POWER TO THE PEOPLE

Energy justice through community energy in decarbonising EU coal regions – A case study of Lusatia and Moravia Silesia

Master's Thesis

Double Degree MSc European Governance

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"A people-centred approach to the climate crisis is needed now!"

Mary Robinson (2022)

former President of Ireland and United Nations High Commissioner for Human Rights

Acknowledgement

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Abstract

This thesis studies the potential of community energy to enhance energy justice in decarbonising European coal regions. It does so by means of a case study analysis of two EU coal regions: Lusatia in Germany and Moravia-Silesia in the Czech Republic.

More specifically, this thesis examines the capacity of, and the conditions necessary for, community energy to improve distributive, procedural, and recognition justice, with a particular consideration of the specific challenges of coal regions. Indeed, this particular focus of community energy in coal regions represents the novelty of this research.

Overall, this thesis confirms the high potential of community energy to enhance energy justice. In doing so, it validates and details the conditions necessary for community energy to enhance energy justice, those being: accessible energy prices, opportunities for public participation, and an inclusive design. More specifically, this thesis evidenced that a knowledge gap and lack of citizen engagement (as was the case in both case study regions) hinder the full realisation of community energy's potential. However, it also demonstrated the significance of information events and the role of municipal leadership to overcome the above-mentioned hindrances.

In sum, by shedding light on the potential and conditions necessary for community energy to enhance energy justice in decarbonizing coal regions, as well as through noting a number of implications for community energy initiatives and policy makers, this thesis contributes to the broader understanding of inclusive and just energy transitions in Europe.

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1 Introduction

The impact of the climate crisis is substantial and mitigation measures indispensable. A rapid switch to renewable energy sources is crucial for reaching the targets of the Paris Agreement (IPCC, 2022, p. 28) but requires transformative policies, particularly in some carbon-intensive Member States and regions, which will require fundamental structural economic changes to achieve complex transitions to low-carbon economies. While such change is necessary and can have positive implications for the overall economy, there will also be initial negative effects on certain groups and regions (Fay et al., 2015; Green & Gambhir, 2020). In Europe, this will be especially true in regions that are historically dependent on coal, as they are facing big challenges in managing the structural changes that come along with decarbonisation. As such, the concept 'just transition' must be at the forefront of decision-making and policies on decarbonisation of carbon intensive regions, as the term implies a balancing of the adverse impacts, support to citizens in the green transition, and preservation of public support for the transition.

This thesis provides insights into, and analysis of, the potential of a people-centred approach in community energy[1] to support a just transition, specifically through its contribution to energy justice. Indeed, due to the bottom-up design and consequent focus on the specific needs and expectations of the community, community energy encompasses an untapped potential for energy justice (Hoicka et al., 2021; Laes et al., 2021; Leiren et al., 2020). More specifically, in this thesis, the argument that this potential could particularly improve the situation in regions struggling with the energy transition (i.e. coal regions) is empirically tested and analysed. In other words, the potential of community energy to enhance energy justice during decarbonisation processes in historically coal-dependent regions is researched. This is done through a case study analysis of Lusatia (Germany) and Moravia-Silesia (Czech Republic). Hereafter, the situation of coal regions in the energy transition is further elaborated and the concept of community energy introduced. This is followed by an identification of the research gap, from which the research question is drawn, and an overview over the approach and findings of this thesis.

1.1 A just energy transition in coal regions

The energy transition in favour of more sustainable sources is indispensable to reduce carbon emissions and reach the objective of limiting global warming to 1.5-2ºC set in the Paris Agreement (IPCC, 2022, p. 28). Renewable energy increases the EU's energy independence by reducing its dependency on

[1] Community energy refers to renewable energy projects collectively organised by citizens, small and medium-sized local businesses, and/or municipalities with a primary objective other than financial profit (see Chapter 1.2 for full definition).

imported fossil energy (Mata Pérez et al., 2019; Sattich et al., 2022), while simultaneously creating new jobs in the renewable power sector and contributing to energy security as a stable energy source securing supply (Mata Pérez et al., 2019; Ram et al., 2020). Furthermore, renewable energy is now considerably cheaper than fossil alternatives, even without taking into account any subsidies or the 2022 jump in gas prices (IRENA, 2022). This, combined with a strong positive health impact by reducing fossil air pollution, leads to a positive impact of the energy transition on welfare and the economy (Garcia-Casals et al., 2019).

