all residents (albeit not mandatory connection itself)(Johansen and Werner, 2022). The latter also decreased investment risks in DH.

In this way, the Danish policies reflect one way of ensuring that the distributional inequality of high energy prices is minimised. However, Grevisse notes that in Denmark, paradoxically, the relatively high energy prices are the result of a taxation policy intended to "protect the citizens against low energy prices" (2011, p. 542). It is true that the Danish authorities are not afraid to include taxes in the energy price. During the transition, combined heat and power research was funded equitably by ratepayers, instead of externalised to all Danes (Sovacool and Martiskainen, 2020). Denmark was also one of the first to include a carbon tax on unsustainable heating sources which made non-DH options less competitive (Sovacool and Martiskainen, 2020). Municipalities are also tasked to take care of social provisions for those that are struggling. These have until very recently, not included direct schemes for energy bill relief, but do provide financial support to vulnerable households, examples include the "heating supplement for pensioners, special supplementary housing benefit, additional cash support and the green check to compensate for higher green taxes" (NECP Denmark, 2020). In February 2022, an additional "heat-cheque" of around 800 euros was implemented to aid 320 000 of the hardest hit households. (Bruegel, 2022)

5.4 Recognitional justice

In and after the transition, energy poverty was not recognized by the Danish state as a phenomenon worth tracking. In fact, in their National Energy and Climate Plan for the EU, the Danish government stated in 2020 that they had not set any "specific national objectives" in their energy policy to limit energy poverty, because this was treated as a social issue (NECP Denmark, 2020). In their report, the Danish Ministry of Climate, Energy and Utility acknowledges the 3 per cent energy poverty confirmed by an international source and lists energy related social policy remedies. One possible explanation for why energy poverty is not recognized is because in Denmark high energy efficiency and central energy systems make the group experiencing energy poverty almost identical to the demographic experiencing poverty. Especially Denmark's preoccupation with energy efficiency and labelling has likely prevented distributional inequalities normally experienced by renters. That is why Denmark having one of the biggest social housing sectors in Europe, is no reason for concern. Moreover, Denmark has also introduced the principle of tenant democracy, a mechanism that grants decision power over the home to residents (Grevisse, 2011). While this actually belongs in the procedural justice category, I mention it here as proof of the many ways that the Danish state recognises injustices and prevents situations that are common barriers to energy poverty alleviation in other countries. Even its municipality-led social policies do reveal certain respect or recognition for vulnerable groups. There is the previously mentioned pensioner heating supplement and Denmark even has a compensation check for green taxes (NECP Denmark, 2020). Lastly, I want to mention that "the quadrupling of the prices" caused great economic difficulty in Denmark during the oil crisis in the 70ies (Rüdiger, 2014). For a brief period, energy poverty was on everybody's mind. While this burden was not distributed evenly, it is significant to explore if this caused a shared public trauma and a generation attuned to respecting energy hardships.

5.5 Procedural justice

Procedural justice experienced two extremes in the Danish DH transition. During the transition the Danish population seemed to have no say in any of the drastic measures implemented. Rüdiger argues that the Danes accepted this lack of direct access to decisions because of "a combination of

the strong interventionalist welfare state and the heavy dependence on Middle Eastern oil" (2014, 107). Although, that does not mean concerns were ignored. While the Danish government was still debating the energy supply source, there was a clear citizen-led movement against the nuclear energy solution that led to the abandonment of those plans (Chittum and Østergaard, 2014).

However, once the DH systems were in place, citizen ownership over energy became a widespread reality. Today, Denmark remains a frontrunner in Europe when it comes to community energy (Chittum and Østergaard, 2014). There were several variations such as: national cooperatives, local municipal or consumer companies, national or local foundations, distant municipal companies, local cooperatives (Gorroño-Albizu, Sperling, and Djørup, 2019). In 2016, around 60% of DH energy was supplied by municipal cooperative (urban areas) and 36% by consumer cooperative (rural areas) (Gorroño-Albizu, Sperling, and Djørup, 2019). Because of the top-down imposed no-profit rule, monopolistic behaviour is prevented. As a bottom-up measure, consumers, in both municipal and consumer cooperatives, can elect representatives for the company board. This power puts pressure on those managing the DH company to keep prices as low as possible (Chittum and Østergaard, 2014). Moreover, the Danish government established there to be national oversight of the prices of District Heating companies to increase transparency and ensure a fair price for consumers (Chittum and Østergaard, 2014). All companies were obliged to report what their variable and fixed costs were, so consumers could compare to other areas.

It is hard to determine if and how those suffering from energy poverty use this access. But if they are urban residents, they are likely connected to a DH of a municipal cooperative, which represents most energy provision in Denmark. Contrary to the citizen-led cooperative, which are also widespread in the rural areas, there is no additional participation burden required of citizens to reap the advantage of the system that is designed to hold energy service providers accountable. Because of the stable energy policies, the citizen ownership policy has not changed much since the early eighties. With one exception, in the past decades years stricter and rules supporting DH such as mandatory connection and other coercion laws have loosened (Gorroño-Albizu, Sperling, and Djørup 2019). This, however, begs the question if a certain level of national regulation that goes beyond mere incentive is a precondition for the establishment of a well-functioning non-commercial DH system. Indeed, multiple reviews of Danish citizen ownership argue that targeted institutions are a stronger prerequisite for success than favourable discourse or available resources. (Kooij et al, 2018, Mey and Diesendorf, 2018).

