The inclusion of energy vulnerable citizens in the energy transition

A comparative analysis between perspectives on energy justice in policy and of energy vulnerable citizens in Tilburg, the Netherlands

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Preface

Before you lies my master thesis 'The inclusion of energy vulnerable citizens in the energy transition', which forms the capstone of my master Environment and Society Studies at Radboud University in Nijmegen. This master in general - and writing this thesis in particular - was a wonderful challenge in which I experienced joy, insecurity and perseverance. I got to know many special people and learned a lot about myself.

I performed my internship, which is part of this graduation research, at PON & Telos, a social science research- and consultancy agency in Tilburg. Here, I had the opportunity to investigate how energy vulnerable people experience (in)justice in the energy transition, as well as to experience what it is like to work in my field of study. I cannot emphasise enough what a pleasure this introduction to the field was. It makes me look forward to finally spreading my wings in the world of sustainability and gives me great confidence that I will find my way in it.

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Dear reader, I wish you a lot of pleasure reading this thesis.

Ismay Kieskamp

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Abstract

The objective of this thesis is to examine how energy justice is understood in local policy on the energy transition and which (mis)matches arise when comparing this to real practices and lived experiences of the energy poor citizens affected by these policies. In order to do so, this thesis makes use of a multi-dimensional approach to operationalise energy poverty (EP) and related this to energy justice by deploying the three tenets of distributional, procedural and recognition justice. To answer the research question, a qualitative, explorative study was carried out, based on the case of the city of Tilburg. It included a literature review, interviews with energy poor citizens and an analysis of policy documents on the regional and local scale. The results show seven main mismatches regarding the understanding of justice when comparing both narratives. The main mismatches were found regarding the recognition and prioritisation of EP; citizens willingness to participate in the energy transition; the objective of the energy transition; how citizens should take responsibility on the individual and the collective level; and the embeddedness of a long term strategy in policy. A main outcome is that the interviewees perceptions of injustice regarding distribution and procedures could oftentimes be traced back to a lack of recognition for their distinct needs and vulnerabilities in the first place. Hence, to address citizens' perceptions of injustice, it is not enough to arrange extended participation procedures (to improve procedural justice) and financial compensation (to improve distributional justice), as this does not address people's more fundamental sense of misrecognition. A fundamental challenge therefore lies in integrating recognition into energy policy and rebuilding trust with citizens. In order to connect this conclusion to policy practice, this thesis concludes with seven policy recommendations on how to improve the inclusion of energy poor citizens in the energy transition.

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List of abbreviations

- EP Energy poverty
- EV Energy vulnerability
- ILNQ Implementatie Proeftuin Aardgasvrij Quirijnstok Implementation living lab natural gas-free Quirijnstok
- RES Regional Energy Strategy
- REKS Regionale Energie en Klimaat Strategie Regional Energy and Climate strategy
- TVH Transition Vision Heat
- UK United Kingdom

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1. Introduction

1.1 Problem statement

By signing the global Paris Agreement for reducing carbon emissions in 2015, the Netherlands agreed to become a carbon-neutral society by 2050. To achieve this aim, national greenhouse gas emissions should be decreased by 50% by 2030 compared to 1990 (Rijksoverheid, 2019). This asks for a transition from fossil fuels to renewable energy sources such as solar and wind energy, a process known as the energy transition (Rijksinstituut voor Volksgezondheid en Milieu, n.d.). A key policy in this transition is the Climate Agreement of 2019, which describes the objectives and measures that should be taken by different sectors. For the built environment, it is established that 1,5 million existing residences should be well isolated and free of natural gas by 2030. By 2050, this number should have been increased to 7 million homes (Rijksoverheid, 2019). As almost 90% of the Dutch heat requirement is currently dependent on natural gas (van der Linden et al., 2018), this is a demanding task that requires joint efforts of national- and local governments, businesses and individual citizens. Citizens are expected to play a significant role in the transition process, for example by planning and co-creating housing renovations in their neighbourhood or by becoming co-owner of local energy projects (Rijksoverheid, 2019). In the same document, it is stressed that all citizens should be able to participate in the energy transition (Rijksoverheid, 2019).

However, not all citizens have the capability to contribute to- and participate in the energy transition to the same extent, for example due differences in income, skills or knowledge (Breukers, Agterbosch & Mourik, 2020). The way in which the transition will take shape in the coming decades will affect the quality of life of current and future generations (SCP, 2021). Without specific efforts made to ensure the involvement of vulnerable citizens, they are at risk of bearing a larger share of the burdens of the transition without sharing equally in the benefits (Breukers, Agterbosch & Mourik, 2020). This can lead to an increase in the share of people living in energy poverty (EP). One speaks of energy poverty when people have difficulties obtaining adequate energy services such as heating, cooling, lighting or internet connection (Bouzarovski & Petrova, 2015). Anno 2022, practises like showering and cooking can be added to this definition (Movisie, 2022). People living in energy poverty are proven to have a greater chance of physical health issues, mental health issues and social isolation (Braubach et al., 2011; Gilbertson et al., 2012). According to recent statistics, approximately 550.000 households in the Netherlands faced EP in 2021 (TNO, 2021b), which is estimated to rise to 700.000 households by the end of 2022 due to an increase in gas- and energy prices (Movisie, 2022). Another 140.000 households face 'hidden' EP, which means that they consume less energy than they need or want to, to keep their energy bills artificially low (TNO, 2021b). This means that by the most conservative

estimations, currently at least 7% of Dutch households cannot guarantee fulfilment of their basic energy needs for a healthy living environment (TNO, 2021b). For these households, there is a lot at stake in the energy transition. If their vulnerabilities and needs are acknowledged and taken into account in the policies guiding energy transition processes, opportunities may be posed for them to extricate themselves from this situation; if their participation in the transition process is hampered, however, it may reinforce their situation (Sunderland, Jahn, Hogan, Rosenow & Cowart, 2020; Streimikiene et al., 2020). For example, when climate mitigation measures are promoted by means of rising taxes on energy consumption (creating an incentive to improve residential energy efficiency), this can disproportionally hit energy-poor households. If they are unable to afford the necessary investments, carbon pricing can lead to further deprivation of low income groups, without actually contributing to lower energy use among them (Streimikiene et al., 2020; Ürge-Vorsatz & Tirado Herrero, 2012). It is highly likely that such developments go at the expense of the public support for the energy transition (TNO, 2020). People are more likely to oppose the transition when they fear that it aggravates the EP they already experience, or when they consider it unjust (Evensen et al., 2018; Neuhoff et al., 2013). When EP is thus not considered sufficiently in climate change mitigation policies, it can become a major obstacle to achieving the national and international climate mitigation goals that the Netherlands committed to (TNO, 2020). Therefore, the issue of EP within the context of the energy transition warrants scholarly and governmental attention (Ambrose & Marchand, 2017; Gillard et al., 2017).

It is necessary to distinguish EP from poverty in general, since the aspects that usually play a key role in explaining poverty and inequality (such as income, education level and socio-demographic factors) cannot fully explain the prevalence of EP. Although EP is strongly related to those factors, it is also related to specific and structural underlying causes, such as poorly insulated dwellings, high energy prices, taxes, and the energy transition (TNO, 2020). In contrast to income poverty, energy poverty in the Netherlands is much more geographically concentrated in certain municipalities and neighbourhoods, particularly outside of the Randstad (TNO, 2021a). Moreover, energy poverty has an independent effect on the physical and mental health, social life and job opportunities of people that deal with it. As such, specific attention to energy poverty is needed to gain more insight into specific solutions (TNO, 2020).

In order to design a more just energy transition, it is necessary to take into account the perspectives of energy vulnerable citizens. The current debate on energy justice in the context of the energy transition is dominated by policymakers, activists and scientists (Haarbosch, Kaufmann & Veenman, 2021), while body of scientific knowledge on the perspectives of energy vulnerable residents regarding the energy transition is still limited (Bartiaux, Day & Lahaye, 2021). As a result, perspectives of vulnerable citizens circulate less and their opinions are less likely to be taken into consideration in the policy making process (Haarbosch et al., 2021). In this thesis, it is therefore examined how energy vulnerable citizens in the Netherlands experience (in)justice in the energy transition and what, according to them, constitutes a just energy transition. Their descriptions of energy justice are compared to descriptions of energy justice found in policy documents on the energy transition and matches and mismatches between both narratives are distinguished.

The examination of energy vulnerable citizens' experiences and opinions takes place on the city level. For this, the city of Tilburg in North-Brabant was chosen as a case study. This was done in agreement with the host organisation PON & Telos. The prevalence of EP in Tilburg is high, compared to other townships in Brabant (PON & Telos, 2020). It has a surplus in residences with a low energy efficiency: almost 40 percent (38,8%) of the households in Tilburg live residences with a low energetic quality, which means that they are heated with natural gas and are generally poorly isolated (PON & Telos, 2020). At the same time, with an average yearly income of \in 24.800, Tilburg has the lowest average income per inhabitant out of all townships in North-Brabant (Allecijfers.nl, 2022). This makes Tilburg an interesting case to study citizens' narratives on EP and the energy transition.

1.2 Research aim and questions

1.2.1 Research aim

The aim of this thesis is to map perceptions of justice of energy vulnerable citizens in the Netherlands and in policy and to analyse whether there are (mis)matches in this regard between citizens and policy. As said, distinguishing such mismatches is relevant since they may create challenges in the implementation of a just energy transition: if citizens consider a transition as unjust, the public support for the transition (and hence its effectiveness) is likely to be undermined (Evensen et al., 2018). Insight in the needs and motivation of energy poor citizens enables policymakers to implement interventions that are based on sufficient public support (Belaïd & Garcia, 2016; IPCC, 2018). Studying perceived fairness in a relatively early stage of the energy transition enables adjustments to the policy approach, which may ultimately lead to a smoother implementation of interventions. Moreover, a fair transition in which energy poverty is taken into account may contribute to improved wellbeing of this vulnerable group in society.

1.2.2 Research question

The aim led to the following research question: "How do energy vulnerable citizens in the Netherlands describe a just energy transition, how do their descriptions differ from descriptions of a just transition found in policy documents, and what can be learnt from the (mis)matches between these narratives in order to create more just energy policies?"

To find an answer to this question, the following sub-questions were composed:

- 1. How do energy vulnerable citizens experience energy (in)justice in the energy transition and what, according to them, constitutes a just energy transition?
- 2. Which perceptions of energy justice can be found in policy documents on the energy transition on a regional and local scale?
- 3. Which (mis)matches arise when comparing the perceptions of energy justice of energy vulnerable citizens to the perceptions of energy justice in policy documents?

To provide an answer to these questions, this thesis starts with a literature review of energy poverty and energy justice and their relation to the energy transition. Next, an in-depth case study is provided of the city of Tilburg, including semi-structured walk-along interviews with 13 energy vulnerable citizens. Additionally a document analysis was conducted, including 5 policy documents regarding the energy transition on a regional and local level.

1.3 Scientific and societal relevance

1.3.1 Scientific relevance

This thesis adds to the literature on energy poverty and energy justice. The existing body of literature on energy justice evaluates where injustices emerge (Heffron & McCauley, 2017; Snell et al., 2015), which affected groups in society are ignored (Savacool & Dworkin, 2015; Bouzarovski, 2014) and which processes exist for their remediation in order to reveal and reduce such injustices (Jenkins, McCauley, Heffron, Stephan & Rehner, 2016). The field of energy justice research is gradually becoming more qualitative (Gillard, Snell & Bevan, 2017; Damgaard, McCauley & Long, 2017), but is still dominated by quantitative research (McCauley et al., 2019; Bartiaux, Day, & Lahaye, 2021). In this thesis, the focus is not so much on analysing the unequal access to energy services by energy vulnerable citizens, but rather on how this group of energy vulnerable citizens perceives energy justice in the context of the energy transition. By shining a light on citizens' perspectives using qualitative methods, it provides insights into lived experiences, which is useful to deepen and nuance knowledge derived from quantitative research (Middlemiss et al., 2020) and to support the creation of policies that are informed with lived experiences. Conceptually, it integrates energy vulnerability, the energy transition and energy justice; a combination that has not been explored extensively yet in the Dutch context (see for example Bartiaux, Day & Lahaye, 2021, Feenstra et al., 2021, TNO, 2020). This thesis contributes to filling this gap by explicitly integrating these themes using qualitative research methods.

1.3.2 Societal relevance

This thesis is relevant because it creates knowledge that can contribute to a just and effective energy transition in which (the risk of) energy poverty is taken into account. The elevation of energy poverty requires scholarly and governmental attention, since households living in energy poverty are proven to have a greater chance of physical health issues, mental health issues and social isolation (Braubach et al., 2011; Gilbertson et al., 2012; Liddell et al., 2010; Middlemiss et al., 2019; Recalde et al., 2019; Thomson et al., 2017). Also, they are more likely to face behavioural barriers to participate in the energy transition, as a relatively large share of energy poor citizens experience distrust in governmental institutions due to negative experiences in the past; a fear of complicated procedures; or energy-induced stress, that affects people's cognitive capacity to make rational decisions (Agterbosch, Wentink & Paenen, 2020). As mentioned in the introduction, without specific efforts made to ensure an equitable transition, people living in energy poverty are at risk of carrying a larger share of the burdens and profiting less of the benefits of the energy transition. Hence, taking energy poverty into account in the design of the energy transition creates opportunities to contribute to both sustainability goals and social goals simultaneously.

1.4 Reading guide

The thesis starts with a theoretical framework, in which the academic background of energy poverty and energy justice are elaborated upon and both concepts are related to the energy transition and the Dutch policy context. In the method section, it is set forth why a qualitative, exploratory research design was the preferred research strategy, followed by an in-depth description of how the interviews and document analysis were conducted and how the resulting data was analysed. In the result section, it is outlined how energy vulnerable citizens experience and understand energy justice, as well as how energy justice is described in policy documents. In the discussion and conclusion, an overview is provided of the (mis)matches between citizens' perspectives and those found in policy documents and it is argued how these findings can contribute to the design of a more just energy transition.

2. Theoretical framework

This chapter shows how energy poverty, energy justice and the energy transition relate conceptually. It elaborates on the academic debate regarding the relationship between people's wellbeing and energy use, and provides a theoretical introduction to energy poverty and energy vulnerability. It argues that the scientific debate would benefit from more qualitative research into the perceptions of justice by energy vulnerable citizens. To do so, an overview is presented of the academic background of fuel poverty and energy poverty, followed by arguments for a vulnerability- and capabilities approach. Secondly, the individual and societal consequences of energy poverty are presented, to provide deeper understanding of the issue. Thirdly, it is argued how the energy transition entails both risks and chances for energy vulnerable households, followed by an explanation of how minimising energy poverty can contribute to the acceleration of the energy transition. Subsequently, a conceptualisation of energy justice is provided, connecting the three tenets of energy justice to energy poverty and the energy transition, demonstrating how they can serve as a guideline to identify patterns regarding people's experiences and perceptions. Lastly, different ways of operationalising energy poverty and energy vulnerability are presented, which leads to the argument that a multidimensional perspective is needed that includes both objective and subjective measures.

2.1 The energy system and well-being: the academic debate on energy poverty and the benefits of a vulnerability and capability approach

Energy poverty, the key concept in this thesis, originates from a decade-long history of research into the relationship between people's well-being and the exclusion from certain benefits of energy services (building on the work of Brenda Boardman, 1991). This paragraph discusses the history of fuel poverty and energy poverty, argues that vulnerability thinking enriches our understanding of energy poverty, and shows that a capabilities framework is useful to examine households' experiences with energy poverty.

2.1.1 Fuel poverty

The issue of fuel poverty arose in the United Kingdom (UK) in the 1970s, as activists drew attention to inequalities in access to affordable warmth which disadvantaged certain socio-economic groups. Isherwood and Hancock (1979) are credited with being among the first to draw attention to the issue of fuel poverty (Thomson, Bouzarovski & Snell, 2017), but the issue really gained momentum in academic literature ten years later, when Boardman published her book "Fuel poverty: from cold homes to affordable warmth" (Ambrose & Marchand, 2017, Boardman, 1991). The book led to the recognition of this distinct form of poverty in the UK and marked the start of an academic quest to

find its causes and consequences, both within the UK and internationally. Nowadays, an extended community of researchers seek to understand the problem and aim to inform stakeholders and challenge responses. The field includes a wide range of disciplines, such as sociology; public health; engineering; geography; architecture and planning; urban studies; and economics and business (Ambrose & Marchand, 2017). In the broadest sense, fuel poverty research can be understood as

"the study of issues associated with the plight of households and individuals who cannot, due to a combination of a low income, an energy inefficient home and high fuel costs, heat their home to an adequate level and who may therefore experience a range of negative consequences including poorer physical and mental health and wellbeing, poorer life chances and financial exclusion" (Ambrose & Merchant, 2017, p. 875).

Although the focus of the research field is widely supported among scholars, the multidisciplinary background and the ever-evolving social circumstances regarding the issue make that multiple definitions, approaches and operationalisations exist (Walker, Thomson & Liddell, 2013).

2.1.2 Energy poverty

Energy poverty is subject to similar disagreement regarding its definition and operationalisation (Kyprianou et al., 2019; Middlemiss et al., 2020; More, 2012). Since both energy poverty and fuel poverty concern the problem of household's access to domestic energy consumption, the two concepts are often used as synonyms within academic literature (Li, Lloyd, Liang & Wei, 2014). However, their academic background is different. While fuel poverty research is mainly targeted at residents in England, Ireland and Scotland, with a focus on energy affordability issues, energy poverty research is often studied in the context of international- and sustainable development, with a focus on households who lack connection to any form of energy infrastructure (Li et al., 2014). Against that background, energy poverty can be understood as 'an issue of physical access to electricity, whereas fuel poverty is more of an issue of financial affordability of energy services' (Li et al., 2014). However, throughout several decades, the cross use of the terms became common in academic literature and nowadays energy poverty frameworks are widely used to describe the issue of difficulty of consuming energy services in both the developed-world and the developing world (Bouzarovski & Petrova, 2015; Li et al., 2014). At the European scale, the term energy poverty is most commonly used to describe energy deprivation (Thomson, Snell & Liddell, 2016), rather than the term fuel poverty (Bouzarovski, Petrova & Sarlamanov, 2012), although they are also often used interchangeably, even within official policy documents¹ (Thomson, Bouzarovski & Snell, 2017). Due to this development, it can be argued

¹ See for example European Commission: Communication from the commission to the European Parliament, the Council, the European economic and social committee and the committee of the regions. The European Platform against Poverty and Social Exclusion: a European Framework for social and territorial cohesion, 2010.

that the terms of energy poverty and fuel poverty are so similar and intertwined that it makes sense to treat them as interchangeable concepts. I follow this tradition and from here on treats energy poverty and fuel poverty as interchangeable concepts. This has the advantage that it enables the use of insights from both academic traditions. With regards to terminology, in order to join the Dutch academic, political and public tradition (Dalla Longa, Sweerts & Zwaan, 2021; TNO, 2020; NOS, 2021; CBS, 2021; Rijksoverheid, 2022), energy poverty is the preferred term throughout this thesis.