Despite an overall positive impact, carbon-intensive regions such as coal regions initially suffer from this transition. The shift away from carbon-intensive industries has a stronger short-term impact than the positive effects of clean energy. This difference is evident between countries and even more pronounced between regions within a country (Kapetaki et al., 2021). Carbon-intensive jobs and industries are concentrated in specific regions within Member States. Since renewable energy sources are often developed in different locations, other regions and people may benefit from these changes. With the closure of many coal mines, estimates expect around half of the jobs directly related to coal existing in 2020 to disappear by 2030 (Alves Dias et al., 2018, p. 59). There is further impact on indirectly related jobs in industries such as steel that are currently heavily relying on coal energy for their production (Kapetaki et al., 2021, p. 84). These challenges are amplified by other issues in coal regions limiting their ability to absorb changes. Most coal regions have a GDP per capita below the European and national average, show an above-average rate of people at risk of poverty or social exclusion (AROPE[2]), as well as a higher share of young people, neither in employment nor in education or training (Maleki-Dizaji et al., 2023, pp. 18–19, 23–24). Furthermore, the transition requires the replacement of coal energy with renewable energy, also including a loss of cultural heritage (Maleki-Dizaji et al., 2023, p. 12). These conditions result in particularly high challenges for coal regions in the energy transition and require a decarbonisation path that accurately reflects them. To reflect these challenges, there is a need for a just transition[3], where social policies complement environmental policies to achieve *"a fair and equitable process of moving towards a post-carbon society"* (McCauley & Heffron, 2018, p. 2). Such an approach, to which all Member States committed by signing the *Solidarity and Just Transition Silesia Declaration*, requires an energy transition that is focused on the needs of communities most affected.

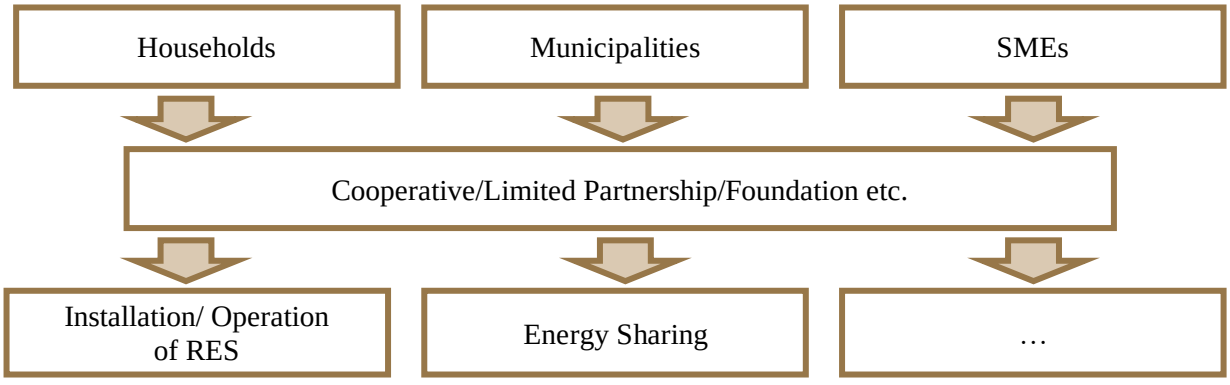
[2] AROPE examines the risk of being in poverty, materially or socially deprived, or living in a household with a very low work intensity (Eurostat, 2021).

[3] The discussion surrounding a just transition first emerged from the labour movement in the 1970s and 1980s but especially gained traction in the more recent context of climate change and the accompanying structural economic changes (Abraham, 2017; Krawchenko & Gordon, 2021; Stevis & Felli, 2015). In recent years, the usage of the concept has grown beyond the relation to workers' rights to include a broader meaning in the context of various categories of justice.