6. Results: The Netherlands

6.1 Dutch Case Study on selected vulnerable neighbourhood projects under the Gas-free District Programme

To achieve its climate goals the Dutch government has announced its plans to disconnect eight million homes and buildings from natural gas heating systems by 2050. In 2018, the government set up the inter-governmental Natural Gas-Free Districts Programme (in Dutch *Programma Aardgasvrije Wijken*), a collaboration between the Dutch Ministry of the Interior and Kingdom Relations, Ministry of Economic Affairs and Climate, the Association of Provinces of the Netherlands (IPO), the Union of Water Boards and the Association of Dutch Municipalities (VNG). With an investment of 435 million euros for the pilot projects (until 2028), the government aims to learn how municipalities best transition to a low-carbon heating supply. The selected municipalities participating in the programme decide how they disconnect their district from natural gas or in case that is not yet possible how they can best prepare for a transition (Aardgasvrije wijken, 2022). The third pilot group of municipalities has been launched in March 2022, making it 64 neighbourhoods and 50 000 homes participating. In order to find out which of the participating neighbourhoods can be considered as "vulnerable neighbourhoods", where questions of energy poverty might be most relevant, I reviewed another Dutch governmental programme.

At the beginning of 2019, the programme "Preservation of Vulnerable Neighbourhoods" officially started with fifteen participating neighbourhoods. In this programme, a neighbourhood is considered vulnerable when, in addition to the sustainability task, there are also social and/or physical challenges that require policy attention in order to improve the quality of life and/or safety (Platform 31, 2022). In February 2022, a comparative research report was published on the results of the programme (ibid). For my Dutch case study, a selection was made of seven projects that were both analysed in the framework of the Vulnerable Neighbourhood Programme and selected as a pilot project under the Natural Gas-Free District Programme (NFD-Programme). The advantage of this selection: empirical results for these projects are already available due to the research study mentioned.

Neighbourhood	Municipality	Residents
Nieuwborgen	Oldambt en Delfzijl	2.825
Nijverheid	Hengelo	4.305
Overvecht-Noord	Utrecht	17.335
Pendrecht	Rotterdam	12.380
Selwerd	Groningen	6.231
Zandweerd-Noord en -Zuid	Deventer	4.535
Zwanenveld	Nijmegen	4.695

Table 3: Selected Projects under NFD-Programme (Source: Platform 31, 2022)

6.2 Intergenerational justice in the NFD-Programme

The Dutch statistical office (PBL) calculated that at the current rate, the Netherlands will not be able to reach the objective of making 1,5 million existing homes natural gas-free by 2030, as stipulated in the Dutch Climate agreement (PBL, 2021). Despite the NFD-Programme efforts, the implementation of the broader policy package for gas-free neighbourhoods has been delayed. As a result, the measures for rented and owner-occupied homes together cannot achieve more than 0.5 to 1.4 megaton CO_2 reduction instead of the targeted 1.1 to 2.4 megaton. Without additional policy measures, it is highly unlikely that the upper limit will be achieved. In sum, important legal, financial, and social instruments are missing which have led to delays (PBL, 2021).

The results from the comparative research on the seven selected projects under the NFD-programme confirms and mirrors the rather negative picture with respect to contributing fast enough to mitigating climate change. The implementation of most of the projects is delayed.

NFD-Programme Projects	**Implementation – Status Quo**
Nieuwborgen (Oldambt en Delfzijl)	The project implementation is delayed: the need to improve the business case for green gas caused unexpected hurdles and consequently delays in an otherwise advanced planning process.
Nijverheid (Hengelo)	The project implementation is delayed: Resistance from residents in De Nijverheid caused unexpected hindrances and consequently delays in an otherwise advanced planning process.

Overvecht-Noord (Utrecht)	The implementation is pending: the future heat alternative is already (largely) known; decisions by the municipal council have been taken and adopted, but the plans are not yet fully worked out.
Pendrecht (Rotterdam)	The implementation is on track: a technical and financial offer with respect to the connection to the heat network has been developed and presented to residents.
Selwerd (Groningen)	Implementation started successfully: the construction of the heat network started already.
Zandweerd-Noord en -Zuid (Deventer)	The future heat alternative is already (largely) known; municipal council decisions have been taken, but the plans are not yet fully worked out.
Zwanenveld (Nijmegen)	The project implementation is delayed: the cancellation of the tender for the Zwanenveld heat district resulted in unexpected obstacles and, as a result, a delay in the advanced planning.