In defining energy poverty, this thesis is inspired by Bouzarovski and Petrova's (2015) emphasis on energy services and vulnerability thinking, and Day, Walker and Simcock's capabilities framework (2016). Firstly, Bouzarovski and Petrova stress the importance of thinking in terms of energy services. They argue that all forms of energy (and fuel) poverty are underpinned by a common condition: "the inability to secure adequate energy services", whereby energy services can be described as "benefits that energy carriers produce for human wellbeing" (2015, p. 34). If citizens lack access to such services, they are prevented from participating in societal lifestyles, customs and activities (Buzar, 2007). The advantage of thinking in terms of energy services is that it views 'energy' not as a goal in itself, but rather as a means to enable certain domestic functions, such as cooking, washing, heating, cooling and internet connection (Bouzarovski & Petrova, 2015). It shifts the perspective away from energy sources, and onto the utility and satisfaction perceived by the final user. This allows for more subjective, user-oriented examination of energy poverty.

2.1.3 Vulnerability approach

Furthermore, Bouzarovski and Petrova (2015) stress the importance of a probabilistic vulnerability approach when studying energy poverty. This approach draws a distinction between energy poverty - as a *state* that a household is in at a certain point in time- , and vulnerability as a set of *risk factors* leading to such circumstances (Thomson, Bouzarovski & Snell, 2017). This distinction is important, since it acknowledges that energy poverty is not a static problem. It takes into account that a multitude of factors influence whether households become energy poor, including energy prices, household income, energy needs, energy efficiency of the residence, social practices of energy use and institutional factors. When one of these factors changes, a formerly non-energy poor household can become energy service poor, and vice versa (Haarbosch et al., 2021). As such, vulnerability thinking enables a more nuanced and unique examination of the complex issues contributing to energy poverty (Thomson et al., 2017).

2.1.4 Capability perspective

As an extension of this experience-based, user-oriented approach, Day, Walker and Simcock (2016) add a new dimension to conceptualising energy poverty by linking it to the capability perspective

pioneered by Amartya Sen and Martha Nussbaum (Sen, 1992; Sen, 1993; Sen, 1999; Nussbaum, 2000; Nussbaum, 2007; Nussbaum, 2011). According to the authors, this perspective allows for a more systematic understanding of the relationship between energy consumption, energy services and the well-being that energy services enable, which leads to a deeper understanding of energy poverty and energy vulnerability across a wide variety of regional contexts (Day et al., 2016). Central to the capability approach is the notion that the focus of social and economic development should not be on material wealth, but rather on "wider human flourishing, and on what people can achieve and do" (Day et al., 2016, p. 258). It uses two linked concepts: functionings and capabilities. Functionings are defined as 'beings and doings' (Sen, 1992 p. 40), for example 'being in good health' or 'engaging in education'. Capabilities then are the actual opportunities that individuals have to realise given functionings. Increasing peoples' capabilities leads to increased opportunities and alternatives, which creates freedom to choose the kind of life one values (Day et al., 2016). This relation is visualised in figure 1, which depicts the relationship between energy sources, energy services and capabilities.





Poverty, in this understanding, is conceptualised as 'capability deprivation' (Sen, 1993; Alkire, 2007). As such, Day, Walker and Simcock (2016) define energy poverty as "an inability to realise essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy services, taking into account available reasonable alternative means of realising these capabilities" (p. 260). This definition is adopted in this thesis. Characteristics of this definition include the fact that it is multidimensional; dynamic; outcome-focussed rather than input-focussed; and open to the exploration of alternative routes to realise capabilities (not necessarily at household level). Although it is criticised for being less suited for measuring energy poverty at a large scale, due to a lack of agreement on what 'essential capabilities' constitute (Day et al., 2016), it lends itself well to the assessment of the impacts of energy poverty at the scale of individuals and households. Experiences with energy poverty can be described in terms of diminished capabilities as a result of energy service

deprivation (Day et al., 2016). Therefore, the capability approach provides a useful framework to study the effects of energy deprivation as experienced by households.

So far, this section established that fuel poverty and energy poverty can be studied as interchangeable concepts. It is argued why energy poverty is theorised through a vulnerability lens within this thesis, and why the effects of energy poverty on household scale will be examined using a capabilities framework. In the next paragraph, different methods of operationalising energy poverty are outlined.

2.2 The complexity of energy poverty and its interplay with the energy transition

The forgoing paragraph has shown that energy poverty occurs when people are unable to obtain a sufficient level of domestic energy services. This paragraph provides a more in depth understanding of how energy poverty influences people's lives, why it is such a wicked societal issue and how the energy transition poses both risks and opportunities for diminishing the prevalence of energy poverty.

2.2.1 Energy poverty as a complex social issue

Energy poverty is a complex issue that is interrelated with other socio-economic and health-related vulnerabilities (Charlier & Legendre, 2021). Adverse personal circumstances are both a cause and consequence of energy poverty: a compromised physical health, stress, low education and low socio-economic status may lead to energy poverty, and in turn energy poverty makes it harder for households to improve their financial situation, health and social situation (Xu and Chen, 2019). Besides personal circumstances, energy poverty in Western societies is also connected to institutional and cultural circumstances, such as the labour- and housing market (Ambrose, 2015). A first factor that is strongly related to energy poverty is a low income. Low-income households generally spend a higher percentage of their total income on energy than middle- and high-income households, as they are more likely to live in poor quality buildings and hence must consume more energy to reach satisfactory indoor temperatures (Healy & Clinch, 2002). Also, they often lack the financial resources to upgrade electrical appliances or to invest in energy efficiency measures (Jessel et al., 2019). Due to these circumstances, they are often locked in an energy vulnerable situation which confronts them with disproportionally high energy bills (Kontokosta, Reina & Bonczak, 2020). This may force people to keep their energy bills artificially low by using less energy than they need to, a situation known as hidden energy poverty (Cong, Nock, Qiu & Xing, 2022).

A similar lock-in mechanism exists regarding education: lower educated citizens are more likely to face energy poverty. They may for instance lack the knowledge and skills that are needed to find their way in the bureaucracy of utility companies, or to decide on which energy efficiency measures to take

(Jessel et al., 2019). A recent study by Duren et al. (2022) found that not only lower educated citizens have difficulties finding their way in the Dutch energy system; also people with middle and higher education experience difficulties in this regard which highlights the complicated nature of the energy system. The other way around, energy poverty may reduce children's performance in school. They are more likely to be exposed to poverty related stress, which may impair their concentration, and may have difficulties studying at home due to a lack of adequate heating and cooling (Feenstra et al., 2021; Jessel et al., 2019).

Thirdly, health is strongly related to energy poverty. Households with younger children, elderly and households that care for a disabled or ill person typically have a higher energy requirement (Snell et all., 2015; Wrapson & Devine-Wright, 2014; Yohanis, 2012), and people with chronic diseases are at a higher chance of unemployment and lower wages, which makes them vulnerable for energy poverty (Bouzarovski et al., 2017; Middlemiss et al., 2015). Simultaneously, energy poverty confronts people with substantial health risks. Most notably perhaps is the excess winter and summer mortality among people living in energy poverty, due to an inability to adequately heat or cool the living environment (Liddell & Morris, 2010; Sánchez-Guevara Sánchez et al., 2017). People with a low income are more likely to live in homes that are less well protected against extreme temperatures, and are therefore at greater risk of heat stroke during heat waves (Geddes, Bloomer, Allen & Goldblatt, 2011). During winter, a combination of energy saving behaviour and a poor insulation can lead to prolonged exposure to low indoor temperatures, which is commonly associated with a wide range of negative health consequences, including an increased risk of strokes, heart attacks and respiratory illnesses (Geddes et al., 2011; Webb, Blane & de Vries, 2012). Furthermore, people's mental health is often impaired due to energy related stress, for example when one faces the consequences of rising energy prices (Sánchez-Guevara Sánchez et al., 2017). Energy poverty can interfere with people's social lives as well, since people can feel a barrier to invite friends and relatives to their underheated homes (Liddell & Morris, 2010). In turn, a lack of social relations can make a household more vulnerable to energy poverty, since the mental support and practical advice on energy related issues that neighbours, family and friends can provide, is lacking (Middlemiss et al. 2019; Kearns et al. 2019).

In short, it can be concluded that energy poverty is a complex societal issue with interdependencies regarding other social problems. This makes it difficult to extricate oneself from it.

2.2.2 Energy poverty and the energy transition in the Dutch policy context

Scholars agree that realising a sustainable energy transition requires a system change in society (Steg & Vlek, 2009; Steg et al., 2015; Steg et al., 2021). Its success depends on the development of technical innovations that reduce dependence on fossil fuels; the acceptance, understanding and

deployment of these technologies by companies and households; and large-scale behavioural changes that lead to energy savings (Steg & Vlek, 2009; Steg et al., 2015; Steg et al., 2021). To encourage sustainable energy behaviour, many Dutch municipalities started deploying energy coaches over the past years, which provide citizens with advice on home sustainability measures and energy- and cost saving (TNO, 2020). Furthermore, in order to reduce dependence on fossil fuels, governments from the national to the local level put schemes and grants in place to encourage citizens to improve the energy efficiency of their homes and to deploy technologies for sustainable energy generation (TNO, 2020). However, these tend to be generic, and are often an ill fit for the group of people living in energy poverty (Fries Sociaal Planbureau, 2021). For example, home owners have to pre-finance energy efficiency measures in order to be entitled to a subsidy. Households that cannot pre-finance the investment, are therefore not eligible. This makes that subsidies often end up with people with sufficient capital, who could have taken the measure without the subsidy as well (Fries Sociaal Planbureau, 2021). This also applies to the province of North-Brabant: only 15% of all households have sufficient financial resources to qualify for the available home-improvement subsidies and loans, while all citizens contribute to financing these measures (Provincie Noord-Brabant, 2022). Another instrument installed by the national government to stimulate sustainable home improvements is a financial incentive to discourage the use of natural gas. It entails that governmental levies on gas consumption are increased gradually over time (Vergeer, 2017). This method is suitable for households that are financially able to improve their residence, but further it impairs the financial position of households that are unable to invest in renovation measures (Breukers, Agterbosch & Mourik, 2020). As such, the current policy arrangement of the energy transition in the Netherlands has several distributive mechanisms in place that put a larger share of the burdens of the transition with the group of people living in poverty (Breukers, Agterbosch & Mourik, 2020). This has been referred to as the 'energy poverty paradox' (Fries Sociaal Planbureau, 2021): people who experience energy poverty can financially and in terms of health benefit most from a more sustainable home, but are often unable to achieve this because of financial, social, emotional and institutional thresholds. If unattended, it is highly likely that this issue will go at the expense of the public support for and the success of the energy transition (TNO, 2020). Therefore, ensuring a just transition is not only justified from an ethical viewpoint, but also instrumentally.

2.3 Energy poverty as a social injustice

So far, it has become clear that energy poverty is a complex societal issue which can be understood in many different ways, depending on the scientific and political context. However, social scientists agree that it is a form of social inequality, which highlights the need for a 'just transition' (Carley & Konisky, 2020). Energy justice is a framework that brings ethical concerns into the analysis of the

energy system (Hu, 2020). This paragraph provides a brief introduction to the concept of energy justice, largely building on Walker & Day's understanding of the concept (2012). It sets forth the three central dimensions of energy justice and relates them to EP and the energy transition. It is argued that together, the three tenets provide a comprehensive framework to understand EP as an injustice and to explore how (in)justice is perceived by citizens in the context of the energy transition. These dimensions are helpful in answering the research question by providing a framework for collecting, organising and analysing the citizens' narratives and the policy documents.

2.3.1 Energy justice

Energy justice is a conceptual, analytical and decision-making tool that concerns the ethical dimension of energy systems (Sovacool & Dworkin, 2015). Scholars agree that in a just energy system, people share equally in the burdens and benefits that are associated with the production and consumption of energy services and people and communities are treated fairly in decision-making on energy related matters (Sovacool & Dworkin, 2015). Over the past decade, the energy justice literature has seen a rapid growth in application and use (Jenkins et al., 2021). This has resulted in a wide range of interpretations, concepts and notions, including prohibitive and affirmative principles (Sovacool et al., 2013), notions of restorative justice (Heffron & McCauley, 2017) and spatial justice (Bouzarovski & Simcock, 2017). However, the use of the three tenets of distributional, procedural and recognition justice remains the dominant approach in energy justice literature (Jenkins et al., 2021). In short, this framework evaluates how the burdens and benefits of the energy system are distributed (distributional justice), which groups in society are (mis)recognised or (dis)respected (recognition justice), and what processes exist that maintain or reduce these injustices (procedural justice) (Jenkins, McCauley, Heffron, Stephan, & Rehner, 2016). Several scholars have applied this framework to energy poverty (Bouzarovski & Simcock, 2017; Walker & Day, 2012) and the energy transition (Heffron, 2022; Healy & Barry, 2017), which substantiates its use in this study.

2.3.2 Distributional justice

Distributional justice is concerned with the fair distribution of burdens and benefits among members of society (Walker, 2009). It acknowledges that multiple interacting distributional inequalities exist, and focuses on minimising these inequalities through redistribution, for example through subsidies (Jenkins et al., 2016). Energy poverty can be understood as a matter of distributional justice, as it concerns the unequal distribution of the access to energy services, such as heating, cooling or internet connection (Jenkins et al., 2016). In relation to the energy transition, distributional justice has been used to highlight the (un)fair distribution of the costs and benefits of the transition (Jenkins et al., 2021); the (un)fair distribution of nuisance during (re)construction processes; and the (un)fair spatial distribution of renewable energy sources, such as windmills and

solar parks (Jenkins et al., 2016). According to Walker & Day (2012), households' unequal access to energy services is related to the unequal distribution of three underlying factors: income, energy prices and energy efficiency of the residence. These factors are considered the three pillars of distributional justice (Walker & Day, 2012). As became evident in paragraph 2.2.1, these underlying factors are interrelated: they can reinforce each other and hence sustain energy poverty (Walker & Day, 2012).

2.3.3 Procedural justice

Whereas distributive justice is concerned with outcomes, procedural justice is about processes. Procedural (or participatory) justice evaluates the fairness of a decision-making process (Walker & Day, 2012) and calls for the equitable and democratic involvement of all stakeholders (Lee & Byrne, 2019). It considers the availability of appropriate, sufficient, and accurate information for all participants; the access to legal processes; and the extent to which different participants' opinions, suggestions and concerns are considered in decision-making (Walker, 2012; Simcock, 2016; Haarbosch et al., 2021). Procedural justice is closely linked to recognition justice (Simcock, 2016), since a lack of recognition is considered to be part of the reason for unjust procedures resulting in unjust outcomes (Young, 1990; Schlosberg, 2001; Miller, 2003). The aim of procedural justice is to contribute to the design of fair, transparent, and accessible governance processes (Jenkins et al., 2016). For the energy transition, it has for example been used to examine the perceived fairness of the consultation process prior to the construction of wind turbines (Mundaca, Busch & Schwer, 2018). Day and Walker (2012) distinguish three pillars of procedural justice, which are access to information, access to and meaningful participation in decision making, and access to legal processes. These are widely recognised as key interacting elements of justice in procedural terms (Day & Walker, 2012) and will be adopted in this thesis.

2.3.4 Recognition justice

Lastly, recognition justice focuses on (mis)recognition or (dis)respect given to different social, cultural, spatial and political groups, such as elderly, low income households or ethnic minorities (Bouzarovski & Simcock, 2017). It aims to identify where inequalities emerge (McCauley et al., 2019); calls for the acknowledgement of the rights, needs and desires of particular groups (Walker and Day, 2012); and aims to ensure that the opinions and ideas of vulnerable groups are considered during policy formulation (Walker, 2019). Recognition justice is strongly connected to energy poverty, as it calls for recognition of the specific needs and characteristics of this group (Jenkins et al., 2021). In the context of energy poverty, it has been used to raise attention to the higher energy demand of elderly (Savacool, 2015), disabled people (Ball, 1999) and families with young children (Gillard et al., 2017). For the energy transition, it a.o. has been used to highlight the fact that people with a low income or

lower level of education may have different capacities to contribute to the energy transition than those with a higher level of education or income (Breukers et al., 2020; Haarbosch et al., 2021). Day and Walker (2012) distinguish three pillars of recognition justice, namely vulnerability, needs and respect, which are taken on in this thesis.

2.4 Operationalising energy poverty

In the foregoing paragraph, it became evident that recognition of the special needs and vulnerabilities of energy poor citizens can contribute to the design of a more just transition. However, determining who should be included in this group is not a straightforward task. Although energy poverty is an issue that is growing in both recognition and prevalence across Europe, there is no consensus on how to measure it (Thomson et al., 2017; TNO, 2021). Researchers use a wide range of (combined) indicators, varying greatly in objectives and complexity (Kelly et al., 2020). According to Charlier and Legendre (2021) and Kelly et al. (2020), these methods can generally be divided into three categories: expenditure-based measurement methods (also called objective methods); self-reported methods (also called subjective methods); and multidimensional methods (also referred to as composite approaches). In this paragraph, these three approaches of measuring energy poverty are characterised. It will be argued that the field would benefit from increased use of multidimensional approaches, with an emphasis on subjective experiences.