1.2 Community energy

One approach to community-centric renewable energy development are community energy initiatives. Community energy is an umbrella term for energy initiatives, in which a community of citizens takes up a leading role. In the EU, such projects currently include around 1.5 million citizens and encompass the potential to produce up to 45% of the EU's renewable energy by 2050 (Vansintjan & Vrettor, 2023). Hence, community energy encompasses high potential as a source of renewable energy in the energy transition. As the term lacks a clear uniform definition, the understanding used in this thesis is described hereafter, largely based on the concepts developed by Walker and Devine-Wright (2008) and Brummer (2018). It can be described as collectively organised 'prosumers'[4]. This includes various energy activities such as the operations of renewable energy installations (e.g. roof or ground photovoltaics, wind power, or biomass plants) that are operated by collectively organised households, SMEs, or municipalities with an objective other than financial profit (e.g. in an apartment building or through a cooperative) (see Figure 1). Additional characteristics of community energy are its grassroots development and the benefit for local communities. It usually includes some degree of participation and democratic control by its members, the local community (Brummer, 2018, p. 194). However, the degree to which such participation and control is required for the usage of the term community energy is disputed with some proponents prioritising an outcome beneficial to the community over the participatory nature (Walker & Devine-Wright, 2008, pp. 498–499). For this thesis, a broader definition is used for community energy, although the degree of participation and the outcome are repeatedly included in the assessment of community energy and influence its ability to enhance energy justice.

Figure 1: Visualisation of community energy (own creation)



[4] Energy 'prosumer' refers to decentralised renewable energy production by individuals or groups for their own consumption or the sale of the energy without this activity being their primary commercial objective (European Environment Agency, 2022, pp. 13–15).

1.3 The research gap and research question

Apart from acting as an accelerator for the use of clean energy sources, some research suggests community energy to be capable of enabling and reinforcing a just transition (Hoicka et al., 2021, p. 6). By allowing for and encouraging citizen participation, it can support energy democratisation and increase public support for local renewable energy projects (Heldeweg & Saintier, 2020; Leiren et al., 2020; Szulecki & Overland, 2020). Moreover, by including vulnerable groups, community energy initiatives possess a capability to reduce energy poverty, for example by providing lower energy prices and providing the necessary initial investments (Bode, 2022; Hanke & Lowitzsch, 2020).

Despite the above-mentioned optimism about the potential of community energy to support the just transition, the real-world effect of community energy is contested in the literature. Many community energy projects are currently not actively pursuing such objectives, in particular related to inclusive membership (Hanke et al., 2021). Some studies even suggest that community energy reinforces existing injustices. Research by Radtke and Ohlhorst (2021) showed how community energy can increase injustice by fostering social and class differences. Hence, while there seems to be a potential community energy, it remains unclear how effective their contribution to a just transition is.

Moreover, the current research has only examined the potential of community energy to enhance energy justice on a general basis, not considering any specific context. There are claims that community energy can also support a just transition in coal regions (European Commission, 2023; WWF, 2022). There is, however, no substantial base to these claims, as there is no research that analyses the potential of community energy in carbon-intensive regions. The supposed benefit of community energy in creating energy justice still suggests an untapped potential to balance the adverse effects of the energy transition. As such, this master thesis aims to address this gap and analyse the potential of community energy to promote a just transition in coal regions by enhancing energy justice. Following the research gap, the thesis adds to the literature by analysing how citizen and community energy can act as a promoter of energy justice in EU coal regions and identifies the key aspects determining this effect. It shall act as an empirical impetus to future policymaking by better adding to the understanding of where and how community energy can enhance energy justice and create a fair transition. Therefore, the following central research question is followed:

RQ: How can community energy promote energy justice in decarbonising EU coal regions?

This main research question is broken down into the following 3 subquestions, drawn from the three aspects of energy justice and focused on the conditions shaping the respective impact:

SQ1: Under which conditions does community energy improve distributive justice in the face of specific challenges faced by EU coal regions in the energy transition?

SQ 2: Under which conditions does community energy improve procedural justice in the face of specific challenges faced by EU coal regions in the energy transition?

SQ 3: Under which conditions does community energy improve recognition justice in the face of specific challenges faced by EU coal regions in the energy transition?

To research these questions, in Chapter 2, the thesis starts with a placement of community energy in the just transition. There, the legislative environment (2.1) as well as the relevance of social acceptance towards renewable energy (2.2) are explained. It is followed by a summary of the current research on community energy's impact on energy justice in Chapter 2.3, from which key conditions shaping this impact are extracted. In Chapter 3, the theoretical base of this thesis with Green Industrial Policy, the three elements of energy justice, and political economy, are explained. Chapter 4 explains the methodological approach, relying on a case study of the coal regions Lusatia (Germany) and Moravia-Silesia (Czech Republic) with expert interviews as main source of information. The results of this study are discussed in Chapter 5 alongside examination of the regional challenges in the energy transition (5.1) and following the structure of energy justice with community energy's impact on distributive (5.2), procedural (5.3), and recognition justice (5.4). In Chapter 6, these findings are summarised and discussed, including an outline of their implications for policymaking and future research.