Table 4: Intergenerational Justice –contribution of the projects in the framework of CO2-reduction. Source: author's own compilation based on (Platform31, 2022)

Several NFP-programme experts pointed out that the individual projects are hindered by the delay of national law-making. The most important example: In 2020, the Ministry of Economic Affairs worked on a bill to replace the existing Heat Act to facilitate the growth and sustainability of collective heating systems in the built environment, among other things by adapting the market organisation with a clear division of roles (central government, municipalities, heat company, etc.) (VEMW, 2022). The delay of the legislative process is fuelling uncertainty among the actors. Many municipalities need to know what the new legal and financial conditions are before its announced implementation in 2023 in order to build on solid business plans. On the other hand, experts mentioned that one reason for the delay in legislation is also the uncertainty as to what lessons to draw from the NFD-programme. In this case, the delay of NFP-programme projects – as seen in the case of most of the selected seven projects – is a negative aspect with respect to the achievement of climate policy goals. It represents a classic "chicken-and-egg" situation where both sides are waiting for the other to deliver. But as argued by experts at the NFD conference, the municipalities have certainly delivered on their assignment. The Dutch government asked all

municipalities (also outside of the pilots) to submit plans for the heat transition before 2022 (*Transitievisie Warmte*). These plans have been formulated, but details on practical implementation is hindered by the above-mentioned uncertainty due to the lack of a solid financial and legal framework. For example, the municipality of Deventer (NFD-Project *Zandweerd-Noord en –Zuid*) has recently published its "Transitievisie Warmte" and described the dilemma accordingly:

> *At present, there is still a great deal of confusion surrounding collective heat about the relationship between public parties and market parties (ownership of heat infrastructure), for example, the coverage of additional costs in comparison to natural gas, and the possibilities that people have to make their own choices within such a collective system.*
>
> (Gemeente Deventer, 2021, p. 33)

Handing over responsibilities to the municipal level for leading the transition with pilot projects without ensuring a sound and consistent legal framework had rather negative effects on the question of intergenerational justice. It leads finally to a delay of the necessary reductions of emissions in the housing sector and as already mentioned, to a transfer of financial and environmental costs to younger generations.

Against this background, the uncertain situation in the selected seven vulnerable neighborhoods is not any different from other projects under the NFD-Programme. It is however likely that the responsible municipal councils are even more cautious with respect to any unforeseeable financial risks for the residents of vulnerable neighborhoods which could be also an additional explanation for the above-mentioned delays.

6.3 Distributional Justice in the NFD-Programme

Over half a million households in the Netherlands live in energy poverty: they have high energy costs, usually live in a house that is not properly insulated and have a low income (TNO, 2021). Amongst them, there are 140,000 households with hidden energy poverty; these are people who, due to financial problems, consume less energy than they would like to. Severe energy poverty is

spatially much more concentrated than income poverty in the Netherlands: in only 5 municipalities and 7% of all neighbourhoods (TNO, 2021).

The Dutch low-carbon transition is therefore prone to distributional injustices increasing. To prevent negative effects in the course of intervention in the building sector, the neighbourhood approach of the NFD-Programme approach has been chosen as a way to safeguard a collaborative and watchful eye from the municipalities to these injustices (TAUW, 2022, p. 10). The ambition is high: it is stated as part of the official description of the NFD-programme, that the neighbourhood approach will strive to achieve "housing cost neutrality" for homeowners and tenants (PAW Kostenfinanciering, 2022). During the annual conference, one of the most used terms was means 'to take worries away' (*ontzorgen*) in the context of vulnerable neighbourhoods. The municipality of Deventer has formulated this in a more cautious way in its official "Transition Heat" document: "Everyone must be able to participate and solutions must remain affordable for all residents of the municipality (Gemeente Deventer, 2021, p. 33)". The first results from the comparative study are not that promising with respect to the seven selected vulnerable neighbourhoods. The following table shows the findings of the Platform 31 study (2022) with respect to distributional effects of the individual projects under the NFD-Programme.

Neighbourhood Pilot	**How distributional aspects are part of the planning of the projects**
Nieuwborgen (Oldambt en Delfzijl)	While well-intended, in practice, Nieuwborgen ended up neglecting the coupled eco-social opportunities (*koppelkansen*). They started with a technical lens, and the 'narrow' focus remained on providing a good technical option that could be presented to the residents. Nobody was made explicitly responsible for looking for social opportunities and so it was not taken up.
Nijverheid (Hengelo)	In De Nijverheid, something similar to Nieuwenborg happened. The project leader deliberately chose a 'narrow focus' in the initial phase, aimed at elaborating the future heat alternative, with the intention of making connections with other tasks in the district at a later stage, once the technical issues have been resolved. But in practice this did not work out well.
Overvecht-Noord (Utrecht)	In Overvecht-Noord, data for the district's own primary task (to transition away from natural gas) formed the starting point: for example, information about underground infrastructure and property characteristics, sometimes supplemented by general characteristics of the district's population (age demographic, household composition, income).
Pendrecht (Rotterdam)	In Pendrecht, the project leader and/or the project team started with a broad exploration of the neighbourhood across various policy areas. They did this