2.4.1 Objective approaches

Objective approaches use measurable and observable criteria to qualify energy poverty (Kelly, 2020). They often build upon economic theories and use income/expenses-based indicators, which is why they are also called expenditure-based methods (Charlier & Legendre, 2021). Within this approach, a distinction is made between absolute measures and relative measures. Absolute measures use a predefined set of indicators to identify energy poor households, such as while relative measures compare the situation of a household considered to be energy poor to other households, often based on a normative threshold (Charlier & Legendre, 2021). The most well-known example of this approach is the 10% indicator, which considers households to be energy poor when more than 10 percent of the disposable household income is spent on necessary energy supplies. It was developed by Brenda Boardman (1991) and has been used as the official indicator for fuel poverty in the United Kingdom for over a decade. Over time, more complicated objective indicators were developed, such as consensual measures, the Low Income-High Cost indicator and the Minimum Income Standard (Callan, Nolan & Whelan, 1993; Day et al., 2016; Hills, 2011; Moore, 2012), which make use of indicators such as income level, energy efficiency, household size and housing conditions (Siksnelyte-Butkiene et al., 2021). Advantage of objective approaches include their relative ease of measurement, calculation and communication (Labandeira & Linares, 2014), which contributes to

them being the most used approaches in scientific as well as policy contexts (Ambrose & Marchand, 2017). They are fitted for the generation of knowledge on a large scale (e.g. nationally) and can generate insights into the extent of the problem including the number of people in energy poverty; the regional distribution of the issue; and changes over time (TNO, 2021). However, objective approaches are also critiqued for various reasons. Firstly, they are difficult to transfer to different geographical contexts. For example, while the 10% threshold may be suitable to reveal energy-poor households in England, other countries need to set a different national threshold using local statistics to make accurate measurements, which is often omitted (Thomson, Bouzarovski & Snell, 2017). Also, thresholds can be arbitrary, since they are highly dependent upon price- and climate fluctuations throughout the measurement period (often over multiple years) (Charlier & Legendre, 2021). Furthermore, they can lead to false in- or exclusion of households, meaning that fuel-poor households are unintentionally considered non fuel-poor, or vice versa. This can, for example, happen in the case of hidden energy poverty, a situation in which households keep their energy bill artificially low by taking measures such as under-heating their homes, not warming their dinner or taking cold showers (Hills, 2011; TNO, 2020). Although such households are not recognised as energy-poor by expenditure standards, they undeniably encounter energy poverty. This reveals a more fundamental issue of objective measurement methods: they are unfit to provide insight into people's subjective experiences. This is where subjective measurement methods come in useful.

2.4.2 Subjective approaches

Subjective approaches use indicators based on households' self assessment of their living conditions (Kelly et al., 2020). Studies are usually conducted by social investigators and surveys as the most commonly used method. These would typically include questions such as: 'Are you able to heat your home adequately? Have you had difficulty in paying your utility bills over the past year? Do you find your dwelling dark?' (Charlier & Legendre, 2021; Kelly et al., 2020). Subjective approaches enable a deeper understanding of energy poverty by highlighting peoples' feelings, experiences and perspectives and providing stories rather than numeric data (Charlier & Legendre, 2021). This is especially useful in policy contexts, since the obtained examples of human impact prove to be influential in shaping policy (Whitehead et al., 2004; O'Sullivan & Howden-Chapman, 2017). Moreover, a qualitative approach does justice to the complexity of energy poverty. It recognises that different people might have a different understanding of energy poverty, not only between themselves but also in comparison to experts' expectations (Middlemiss & Gillard, 2015). However, there are also downsides to subjective approaches. Most notably perhaps the potential over- or under-identification of the phenomenon, due to peoples' different opinions regarding their needs, preferences and circumstances. People simply do not perceive (dis)comfort in a similar way (Charlier

& Legendre, 2021; Thomson & Snell, 2013). This means that the results of subjective studies should be interpreted with caution (Price et al., 2012; Kelly et al., 2020). In line with this, some studies (see for example Hill, 2011; Kelly et al., 2020) show that there is a considerable mismatch between the results of objective indicators of energy poverty and the results of subjective indicators.

Ultimately, many scholars agree that energy poverty cannot be captured accurately by adopting only an objective approach or using subjective measures, and in response have tried to incorporate different dimensions into a broader framework by introducing multidimensional approaches to energy poverty (see for example Charlier & Legendre, 2021; Day et al., 2016; Sovacool, Sidortsov & Jones, 2014; Siksnelyte-Butkiene, Streimikien, Lekavicius, & Balezentis, 2021). These approaches could allow a richer comprehension of the phenomenon (Kelly et al., 2020).

2.4.3 Multidimensional approaches

Multidimensional (or composite) approaches acknowledge the complex and multidimensional nature of energy poverty. They aim to move away from narrow, one-dimensional indicators, which pose the risk of over-simplification, by combining a set of sub-indicators (Thomson & Snell, 2013; Kelly et al., 2020). The capability perspective on energy poverty (Day et al., 2016), as introduced in paragraph 2.1.4, is an example of a multidimensional approach. Other composite approaches used for measuring energy poverty include the Alkire-Foster counting methodology, the Multidimensional Energy Poverty Index and the Energy Inconvenience Index (Alkire et al., 2015; Mirza & Szirmai, 2010; Nussbaumer, Bazilian & Modi, 2012; Sakolowski et al., 2020). Although composite approaches are fit to include both objective and subjective indicators, as exemplified by Sokolowski et al. (2020), most studies only include subjective ones (Sakolowski et al., 2020; Siksnelyte-Butkiene et al., 2021). In the Dutch context, the scientific research agency TNO recently introduced a multi-indicator approach in one of their reports to gain insight into the extent of energy poverty in the Netherlands (TNO, 2021). The authors of the report take into account three dimensions of energy poverty, which are the affordability of energy; the energetic quality of the residence; and the choices and opportunities people have to participate in the energy transition. The latter is, as the authors point out, inspired by Sen's capability approach (TNO, 2021). TNO's research provides a detailed map of the distribution of energy poverty in the Netherlands, on municipality- and neighbourhood level. However, the authors acknowledge that this quantitative research is not sufficient for designing effective energy poverty policies at the local level, unless it is combined with small-scale, gualitative research (TNO, 2021b).

In short, it can be concluded that energy poverty can be approached in an objective, subjective and multidimensional manner, each with their own advantages and disadvantages. This study will make use of a multi-dimensional approach for selecting energy vulnerable citizens for the interviews (see section 3.3.2: citizen interviews), combining objective and subjective indicators. This is considered the

most fitting approach, as it does justice to the complex nature of the issue and the divergent personal circumstances that participants may face. The interviews are then focussed on people's subjective experiences. According to TNO, "statistics (...) are typically a necessary but no sufficient condition for the development of effective energy poverty policy on the local level" (TNO, 2021b, p. 36), and insight in lived experiences and perspectives is needed to enable a more profound understanding of the interdependencies between energy poverty and other challenges that play a role in vulnerable households (Middlemiss & Gillard, 2015; TNO, 2020). As such, insight in people's subjective experiences has the potential to advantage the design of a more just energy transition.

2.5 Conclusion and conceptual framework

This chapter has provided an overview of the academic debate on energy poverty and characterised energy poverty as a complex societal issue with severe individual consequences. It has argued that the three central tenets of energy justice are useful to apply to EP in an energy transition context. It has shown that over the years, scholars have operationalised energy poverty in different ways, using objective, subjective and composite approaches. Although subjective and composite approaches are less commonly used, they are necessary to gain a deeper understanding of the problem. Furthermore, it has become clear that the future of energy poverty is largely dependent on its interplay with the energy transition. As such, it is necessary to take justice into account when designing policies regarding the energy transition.

To give an overview of the operationalisation of energy justice in this thesis, a conceptual framework is provided in figure 2. It shows the application of the presented concepts and indicates the boundaries of what is within and beyond the scope of this thesis. In the centre of the figure is the objective that is being researched in this study, namely the perceptions and experiences of energy poverty as an energy injustice. The left hand side shows how energy poverty is measured, using a multidimensional set of objective and subjective indicators. The right hand side shows how perceptions of energy justice are examined through the three pillars of energy justice. All concepts are embedded in the context of the energy transition. This framework forms the basis for the interview guide and the coding scheme of the document analysis.



Figure 2. Experiences of energy poverty as an energy injustice in an energy transition context.

3. Methods

As stated in the introduction, the aim of this thesis is to compare perceptions of justice in policy documents with perceptions of justice of energy vulnerable people to identify (mis)matches between the narratives. To do so, this thesis examined how energy vulnerable citizens experience (in)justice in the energy transition and what they conceive as a just transition by conducting interviews based on the three dimensions of energy justice. Subsequently, it was examined how energy justice is integrated in Dutch policies on a regional and local level through a document analysis. This chapter elaborates on the research philosophy, research strategy and methods of data gathering and -analysis.

3.1 A qualitative, exploratory research strategy

This thesis makes use of a qualitative research design, which involves gathering stories rather than numerical data to understand reality. This approach allows for flexibility and the retaining of rich meaning when interpreting data (Stenfors, Kajamaa & Bennett, 2020). This is in line with the objective of this thesis, since it aims to explore people's perceptions of energy poverty. According to Bryman (2016), three features are particularly noteworthy about qualitative research. First, qualitative research generally has an inductive understanding of the relation between theory and observation (Bryman, 2016). Rather than drawing conclusions based on hypotheses (deduction), such research derives conclusions from the gathered data. Furthermore, the epistemological position of qualitative research is generally an interpretivist one (Bryman, 2016). Interpretivists acknowledge that reality is not objective and argue that the social world can best be understood through an examination of the interpretation of that world by its participants. Third, its ontological position can be described as constructivist (Bryman, 2016). As opposed to objectivism, constructivism asserts that social phenomena and their meanings are continually being accomplished and re-accomplished by social actors; as people experience the world, they reflect upon these experiences and build their own mental representations of reality (Bryman, 2016). These representations are not static: they are revised in reaction to new experiences and incorporated into pre-existing knowledge (Bryman, 2016). One of the advantages of a constructivist approach is that it encourages close collaboration between the researcher and the participant, while enabling participants to tell their stories (Baxter & Jack, 2008).

This thesis does not use a strictly inductive procedure. Instead, it uses an iterative approach, which means that emerging insights at any point in the research are used to inform the rest of the research, progressively leading to a refined focus and understanding (Srivastava & Hopwood, 2009). Practically, this means that the researcher moves back and forth between theory and empirics (Bryman, 2012).

In the context of this thesis, existing theory is used to provide a framework for understanding energy poverty and energy justice; however, the final conclusions are drawn from the empirical data, and are used to generate theory and expand existing knowledge (Bryman, 2012). As established in the introduction, only limited research is conducted in the Dutch context with regards to perceived fairness of the energy transition from the viewpoint of energy vulnerable citizens. Therefore, this thesis involves exploratory research: it does not intend to offer final and conclusive answers to a problem, but rather to expand the understanding of the issue (Swedberg, 2020).

With regards to its structure, this thesis is divided into three research steps that closely relate to the sub-questions. First, semi-structured interviews are conducted to gather citizens' perceptions on energy justice in the energy transition. Secondly, a document analysis is conducted, involving policy documents on the energy transition from a regional and local level. Thirdly, these perceptions are compared to distinguish matches and mismatches. All steps are part of the iterative research design. This means that they will be carried out mostly chronologically, but the researcher may revisit theory based on finding in the empirical data, and vice versa (Bryman, 2012). An overview of the research structure is provided in table 1.

Sub-qu	estion	Answered in section	Answered by means of
1.	How do energy vulnerable citizens experience energy (in)justice in the energy transition and what, according to them, constitutes a just energy transition?	Section 4.1: Perceptions of justice regarding the energy transition of energy vulnerable citizens	Citizen interviews and thematic analysis in Atlas.ti
2.	Which perceptions of energy justice can be found in policy documents on the energy transition on a regional and local scale?	Section 4.2: Perceptions of justice regarding the energy transition expressed in policy	Document analysis with the use of a code book in Atlas.ti
3.	Which (mis)matches arise when comparing the perceptions of energy justice of energy vulnerable citizens to the perceptions of energy justice in policy documents?	Section 4.3: (Mis)matches between citizen perceptions and perceptions expressed in policy	Document analysis and thematic analysis of citizen interviews in Atlas.ti

Table 1. Overview of methodological approach per sub-question.

3.2 Case study design and case selection

A case study can be described as an in-depth, multifaceted investigation of a single social phenomenon (Feagin, Orum & Sjoberg, 1991). This approach is suitable to investigate phenomena which lack detailed preliminary research (Mills, Durepos, Wiebe & Pagano, 2010), as is the case with lived experiences of energy poverty in the Dutch energy transition context. A single-case study design was chosen, which has the advantage that it allows for a detailed and rich understanding of the case,

but the downside that it is usually difficult to generalise findings to other situations, either because the case is unique or because results only apply to the particular context that has been examined (Flyvbjerg, 2006; van Thiel, 2014).

3.2.1 Case selection: the city of Tilburg

After deliberation with the host organisation, a city-level approach was chosen rather than a neighbourhood approach for this thesis. The latter would have been a defensible choice, since EP is concentrated at the neighbourhood level (TNO, 2021a) and the energy transition is predominantly governed at this level (RVO, 2021). However, consultation with the host organisation led to the notion that recruitment on neighbourhood-level would likely be a time consuming and costly process, since the preferred approach would be to print and distribute flyers to all residences in the selected neighbourhood and going door-to-door to invite people personally. Hence, a city-level approach was chosen. This level is justified within the purpose of this thesis, since the aim is not to explore the (in)justices of a specific, neighbourhood-bound situation, but to explore the general view on justice of energy vulnerable people. In agreement with the host organisation, the city of Tilburg in the province of North-Brabant was selected as a case study.

The city of Tilburg has several features that make it eligible for studying energy poverty in a transition context. First, out of all townships (gemeenten) in the province of North-Brabant, it has the lowest average income per inhabitant, with an average yearly income of \in 24.800 (Allecijfers.nl, 2022). Additionally, the city has a relatively low energy efficiency in a large part of its housing stock; relative to the rest of North-Brabant, Tilburg has a surplus in residences with an energy efficiency label of E and F (PON & Telos, 2020)². Almost 40 percent (38,8%) of the households live in a residence with a low energetic quality (reflected in an energy efficiency label between D and G), which means that they are heated with natural gas and are generally poorly isolated (PON & Telos, 2020). Figure 3 shows an overview of the percentages of residences with energy label E - G inTilburg on neighbourhood level, showing that the prevalence of low energetic quality homes is geographically concentrated in certain neighbourhoods.

² All residences in the Netherlands have an energy label, rating from A to G. Homes with an A-label are the most energy-efficient, homes with a G-label are the least energy efficient. Labels E to G correspond to a 'fairly low' to 'very low' energy efficiency.





In line with the conviction that energy poverty is a highly localised issue, the rate of EP in Tilburg varies greatly per neighbourhood. According to calculations by TNO (2021a), the percentages in Tilburg range from 0.40 percent in the neighbourhood Stappegoor, to 14.8 and 15.68 percent in the neighbourhoods Wandelbos-Noord and Groenewoud respectively. For comparison, the national average is 7 percent (TNO, 2021a). However, it should be noted that TNO's numbers are based on data derived in 2019, so it is highly likely that the current rates are higher due to inflation and the sharply increased energy prices (Movisie, 2022). The combination of these factors provides Tilburg with a challenging task regarding energy poverty and the energy transition (PON & Telos, 2020), and makes Tilburg an eligible case to study energy poverty in an energy transition context.

3.3 Data collection and data analysis

Case study research typically includes multiple data collection techniques and sources (Yin, 2009). This enables different interpretations and meanings to be included in the analysis and strengthens the credibility of outcomes (Flick, 2014). By examining information collected through different methods, the researcher can corroborate findings across data sets and thus reduce the impact of potential biases that may exist in a single study (Bowen, 2009). The data collection started by gaining insight into the local context, in an aim to find out how the energy transition is proceeding in Tilburg, what the situation regarding energy poverty is and which actions have been already undertaken by the municipality and REKS-region³ to deal with the two issues. This information was obtained through

³As stipulated in the Climate Agreement, the Netherlands has been divided into 30 'energy regions', each responsible for formulating a Regional Energy Strategy (RES). These strategies outline the regional uses of heat sources, the construction of storage- and energy infrastructure and the siting of renewable energy production (Nationaal Programma Regionale Energie Strategie, n.d.). Tilburg expanded its RES to a Regional Energy and Climate Strategy, abbreviated to REKS in Dutch.

policy documents, information on the municipal website, through the REKS website, and interviews with two local energy coaches. These expert interviews served two goals: to get a feeling for the situation of citizens living in energy poverty, and to gain practical tools for talking about this sensitive subject. The expert interviews were not part of the analysis.

When the initial understanding of the local context of Tilburg was established, I examined how energy justice is understood by energy poor citizens of Tilburg through interviews, and how justice is reflected in regional and local policy documents through a document analysis. The citizen interviews served two goals: to gain insight into how energy vulnerable citizens of Tilburg experience (in)justice in the energy transition, and to uncover which meaning they give to a just transition. To do so, in the selection procedure, the 13 participants were asked seven questions to qualify whether they indeed experience energy vulnerability (see paragraph 3.3.2). Next, they were interviewed using an interview guide based on the three tenets of energy justice. Subsequently, a document analysis was carried out. Four policy documents were analysed from a regional, city and neighbourhood level. The documents were analysed using qualitative content coding, with a combined inductive and deductive approach. The analysis builds on the already established analytical dimensions in the literature on energy justice, namely recognition-, procedural- and distributive justice. The next two paragraphs provide a detailed description of how the interview process and the document analysis took place.

3.3.2 Citizen interviews

An interview is a conversation during which information is gathered by questioning one or more people (van Thiel, 2014). It is one of the most widely employed methods in qualitative research, since it allows for the gathering of rich, detailed information on people's feelings, perceptions and experiences regarding a phenomenon (Bryman, 2016; van Thiel, 2014). Two main types can be distinguished (Bryman, 2016); structured and unstructured interviews. In their most strict sense, structured interviews resemble an oral version of a questionnaire; while unstructured interviews resemble an open conversation in which the only fixed item is the initial question (van Thiel, 2014). Semi-structured interviews, the preferred method within this thesis, are situated in the middle of this continuum. It includes an interview guide (see Appendix 1), featuring a list of specific topics that are to be covered for the sake of systematic and consistent research. The interview guide was based on the three tenets of energy justice and provided several topics per tenet. For structuring the topics, the researcher used Michael Patton's typology and sequencing of interview questions (2014). Patton distinguishes five types of questions, namely questions about experiences and behaviours; opinions and values; feelings; knowledge; and finally sensory observations. He advises to sequence them in this particular order, since this makes the interviewee feel more comfortable, as it starts with questions that are easier to answer.