Overall, this analysis showed a high potential of community energy and validated the importance of accessible energy prices, opportunities for public participation, and an inclusive design in facilitating the positive impact of community energy on energy justice. However, it also revealed a knowledge gap and lack of citizen engagement that hinder the full realisation of community energy's potential. Here, the research highlighted the significance of information events and the role of municipal leadership in overcoming these limitations and advancing community energy initiatives. By shedding light on the potential and conditions necessary for community energy to enhance energy justice in decarbonizing coal regions, this thesis contributes to the broader understanding of inclusive and just energy transitions in Europe.

2 Community energy in the energy transition

This chapter discusses the background and the framework for the analysis of community energy's contribution to energy justice in coal regions. It starts with a summary of the relevant European policies regarding renewable energy, just transition, and community energy. This is followed by a discussion of the importance of community involvement and justice for the public support of renewable energy projects and a summary of the research on community energy's contribution to energy justice, serving as a guide for the analysis of community energy in coal regions.

2.1 EU policy on renewable energy and community energy

The shift towards renewable energy sources is a key part of the European Union's push towards carbon neutrality. Its approach, bundled under the European Green Deal[5], is described hereafter with a focus on the phase-out of coal and the role of community energy.

In 2018, as part of the *Clean Energy for all Europeans* package, the EU adopted the REDII directive with a binding target of 32% share of renewables in the energy mix by 2030 (Dir 2018/2001 REDII, Art. 3). The political ambitions increased since, not least because of the importance of energy independence following the war in Ukraine. Under *REPowerEU*, Council and Parliament reached a provisional agreement[6] to reform the REDII directive with an increase of this target to 42.5% by 2030 (European Commission, 2023). This requires a replacement of carbon-intensive energy with renewables, achieved by taking advantage of the rapidly decreasing price of solar energy, a reduction of administrative hurdles by classifying renewable energy as an overriding public interest, and increased funding (European Commission, 2022a; 2022b). It includes a phase-out of coal energy, which has a detrimental impact on the climate and is incompatible with emission mitigation objectives but also suffers from high lock-in costs that increase the costs of stopping operations and lead to different situations in the Member States depending on their earlier path (Böhringer & Rosendahl, 2022; Welsby et al., 2021). Ten Member States already ended their reliance on coal and Slovakia is due to follow suit by the end of 2023. The remaining Member States have different phase-out dates, among them the Czech Republic in 2033 and Germany in 2038 (European Commission, n.d.-a).

To counter the differentiated impact of this transition (i.e. on coal regions), the EU adopted balancing measures alongside the European Green Deal in form of funding schemes under the Just Transition

[5] The European Green Deal is the centrepiece of the EU's climate policies, including the pledge to climate neutrality by 2050 as well as various policy packages to adapt the European economy accordingly (European Commission, 2019).

[6] Pending approval by the co-legislators as of June 2023 (European Commission, 2023)

Mechanism[7] (JTM), whose objective is to *"support workers and citizens of the regions most impacted by the transition"* (European Commission, 2020b, p. 1). Furthermore, the European Commission started the 'Initiative for coal regions in transition', which supports coal regions by connecting stakeholders between regions, providing tailored technical assistance, and providing information in the form of toolkits, guidelines, and reports for common transition issues (European Commission, n.d.-c).

The European Union also recognises the potential of community energy to accelerate renewable energy deployment with citizens as active participants. Energy communities, a subgroup of community energy, are supported through legislative acts and initiatives by the European Commission. The Internal Electricity Markets Directive (Dir 2019/944 IEMD) introduces 'citizen energy communities'[8] (CECs), whereas the Renewable Energy Directive (Dir 2018/2001 REDII) defines 'renewable energy communities'[9] (RECs). In both definitions, the participatory nature of the community is stressed, and the primary objectives are community benefits. The legislation further mandates Member States to promote energy communities through a clear legal definition as well as a concrete enabling framework allowing non-discriminatory market access. For RECs, Member States are additionally required to assess existing barriers and the potential to develop RECs in their country, as well as to consider the particularities of RECs when designing support schemes for energy projects. While the EU has adopted this legislation to support community energy, transposition proves to be lengthy and the regulations in place remain complex and insufficient in incentivising citizen led energy (Frieden et al., 2021). The transposition is followed closely by REScoop (n.d.-b) and shows that many Member States have not yet provided the framework of a clear legal definition of energy communities, nor legislation ensuring non-discriminatory treatment in the development and maintenance of energy communities. This limits the effect of the legislation and reduces the contribution of energy communities in the energy transition. The lack of a uniform definition across Member States also complicated research on the topic, which is why this thesis is not restricted to energy communities but rather includes all forms of community energy.