	by holding discussions with residents and other stakeholders and making an inventory of figures and policy documents about the district. The project team succeeded in involving other relevant policy areas (employment and combating poverty). As a result, Pendrecht is one of the few neighbourhoods where a differentiated offer to connect to the district heating network has been made to residents and landlords in mid-2021.
Selwerd (Groningen)	Fully integrated approach including social aspects. Selwerd set up Sunny Selwerd, a policy framework that included four overarching ambitions to which all the efforts of the parties must contribute. One element of the project is “Affordable and sustainable living”, where the policy ambition is formulated that “the total cost of living does not increase. If you want a better house, you don't have to move to another district.” (see also: SunnySelwerd, 2022)
Zandweerd-Noord en -Zuid (Deventer)	Started with an integrated approach but compartmentalised tasks in the end. Municipality and housing corporation are trying to make the most of the opportunities for linking up, despite the compartmentalisation within the municipality. The results achieved can be attributed to the mind-set of the civil servants and housing corporation employees involved, who are not afraid to cross domain and organisational boundaries and roll up their sleeves. 'Two-legged cooperation': by working with one leg in and one leg out of the organisation, connections are made and creative solutions found for the complex issues in the neighbourhood. One official, for example, worked simultaneously on two programmes in the neighbourhood (climate adaptation and social domain), which enabled her to make connections within the organisation.
Zwanenveld (Nijmegen)	There was awareness of multiple challenges that could be integrated but a holistic neighbourhood approach still has to be developed.

Table 5: Awareness and integration of distributional effects in the individual plans. Source: Author’s own compilation from (Platform 31, 2022)

The rather positive judgment on the Selwerd project was confirmed by additional interviews. Martin Klooster, working for the pilot municipality, described that this transition is easier through the municipal approach than with all sorts of complicated concepts from the national government. It should be a shared trajectory with all the local actors involved. Nevertheless, in the case of some of the seven projects, distributional effects were barely integrated into the plans. While the neighbourhood approach is set out by the practitioners to be holistic and integrated, in practice this is still a learning curve.

Different views exist in relation to the redistribution justice and effectiveness of the instrument subsidies. Regien van Adrichem, who works for Platform 31 (the organisation behind the 2022 report) explained that the currently available subsidy programmes do not work for vulnerable neighbourhoods because they do not target the right needs, which hints towards a combined recognitional and distributional problem. Other experts believe that the complexity of the current subsidy schemes and their certain rules lead to a non-use where there is a need. One expert pointed out that the idea behind the subsidies was that the market will take over because of the financial incentives. However, this was not the case if it comes to the question of vulnerable neighbourhoods. Especially with respect to district heating, there was not a real market and business case for private investors. It was also mentioned that notably two structural things were jeopardising vulnerable households and limiting the use of subsidy schemes: namely the gas price and the district heating price are coupled and this leads to a significant disadvantage for those that make the transition and leads to negative publicity (recent examples include: NOS, 2022). Again, slow and delayed regulatory adjustments are one of the main reasons for a relevant distributional problem.

Experts also emphasised the role of small-scale subsidy schemes where vulnerable households are the specific target group. These instruments were developed already before the NFP-Programme. Municipalities work for instance with energy coaches (consultants) who visit households in order to inform residents about practical energy saving options. Often this is combined with the distribution of “energy boxes”, a gift for households with energy light bulbs and other practical appliances that help to save energy. It is evident, that these types of soft instruments can help but do not play a major role in the seven NFP-Projects in vulnerable neighbourhoods and the positive distributional effects are very modest.

6.4 Recognitional Justice

The analysed Platform 31 study did not extensively reflect on recognitional justice. The pilots for the study were explicitly chosen because of the vulnerable situation of the neighbourhoods and there was an implicit recognition of the needs in this respect. Therefore, no table has been produced since the findings were rather limited. However, there is one interesting finding from the project in Overvecht-Noord (Utrecht). At the beginning of 2019, it was discovered that general practitioners in the district experienced a sudden increase in patients with stress-related health

complaints around the time when district residents were informed about the gas-free project through letters or information meetings (Platform 31, 2022). This is significant because it confirms that project or measures in the framework of the energy transitions have the potential to be very disruptive in the eyes of citizens. It is therefore relevant to recognise the concerns and needs of especially vulnerable citizens.

As a result of the interviews conducted with project experts and the extensive monitoring of recent news articles, it became clear that with the explosion of gas and oil prices at the end of 2021 and in the spring of 2022, the awareness with respect to energy poverty and vulnerable neighbourhoods changed tremendously. To date, the Dutch government has not formulated specific goals with respect to the prevention of energy poverty but has recognised the urging problem by allocating specific funds and tax credits at the start of 2022 (Rijksoverheid, 2022). Reinier Romijn from the Ministry of Interior and member of the ministerial task force on the NFD-Programm, said that "until the middle of 2021, energy poverty was not an issue within NFD-pilots, and the programme director was of the opinion that it doesn't really belong to us. Now you can't escape it." This also means that existing other programmes could play a role in the fight against energy poverty. Regien van Adrichem from Platform31, for example, manages CityDeal, a governmental programme that was set up specifically to synthesise lessons from municipalities and provide adequate national regulation in response.

Most experts mentioned that the neighbourhood approaches allowed them to uncover the groups beyond the statistics. Statistics that according to Eric Maessen of the municipality of Nijmegen, were in most cases off limits anyways because of privacy laws. By getting a foot in the door, vulnerabilities were finally accessible. The notion that privacy laws were a hurdle for more effective justice work, was not commonly shared. During the annual conference, experts pointed out that a localisation of vulnerable households at the level of neighbourhoods would be the most appropriate instrument and that this is already possible because it does not harm privacy laws. Nonetheless, the technical need to get into people's homes because of the transition was seen as a big advantage.