Topics that were covered in the interview guide were a.o. energy saving behaviour; state of the residence; financial situation; capabilities to make the home more sustainable; responsibilities of different parties regarding the energy transition; access to information; ability to participate in decision-making; experiences of (mis)recognition; and what is considered a fair outcome of the transition. Although the core topics were predetermined, there was room to discuss probing questions and questions that were not outlined beforehand, which allowed for a more natural development of the conversation (Bryman, 2016; Longhurst, 2010). In line with literature (Bryman, 2016), this interview method proved to be flexible enough to gather rich information, yet structured enough to enable a certain level of cross comparability.

As a second step, interview candidates were recruited. For the purpose of the research, it was important that interviewees experienced energy vulnerability in their day to day lives, so that they could provide insights into lived experiences. Therefore, a list of characteristics of energy vulnerability was composed (see table 2). The list was based on objective indicators of energy poverty derived from TNO's report 'De feiten over energiearmoede in Nederland' (2021) and the Het Pon & Telos report 'Betaalbaarheid van de energietransitie in Tilburg' (2020), which were complemented with subjective indicators of energy poverty derived from Charlier & Legendre (2021), Kelly et al. (2020), Jessel et al. (2019), Liddell & Morris (2010) and Sánchez-Guevara Sánchez et al. (2017). The indicators were converted to seven questions which were asked as part of the selection procedure and later on discussed in more detail during the interviews. As such, the selection of the interview candidates was based on a multidimensional operationalisation of energy poverty. Besides providing insights into people's vulnerabilities and capabilities, the answers were used for accountability purposes: clearly knowing in which ways the interviewees experience energy vulnerability contributes to the internal validity of the research, by making sure that the intended group was interviewed.

Indicators for energy vulnerability	Abbreviation	Based on
10% or more of the household's joint income is spent on gas and energy bills.	A	Het PON & Telos, 2020
Household members adjust their behaviour to save energy. This is done by at least one of the following practices: a) the heating is set at a temperature that the interviewee reports as uncomfortable or cold; b) only rooms in use are heated (e.g. the living room); c) the preparation of food is influenced by energy-saving behaviour (meals are not or briefly heated) d) in general: household members avoid doing things that they find important to suppress energy costs (e.g. take less showers per week, under-light the house, reject to invite visitors due to their cold homes).	В	Charlier & Legendre, 2021; Kelly et al., 2020; Jessel et al., 2019; Liddell & Morris, 2010
Emotional health issues due to high energy costs: one experiences stress at least weekly as a result of energy costs.	с	Sánchez-Guevara Sánchez et al., 2017

Inability to pay energy bills: over the past year, one or more gas/energy bills could not be paid in time.	D	Het PON & Telos, 2020
Low energetic quality of the residence: a) the residence has a definitive energy label of D or lower, or b) if the label is unknown: the interviewee indicates that at least one of the following circumstances is present in their home: 1) mould; 2) draft; 3) cold; 4) poor insulation.	E	TNO, 2021; Charlier & Legendre, 2021
Owned property with a low energetic quality, where the owner is unable to take energy efficiency measures due to a) insufficient equity (vermogen) or b) insufficient loan capacity. In practical terms: the household owns less than \notin 40,000 in equity or has a home equity (vermogen) value of less than \notin 80,000.	F	TNO, 2021
Rental housing with low energy quality, where the renter is unable to make decisions about energy efficiency measures. In practical terms: one depends on the willingness and capacity of a housing association or private landlord for taking energy efficiency measures.	G	TNO, 2021

 Table 2. A composite approach to operationalising energy poverty.

Since the aim of this thesis is to explore meanings and experiences, a certain heterogeneity within the sample group was desired, as this would enable the inclusion of a diverse range of interpretations (Robinson, 2014). This was accomplished through purposive sampling, hence respondents were selected strategically with the research objective in mind (Bryman, 2016). Several methods were deployed to recruit interviewees. Firstly, various social work organisations in Tilburg were contacted, namely the Quiet Community, Meedenkers, Contour de Twern, Voedselbank, Energybox and several community centres in more vulnerable neighbourhoods (based on TNO's map of energy poverty, 2020). This resulted in 4 respondents. Next, during the expert interviews, the energy coaches were asked for potential respondents. This resulted in 1 participant. Furthermore, the personal networks of the researcher and of colleagues at the host organisation were deployed. This resulted in 4 participants. Furthermore, the researcher went door-by-door in the vulnerable neighbourhood Wandelbos-Noord (see paragraph 3.2.1). This resulted in 3 participants. Lastly, after every interview, the participants were asked if they knew other potential participants. This resulted in 1 participants. Lastly, after every interview, the participants were asked if they knew other potential participants. This resulted in 1 participant. The process of recruiting and interviewing continued until theoretical saturation occurred, which means that no new relevant data came up in the interviews (Bryman, 2016).

The final sample group included 13 respondents with a great variety of characteristics. This variety was based on *housing situation* (as 3 lived in private rental homes, 6 lived in social housing and 4 owned a property themselves); *gender* (as 8 men and 5 women participated); *age* (20 - 29 (3 respondents), 30 - 39 (1 respondent), 40 - 49 (2 respondents), 50 - 59 (6 respondents), 60 - 69 (1 respondent)) and *family situation* (as 5 respondents live alone, 2 respondents live with their partner and 6 live with their families). Table 3 provides an overview of the relevant characteristics of the

interviewees and the ways in which they encounter energy vulnerability, expressed as the abbreviations of the energy vulnerability indicators (see table 2). For privacy purposes, the interviewees' names are pseudonyms.

Name	Age	Gender	Housing situation	Family situation	Energy vulnerability indicators
Willem	26	М	Private rent	Two-person household	B, E, G
Arthur	28	М	Private rent	Single household	B, G
Mitchell	27	М	Private rent	Two-person household	B, E, G
Bé	30	V	Owned property	Single household	C, E, F
Mark	55	М	Owned property	Family	C, E, F
Emma	57	V	Owned property	Family	A, B, C, E, F
Hans	57	М	Owned property	Single household	A, B, E, F
Brandy	40	V	Social housing	Family	A, B, C, D, E, G
John	56	М	Social housing	Single household	A, B, C, G
Gabri	61	М	Social housing	Family	B, G
Charlotte	46	V	Social housing	Family	A, D, E, G
Lobke	57	V	Social housing	Single household	A, B, C, G
Kos	55	М	Social housing	Family	B, E, G

Table 3. Background information and energy vulnerability indicators per interviewee.

As a third step, 13 walk-along interviews were conducted. At the start of the interviews, the interviewees were informed about the purpose of the interview, the practicalities, confidentiality and informed consent (see interview guide, appendix 1) (Gray, 2006). The conversations were recorded to allow the researcher to focus on what was said, to facilitate asking follow-up questions and to enable a detailed transcription afterwards (Bryman, 2016). To make sure that all relevant topics were covered, notes were made on a printed version of the interview guide. Topics that were not yet covered by the end of each interview were discussed explicitly. Most notably, the subject of access to legal processes had to be brought up by the researcher, which may indicate that this subject is outside the scope of most interviewees. The interviews were conducted in Dutch.

Since energy poverty is a sensitive topic, it was important to develop a situation in which both the researcher and the participant felt comfortable and where there was a sense of equality between the participant and the researcher (Moen, 2006). Therefore, walk along interviews were the preferred method. This method has several advantages when researching experiences and practices of marginalised groups (Anderson, 2004; Haarbosch et al., 2021). It helps to reduce the power imbalance between interviewer and interviewee, and encourages spontaneous conversation as 'talking becomes easier when walking' (Kinney, 2017, p. 2). The route of the walks was decided by the

interviewees, which enabled them to walk to specific areas that were meaningful for their stories. As anticipated, walking proved to be a great way to reduce the tension and formality of the interviews. Several interviewees made small talk about the surroundings right after discussing a sensitive topic, which seemd to help them to recharge for the rest of the conversation. As interviewee Lobke commented: "Relaxed, in the sun like this. I like it better than at home." It turned out that most conversations developed naturally, and most topics included in the interview guide could be discussed in the natural order they occurred. The probing questions often resulted in the most insightful answers, as they invited the interviewees to share feelings, vision and experiences.

Simultaneously with the interviews, transcription took place. A transcript is a literal, verbatim account of a conversation, including meaningful non-verbal expressions. It is considered the most accurate and full interview report a researcher can give (van Thiel, 2014). The transcription was carried out right after each interview was conducted. In this way, any small unclarities in the recordings could be filled in by memory, and new themes that emerged in the interviews could immediately be taken into account for subsequent interviews (Rubin & Rubin, 2005). The transcription software Sonix.ai was used to create a draft version of the transcripts. The drafts were optimised by listening to the records and altering the transcripts, until they accurately represented the conversation.

Lastly, the analysis of the interviews took place in Atlas.ti, using qualitative content coding. An inductive approach was chosen to allow for the emergence of new themes and interpretations, and to do justice to the richness of the interviewees' stories (Blumer, 1969). The analysis started with the annotation of codes to all text fragments that seemed relevant. In this first round of analysis, the codes were close to the text fragments (e.g. a text fragment about mould in someone's home was assigned the code "unfavourable condition of residence"). In the second round of analysis, the data was conceptualised, meaning that categories and subcategories were created by grouping the codes that were created in the annotation phase (e.g. all text fragments assigned with the code "unfavourable condition of residence" were assigned to the overarching group "energy poverty"). In this part of the process, the three tenets of energy justice were used as sensitising concepts to filter and interpret the empirical data (Blumer, 1969). This practically meant that the tenets were kept in mind when grouping the codes, although being open to the emergence of new themes. Lastly, segmentation took place by positioning and connecting the different categories. The researcher used a creative method to structure the obtained data, namely by sticking post-it notes with the codes on large sheets of A2 paper to structure the categories under different themes, such as energy poverty, the three tenets of energy justice and 'other', representing newly emerged themes. This exercise was at the base of the final segmentation in Atlas.ti.

3.3.1 Policy document analysis

A document analysis is a systematic procedure to review or evaluate documents and answer specific research questions (Bowen, 2009). As a research method, document analysis is particularly applicable to qualitative case studies since it helps the researcher to uncover meaning and develop understanding of the research problem, and it contributes to corroboration of the findings (Bowen, 2009; Yin, 2009).

The objective of the document analysis was to find out how the concept of justice is reflected in policy documents on the energy transition on a regional and local scale. The analysis contributes to the understanding of the values, interests and political contexts underpinning policy decisions (Browne et al., 2019). As such, the document analysis relates directly to the second sub-question ('Which perceptions of energy justice can be found in policy documents on the energy transition on a regional and local scale?'). It is important to note that policy makers' (current) personal perceptions of energy justice and energy poverty may differ from those found in policy. This is especially relevant in the case of energy poverty, since the political attention to energy poverty only recently increased sharply in the Netherlands (Middlemiss, 2022) and policy makers' view on the subject may have changed over time, while texts remain static. However, policy documents are "social products that have consequences in themselves, irrespective of their authors' intentions" (Karppinen & Moe, 2018, p. 11), so they indirectly create the framework in which citizens and governmental actors have to operate and are therefore relevant to analyse.

The documents were selected in consultation with a team of experts, based on the criteria of 1) relevance for the energy transition, 2) release date (the most recent documents available were selected), 3) relevance for the policy context of Tilburg and 4) achieving a balance between strategic and practical documents. The documents were analysed using qualitative content coding, combining inductive and deductive approaches. Table 4 provides an overview of the analysed documents.

Name	Year	Scale
Energy Agenda 2019 - 2030 Province of North-Brabant	2018	Regional
Regional Energy and Climate Strategy Region Hart van Brabant	2021	Regional
Transition Vision Heat Tilburg	2021	Local
Energy Vision Municipality of Tilburg Tilburg	2017	Local
Implementation living lab natural gas-free Quirijnstok, Tilburg	2019	Local
Table 4. Analysed policy documents.

To enable autocoding in Atlas.ti, the use of a coding scheme was the preferred method. The code list of Haarbosch et al. 's study 'A Mismatch in Future Narratives? A Comparative Analysis Between Energy Futures in Policy and of Citizens' (2021) proved to be a useful guide to build upon, since this study also analysed policy documents in the Dutch context using the three tenets of energy justice, although in combination with futures theory. Hence, only its section on energy justice was used as the initial code list.

In terms of process, the coding took place in three phases. In the first phase, the documents were read globally. Potential keywords that appeared in the policy documents and were not in the initial code scheme (e.g. 'household' as part of 'recognition of actors') were identified and added to the list. In the second phase, the scheme was used for autocoding in Atlas.ti. The autocoding was checked by carefully reading the text surrounding the codes, to make sure that every code connected to the appropriate information. Keywords that did not return the appropriate results were removed and documented in the coding scheme under 'rejected keywords'. If a keyword resulted in both appropriate and inappropriate results, it remained in the code list and only the appropriate results were coded. For repeatability purposes, the underlying rationale for such choices was included in the coding guidelines of the scheme. This led to the final scheme, which can be found in Annex 2. In the last phase, the coded documents were read once again to make sure that all relevant paragraphs were linked to the appropriate codes and no relevant information was left uncoded. This led to the assignment of codes to 12 additional text fragments.

4. Results

This chapter provides an overview of the results of the citizen interviews and the document analysis. Regarding the perceptions of justice of energy vulnerable citizens, it will become clear that most interviewees consider it fair if the responsibility to take action is shared proportionately between government, businesses and citizens, and citizens with a low income are prioritised in the energy transition. Regarding the understanding of justice as expressed in the policy documents, we will learn that citizens are expected to play a central role in the transition and affordability is considered a key principle to achieve fair outcomes. This chapter will first outline the perceptions of energy vulnerable citizens, then detail how justice is expressed in policy documents, and lastly compare the two sources.

4.1 Perceptions of justice of energy vulnerable citizens

This section provides an answer to sub-question two: "How do energy vulnerable citizens experience energy (in)justice in the energy transition and what, according to them, constitutes a just energy transition?". This thesis draws on distributional, procedural and recognition justice and expands these aspects with a newly emerged theme: 'responsibility to take action' under recognition justice. This paragraph identifies which aspects of these dimensions are relevant for how energy vulnerable citizens understand energy justice.

4.1.1 Distributional justice

As outlined in the theoretical framework, the three aspects that arise from the literature on energy poverty and energy justice are 1) income, 2) energy efficiency and 3) energy prices (Walker & Day, 2012). In this section, the findings for all aspects are elaborated upon.

4.1.1.1 Income

The first aspect is that of income (Walker & Day, 2012), which is relatively low among most of the interviewees, although four have an average income. As mentioned in the theoretical framework, the aspect of 'income' is broadly interpreted to make it more fitting to analyse energy poverty not only on a household level, but also in a society-wide transition context. The first income-related theme that arose in the interviews is the perceived difference in abilities to participate in the energy transition among different socio-economic groups. Most interviewees link differences in income to different needs for governmental support, but are sceptical whether these differences are recognised. This is exemplified by Brandy. Brandy lives in social housing, is a mother of three children and her husband is declared unfit for work, so she is responsible for the family income. She speaks about which groups in society should be first to receive government support in the energy transition.

"The low-income people. Definitely. Because they really have very little to spend already. (...)

That (support) really gives them some peace and some more room to breathe. (...) those richer people, they can do it all by themselves and they all do it themselves. But I have the feeling that exactly those people are helped more than the people with a lower income."

Almost all interviewees share her vision that it would be fair for people with a low income to be among the first to receive government support for energy efficiency measures, especially in the light of the rising energy prices. In the words of Mitchell, a 27 year old man living in a private rental apartment with his girlfriend, on the brink of a poorer and a wealthier neighbourhood: "*In the richer neighbourhoods live people who are richer already. So if it is less sustainable there, they can still afford it. So then focus first on people who can't afford it already*". Two respondents have a dissenting opinion. Bé argues that support should be shared equally among all citizens without benefiting one group in particular, while Emma suggests linking support to people's energy saving behaviour instead of income.

To some interviewees, the division of governmental support is a matter of restorative justice. For example, Arthur. Arthur is 28 years old and lives on his own in a private rental home. In order to suppress the energy bills, he has kept the indoor temperature to 16,5 degrees throughout winter. About this, he says: *"When the snow came, I put it on 18 degrees. I thought: 'oh, just a little luxury'. But when it warmed up a bit again, I immediately put it back to 16.5."* When asked what the government should focus on, he says: *"I think the ones who suffered the most (...) from these unimaginably high energy prices at the moment. Because I doubt those will go away any time soon."* This perception relates strongly to the dimension of vulnerability and political respect as part of recognition justice, which will be deliberated in section 4.1.2.2.

Summarising, most interviewees link a lower income to a higher need for governmental support. However, they doubt whether the current division of support measures does enough justice to the needs of energy poor citizens. Most interviewees would consider it fair if this group would be among the first to receive support in the energy transition.

4.1.1.2 Housing technology and energy efficiency

The second dimension of distributional justice is energy efficiency (Walker & Day, 2012). Energy efficiency is important for both the energy transition and energy poverty, because efficient houses require less heating to achieve a comfortable temperature, which leads to fewer emissions and less energy poverty (Walker & Day, 2012). In the interviews, several patterns emerged regarding energy efficiency. Nine interviewees expressed serious concerns about the current energy efficiency of their homes, which results in mould, cold fronts, draft, and in some cases the inability to adequately heat the house, even with the heat turned up. In the case of Brandy, there is an interplay between the poor state of her residence and her energy saving behaviour. She expresses that there is mould in her

attic, and while she knows it is important to aerate her home to prevent the mould from spreading, she and her husband "do not dare to open the windows too often, because then it gets really cold inside quickly. And then it takes a long time to warm up again. So we hardly aerate. While I know it is good to do".

For 11 interviewees, these concerns lead to a desire to take energy efficiency measures in their houses. For example Willem, when asked if he wants to take measures: *"Yes. 100 percent. The first thing I would do is take double glazing, so that our gas bill is lower and so that we really have to consume less."* 7 interviewees have already taken small measures, like placing draft strips, using LED-lights, placing radiator foil or buying energy efficient appliances. John exemplifies this. He lives on his own in a social housing apartment, and tries to save energy as he fears the final annual bill of his energy provider. He says: *"I just bought a new freezer, with my holiday money. Because the other two I had, they were twenty or thirty years old, so they used a lot of energy."* 2 interviewees are sceptical, however, whether such 'smaller' measures really make a difference for their situation. Lobke, for example, has placed radiator foil and draft strips in her house, but she thinks that *"if you live in a poorly insulated house, you can put three layers of radiator foil behind your radiators, but that will do little to nothing".* As such, energy efficiency relates to meaningful participation as part of procedural justice (see paragraph 4.1.3.3).