[7] The JTF consists of three pillars. (1) The Just Transition Fund is targeted at the most affected regions – identified by Member States – to fund projects that "*address the social, employment, economic and environmental impacts of the transition"* (Reg 2021/1056, Art. 2), including investments in renewable energy as well as systems and infrastructure enabling affordable clean energy (Art. 8(2)). This is complemented by (2) a dedicated just transition scheme under the InvestEU programme, and (3) a public sector loan facility in cooperation with the European Investment Bank (European Commission, 2020a).

[8] Citizen energy communities are autonomous entities acting in the electricity market, defined due to their openness to participation and participatory governance structure with environmental, economic, or social community benefits as a primary objective (Dir 2019/944 IEMD, Art 2(11) & 16)

[9] Renewable energy Communities are autonomous entities with open and voluntary participation that are effectively controlled by local shareholders or members, which are natural persons, SMEs, or local authorities such as municipalities, with the primary purpose of providing environmental, economic, or social community benefits (Dir 2018/2001 REDII, Art. 2(16)).

Complementing the legislative framework, the European Commission (n.d.-b) started initiatives to support the creation and maintenance of energy communities. The 'Energy Communities Repository' and the 'Rural Energy Community Advisory Hub' support local authorities, businesses, and citizen organisations with know-how, as well as technical and administrative advice to support the development of urban energy communities. This is complemented by a collection and dissemination of successful best practices across Europe. Furthermore, specific initiatives are launched for regions in which community energy remains underdeveloped, such as an initiative to support energy communities in Czech Just Transition regions. Hence, the European Commission is actively engaged in supporting the development of more community energy.

2.2 Public support for renewable energy sources

In the discussion about community energy and the energy transition, apart from the political and legislative approach, the public acceptance of the energy transition, renewable energy projects, and community energy takes up an important role, influencing the dissemination of renewable energy and community energy. The academic discussion on the topic is attributed to Wüstenhagen et al. (2007), who first gave the discussion an analytical framework, distinguishing between socio-political acceptance, community acceptance, and market acceptance. For this thesis, the focus lies on the community acceptance of renewable energy projects, whereby the opinions of local stakeholders such as residents and local authorities are considered. Renewable energy projects oftentimes include the interests of various stakeholders beyond the investors, as many residents are at least partially affected by the project, making it a local political decision influenced by community opinions (Wüstenhagen et al., 2007, p. 2686). Their support can become a critical barrier to the development of renewable energy, especially in the case of wind power (Leiren et al., 2020). Several important factors have been identified. Wüstenhagen et al. (2007, p. 2687) highlighted fairness and trust as primary factors influencing the community acceptance of renewable energy projects. Thereby, they refer to the fairness of the outcome and the process surrounding decisions as well as trust in the project developer (e.g. for risk assessment), an especially challenging factor in case projects are developed by community outsiders. This framework closely relates to considerations of energy justice, which has equally been associated with a strong positive impact on the social acceptance of renewable energy projects (McCauley et al., 2019, p. 917; Simcock, 2016).

This approach, however, has also been criticised more recently for merely considering the community as being a recipient of renewable energy projects. Batel (2018) suggests the discussion of communities as active participants in renewable energy project development. This view is supported by recent studies highlighting the positive impact of active community involvement on local support of renewable energy. Musall and Kuik (2011) showed how community (co-)ownership of local wind energy projects

increased the support for both the project in question and wind energy in general, while von Wirth et al. (2018) confirmed the same result for other renewable energy sources. Likewise, in the realm of energy justice, studies have demonstrated that all options for participation have a positive impact on social acceptance but that the effect is especially strong if there are real possibilities for citizens to shape the outcome instead of processes that primarily exist to meet minimal regulatory standards (Ellis & Ferraro, 2016, pp. 40–42). This effect tends to be stronger the higher the involvement opportunities are, up to and including the option for financial participation (De Luca et al., 2020). Accordingly, Maleki-Dizaji et al. (2020) concluded that procedural and financial participation are key conditions for social acceptance of wind energy projects and residents show a high interest in such active participation in the energy transition.