6.5 Procedural Justice

According to the NFD-Programme description, participation and communication are important issues when making a neighbourhood gas-free (PAW Kennisthema's, 2022). The challenge is to develop approaches that can be scaled up at the neighbourhood level, which give all groups of citizens the opportunity to participate and thus encourage them to take sustainable measures. Besides technology, finances and organisation, an approach to a gas-free neighbourhood is according to the programme mainly about the inhabitants of the neighbourhood. The following table is a compilation of the findings of the Platform 31 study on the question of procedural justice.

Neighbourhood Pilot	**How are citizens involved in the NFD-Projects?**
Nieuwborgen (Oldambt en Delfzijl)	Too little involvement was noted, since mistrust grew: sufficient work had been done on participation in the preparatory phase of application in 2018. This was not the case afterwards. The residents had the feeling that participation in developing the gas-free plans was limited. Therefore, the project team started a structured dialogue in order to make differing opinions visible and discuss them. Project manager Gert Jan van 't Land: "First we checked whether the residents forgave us for putting them in this position. Fortunately, that was the case". In the continuation of the project, the project team focused completely on the question resident's involvement.
Nijverheid (Hengelo)	Difficult relations between residents and the municipality.
Overvecht-Noord (Utrecht)	The present feelings of disinterest and apathy among residents grew in the course of the project.
Pendrecht (Rotterdam)	In Pendrecht, a residents' survey was carried out under the supervision of behavioural scientists. A Living room "natural gas-free" was opened where residents could experience new technology (i.e. cooking on induction).
Selwerd (Groningen)	A neighbourhood-oriented approach was already in place to improve liveability and safety in the neighbourhood.

Zandweerd-Noord en -Zuid (Deventer)	Several neighbourhoods made use of Buurkracht (e.g. in Zandweerd and Emmerhout), an organisation that organises joined energy saving projects in neighbourhoods.
Zwanenveld (Nijmegen: is Dukenburg)	The already present feelings of disinterest and apathy among residents grew In Zwanenveld the project recruited an artist to develop an experience map.

Table 6: Procedural justice: How are citizens involved in the NFD-Projects? Source: Author's own compilation from (Platform 31, 2022)

The interviewees and participants of the 2022 NFD-Programme conference named multiple reasons why broad societal support (*Draagvlak*), was the most important aspect of the municipal transition. Most referred to Anke van Hal, the professor closely involved with the NFD-Programme pilot programme. According to van Hal meaningful and enthusiastic participation is the third key to a smooth transition; the first two are technological solutions and affordability (Hal, 2019). The solution is to use energy measures as a means to help residents and not as an end in themselves. At the conference involved decision-makers commented on the fact that coercion does not belong in the political toolbox of the 21st century. Moreover, the democratic legitimacy of municipalities appears to not insufficient for making this decision for the residents. One offered reason was the decline in trust in the Dutch government.

The question is whether the NFD-Programme provides any procedural certainties or rights for the residents. To some extent yes, the general rule applies that municipalities need a 70% approval rate before they can start the transition. A problem detected by the Platform 31 research is that involving residents is sometimes seen as a compulsory step, a hurdle that must be taken. Traditional participation instruments like door-to-door letters, surveys, information evenings do not work well. Moreover, often times residents are bombarded with different inputs that are not streamlined and this produces procedural fatigue. That could be described as participation burden. Intensive personal contacts with only a handful of social and technical workers is the best option. This is the only way to generate trust. Roel Woudstra from Buurkracht (a participation-enhancing service used in some pilots) has 8 years of experience with neighbour-led transitions. According to his experiences, transitions that are led by people from the neighbourhood itself work best. Finding these few neighbours that want to lead is key. When it comes to the type of technology

that is chosen, the municipality experts argue that proposing a cooperative is in some cases deemed more trustworthy and might be used to convince already distrusting neighbourhoods of their power and control over the new heating system.

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7. Contrasting Dutch and Danish approaches

7.1 Identifying four approaches

So, what can these two connected cases teach us about (1) how energy poverty can be addressed in the framework of a municipal heat transition and about (2) what conditions explain a country's capacity to do so? Taking a step back from analysed energy justice dimensions, I argue that their results reveal a pattern of implementing approaches. The Dutch pilot project case is at risk of intergenerational injustice to a much larger extent than the Danish case. From the analysis it seems that the lack of regulatory frameworks and national incentives have not only caused this delay, but also made it difficult to implement the model of municipal heating that Denmark has followed since the 80s. While both cases seemingly neglect recognitional justice, their findings suggest that they do detect barriers and respect those suffering energy poverty. However, the most fascinating insight out of the comparison is how the two case studies deal with trying to increase procedural and distributional justice. I have crystalised four dominant trends in addressing energy poverty from the pilots, two of which are inspired by the Danish case but currently at least partially out of reach for Dutch neighbourhoods. These four approaches are divided by two variables: ownership and the participation burden.