9 participants express they would be willing to take larger energy saving measures, like solar panels, insulation, triple glazed windows or new window frames. However, their desire is hampered by either a lack of financial capacity, a lack of capabilities (especially regarding finding information), fear of changing one's financial situation, lack of agency regarding the residence, or distrust in sustainable technologies.

1) The inability to finance the costs of (larger) home improvements. As Bé puts it: "Of course you can make your home more sustainable in simple ways. But if you really want to do it properly, then you really have to invest. That savings, I just don't have that." All interviewees mentioned this problem except for Kos, who's home was being renovated by his housing corporation at the time of the interview.

2) The fear that investments will not lead to enough savings to outweigh the costs, or even worsen one's financial situation. Lobke, for example, was offered to have solar panels placed by her housing association. After calculating the costs and benefits, she decided not to take the offer:

"You have to consider, on the one hand you no longer use energy. On the other hand, you get so much rent increase that the balance...yes, it doesn't help me very much. And it may even cost me more due to the rent increase than what I eventually get back from the electricity." Later on in the conversation, Lobke admits that she is hesitant to change anything in her financial situation, because then she may no longer be entitled to certain benefits:

"If I want to start working part-time now, then I really have to start calculating, because if I exceed it [the income limit] by a few euros, I will no longer receive rent and care benefits. So then I'll be much worse off at the end of the month. (...) So I'd rather it stay this way than have to do all kinds of scary things and then not know at the end of the month if I have enough to get by".

Lobke's hesitance to take energy saving measures is thus related to the negative associations she has with stirring up her financial situation. By keeping things the way they are, she at least knows what to expect.

3) Distrust in the affordability, effectiveness and control one has when switching to sustainable solutions. Three interviewees expressed these concerns, and for all three, their concerns were fueled by their negative experiences with district heating. They mentioned four main issues with this technology, namely:

- 1) that the prices are higher than with natural gas;
- 2) that the producer of the district heating has a monopoly position;
- 3) that switching energy providers is impossible; and
- 4) that one has less control over their heating settings than with central heating.

Their negative experiences with district heating induce mistrust and even resistance towards sustainable solutions. Take for example John, who feels he is being punished for being on district heating: *"We are all off the gas here in the Reeshof (neighbourhood). Actually, we should all be rewarded because we are off the gas. But apparently we are hit the hardest"*. By being hit the hardest, he refers to the fact that the price of district heating is even higher than that of natural gas. Charlotte, a single mother who lives in a social housing home, was connected to district heating in her former home. She dreads the monopoly position of the provider: *"You are so very trapped. That's just not nice. So if at all possible, just let me be on natural gas".* Hence, her negative experience with sustainable technology in the past has led to a strong reluctance to be disconnected from natural gas in the future.

4) The fourth hampering factor is a difficulty to find accurate, reliable information on how to make one's home more sustainable. Emma exemplifies this. She is a single mother living with her two children in a house she bought from the housing association years ago. About searching for information to renovate her home, she says: "That, for me, is a big stumbling block. You can scour the internet of course. And then you can ask an energy coach: 'what does this mean? What do they do, then?'. And then of course you still have to deal with applying for a subsidy. But those subsidy pots are always gone at the end of the year. So you have to think that through very well, and calculate, and do it. And then, I think, I drop out."

Hence, difficulties to find, filter and process information hampers Emma from making her home more sustainable, even though she desires to do so.

5) In the case of a rental house or owned apartment, interviewees experience a lack of agency to decide whether energy efficiency measures are taken. Hans, for example, tried to convince his owner association (Dutch: VVE) to insulate the outer walls of the apartment block several times, because *"the cold comes through it"*. However: *"they do not give in, because then they have to pay more"*.

From this, it becomes clear that Hans does not have agency about whether his home is insulated. This proved to be a problem among all interviewees living in rental homes or apartments. The interviewees living in social housing expressed that they expect renovation measures at some point in the future, but they don't know in what time frame (except for Kos, who's home was being renovated at the time of the interview). Among the interviewees living in a private rental home, there is little trust that landlords have any incentive to improve the energy efficiency of the building. Mitchell exemplifies this when he speaks about the tightness of the housing market and the effect this has on his landlords: "(...) they will not earn from it themselves, because they can now ask the same price as when they would have made it sustainable. It's not profitable enough for them. (...) If we go out, someone else will come and pay the same amount".

From this paragraph, it has become clear that many interviewees have concerns about the energy efficiency of their homes. Some interviewees have already taken smaller energy efficiency measures, however they doubt whether these really make a difference for their situation. The majority of the interviewees would be willing to take substantial renovation measures, but they often hampered by one of the following factors: the inability to pay the costs; fear that measures will worsen their financial situation; distrust in sustainable technologies; difficulties to find accurate information; and a lack of agency to decide about home renovations. These hampering factors relate to several other justice dimensions, namely energy costs, information, participation and vulnerability as part of procedural and recognitional justice. These dimensions will be discussed in more detail in paragraphs 4.1.2 and 4.1.3.

4.1.1.3 Energy prices

As mentioned in the theoretical framework, the third aspect of 'energy prices' is interpreted broadly and refers not only to energy prices but also to other transition related costs, such as investment costs for improving residences. Two main patterns emerged regarding energy prices, namely concerns regarding the recent increase in energy prices and concerns regarding the costs for improving residential energy efficiency.

About the energy prices, Lobke says: "You notice from the gas price that it has gone up enormously. So I hold my heart. When I get the annual electricity bill, how am I going to do that?". The uncertainty of the price fluctuation leads to severe stress among 4 interviewees and an increase in energy saving behaviour among 11 interviewees. This behaviour includes putting the heating on a lower temperature (6 respondents); turning the heating off entirely (1 respondent); heating only one room of the house (3 respondents); keeping windows shut at all times (4 respondents); preparing meals with a short cooking time only (1 respondent); and taking less and shorter showers (7 respondents).

Lobke exemplifies what it is like to try to save as much energy as possible. She is 57 years old and lives alone in a social renting house. She does not have paid work and therefore receives a social assistance benefit (Dutch: bijstandsuitkering), although she works as a volunteer for approximately 32 hours a week. When Lobke is asked what she does to save energy, she answers:

"You are actually constantly working on that. You don't turn on the heating. Currently it is not necessary because it is warm outside, but in the winter I did not have the central heating on. Or very occasionally, sometimes you get visitors that you can't avoid, and then I also put it on for a while. But rather not. And you take... Yes, take a short shower. Those standard things. (...) draft strips, brush in the letterbox, radiator foil. And be mindful of what you cook. Because you are not going to put on simmering steaks because they are on the gas for three hours. Yes, that that that that ... is simply not possible."

What becomes clear from Lobke's story, is that her energy vulnerability interferes with her social life. Later on in the interview, she explains that she tries to avoid inviting people to her home from November to March due to the cold.

For Arthur, his energy saving behaviour leads to health issues. He suffers from asthma, and while he knows aerating his home would benefit his condition, he keeps the windows closed as much as possible to avoid extra heating costs, although it makes him feel out of breath.

It is thus evident that many interviewees are concerned about energy prices and try to reduce their energy use. Within the group of 13 interviewees, it became evident that the high energy prices led to stress, health issues, interference with one's social life, and an overall lower experienced quality of the living environment due to the inability to adequately heat one's home.

4.1.2 Procedural justice

This section elaborates on people's perceptions of justice regarding procedural aspects of the energy transition. In the literature, three aspects of procedural justice arise, namely information, participation and legal rights (Walker & Day, 2012). Several themes were identified through the interviews. The patterns that are in line with existing scientific knowledge will only be discussed briefly; new patterns and trade-offs are elaborated upon in more detail. Since legal rights only came up sporadically in the interviews, it is discussed in combination with participation.

4.1.2.1 Information

For information, the themes that arose are 1) need for information, 2) reliability of information and 3) the desired shape of information. Regarding the need for information, many interviewees expressed having heard about the energy transition on a national level, but only one indicates to know about regional or local transition plans (e.g. the REKS or the municipal heat transition strategy). Only 2 of the interviewees wish to be informed about such general municipal plans, as opposed to plans that directly affect people's neighbourhood; in that case the demand for information is high. Furthermore, 6 interviewees express a need for reliable information on how to make their home more sustainable. They indicate that they feel overwhelmed by the information available online, which makes them question which information is right or can be trusted. This affects their willingness to take action: *"Uhm, if I would understand it very well and if I knew the costs very well. Then I would be open to it."* (Emma). A well trusted source of information are first hand experiences of acquaintances, such as colleagues, friends or neighbours. Especially if they have made their homes more sustainable, since *"that really gives a realistic picture"* (Arthur). However, only 7 interviewees indicate to know someone who has taken energy efficiency measures such as solar panels or insulation, while 6 interviewees indicate not to know anyone to discuss energy efficiency measures with.

Regarding the shape of information, there is a need for accessible, reliable, compiled information. In line with existing literature, the interviewees express a demand for easy to understand, inclusive information, most notably in multiple languages, in accessible language (B1 level) or supported with pictograms. Furthermore, multiple interviewees express they would feel more confident in taking energy saving measures if there was one person or point of contact for their transition related questions. This would help them to navigate the 'forest' of utility companies, sustainability subsidies and home renovation options. Some would prefer a contact point located in their neighbourhood, for example in the community centre. Others would be open to online or telephonic contact, as long as they can get advice from a real person. According to Lobke *"it would actually be nice if some sort of*

neighbourhood teams, that are already known in the neighbourhood, would have a kind of consultation hour. Accessible, preferably without barriers". According to Emma, personal advice would help her to get into action, by making the transition more comprehensive and less overwhelming:

"If someone were to tell me: well, if you put in new windows and you install solar panels, this is what will happen to your house, and this is a subsidy that you get, then it becomes clear to me. Now you have to go after everything yourself and then I don't know, then I get uh... I get lax."

For information, it can thus be concluded that the need for information is high when the interviewees' neighbourhoods are affected. It is also evident that the respondents face difficulties sifting through all information available online, which for some people results in feelings of insecurity and a reduced willingness to take action, even though there is awareness that taking energy measures could benefit one's living conditions and financial situation. Hence, there is a need for accessible, reliable, compiled information, ideally available through personal contact with one person or point of contact.

4.1.2.2 Participation and legal rights

For participation, four themes arose, namely 1) need for participation 2) ability to participate 3) desired shape of participation processes and 4) trust in participation processes. It should be noted that participation can refer to either actively taking part in the decision making process or taking part in the implementation of the transition (e.g. by becoming a member of an energy cooperative).

Regarding the need for participation in the decision making process, 4 interviewees express a desire to be involved. However there seems to be an ill fit to some common participation methods currently in place. Most people express they would not be likely to join consultation evenings (Dutch: inspraakavonden). Four main reasons were given, namely: people don't feel like going; they find it apprehensive to speak in groups; they have the idea that only extreme supporters or opponents are attracted to such events; or that nothing is done with their ideas since policies are already decided upon beforehand. The latter is closely related to trust in governmental actors, as Brandy exemplifies when speaking about consultation evenings: *"I think it is wasted effort. (...) When the government comes up with something, it is going to happen anyway. (...) The government has that. It doesn't listen to the people."* However, Brandy does think that people like herself should be heard and could improve policies by informing them with her experienced reality:

"Very often people sit behind a desk who don't understand at all, who think they understand it, but they don't understand it, you know? And uhm, those folks, I say rich folks, the highly learned ones, they sit behind a desk and make up something (...) But in practice it doesn't work that way. So go into the neighbourhood. Talk to people. Ask the people. Ask for feedback and work on it."

Like Brandy, 7 interviewees express they would have more trust in the participation process and would be more likely to participate if policy makers (or third parties such as social workers) would come into the neighbourhood for one on one interaction.

Regarding the ability to participate in the transition, interviewees face several barriers (besides the already discussed financial and informational ones). Firstly, social cohesion in most interviewees' neighbourhoods tends to be low, which results in little trust in the successful establishment of a local energy initiative. Kos, who is a single father living in a social housing home with his two sons, expressed the following about his neighbourhood:

"(...) it is of course a neighbourhood with many different nationalities. Who literally and figuratively do not always understand each other. And sometimes you understand the language and then you don't understand each other's culture. So I don't think it's very easy in my neighbourhood to get such a widely supported initiative off the ground. That uh, that's where I really see the role for the municipality in that respect".

Subsequently, for interviewees who live in rental homes, one of the main barriers that they encounter is the powerful position of landlords, homeowners associations and housing associations (as mentioned in paragraph 4.1.1.2 on housing technology and energy efficiency). These parties decide whether and in what time frame investments in the residences are made. This can frustrate people's efforts for home improvement, as Hans exemplifies:

"I also tried to save energy through the homeowners association, but they won't cooperate. The outer wall, on the side, so to speak, is always very cold and I think it's very poorly insulated. And because of that you also get mould and et cetera. Quite a lot of people in our blocks have problems with that. And if you then send photos to the VVE about it, then it is your own fault. Then you should have opened your aerators."

A barrier for some home owners in applying for subsidies is their negative experiences with applying for allowances in the past. This strongly relates to trust in governmental organisations from the national to the local level. About this, Hanny tells:

"Well, if someone applies for social assistance benefits, they have to go through 23 counters. And 23 times, you have to tell that you are poor. And that you need it. (...) Yeah that's really bizarre. And then you give up. Or you don't know exactly how to fill in everything and if you put even one cross wrong, you are immediately a fraud. While you can also say, 'Gosh, ma'am, or sir, we've received your application, can we sit down for a minute because I think you've filled in a few things wrong' or something, that sounds very different".

For participation, it can thus be concluded that there is a desire to participate, but public consultation events do not seem to be the best fit for most of the interviewees, as they prefer a one-on-one approach. Also, tenants are likely to experience a lack of agency in the transition due to their relationship of dependency with third parties. Lastly, trust is a major issue related to participation, often as a result of negative experiences in the past. This will be elaborated in more detail in paragraph 4.1.3.

A similar pattern emerges regarding legal rights. Interviewees express an appreciation of the fact that legal rights are installed to enable protesting if one does not agree with the (spatial) design of the energy transition, but some people doubt whether their input would actually make a change. Again, trust in governmental authorities plays a large role here. Also, it should be noted that the little emphasis on legal rights in the interviews could also imply a lack of knowledge about legal procedures. This is exemplified by Brandy, who expressed that when she had a long lasting conflict with her housing association, she decided to turn to social media instead of a legal association. Her story was picked up by a local news outlet which resulted in the housing association solving the issue. She would now advise others in similar situations to take the same route.

4.1.3 Recognitional justice

For justice of recognition, three themes arose from the theoretical framework, namely needs, vulnerability and cultural & political respect (Walker & Day, 2012). Since needs and vulnerability are strongly related, they are discussed in the same section. In addition to these initial themes, a fourth theme emerged from the interviews, namely 'responsibility to take action'. This will be elaborated upon in the last paragraph.

4.1.3.1 Needs and vulnerability

According to the interviewees, the recognition of the vulnerable position of energy poor citizens is two-sided. On the one hand, interviewees express that their vulnerable position is quite well seen and heard by the local government. For example, regarding the municipal compensation for the rising energy prices, Brandy expresses: *"They gave everyone 800 euros. (...) Tilburg, in that respect, Tilburg itself is a really nice city. It does more for the people, I have the feeling, than many other cities so to speak"* and Emma: *"in itself it is well organised in Tilburg for the less fortunate"*.

Hence, the municipal compensation for the high energy prices is hence considered a fair measure. On the other hand, people feel less recognised in their vulnerability when it comes to the procedures that one has to go through to apply for governmental support. As discussed in paragraph 4.1.2.1, people face difficulties in sifting through and understanding information online. This interferes with the application for allowances and subsidies. John exemplifies this when speaking about the municipal energy allowance: *"This week they said to me at the tennis club: 'You should do that John'. But I don't know how to do it. I don't know how to do it. I wouldn't know where to be. yes, at the municipality somewhere. Somewhere."*

John feels like the governmental expectations of people's self-sustainability and responsibility are higher than he can comply with:

"They just shouldn't let people figure it all out for themselves. The Netherlands has really gone overboard in recent years with people's own responsibility. That should be regulated more by the government. (...) You have to figure everything out yourself. Applying with certain allowances, (...) using certain subsidy funds yourself, which you are entitled to. Where do you find it? It's all so fragmented. (...) A susidie there, a grant there, a grant there, a subsidy there. There should just be a central counter for that sort of thing. As a citizen, you can no longer oversee that, can you?"

Feelings of being left to one's own devices relates to trust in governmental organisations from the national to the local level. Summarising, the interviewees generally feel recognised by governmental policies that are in place at the municipal level. However, many of them face difficulties finding their way in bureaucratic procedures and they express the need for more personal support in this.

4.1.3.2 Cultural & political respect

From a sustainability point of view, most interviewees understand that the government wants to take measures that are cost-efficient, in the sense that they contribute most to climate mitigation goals with as little investments as possible. As Bé exemplifies:

"I think that in terms of housing situation, my first impression would be that there is much more to be gained in the somewhat lower income groups who also live in somewhat older, poorly insulated houses. So you would actually say that they should mainly commit to that. However, I think as a government you would have to invest more in that than if you make some subsidies available for people who want solar panels. So that's actually a really tough dilemma, I think, because there's kind of a balance there (...). Because that's probably where the most benefits can be achieved with the least money invested, where you just have to give a little push". Like Bé, most interviewees express understanding of the fact that there is a limited budget available for the energy transition which limits the government's options to invest. However, there is a shared vision among the interviewees that there should be recognition for the vulnerable position of citizens with a low income. They emphasise that the energy transition is a social issue just as much as an environmental one, and by treating the transition as such, the government could "kill two birds with one stone", as Willem puts it. The general viewpoint among the interviewees is that citizens with a low income would benefit significantly more from a more sustainable home than people in a less vulnerable financial situation. This also comes forward when the interviewees are asked what a lower energy bill would mean to them. Willem: "The first word that comes to mind is carefree", and Lobke: "Then I'll have a warm house. Then I would invite people in the winter". The interviewees would therefore consider it fair for the government to prioritise people in energy poverty (see paragraph 4.1.1.1), especially in terms of support for sustainable housing renovations. However, they have the idea that such prioritisation is insufficiently incorporated into policies at the moment. 6 interviewees mention that they feel like subsidies mainly go to people who can already afford the investments. As Emma puts it: "It is so difficult, because the money for the solar panels actually ended up with people who can afford it well. These are the first people to install solar panels on their homes."