2.3 Community energy in energy justice

The existing research on the contribution of community energy to energy justice and a just transition is still limited with many studies merely referring to potentials and assumptions. Nonetheless, this chapter provides a summary of the research, serving as a guide for the analysis of its contribution in coal regions. This contribution is measured along distributive, procedural, and recognition justice, the three aspects of energy justice (see Chapter 3.2).

On the distributive aspect of the energy transition, an important aspect to consider is the price of energy. Due to the use of cheap renewable energy sources and not-for-profit business models that redistribute potential profits among the member, community energy is generally expected to provide its members with lower energy prices than traditional suppliers, (Hanke et al., 2021; Hoicka et al., 2021; Szulecki & Overland, 2020). In particular for vulnerable groups, that aspect of community energy has been shown to possess the potential to reduce energy poverty and, thereby, increase distributive justice (Bode, 2022). It, however, must be noted that this beneficial aspect is dependent on the inclusion of disadvantaged groups in community energy projects and on potential restrictions of community energy prices to members. Research has shown that many community energy projects show deficiencies in the aspect of inclusiveness (Hanke et al., 2021), which can even lead to a restrengthening of distributional injustices when only privileged groups have access to community energy benefits (Radtke & Ohlhorst, 2021). Nevertheless, the community aspect of community energy allows people to participate as prosumers who would lack the financial or organisational resources to do so individually (Standal & Feenstra, 2022).

An important role of community energy's contribution to energy justice falls to procedural justice. Community energy contains the potential to actively engage citizens in the energy transition by giving them a voice and decision-making power in the development of renewable energy (Hoicka et al., 2021;

Szulecki & Overland, 2020; Van Veelen, 2018). Not only consulting citizens but actively cooperating with residents, for example by providing the opportunity to participate financially or shape the design of the project, can enhance the procedural justice of the energy transition. Nonetheless, the amount to which procedural justice can be enhanced, even in the case an active participation in renewable energy development is possible, is again limited by the participation of vulnerable groups. Community energy does also, in some cases, reinforce social classes and groupings if participation requirements are difficult to meet for vulnerable groups (e.g. volunteering or initial financial contributions), or if the biases held by members favour the opinion of privileged groups (Hanke et al., 2021; Radtke & Ohlhorst, 2021; Standal & Feenstra, 2022; Van Veelen, 2018). Hence, researchers suggest enabling frameworks to actively support the inclusion of vulnerable groups in community energy from the side of legislation and local authorities.

Summarising the state of research, community energy encompasses a high potential for contributing to energy justice by lowering energy prices and giving residents the option for an active role in the energy transition through their participation in the development of renewable energy. There, however, remains a challenge for energy justice in the inclusiveness of community energy. Hence, these factors are critical for the analysis of community energy's contribution to energy justice in coal regions.

3 Theoretical base

This thesis is using three theoretical aspects as a basis to analyse the opportunities for community energy within the energy transition of coal regions. First, Green industrial policy is used as an underlying theory justifying active government intervention in the energy transition while considering fair processes. Energy justice, in combination with the literature on just transition, is used to develop the criteria along which a fair process can be evaluated and through which the impact of community energy on energy justice is measured in the thesis. This is supplemented by a discussion of the political economy and the coalitions necessary for renewable energy initiatives and policies as well as the capability of energy justice to facilitate constructive environments. Doing so, this thesis adds to the literature by elaborating on the possibility and capability of community energy in creating energy justice in the context of a low-carbon transition for the case of carbon-intensive regions. This is achieved by regarding the just transition as a broad process that includes climate, economic, and social objectives, and by bearing in mind the importance of coalitions and public support for such undertakings. Therefore, this chapter is laying the foundation by discussing the three theoretical approaches in the context of the energy transition and community energy.