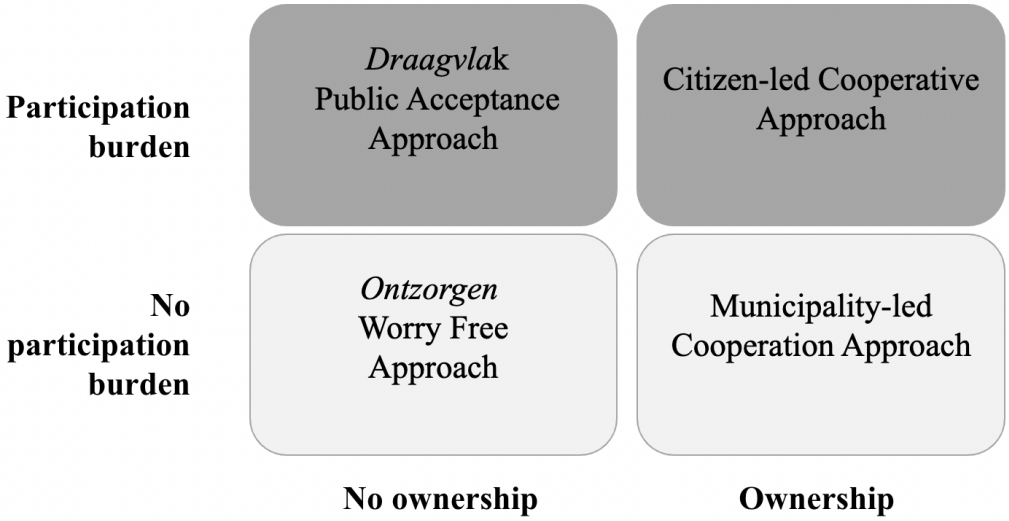

Figure 3: Approaches for addressing energy poverty in municipal district heating transitions from the Dutch and Danish case studies (Source: own composition)

I define creating ownership as a way of addressing energy poverty by providing direct power and control to those that have inadequate access to energy sources. The Danish example makes a strong case for the redistribution of ownership to municipalities by a supportive national legislation. The Dutch try to strengthen the role of municipalities in the first place without a clear legal and political redistribution of ownership. The results for the Netherlands show that their way of addressing vulnerable neighbourhoods starts with finding the right tools for participation, instead of practical policy changes. This second axis I have called burden of participation. The question of participation or procedural access is the strongest and most conflicted theme shown by the primary data from the vulnerable neighbourhoods in the NFD-Programme pilots. There is a growing number of practical insights in how municipalities ought to best involve residents, however with modest results as shown by the case studies. In the historic Danish case – other than in the present Dutch – the municipality did not organise participation related to the choice of technology. The decision was taken by the national government. This burden was taken from residents, instead participation was strengthened inside an ownership model. Meaning ownership of citizens in relation to the competences of their own municipality, municipal energy company or citizens' cooperative. The category of ownership does not carry this label of burden. Participation is often seen as a pure positive option as a benefit for citizens. In contrast, I call it a burden, to reflect the

time and resources that are required by citizens, which is often problematic for energy poor households. Of course, also the Danish ownership model requires time and resources, but mainly by elected politicians, professionals and very motivated citizens. And ownership is in this case embedded in the normal routines of local democracy and do not require extra or new participatory processes.

7.2 The worry free "Ontzorgen" approach

Ontzorgen is a Dutch verb that means taking worries away. One way of addressing energy poor during a transition is by relieving vulnerable neighbourhoods of the burden of choice and the burden of ownership. Especially municipal workers and managers in the national government were attached to this term. The case studies have shown that the selected municipalities had some instruments at hand like energy coaches or energy boxes where direct help to vulnerable households was provided. Another way to interpret this approach is to focus on fixing problems before burdening residents with the overwhelming task of a heat transition in a neighbourhood. Another assumption that is made, is that citizens want concrete offers that are affordable, they do not want to get involved in the technical questions. In practise, it turned out that plans had to be readjusted in a lot of vulnerable neighbourhoods, and that there was a risk of resistance due to distrust. This approach focuses on providing relief during the transition. It focuses on providing assistance or improving the financial situation by subsidies schemes or other social benefits. However, the municipality has very often little influence on the subsidy schemes or social benefits that make the difference. The "worries away" approach has in this sense its clear limitations and can be also counterproductive, when increasing energy prices cannot be compensated by municipal assistance. A case in point is the present energy price crisis. The Dutch municipalities have not the means to take away the worries of poorer households but is entirely dependent on ad-hoc national social benefit schemes.

7.3 The public acceptance "Draagvlak" approach

Draagvlak is another typical Dutch term that directly translated means supporting base or the public acceptance of the choice. The *draagvlak* approach is most concerned with getting people's

approval and encouraging participation in the transition. This strand is backed up by Prof Anke van Hal's philosophy that is often used in municipal plans and government documents. This approach is time consuming for municipalities, but some argue that there is no other way. Experts also emphasised that in this age 'draagvlak' or public support is an undeniable, if not the most important ingredient for a successful transition. The reason why this approach was not used in Denmark was because there was no choice of technology. In the Netherlands the choice of how to replace natural gas is up to the municipality and finally up to the neighbourhood. Public acceptance is hence crucial. Another way of looking at pairing opportunities, from a 'draagvlak' approach is that participation reveals what people need and want. Supporters of this approach belief that dialogues are a necessary precondition for helping beyond the energy transition.
But mostly, this approach is used to avoid resistance from neighbourhood residents. Especially in times of low perceived need for a change, this approach is important. Today, the general political situation in the Netherlands is critical with respect to the concept. The public acceptance of governmental policies has decreased not only due to Corona crisis. Hence, municipal heat transition projects are confronted with a general phenomenon of mistrust. Certainly, a reason why searching for an extensive public acceptance with respect to energy transition project, can be in conflict with the overarching aim of accelerating the transition to a low-carbon economy.