This relates to the interviewees' perceptions of political respect for the needs of low income citizens. In line with this, 8 interviewees consider it fair if measures that are available for different income groups yield the same amount of savings and demand the same amount of behavioural adjustment. They feel like it is not fair if measures available for higher incomes give these people a lot of savings, while the measures available for lower incomes produce small savings and require much behavioural adjustments. Likewise, it is considered unfair that the instruments that the government has put in place for energy vulnerable citizens, such as consultation with an energy coach⁴ or energy surcharge (Dutch: energietoeslag), are more focussed on small energy saving measures or relieving financial pressure on the short term. The interviewees have a shared vision that they would ultimately benefit most from long term solutions, such as a more sustainable home. As Lobke points out:

"We cannot apply for a subsidy pot, because we cannot even buy that subsidy, those solar panels ourselves. (...) And then you do have energy coaches, and you can call them and they will come to your home, and then you will receive an energy-saving light bulb and a timer for the shower. But they do not solve the moisture problem. Or the insulation problem."

⁴ In Tilburg, energy coaches are freely available to give energy advice. The also freely available Energy Box contains small energy saving measures, such as radiator foil, a draft strip and a LED-lamp.

Concluding, it has become clear that most interviewees understand that there is a limited budget available for the energy transition, which forces the government to invest in a cost-efficient way. However, a shared viewpoint among the interviewees is that investments in the homes of low income citizens could contribute to both social and environmental aims, which justifies the prioritisation of people living in energy poverty in the energy transition. Also, it is considered fair if the responsibility to change behaviour does not primarily lie with citizens -especially those with a low income-, but is shared equally among all parties involved in the energy transition, including businesses and high income citizens.

4.1.3.4 Responsibility to take action

In addition to Walker & Day's (2016) aspects of recognitional justice, 'responsibility to take action' arose as a fourth aspect under recognitional justice. It is concerned with questions of who is to blame for pollution and climate change; who should make efforts to transition; who should bear the costs of the transition; and who should gain the benefits from an early stage of the transition onwards. It aims for recognition of the fact that some actors have contributed more to the problem than others, and some actors are contributing more to solutions than others. In short, it poses the question whether accountability for the problem should be linked to responsibility for solutions.

A large proportion of the interviewees is willing to contribute to a more sustainable society, for three reasons: out of financial considerations, for the benefit of the environment and for the benefit of future generations. Hans: *"The whole story of the energy transition in itself, I support that one hundred percent. Because we're all currently screwing up the earth"*; and Mark: *"Certainly for your descendants, so to speak. Because continuing the way it is now, that's not going to work"*. The interviewees acknowledge their responsibility to contribute to a solution, even if it comes with certain drawbacks, like visual pollution (windmills) or renovation nuisance. As Kos says: *"(...) I'm also willing to sacrifice. If, later on, I am presented with the fact that I have to adjust my lifestyle, because otherwise we will not achieve those sustainability, climate and environmental goals... Yes, well, then so be it." And Hans: <i>"We can't escape it. (...) even without that war, it's just not maintainable the way we were doing."* and Willem: *"I think that especially if I bought my home, I would give quite a lot to make it more sustainable. Simply because I would benefit much more from it myself in the long term. But also just from an ecological point of view."* And Bé, on the development of more wind turbines around Tilburg: *"I wouldn't disagree with that (...) I think that's where we're just going if we want to keep it all livable. So then, yes, then you just have to go with it."*

However, this goes together with a shared notion among the interviewees that other actors should take responsibility as well. The interviewees perceive climate change as a common issue, so the energy transition should be a joint effort between businesses, the government and citizens, according to them. Bé: "As a society as a whole, you are moving towards a new way of life, I think. So that includes houses, but certainly also heavy industry. So perhaps we should tackle everything proportionally". Notably, several participants indicate that they are less inclined to take action when they have a sense that other parties are not taking their responsibility. Mark: "All those large companies have been making profit, and they have never done anything for the environment in principle. And now we have to. Then we actually pay twice".

Note that Bé referred to the transition as a 'new way of living'. Like her, many interviewees perceive the energy transition not as a technical transition and an end in itself, but rather as a part of the societal transition towards a more sustainable lifestyle, as became evident in the foregoing paragraph.

Furthermore, a widely shared feeling is that the transition is imposed by governmental actors; hence, they should take a leading role in the energy transition and support citizens. Arthur, when asked who should bear responsibility in the transition: *"Well, in the first instance the one who wants me to become more sustainable. I don't know whether that is the government, the province or the municipality, but I think they have to play the leading role in that".*

It is thus evident that most interviewees - at least to some extent - care for the environment and want to take responsibility in the energy transition. The interviewees take responsibility by taking small energy saving measures and by having a frugal lifestyle. However, they often feel misrecognized in their contribution to a sustainable society. It is considered fair if other actors take responsibility as well and governmental actors take up a leading and supportive role. Lastly, it is considered fair if people living in energy poverty are prioritised in the energy transition, as they could benefit greatly from it in terms of living comfort and finances.

In the next paragraph, it is discussed which perceptions of energy justice came forward in the document analysis.

4.2 Perceptions of justice in Policy Documents

This section provides an answer to sub-question 2: 'which perceptions of energy justice can be found in policy documents on the energy transition on a regional and local scale?'. Distributional, procedural and recognition justice are drawn on. It is identified which aspects of these dimensions are present in the analysed documents. Figure 3 shows a visual representation of the qualitative results of the analysis, distinguishing between distribution (red), procedure (blue) and recognition (green) justice.



Figure 3. Quantitative results of the document analysis.

4.2.1 Distributive justice

This paragraph discusses the burdens, benefits and costs related to the energy transition and their distribution among members of society emerging in the analysed policy documents. Regarding distributive justice, issues are mainly discussed in terms of economic burdens and benefits. This applies to both the local level and the regional level: *"We believe it is crucial to keep the transition affordable for our residents. That is why we strive for the lowest costs for every end user."* (Tilburg, Transition Vision Heat, p. 12) and *"The costs of our energy system must not be passed on to a limited group in society."* (Province of North-Brabant, Energie Agenda 2030, p. 11). The dominant narrative regarding economic burdens is that the transition should be affordable for all citizens: *"In addition to CO2 reduction, affordability for our residents is a hard starting point"* (Transition Vision Heat, Tilburg) and *"In an energy-just society, everyone has access to sustainable energy"* (Energy Agenda 2030, Province NB).

This starting point of affordability is reflected in the financial arrangement of the heat transition on the city level: "We are going for natural gas-free where this can be realised in a housing cost-neutral way. Where that step is not yet feasible, we focus on smart interim solutions to save energy and CO2" (Tilburg, Transition Vision Heat, p. 23). Hence, only measures that do not lead to rising housing costs for dwellers are considered acceptable. Although not stressed in the documents, this approach could benefit people living in energy poverty by ensuring that their living costs remain stable throughout the transition. On the other hand, this implies that when citizens' housing costs are high, it is accepted that they remain high throughout the transition.

The fair distribution of costs among members of society is discussed less prominently. It is mentioned in only three of the five documents and when discussed, it is in a general sense: "When making the final choice for the systems, it is important to look specifically at where the ultimate costs will land. Is that with the end user or are those costs socialised?" (Tilburg, REKS, p. 63) and "The question of a fair distribution of costs is a burden on many people" (Tilburg, Transition Vision Heat, p. 13). Although not explicitly linked to fair distribution in the documents, the aforementioned neighbourhood approach suggests that efforts are made to achieve a fair distribution of costs among neighbourhoods with a different socio-economic background.

Another burden that is discussed prominently in the documents, is the need for behavioural change among citizens and businesses. As stressed in the Energy Vision (Tilburg, p. 17): *"it is important to bring about behavioural change through social innovation among residents and businesses in the city so that they realise energy savings and switch to the production or purchase of sustainable energy."* Citizens are mentioned far more often in this regard than businesses, with a ratio of 6:2.

Benefits are discussed to a lesser extent than burders. The expected benefits include: affordable, sustainable and reliable energy supply; job opportunities; increased quality of life and quality of the living environment; and more residential comfort and a lower energy bill. When discussed, the documents refer to citizens in general terms (e.g. 'residents' or 'society'), rather than differentiating between different groups in society: *"We encourage residents to benefit from the energy transition"* (Province of NB, Energy Agenda 2030, p. 15) and *"The energy transition gives citizens the opportunity to 'harvest' their own energy."* (Province of NB, Energy Agenda 2030, p. 15) and *"The energy transition gives citizens the opportunity to 'harvest' their own energy."* (Province of NB, Energy Agenda 2030, p. 5). As such, it remains largely unclear how the distinct group of people living in energy poverty (or vulnerable citizens in general) are expected to benefit from the transition.

Concluding, it has become clear that in the policy documents, issues of distributive justice are mainly discussed in terms of economic burdens and benefits. The dominant narrative is that the transition should be affordable for all citizens. The fair distribution of costs among members of society is discussed less prominently. When discussed, it is in a general sense, hence there is not much differentiation between the needs, capabilities and vulnerabilities of different social groups. As a result, it remains largely unclear how people living in energy poverty are expected to benefit from the transition. This issue will be elaborated upon in the next paragraph on recognition justice.

4.2.2 Recognition justice

This paragraph discusses to what extent the needs, vulnerabilities and capabilities of energy vulnerable citizens are recognised, and to what extent they are involved in the energy transition. Firstly, in all documents, a central role for citizens is stressed. Citizens should *"see opportunities, take their own responsibility, think along, participate in discussions and participate in decision-making."* (Province NB, Energy Agenda 2030, p. 11).

Regarding the recognition of citizens, five main narratives emerged in the documents. This is depicted in figure 4.

R_Recognition of citizens: co-creator of policies R_Recognition of citizens: human capital 5 R_Recognition of citizens: initiator of solutions R_Recognition of citizens: other R_Recognition of citizens: passive R_Recognition of citizens: vulnerable



Figuur 4. Recognition of citizens in policy documents.

These narratives evolve around the different roles that citizens can take up in the energy transition. The dominant narrative in the analysed documents is that of the active, participatory and co-creative citizens. This narrative takes up 66 percent (133 of 202) of the times that citizens are discussed. Within this narrative, citizens "participate in the process by thinking along, co-deciding and co-investing." (Tilburg, REKS, p. 18). Furthermore, they "take the initiative to set up and organise their own energy supply, for example by setting up a local energy cooperative or becoming co-owner of a village mill." (Province, Energy Agenda 2030, p. 5). From a governance perspective, they are seen as relatively equal partners in shaping the energy transition:

"The realisation has arisen that the municipality needs partners such as citizens, energy cooperatives and the market to work on climate policy. (...) Municipality, citizens and the market are jointly responsible." (Tilburg, Energy Vision, p. 31)

On the other hand, although less emphasised, it is recognised that some groups in society have a vulnerable position. It is stated that *"we see that not all citizens want to or are able to participate and develop and shape their own initiatives"* (Provincie, Energy Agenda 2030, p. 5) and *"we keep an eye on everyone's (im)possibilities"* (Tilburg, Transition Vision Heat, p. 3). The transition is recognised as being *"primarily social"*, hence efforts should be taken to *"ensure that everyone can participate"* (Tilburg, Transition Vision Heat, p. 23). Which efforts are made to ensure an inclusive participation process for vulnerable citizens remains largely unclear. This issue is discussed in more detail in section 4.2.3 on procedural justice.

In some cases, a lack of taking initiative in the energy transition is connected to a passive attitude or a lack of motivation: *"without urgency and action perspective, residents will not be moving at the moment"* (Tilburg, ILNQ, p. 10). Or, as stated in the Energy Vision (p. 18):

"There are plenty of options for making private homes more energy efficient. The investments are profitable, financing is possible. However, homes are not insulated or supplied with sustainable energy on a large scale. (...) Responses from private owners include: it's a big job, I'm old and won't live here for long anymore, or I don't have the money and I don't want to borrow. (...) To break this pattern, research is needed into what motivates people." Interestingly, when analysing the narrative on energy vulnerable citizens, the issue of energy poverty remains almost unappointed in the analysed documents. It is only mentioned in the Transition Vision Heat (1 time). Here, it is stated that: *"what we have learned so far, is that for relatively many households in this type of vulnerable neighbourhood, the current energy costs are already (too) high and there is energy poverty."* (Tilburg, p. 26). This is remarkable, seeing the municipal emphasis on affordability as a starting point. It may lead to the question to what extent the specific needs, capabilities and vulnerabilities of people living in energy poverty are recognised within policy.

Although not discussed explicitly, there are some governmental choices that indicate that the vulnerable position of certain groups in society is recognised in the organisation of the transition. For example, the fact that *"Tilburg has made far-reaching energy performance agreements with the Tilburg housing associations. Large numbers of housing associations' homes in Tilburg will be powered by natural gas in the coming years"* (Tilburg, Implementation living lab natural gas-free Quirijnstok, p. 6). This suggests the recognition of renters' relation of dependency with housing associations.

Altogether, we can conclude that two divergent narratives regarding citizens arise in the policy documents: that of the active, participatory and co-creative citizen and that of the vulnerable or inactive citizen. The dominant narrative is that of the active, participatory and co-creative citizens. Overlap of the two narratives occurs, although not often; most notably, overlap between the two narratives takes place in the implementation phase of the transition. This will be elaborated in more detail in the next section on procedural justice.

4.2.3 Procedural justice

This paragraph discusses which procedural norms are considered relevant when citizens are involved. Firstly, the desired governance approach seems to be that of co-creation between government, businesses and citizens. As a reason for this, the municipality emphasises that *"directing from the municipality with a fixed plan of approach is no longer of this time. Stimulating ideas from society that fit within climate policy is."* (Tilburg, Energy Vision, p. 31). The emphasis on collaborative governance holds for all analysed policy levels, from regional to local. From a normative point of view, it is stated that *"the energy transition requires a different way of working together, namely in co-creation and/or with innovation teams. This is based on trust and requires tailor-made agreements, instead of legal agreements"* (Province of NB, Energy Agenda 2030, p. 30). This approach indicates a joint responsibility between citizens and governmental actors. It is expressed that citizen engagement should be based on certain norms, including freedom of choice, mutual trust, and transparency of the decision making process. Social acceptance seems to be an important (instrumental) motive for this approach. It is stated that *"the way in which decisions are made and* how people are involved influences the acceptance of decisions. Safeguarding the interests of residents and businesses is an important principle. In doing so, we strive to realise a supported vision." (Tilburg, Transition Vision Heat, p. 12). Different possibilities on how to engage citizens are described, e.g. citizen representatives in Climate Tables; information facilities in neighbourhoods; digital information platforms; webinars; online surveys; information meetings; a Digital Dialogue; and residents surveys regarding neighbourhood implementation plans. However, regarding the design of the energy transition, it remains unclear to what extent vulnerable citizens are included in the decision making process. For example, in the REKS (p. 13) it is stated that:

"(...) a Tilburger Table was set up, for which residents could register. From approximately 60 registrations, a selection was made as diverse as possible on the basis of, among other things, gender, age and zip code."

Although the emphasis on diversity in zip codes could imply that citizens from vulnerable neighbourhoods were deliberately included in the Tilburger Table, this is not specified. In the other documents, it also remains unclear whether and to what extent energy vulnerable people are included in the decision making process. This raises questions regarding the representation of energy vulnerable citizens in the design stage of the energy transition.

On the other hand, in the implementation phase, there seems to be more emphasis on including vulnerable citizens. For example in the document ILNQ (p. 7), it is stated that *"in housing investments for the heat transition, the municipality of Tilburg wants to emphasise urgency and maintenance- and renovation issues that residents already have regarding their homes."* Within this approach - used in vulnerable neighbourhoods as well as other neighbourhoods -, residents' housing wishes and concerns are examined through questionnaires and conversations. The outcomes serve as input for the energy district plan. This suggests that efforts are made to include the voices of energy vulnerable citizens in the implementation of transition measures.

Concluding, it remains largely unclear whether (energy) vulnerable citizens are represented in the design of the transition and whether efforts are made to ensure that they have access to these facilities. This raises questions regarding the inclusivity of the decision making process. In the implementation phase, however, there is a clearer emphasis on the engagement and needs of vulnerable citizens.

As has become clear in this chapter, several differences exist between the perceptions of justice found in the narratives of the interviewees and the policy documents, most notably in terms of recognition, prioritisation and responsibility. In the concluding chapter, the mismatches between both narratives are discussed in detail. In doing so, an answer to the main research question is provided.

5. Conclusion, discussion and policy recommendations

In this concluding chapter, conclusions are drawn from the analyses performed in this thesis and the implications of these findings for the development of the energy transition and the formulation of new energy policy are discussed. Subsequently, the research process is reflected upon, the contributions and limitations of this thesis are discussed and recommendations for future research are provided. This chapter ends with seven concrete recommendations for policy makers.

5.1 Conclusion

In this thesis, I was specifically concerned about the difference between the way energy justice is framed in policy compared to real practices and lived experiences of the energy vulnerable citizens affected by these policies. The corresponding research question was: *"How do energy vulnerable citizens in the Netherlands describe a just energy transition, how do their descriptions differ from descriptions of a just transition found in policy documents, and what can be learnt from the (mis)matches between these narratives in order to create more just energy policies?"*

In order to answer this question, a qualitative, explorative study was carried out, based on the case of the city of Tilburg. In this concluding section, I firstly sketch the context in which the interviewees perceptions of fairness can be understood. In order to do so, I touch upon the experiences of energy vulnerability that the interviewees encounter and I discuss the reasons that the interviewees gave for their desire to engage in the energy transition, followed by the factors that hamper them from fully participating. Thereafter, I elaborate in more depth which differences were found between the interviewees' narratives of justice and the way energy justice is framed in the analysed policy documents, as well as which implications these mismatches may have for the implementation of the energy transition. In doing so, I formulate an answer to the main research question.

Regarding the experiences of energy vulnerability, the participants mentioned multiple negative effects. These were stress, feelings of embarrassment or failure, issues with physical and emotional health, interference with their social lives and lower experienced comfort of their homes (see section 4.1.1.3: Energy prices). These findings are in line with the literature on energy poverty which mention similar consequences (see Charlier & Legendre, 2021; Bouzarovski et al., 2017; Middlemiss et al., 2015). Following from the interviews, it was found that all of the participants try to reduce their energy use, either by energy saving behaviour or by implementing small energy saving measures. They gave three reasons to do so: to lower the energy bill (13 times); out of environmental concerns (8 times); out of concerns for future generations (9 times) or a combination of those factors.