7.4 The Municipality-led cooperation approach

This category reflects the approach taken by the Danish municipalities in the district heating transition. There is no participation burden because there is no choice nor a required role from residents. This approach fits a transition that focuses on one energy technology and is willing to implement strong national regulation to support the new market. Municipalities are given the tools to lead and are shielded from a competitive market with no-profit rules. This approach requires little responsibility from citizens for setting up and keeping up the cooperation. On the other hand, the decisions of the municipality (implemented by a municipal company) are based on decisions of the municipal council and characterised by democratic legitimacy. One could argue that the participation of citizens can be safeguarded by the normal routines of municipal processes. This approach can be set up faster and is a remedy against fluctuating, unstable prices but also 'not in my backyard' initiatives. A problem in the Netherlands: there are not many strong municipal

energy companies, because many were sold decades ago. A few Dutch attempts to reestablish strong municipal-led energy companies have ended not positive and could be seen as a counterfact for this approach. Different from the Danish case, the Dutch national government has not provided the appropriate legal and financial framework for a broader establishment of sound municipal energy companies. Empowering publicly owned companies at the municipal level will have its limitations.

7.5 The Citizen-led energy cooperative approach

In this transition model, municipalities take a backseat and let citizens lead collaboration with energy cooperatives. There are Danish and Dutch examples of this method, however Danish cooperatives have a much bigger market share and have been actively supported by a stable political framework during the last decades. In terms of procedural and distributional justice, this approach scores highest. It is prone to being a social elite endeavour because it requires time and resources. Poorer households are often not in a position to invest time or money in a citizens cooperative. It is in this sense doubtful whether the approach can be targeted toward the problem of energy poverty. Nevertheless, with respect to the different aspects of energy justice, it seems to be a very useful approach. Governments cannot order this approach but provide an appropriate legal and financial framework. As in the case of the municipalities, also the existing framework under which cooperatives operate in the Netherlands has been not stable during the last couple of years.

8. Discussion

Recognition of energy poverty only via an external shock

When I started this research in 2021, energy poverty in the Netherlands was not that high on the political agenda. There were no official objectives for improving the situation of households affected by increasing energy prices. As shown in the case studies even in the vulnerable neighbourhoods, fighting energy poverty was not regarded as the main objective. The NFD-

Programme clearly states that the projects should be cost-neutral in order to avoid financial problems of residents with lower income. Up to date, distributional justice questions are more abstract within the programme, since there is a delay of implementation or if construction of infrastructure already started, the financial consequences are uncertain. Less abstract are the current global developments with sky rocking gas and oil prices. As shown in chapter 6, the Dutch government has taken ad-hoc measures to support vulnerable households with extra energy allowances. To some extent, one could say that this has been the Danish approach for many years. The Danish government did not regard the question of vulnerable households and energy justice as an integral part of their energy transition policy. Hence, the government took into account that with special levies or taxes, energy prices could go up, at least for a while until investments in district heating and renewables would bring financial benefits. Energy justice was declared a question of social policy, which meant that an increase in energy prices was tackled by 'normal' social benefit instruments. This approach could be copied by the Dutch government to avoid complexity and overload. If municipalities that are developing projects for the transition to gas-free neighbourhoods have to make sure that future energy prices will not jeopardize the financial situation of vulnerable households (given their present situation), the financial calculation of projects will be always extremely difficult. Therefore, the intervention of the national government as a reaction to the exploding energy prices could be a starting point. Energy transition projects will be not without financial risks. Higher energy prices are regarded as an incentive to stimulate efficiency and investments in renewable energies. Municipalities should be able to rely on the instruments and mechanisms of the welfare state. It is evident– not only since the current energy crisis – that energy prices will go up and that a new category of social benefits are necessary to support poorer households.

A subsidiarity problem?

What lessons can be learned from the comparison of the Dutch and Danish case? The NFD annual NFD- programme conference was organized with 1000 guests from the national, regional and local governments and beyond. To the outside world, this conference appeared to represent a heavily supported programme. In contrast, the case study results of the pilots in vulnerable neighbourhoods have been rather disappointing. The actual implementation, the construction of district heating

networks or green gas infrastructure is often delayed. Municipalities struggle with the legal and financial uncertainties due to the delay of important legislation from the national level. It is understandable that municipalities are very cautious to take far-reaching decisions if the financial consequences especially for vulnerable households are not clear. In this sense, they have to make crucial decisions related to energy justice and energy poverty. The Dutch results from the case study indicate a surprising subsidiarity problem. If subsidiarity means that political decisions should be taken on the level that is most appropriate, then the national level in the Netherlands falls short. The programme for the transition to natural gas-free neighbourhoods is confronted with one crucial problem: municipalities as the main responsible stakeholder operating within an uncertain and often problematic legal and financial framework. Therefore, it is the opposite to the Danish case where the political national policy firstly provided a strong legal and financial position for municipalities as political and economic stakeholders. The assumption is that there cannot be a successful municipal-led approach in the Netherlands if the national government does not deliver and adapt the position of the municipalities in accordance with the needs of the energy transition. The same is true for the citizens-led cooperative approach. Other than in Denmark, Dutch citizens cooperatives struggle in the Netherlands with the legal and financial framework.