Concerns for future generations were especially important for the interviewees under 30 years old and those with children. Also, it stood out that engagement in vigorous energy saving behaviour was more frequently mentioned by interviewees that were 1) in the most precarious financial situations or 2) that were concerned for the environment in combination with financial concerns.

Furthermore, the participants mentioned ten main factors that hinder them from (fully) participating in the transition - even if they desired to do so. These are: a lack of financial capacity; a lack of agency regarding the residence; distrust towards sustainable technologies; low social cohesion in neighbourhoods; a lack of acquaintances to discuss energy related issues with; difficulties to find and filter information online; and a lack of suiting financial arrangements; a fear to change their financial situation; and distrust towards institutions and bureaucratic procedures due to negative experiences in the past. The disconnection between the interviewees desire to take part in the energy transition and the factors that hamper them from doing so is visualised in figure 5.



Figure 5. *Disconnection between participants' desire to take part in the energy transition (centre) and the hampering factors that hinder them from fully taking part (circumference).*

Now the context regarding the interviewees experiences of energy poverty in relation to the energy transition is established, the following section will go into more detail on the distinguished

mismatches between the participants perceptions of justice and the framing of justice in policy, as well as the potential consequences of the discrepancies.

In line with research by Haarbosch et al. (2021), two forms of mismatches were identified: *opposing mismatches*, where policy narratives and narratives of citizens focus on the same issue but show opposing narratives, and *disconnected mismatches*, where the mismatch emerges because the narratives do not engage with each other and focus on different issues. Additionally, three *partial matches* were identified as a result of the analysis. For the first partial match (see table 5, procedural dimension), the underlying values matched but there was a mismatch regarding the perceived reality. For the two other partial matches (see table 5, recognitional dimension), part of the underlying values matched and part did not. Table 5 shows an overview of the seven main (mis)matches that were identified.

Dimension	Narrative (mis)match	Citizens' narratives	Policy narratives
Procedural	Opposing mismatch	Desire for long term solutions to relieve EP at the source, preferably by residential energy efficiency renovations	Strategy for the relief of EP on the long term remains abstract, solutions that are implemented mainly focus on the acute relief of EP
	Partial match	Taking action in the energy transition should be a shared responsibility between businesses, citizens and the government - in practice, citizens are held more accountable than commercial actors	Taking action in the energy transition should be a shared responsibility between businesses, citizens and the government - in practice, it is an equally shared responsibility
	Opposing mismatch	Little trust in initiating a collective neighbourhood approach due to a lack of social cohesion, personal capabilities and trust in procedures and institutions	Focus on collective neighbourhood approaches to implement solutions - based on active participation and co-creation with citizens
Recognition	Disconnected mismatch	The relief of EP should be prioritised the energy transition	Living cost neutrality per neighbourhood is used as the vehicle for fair implementation (hence, differentiation between neighbourhoods) - however, the relief of EP

			is not mentioned as a priority
	Partial match	Positive attitude towards making home more sustainable - inaction is most often the result of a lack of financial capacity, capabilities or trust	Inaction in taking initiative in the energy transition is connected to a lack of financial capacity or an unwilling attitude
	Partial match	Taking responsibility in the energy transition can be done by saving energy and living frugally	Citizens should take responsibility in the energy transition by financial investments, saving energy and taking initiative in implementing solutions
Distributive	Disconnected mismatch	Narratives regarding the energy transition are broad in scope and focus on achieving a more sustainable society	Narrative regarding the energy transition is narrow in scope and focuses on achieving energy neutrality in 2050

Table 5. Overview of (mis)matches between perceptions of justice according to policy and citizens.

A first mismatch appeared regarding the recognition and prioritisation of energy poverty. In the policy documents, energy poverty received little specific attention: it was mentioned only one time in total. While socio-economic differences between neighbourhoods were recognised in the policy documents, it is not stated whether vulnerable neighbourhoods will be the first ones to receive support to take energy efficiency measures. Hence, the policy documents show a differentiation between neighbourhoods, but no prioritisation. This does not match with the perception of fairness that came forward in the interviews, as a shared viewpoint among the participants was that vulnerable citizens should be prioritised in the energy transition. However, that is not to say that there is no attention given to vulnerable citizens in the analysed documents at all. For example, the municipality of Tilburg has made energy performance agreements with housing associations, which benefits the people living in social housing (see section 4.2.2 on recognition justice). This indicates that prioritisation of vulnerable citizens may have taken place in practice. However, a statement regarding prioritisation is not explicitly embedded in the policy documents, which makes prioritisation highly dependent on the interpretation of the documents by the policy makers in place at a certain time. This may cause issues with regards to procedural justice, based on issues with recognition.

Next, a partial match was found regarding the *responsibility to take action* in the energy transition. Both the narratives of the interviewees and the policy documents stress that taking action in the energy transition should be a shared responsibility between businesses, citizens and the government. However, a large share of the interviewees express that they do not feel like businesses have to take on the same responsibility as citizens at the moment, especially with regards to energy saving behaviour (see section 4.1.3.4: Responsibility to take action). They feel like citizens are held more accountable than commercial actors by the government to contribute to the transition and thus have to carry a larger share of the burden. As this thesis has not focussed on the role of businesses, the truth value of this feeling cannot be judged within the framework of this thesis. However, the fact that there is a discrepancy in the perceived reality of citizens and their perception of justice regarding the fair distribution of burdens between citizens and businesses may cause issues with regards to recognition and procedural justice. After all, most interviewees indicate they are less willing to contribute to the energy transition if they do not feel treated fairly and equally to other actors. Therefore, it is advisable for policy makers to communicate to citizens about the contributions that commercial actors have to make to the energy transition, thus demonstrating that there is a fair distribution of responsibilities between all involved parties. Such communication could increase citizens' perceived fairness of the energy transition.

A partial match concerns the *willingness* of energy vulnerable citizens to take part in the energy transition. Many of the interviewees indicate that they -at least to some extent- care about the environment and 10 out of 13 interviewees have a positive attitude towards making their homes more sustainable. Not only to reduce their housing costs, but also because there is an understanding that society as a whole should be moving towards a more sustainable way of living (see section 4.1.3.4 on responsibility to take action). Many interviewees have already put this willingness into practice by taking small energy-saving measures that suit their budget, such as energy saving behaviour, placing LED-lights, placing radiator foil or replacing appliances, as became clear in section 4.1.1.2 on housing technology and energy efficiency. In the policy documents, however, one of the narratives that arose regarding citizens was that of the passive citizen, connecting inaction to an unwilling attitude (7 of the 33 times vulnerable citizens were mentioned). Although this may be true for a share of the group of energy poor citizens, the narratives presented in this thesis show that at least part of the citizens living in energy poverty are willing to contribute to the energy transition. A lack of recognition for this willingness is problematic, as citizens may be less inclined to contribute to the transition if their contributions are not seen or valued, or their attitude is misjudged. Hence, this partial mismatch may cause issues for procedural justice, based on misrecognition. When communicating to energy vulnerable citizens, it would therefore be advisable to focus on people's

willing attitude, the energy saving behaviour they already showcase and the small energy saving measures they may have already taken. This positive outlook could sustain their willingness to contribute.

Another mismatch concerns the *objective* of the energy transition. The interviewees perceive the energy transition as part of a broader societal transition towards a more sustainable way of life. They relate this to a wide range of topics, such as sustainable food consumption, sustainable product use and sustainable travel behaviour. In the policy documents, the energy transition comes forward as a self-contained transition, with a strong focus on becoming energy-neutral in 2050. Hence, there is a mismatch regarding the perceived *objective* of the energy transition: the citizens' narratives are broader in scope and focused on working towards a more *sustainable society*, while policy is narrower in scope and focused on achieving *energy neutrality* in 2050. This disconnected mismatch may cause issues for distributive justice as citizens may experience and value the outcomes of the energy transition differently than policy makers.

Another partial match concerns the expectations of how *citizens take responsibility* in the energy transition on an individual level. As became evident in paragraph 4.2.2 on recognition justice, the dominant narrative in the policy documents is that of the active, participatory and co-creative citizen. Behaviour that fits within this narrative, according to the policy documents, is for example insulating the house or placing solar panels on one's roof. Opposing this, many interviewees indicate that they are dependent on third parties for home renovations, lack the financial capacity to do so, or lack the capabilities to take on this task. As such, they argue that they can primarily take responsibility by what they do not do: by not using much energy, not flying and not driving a car for example. Hence, there is a mismatch in what is considered taking responsibility in the energy transition. That is not to say that there is no attention to energy saving behaviour in the policy documents at all: saving energy is indeed recognised as part of the mix of changes that are needed to work towards an energy neutral future. However, the *emphasis* in the policy narratives lies on another element than in the citizens' narratives, namely on *doing* (investing, initiating solutions, co-creating) (151 times) instead of not-doing (energy saving behaviour) (7 times). As aptly appointed in the Transition Vision Heat (Tilburg, p. 7), emphasis lies on citizens' "initiatives and willingness to invest". This is linked to misrecognition of peoples' (in)capabilities and may cause issues with regards to procedural justice.

Another mismatch that is in line with the foregoing, concerns the expectations of how citizens *take responsibility* at the *collective* level. The policy documents argue that a collective neighbourhood approach should be adopted to implement the energy transition. Again, this approach is based on the narrative of the participatory and co-creative citizen. However, the respondents' narratives

demonstrate that taking responsibility for collective neighbourhood initiatives is not considered a plausible option for many of the participants, for three main reasons. Firstly, the social cohesion in their neighbourhoods generally tends to be low, which they think reduces the chances of success of such an initiative. Secondly, many interviewees face difficulties in sifting through and understanding information regarding the energy transition, which makes them feel like they are not capable of taking on the task to initiate a collective energy initiative. Thirdly, regarding co-creation with governmental actors, several interviewees express a low level of trust in governmental organisations and procedures. This strongly relates to negative experiences in the past, for example with applying for allowances: several interviewees explained that procedures were bureaucratic and often stressful, as a little mistake could result in being seen as a fraud (see section 4.1.2.2: Participation and legal rights). Together, these three factors decrease their willingness to take the lead or even take part in collective initiatives. This indicates an issue with procedural justice, which can be related to past experiences of misrecognition.

Lastly, an issue that came forward in the interviews was the issue of long versus short term solutions. The participants indicated that they would ultimately benefit most from a solution that helps them deal with the high energy prices in the long term in the form of a more sustainable home. However, they feel like the instruments that are currently (financially) available for poor households, such as consultation with an energy coach or the energy surcharge (Dutch: energietoeslag), are more focussed on relieving financial pressure in the short term. As such, there is a mismatch between the long term vision of the interviewees and the short term instruments that the government has installed currently. In line with this, most interviewees express the feeling that it is unfair that the subsidies that are available for citizens with a higher income, such as subsidies for solar panels, tend to provide solutions for the long term. Again, this is not to say that there is no attention for any long term solutions for vulnerable households in the policy documents. From the document analysis, it became clear that some of the steps that the municipality has taken do indeed focus on long term solutions, such as the energy performance agreements with housing associations. However, a long term vision regarding the relief of energy poverty was not embedded in the policy documents. This is not entirely surprising, as recent developments regarding the war in Ukraine and the steep rise of the energy prices has made the issue of EP far more pressing and both local policymakers and the national government are still navigating how to deal with this. Due to the pioneering work that is done currently, large differences between municipalities exist. This is problematic in the context of justice, as it promotes inequality between citizens based on living location. The lack of a long term strategy in policy makes the implementation of long term solutions for vulnerable citizens highly dependent on the interpretation of the documents by policy makers, which may cause issues with

regards to procedural justice. Hence, the development of a long term strategy for the alleviation of energy poverty is desirable, not only on the local level but also at the national level.

On a more theoretical level, it has become clear that the interviewees perceived injustices within all three dimensions of energy justice - distributive as well as procedural and recognition. However, from the participants' narratives, it appears that issues with distributive and procedural justice could often be traced back to a lack of recognition in the first place. For example, as mentioned in this concluding section, the fact that difficulties to engage in complicated bureaucratic procedures can result in being seen as a fraud, which leads to distrust in governmental institutions among interviewees with this experience and makes them less inclined to co-create with governmental actors. As such, an implication may be that in order to work towards a more just energy transition, financial arrangements (distributional justice) and adequate decision-making procedures (procedural justice) are required steps, but they will not be sufficient to ensure justice for this group, as they do not fully deal with the misrecognition that some citizens experience. A necessary initial step is therefore to recognise the specific needs, vulnerabilities, idiosyncrasies and perspectives of energy vulnerable citizens in policy and in daily interactions with them.

5.2 Reflecting on the research

As became clear in the theoretical framework, the distributional dimension of energy justice is most apparent in existing studies on energy poverty (CE Delft, 2021; Schellekens et al., 2019). This thesis has shown that distribution is indeed a large concern for energy vulnerable citizens in the Dutch context as affordability and investment costs were central themes in the citizens' narratives. However, the results showed that participants perceived issues with procedural and distributive justice are often primarily based on a lack of recognition. This is consistent with previous literature, as a lack of recognition is considered to be part of the reason for unjust procedures resulting in unjust outcomes (Young, 1990; Schlosberg, 2001; Miller, 2003). For policymakers, however, this is an interesting outcome as it indicates that to address citizens' perceptions of injustice, it is not enough to arrange extended participation procedures as this does not address people's more fundamental sense of misrecognition. A fundamental challenge therefore lies in integrating recognition into policy and rebuilding trust with citizens. One way to address the latter is by improving daily interaction with citizens, as most feelings of misrecognition were based on negative experiences with institutions and bureaucratic procedures in the past.

This thesis has contributed to the literature on energy poverty and energy justice in two ways. Theoretically, this thesis has integrated energy poverty, the energy transition and energy justice; a combination that has not been explored extensively yet in the Dutch context (Bartiaux, Day & Lahaye, 2021, Middlemiss et al., 2018, TNO, 2020). This thesis has contributed to filling this gap by explicitly integrating these themes. By deploying the method of walk-along interviews, an interview setting was created in which open conversations with this vulnerable and unheard group were facilitated, which enabled the researcher to collect new insights that have not been collected before. Hence, this thesis has provided detailed insights into lived experiences of energy poverty in the Dutch energy transition context. In doing, so it added to the existing literature, as the current body of knowledge on energy poverty is still predominantly quantitative in nature (Middlemiss et al., 2020). In line with this, this thesis has demonstrated that citizens living in energy poverty have a broad range of ideas about what a fair energy transition entails and are able to articulate these ideas clearly in a suitable interview setting.

Methodologically, this thesis has presented a composite approach of operationalising energy poverty in an energy transition context, combining objective and subjective indicators. The presented set of indicators enabled a detailed yet concise overview of the ways that households encounter energy poverty. This is valuable, as detailed indicators can be an effective basis for targeted measures and structural monitoring of the development of energy poverty and the effects of policy (TNO, 2021b). The presented approach could be employed to examine the prevalence and experiences of energy poverty on a scale level where much detail is needed, for example through surveys on neighbourhood level. Its outcomes can be used to substantiate the decision on which neighbourhoods to prioritise. It should be noted that the content and extent of the presented framework can be discussed, as well as the question of how many indicators a household must meet to be classified as energy-poor. Future research could address these aspects. By presenting this framework, this thesis has contributed to the ongoing debate regarding the operationalisation of energy poverty in an energy transition context in the Netherlands.

Regarding terminology, the question can be raised whether energy poor and energy vulnerable are the most suitable terms in an energy transition context. Clearly, such descriptions are suitable when discussing people's hardships to come by as a result of the high energy prices. However, in an energy transition context, people's frugal use of energy can also be seen as an example of a more environmentally friendly way of life. This may justify the introduction of a more positive terminology in this context. Two suggestions would be 'energy efficient households' or 'energy friendly households'. These terms could include all households that are sparse with their energy use, either as a result of energy saving behaviour or energy saving investments in the residence. As such, the term is applicable regardless of peoples' financial situation. This could increase the recognition for the fact that low-income citizens can contribute to the energy transition by the behaviour they showcase, and that behavioural contributions are not less valuable than more investment-heavy measures. Such a positive outlook would be especially useful in communication outlets with citizens.

However, there are also at least three potential limitations concerning the results of this study. A first potential limitation concerns the composition of the sample group. A certain heterogeneity within the sample group was desired to include a diverse range of interpretations. Although a high level of heterogeneity was accomplished regarding the interviewees' age, gender, housing situation, occupation and family composition, only one person with a migration background were included in the sample group. According to the literature, people with a migration background remain underexposed in research on energy justice (Middlemiss, 2022; Robinson, 2019). Future research could therefore focus on the viewpoints of this specific group. For example to uncover which distinct energy practices are deployed, or which problems they face when participating in the energy transition (e.g. language barriers or cultural barriers).

A second limitation concerns the way that the interviewees were recruited. Since most interviewees were recruited through referral (10) rather than random selection (3), it is plausible that the interest in energy within the sample group is higher than that of the entire population of energy poor citizens. After all, potential interviewees that are willing to talk about energy are more likely to be recommended than those with little interest in the subject. This has potentially resulted in the inclusion of more energy-minded narratives (either positive or negative) in this thesis compared to what is representative for the entire group of energy poor citizens. Future research could employ random selection to counter this limitation. For this, close cooperation between municipalities and researchers could be helpful, so that the data that municipalities have can be used to invite citizens that meet a set of criteria. Also, it would be advisable to deploy a wide range of participation methods for future research, such as interviews, surveys, serious games, accessible neighbourhood activities or information exchange with debt counselling and social workers. This could help to deal with the various barriers that energy vulnerable citizens may experience to participate in studies (think of shame, little time, language barriers or distrust).

Thirdly, several months have passed between the conduct of the interviews and the publication of this thesis. In recent months, the rapidly increasing energy prices and the outbreak of the war in Ukraine have positioned energy poverty and the energy transition higher on the political agenda (VNG, 2022). Hence, the outcomes of the interviews would have probably been different if they were carried out now. The same likely counts for a document analysis that includes policy documents published in or after 2022. For future research, it would therefore be interesting to take a longitudinal

approach and study the development of citizens' experiences of energy poverty and perceptions of justice within the changing policy context over time.