Public acceptance approach with obvious handicaps

Public acceptance (*draagvlak*) was by many experts mentioned as the most important element of the Dutch programme and the selected case studies. Many actions deal with information, communication and stimulating participation of citizens. Nevertheless, the experiences from the selected cases were not that positive. There are good practice cases, but there are also many projects were in the course of the process mistrust and disinterest grew. I would argue that also this is related to a certain overload. Often the municipality has been in a position where participatory processes could not lead to political decisions because of the already mentioned uncertainties. Hence, creating public acceptance (*draagvlak*) for a policy that is finally delayed or uncertain can jeopardize the already tainted trust of citizens. That is why, it is an interesting question how both could go hand in hand: intensifying public participation (procedural justice) and speeding up the necessary energy transition (intergenerational justice). The present Dutch NFD-Programme is a case in point: it has certainly not accelerated the practical implementation of

projects. Therefore, giving the municipalities a stronger and more comprehensive political role could be helpful: if decisions can be taken by the municipal council, citizens participation and questions related to energy poverty can be closely linked to the official decision-making process. The existence of strong municipal energy companies as in the Danish case could add another element of public participation and legitimacy. Further research should focus on the question how "procedural justice" could be better ensured within the "traditional" decision making process at the municipal level. Inventing new forms of public participation and public acceptance is a task as such, but perhaps not necessarily a main element of a programme that needs to accelerate the construction of gas-free neighbourhoods.

9. Conclusion

This study set out to find what we can learn from the Dutch and Danish heating transition with the aim of finding new ways of addressing energy poverty alleviation at the municipal level. By using an adapted version of the energy justice framework as the lens for this analysis, I was able to draw conclusions on the basis of four tenets: intergenerational, distributional, recognitional and procedural justice. The results showed that the seven Dutch pilot projects analysed within the context of the NFD-programme followed different governance paths than the historical and paradigmatic case study of Denmark. The main reason for this was the stark difference in legislative and regulatory support from the national governments for the municipalities. Especially the first tenet proved instrumental for the comparison, prompting questions of potential usefulness of its addition for further energy justice analyses. The intergenerational justice lens highlighted that the transition's main goal was hindered in the process of maximising social benefits during the transition in the Netherlands. The hesitance of the Dutch government to provide the appropriate legal framework and the high financial risks the municipalities had to subsequently take, were slowing down progress.

I construct four municipal approaches from the two cases. The Danish model, the municipal cooperation approach, which provides ownership, but has no or low participation burden for vulnerable households. Second, the citizen cooperative model, also found in Denmark to a large

extent and differs from the first model by requiring more independence of citizens to set up and run own cooperatives. The Dutch municipal actors often lack the tools to set up these ownership networks and unfavourable regulation is making investments unattractive. Instead, the municipalities can offer their citizens two other ways of addressing energy poverty. Thirdly, by imposing heavy welfare model based distributional relief and releasing vulnerable households of the burden to participate. Here, the municipality provides new energy services with as little time and resource costs for the residents. Or, fourthly by completely throwing themselves into the participatory approach. The public acceptance approach is the dominant approach in the first pilot projects in the Netherlands, which explains the delay because it is trapped in its own construction. It asks for bottom-up legitimacy from neighbourhood residents but deals with a great deal of uncertainty about financial, legal and technological challenges due to a lack of top-down support from the national government. This confirms that polycentric governance, in this case on the local level, is only as strong as its supporting actors and regulations. In saying so, I do not argue that the participatory approach is flawed within itself, rather, I hope this analysis can contribute to what it takes to set up good empowering *participatory* municipality plans.

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Annex

List of Interviews (30-49 min)

Person	Role	Interview Date
Walter Hulshorts	Project manager at Krado, engineering advisory company, and volunteer trainer for the energy transition	22/3/2022
Regien van Adrichem	Project lead for CityDeal, a governmental programme and project lead at Platform31, a learning platform for social and governance issues	23/3/2022
Erik Maessen	Advisor energy transition at the Municipality of Nijmegen (NL)	24/3/2022
Reinier Romijn	Senior Advisor for the natural gas free neighbourhoods Program at the Dutch Ministry of the Interior and Kingdom Relations	4/4/2022
Martin Klooster	Project Manager in Urban Development at the Municipality of Groningen (NL)	7/4/2022
Anne Leeuw Yvon de Ruijter	Substainability advocate at Aedes, the Dutch association for housing corporations Sector developer sustainability and housing & care at Aedes	3/5/2022
Roel Woudstra	Managing director Buurkracht and board member De Energiebank	6/5/2022

Transcripts upon request