5.3 Recommendations for policy makers

Based on the findings of this study, seven recommendations for policy practice were formulated. These are summarised in figure 6.



Figure 6. Policy recommendations for the inclusion of energy vulnerable citizens in the energy transition.

Firstly, this thesis has demonstrated that the analysed policy documents recognise differences between neighbourhoods in terms of economic characteristics and focus on cost neutrality as a vehicle for a fair transition. Although the issue of energy poverty receives much attention among policy makers in practice, recognition justice still remains abstract in the documents and a long- term vision regarding the relief of energy poverty was not included. Hence, a first policy recommendation is to integrate a strategy for the relief of energy poverty in energy transition policy. This strategy should not primarily focus on support for paying the energy bill, but on the prevention of energy poverty in the future. According to the narratives presented in this study, this can best be done through instruments that improve the energetic quality of residences. In designing these instruments, it should be taken into account that various barriers exist to the adoption of sustainable energy technologies for energy poor households. The wide range of barriers presented in this study including behavioural, institutional, financtial capacity, capability and agency ones (see figure 4) - can be utilised for the design of more accessible policy instruments that take into account the multidimensional character of energy poverty.

In line with this, this study pleads for prioritisation of the alleviation of energy poverty in the implementation of the energy transition. Making the homes of energy poor citizens more energy efficient in the first stage of the transition is expected to lead to advantages in several areas at the same time. It could advance the energetic quality of the housing stock (by reducing energy consumption and CO2 emissions), improve citizens' health (by improving their living comfort, physical health and emotional health) and reduce burdens (by reducing the energy bill and thus creating room for new expenses). This approach of prioritisation suits the perception of justice of energy poor citizens. It has the potential to advance both social- and environmental goals simultaneously and make this group feel more recognised and included in the energy transition, which could substantiate their willingness to participate.

Furthermore, designing a targeted policy strategy to alleviate energy poverty requires the combination of information about the built environment with information about personal and socio-economic characteristics of energy poor households. The multi-dimensional framework of energy poverty presented in this study can be adopted to study the prevalence of energy poverty on the neighbourhood level. As it includes subjective experiences, it provides more detailed insight in the issue than a solely objective framework could provide. Ways to implement this is through conducting surveys or interviews. An interview setting may be the most suitable option for this group as difficulties with language can be settled and such a setting helps to build trust, but it is also the more costly option of the two. For a survey, it would be advisable to take into account people's potential difficulties to process information, so a survey should ideally include several languages, easy language (B1-level) and pictograms. The resulting knowledge can be used as a guideline to decide which neighbourhoods should be focused on first, and hence substantiate prioritisation.

An additional step in designing a targeted energy poverty policy is to evaluate existing schemes and programs from the perspective of the energy poor. As this study has demonstrated, citizens living in energy poverty have clear ideas about what a fair energy transition entails and are able to clearly articulate these ideas in an interview setting. Hence, a third recommendation is to use the lived experiences of energy poor citizens to evaluate existing policy, design future policy and monitor the effects of implemented policy. For the latter, a qualitative, longitudinal study could be arranged to get a better understanding of policy effects over time.

Besides the aforementioned strategic recommendations, this study also indicates more practical insights for policy makers. The citizens' narratives pointed out that there is a need for a personal point of contact for energy related issues, preferably located in the neighbourhood. This indicates an important role for civil servants, debt counselling and social workers, who are already known in the neighbourhood and are involved in poverty alleviation of vulnerable households. These parties can contribute to citizens' knowledge on energy related issues. They can also help to monitor the changing role that energy plays in the lives of vulnerable households by providing feedback to the local government.

In addition, the results have shown that both citizens and policy value the fair distribution of burdens and benefits between the government, citizens and businesses. The citizens' narratives, however, pointed out that the perceived responsibility of businesses is smaller compared to that of citizens, especially regarding energy saving behaviour. Therefore, it is advisable for policy makers to communicate to citizens about the contributions that companies have to make to the energy transition, thus demonstrating that there is a fair distribution of responsibilities between all involved parties. These contributions should be described in a concrete way, rather than on an abstract level. Such communication could increase citizens' perceived fairness of the energy transition.

Lastly, this study calls for recognition for the fact that at least part of the people living in energy poverty are willing to take part in the energy transition and already contribute to it by showing energy saving behaviour or implementing small energy saving measures. Among the interviewees, a lack of participation was often caused by a lack of capacity, capabilities or a sense of distrust rather than an unwilling attitude. It is advisable to recognise this when communicating with and about energy poor households, as this contributes to recognition for the contributions that (at least part of) this group makes. This is also instrumentally valuable, as peoples' willingness to participate may increase when they feel recognised, and including the more than 700.000 Dutch households living in energy poverty in the energy transition is essential to reach the national aim of becoming a carbon-neutral society by 2050.

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Annex 1: Interview guide

Interview guide

Heel erg bedankt dat je even met mij wil praten over de energietransitie en hoe dat voor jou is. Het interview is helemaal anoniem, dus je naam wordt niet gebruikt in het onderzoek. Vind je het goed als ik het interview opneem? Dan kan ik het later nog een keer rustig terugluisteren, zodat ik zeker weet dat ik alles goed heb verstaan. De opname wordt weer verwijderd als het onderzoek klaar is.

Heb je nog vragen voordat we beginnen?

Openingsvragen (kennismaken en op gemak stellen)

- Welke kant zullen we oplopen?
- Hoe vind je het om in deze buurt te wonen?
- Met hoeveel mensen woon je in huis? (samenstelling huishouden)
- Wat is je leeftijd?
- Heb je een huurwoning of een koopwoning?

Gedrag:

- 1. Doe je wel eens dingen niet, omdat ze te veel gas of energie kosten? (Wat dan?)
- 2. Zet je je verwarming wel eens lager dan je zou willen, om kosten te besparen?
- 3. Gebruik je wel eens op andere manieren minder energie dan je zou willen, om kosten te besparen? (Bijvoorbeeld je douchet korter/minder vaak dan je zou willen, je zet zo min mogelijk lampen aan, of je kookt met zo min mogelijk pannen om energie te besparen)
- 4. Probeer je energie te besparen? (Op welke manier?)

Gevoel:

5. Maak je je wel eens zorgen om de energierekening? (Wat voor zorgen?)

Staat van huis:

- 6. Vind je het wel eens tochtig of koud in je huis? (vaak?)
- 7. Heb je last van schimmel?
- 8. Heb je het wel eens koud in huis? (Zo ja, doorvragen. hoe koud heb je het dan? wat doe je dan? bezoek?)
- 9. Heb je wel eens het gevoel dat het binnenklimaat in je huis ongezond voor je kan zijn? (hoe merk je dat?)

Financiën:

- 10. Geef je per maand meer dan 10% van het huishoudelijke inkomen uit aan de energierekening?
- 11. Heb je wel eens gehad dat je een rekening niet op tijd kon betalen? (aanvoelen of deze vraag gepast is binnen de band die we hebben opgebouwd.
- 12. (Indien vraag 7 niet gepast voelde:) Vind je het lastig om dagelijks rond te komen met het inkomen dat je hebt?

Mogelijkheid tot verduurzaming:

- 1. Heb je, qua geld, de mogelijkheid om je huis te verduurzamen? (Zo ja, wat voor soort maatregelen kun je dan nemen?)
- 2. In het geval dat je huurt, denk je dat de verhuurder je woning zou willen verduurzamen als je daarom vraagt? (waarom wel/niet? Heb je daar wel eens informatie over gekregen?)
- 3. Weet je waar je informatie vandaan kan halen als je je huis wil verduurzamen?

Kernvragen

- 1. Maak je je ergens druk om als het gaat om energie?
 - a. Verwachte antwoordrichtingen: gasprijzen, Rusland, situatie in huis, energierekening, (aanpassingen) gedrag, gevoelens, verduurzaming, andere issues.
 - b. Doorvragen: waar zie je kansen als het gaat om energie?/Hoe kunnen ze jou helpen als het gaat om energie?
- 2. Heb je al wel eens wat gehoord over duurzame energie in jouw wijk? Wat dan?
 - a. Verwachte antwoordrichtingen: gewenst/ongewenst, aanpassing woning, belang van duurzaamheid, moeite, geld, wie kan meedoen, verantwoordelijkheid, capabiliteiten, gevoelens, andere issues.
 - b. Doorvragen: inzoomen op huishouden. Uitzoomen naar Nederland als geheel.
 - c. Bij 'nog niks over gehoord': Heb je er iets op het nieuw over gehoord? Hoe komt het, veel aan je hoofd?
- 3. **Wat vind je dat jouw verantwoordelijkheid is? En wat doe je al?** (Achterliggend: wil je meedoen, kun je meedoen, wie is verantwoordelijk)
 - a. Verwachte antwoordrichtingen: meedoen/niet meedoen, eerlijk/oneerlijk, verantwoordelijkheid, verwachtingen, andere issues.
 - b. Vervolgvragen: wat vind je dat de gemeente moet doen? En verantwoordelijkheid van de woningbouwcorporatie? Wat zie of hoor jij dat ze doen? Word je betrokken bij de plannen?
 - c. Vervolgvraag bij antwoordrichting 'ik kan niet meedoen': op welke manier zou je wel mee kunnen doen?

Doorvraagopties (algemeen)

- Hoe is dat?
- Hoe vind je dat?
- Hoe voelt dat?
- Waar merk je dat aan?
- Is er nog iets?
- Kun je dat uitleggen?
- Kun je daar een voorbeeld van geven?

Doorvraagopties (gericht op justice)

- Vind je dat eerlijk verdeeld? (distributie)

- Wie is er verantwoordelijk? (distributie)
- Wie zou er verantwoordelijk moeten zijn? (distributie)
- Hoe zou het geregeld moeten worden volgens jou? (procedure)
- Wat zou je helpen? / Wat heb je nodig? (procedure)
- Je omschrijft probleem X. Vind je dat er genoeg aandacht is voor mensen die dat ervaren? (erkenning)
- Heb je het gevoel dat iemand weet wat er speelt bij jou? (erkenning)
- Wie zou je vertrouwen om je daarbij te helpen? (erkenning)

Checklist justice-dimensies

Dimensie	Besproken?	Gekoppeld aan eerlijkheid?
Distributie/verdeling		
Procedure		
Erkenning		

Afsluiting

Bedankt dat je deze vragen met me wilde doorlopen! Dan denk ik dat we al een heleboel besproken hebben. Zijn er voor jouw gevoel nog dingen die we niet besproken hebben, die wel belangrijk zijn? Dan wil ik je heel erg bedanken voor dit interview. Ik vond het heel interessant om jouw verhalen en je mening te horen.

Vind je het fijn als ik je het onderzoek opstuur als het af is?

E-mailadres:

.....

Ken je nog andere mensen die ook zulke ervaringen hebben met energie? En die misschien een interview willen geven?

Moment om te landen (tijdens het teruglopen)

- Hoe vond je het om zo'n interview te geven?
- Dingen die we om ons heen zien
- Heb je nog plannen voor de rest van de dag/het weekend?
- Etc.

EINDE INTERVIEW

Exitstrategieën (tijdens gehele interview)

1. Geïnterviewde vraagt naar mijn mening.

- a. Antwoordoptie 1: wat leuk dat je dat vraagt, maar ik ben vooral benieuwd naar wat jij ervan vindt.
- b. Antwoordoptie 2: dat weet ik nog niet, daarom ben ik dit soort gesprekken aan het houden met mensen.
- 2. Geïnterviewde vertelt over wat anderen hiervan vinden.
 - a. Antwoord: en wat vind jij? Hoe heb jij dat ervaren?
- 3. Geïnterviewde wijdt uit over zaken die er voor het interview minder toe doen.
 - a. Antwoord: Ik merk dat je heel gepassioneerd bent over onderwerp X. Mooi om te horen! Ik wil je graag weer even terug nemen naar het onderwerp energie. Ik ben namelijk benieuwd naar
- 4. Er wordt een vraag gesteld/ontstaat een sfeer die voor mij onprettig voelt.
 - a. Gesprek terugleiden naar onderwerp: ik merk dat deze vraag over mij gaat, maar ik ben vooral benieuwd naar jouw verhaal.
 - b. Indien nodig, gesprek afronden: ik denk dat we zo al een heleboel besproken hebben. Al mijn vragen zijn beantwoord. Bedankt voor dit gesprek.
- 5. De geïnterviewde raakt geëmotioneerd.
 - a. Begrip tonen, ruimte geven voor verhaal. Als geïnterviewde aangeeft dat het weer gaat, vragen of hij/zij nog verder wil praten of wil stoppen met het interview.
 - b. Indien nodig, interview staken.

Toelichting vragensets energiekwetsbaarheid en achterliggende concepten

Gedrag = verborgen energiekwetsbaarheid Gevoel = psychologische gevolgen van energiekwetsbaarheid Staat van huis = fysieke gevolgen energiekwetsbaarheid + oorzaak energiekwetsbaarheid Financiën = oorzaak van energiekwetsbaarheid

Annex 2: Coding scheme

Coding scheme Energy justice

This codelist is based on the following study:

Haarbosch, S. W., Kaufmann, M., & Veenman, S. (2021). A Mismatch in Future Narratives? A Comparative Analysis Between Energy Futures in Policy and of Citizens. *Frontiers* in *Sustainable Cities*, 41.07, July 2021, retrieved from: <u>https://doi.org/10.3389/frsc.2021.654162</u>

Coding guidelines

Citizens point of view: Justice is approached from a citizen's point of view. Only in the case of a direct relationship coding takes place, so indirect influence is excluded from coding.

Auto coding: The citizen focussed approach has implications for auto coding: only if a text surrounding a signal word is about citizens, a code is assigned to it. For example, if the keyword 'impact' results in both text fragments that elaborate on impact to citizens and on impact to businesses/the energy network/energy hubs/etc., only the text fragments on citizens are coded.

Codes refer to text fragments: The textual context of a code helps to understand its nuances, and it enables the use of cross tabulations. Therefore, where possible codes should refer to text fragments rather than words. The fragment length should be as long as is needed to understand the context, and no longer than needed (coding should not include information unrelated to the code).

Recognition justice

Recognition of needs and vulnerability and political and cultural respect

In Atlas	Label	Definitions, examples and signal words for auto coding	Used signal words	Rejected signal words
RJ	Recognitio n of distributio n	Actions, goals and solutions related to distribution.	impact invloed, verantwoordelijk* verde*	No rejected signal words

RJ	Recognitio n of citizens (general)	(Mis)recognition of citizens and their problems/abilities/vulnerabilit ies. Who is involved and who is not involved in the energy transition?	betrokken betrekken burger* inwoner* individu* bewo ner*	Stakeholder, eigena* did not return appropriate results
	Recognitio n of energy vulnerable citizens	(Mis)recognition of energy vulnerable citizens and their problems/abilities/vulnerabilit ies. Who is involved and who is not involved in the energy transition?	energiearmoede armoede socia* burger* inwoner* bewoner* betrokken betrekken huurder*	Energiekwetsba *, betaalba*, haalba*, kwetsba* did not return appropriate results

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Procedure

"fairness" in decision-making (planning/implementation)

Procedural justice

In Atl as	Label	Definitions, examples and signal words	Used signal words	Rejected signal words
PJ	Norms	Which procedural norms are considered relevant in which citizens	betrouwba* transparant* flexibel* borg*	Norm*, waarborg *, belangrijk *, procedur

		are involved (e.g. transparency)		e* did not return the appropria te results.
PJ	Justice	How is justice secured in procedures? What is considered just?	Rechtvaar* gerecht* eerlijk*	Evenred*, gelijk* did not return the appropria te results.
PJ	Communic ation	Different approaches to inform citizens, e.g. newsletters, information meetings, neighborhood office, etc. How do citizens perceive this communicatio n, e.g. do they trust the governmental authorities? Do they perceive the communicatio n as	Nieuwsbrie* loket platform communic* kana campagne inform* inf ormatievoorziening media	Mailinglis t, mail, e-mail, maillijst, bewoners brief, wijkkrant, folder*, product*

		understandabl e?		
PJ	Participati on	Different forms of participation of citizens within the energy transition, e.g. citizen council, representative of citizen in project group, etc. How do citizens in perceive this participation, e.g. do citizens feel respected and taken seriously?	Tafel Klimaattafel meedoen meebelissen betrokken eigen initiatief samen met dialoog gesprek partici* Draagvlak acceptatie meedenken	Projectgr oep*, adviesgro ep*, klankbord *, deelnem* , toehoord er

PJ		Particular	Keuzevrijheid keus Keuzen	Plicht,
	rights	(legal) rights		verplicht,
		that citizens		recht*,
		have. For		bezwaar*
		example, is		, beroep*
		the		(leverde
		participation		resultaten
		in the energy		'functie/b
		transitions		aan op),
		voluntary?		aanspra*
		Are they free		
		or obliged to		
		choose a		
		certain		
		alternative		
		energy		
		source, etc.		
		М		
		b		
		t		
		b		
		e		
		S		
		C		
		h		
		е		
		r		
		m		
		e		
		n		
		v		
		а		
		n		

		b		
		u		
		r		
		g		
		е		
		r		
		S		
PJ	Reasoning	Underlying	No suiting signal words found, hence coding took place	Proble*
	desicionm	rationale.	manually.	
	aking	What		
		information is		
		included in		
		the		
		decision-maki		
		ng by		
		governments?		
		What happens		
		in the		
		procedure		
		when		
		diagnosing		
		the problem?		
		Focused on		
		problem. Only		
		linked to		
		problem		
		definition.		

Bron: Walker & Day (2012) Fuel poverty as injustice

Distributive justice

Distribution of costs and benefits, concerned with outcomes

In Atlas	Label	Definitions, examples and signal words	Used signal words	Rejected signal words
IJ	Burdens	Present or expected burdens emerging from energy transition, e.g. increasing energy prices, spatial impact, health.	Last* bedreig* nadeel* nadelig benade* verde* overlast gedrag sverandering	no rejected signal words.
IJ	Benefits	Expected benefits and opportunities emerging from energy transition.	Kans* voorde* voordelig profiteren baat baten winst	no rejected signal words.
DJ	Costs_ind	Costs for individual emerging from energy transtions.	Kosten, beta*	no rejected signal words.

DJ	Costs_coll	Costs for	Gesocialiseerd*, subsidie	no
		collective/tax		rejected
		payer		signal
		emerging		words.
		from energy		
		transtions		
		transtions.		