3.1 Green industrial policy

Green industrial policy concerns active state involvement in the transition towards a sustainable economy, combining industrial policies with social aspects of the transition. Emerging from developmental state theory, it attributes a central and active role to the state in stimulating growth (Johnson, 1982). More recently, it has been broadened beyond growth to underpin and justify an active role of the state in climate mitigation to advance societal interests beyond growth (MacNeil & Paterson, 2012; Meckling, 2018). Green industrial policy complements this by stressing the necessity for broader change, adding the importance of environmental sustainability, structural change, and a fair outcome to the requirements for a broad emission-mitigating transition (Pianta & Lucchese, 2020). An active green industrial policy – for example through direct funding of renewable energy projects, preferential tax, or regulatory treatment of such – is, thereby, seen as essential for a successful zero-carbon transition (Rodrik, 2014). The theory also addresses the specific needs of communities in the transition, especially for fossil-fuel-dependent communities, where the stark adjustment and decline of opportunities as a result of the transition need disproportionate support in the development of clean economies (Pollin et al., 2020). This includes the participation and consultation of stakeholders as well as the involvement of citizens in the process (Kemp & Never, 2017; Tagliapietra et al., 2020). Hence, green industrial policy combines active state involvement to achieve climate mitigation with economic objectives in an inclusive manner. For coal-intensive regions, the theory can, hence, be useful in understanding government involvement in the energy transition process, including the emphasis on a just outcome.

This thesis will use energy justice to further operationalise the concept of green industrial policy and analyse how community energy can help support a holistic approach to the energy transition that combines climate mitigation, economic, and social objectives.

3.2 Energy justice in the just transition

Energy justice and just transition are highly relevant for questions surrounding the energy transition of coal regions. While the literature on just transition is covering different aspects of the transition including, for example, the reskilling of workers to new industries, energy justice is used as a theory to specifically evaluate the impact of energy systems on equity. In the context of the transition to low-carbon energy, energy justice has gained significant traction in highlighting various unwanted effects. It has been used to highlight injustices that come along with decarbonisation (Sovacool et al., 2019). Thereby, both theories use similar categories to evaluate justice. In the literature on just transition, McCauley and Heffron (2018), for example, promote the focus on distributional, procedural, and restorative justice as categories by which a just transition should be measured. Bennet et al. (2019) add the element of recognitional considerations. These categories closely resemble the categories used in energy justice, which usually distinguishes between distributive, procedural, and recognition justice but focus on the issues in the context of energy (McCauley et al., 2013). As the categories of energy justice are more tailored to the research question at hand – being specifically focused on energy – they are be used as a baseline for the evaluation of community energy's impact by guiding the further elaboration on what conditions determine a just transition surrounding energy production and consumption (Jenkins et al., 2016). This thesis adds to this literature by elaborating on the capability of community energy in creating energy justice in the context of a low-carbon transition. Hereafter, the three categories, briefly summarised in Figure 2, are discussed in more detail.

Figure 2: Categories of energy justice (own creation)

Energy Justice		
Distributive Justice	Procedural Justice	Recognition Justice
• Affordability of energy (prices) • Energy Accessibility • Fair distribution of profits	• Access to information • Consultation of residents • Ability to influence decision-making	• Domination (e.g. expert language) • Disrespect (e.g. ignoring input from some groups)

3.2.1 Distributive justice

Distributive justice is the concept with which the discussion surrounding energy justice first started. It is a concept from ethics that concerns the fair distribution of burdens and benefits from social cooperation, taking into account considerations of entitlement, efficiency, equality, fairness, and community (Kaufman, 2012). Thus, it specifically concerns the fair sharing of costs and benefits among and between different social groups. Common approaches to assess a just distribution are the cost causation principle, where actors pay according to costs caused by their usage, and the ability-to-pay, where actors pay according to their ability (Granqvist & Grover, 2016; Klinsky & Dowlatabadi, 2009). Especially the latter is important for energy in the context of energy poverty, the concept from which energy justice first emerged. Energy poverty refers to situations in which the lack of sufficient access to energy (e.g. due to high energy prices) has negative consequences for health and well-being (Bessa & Gouveia, 2022, pp. 2, 5). Hence, energy poverty and distributive justice are primarily concerned with the affordability of energy prices, energy accessibility, and the distribution of energy profits. Thereby, it encompasses both territorial distributions, i.e. differentiated impact of pollution from power plants, and difference in impact on different societal groups.

Distributive justice is also the aspect in which the decarbonisation of energy systems tends to show the most elements of injustice (Sovacool et al., 2019, pp. 591, 612), which is why its study is crucial in assessing the impact of decarbonisation strategies on energy justice. In the context of the transition to renewable energy, important questions include the expected changes to energy prices, especially potentially a differentiated impact or even prices between various groups. This can, for example, be the result of individual solar panels that are affordable to some but not affordable or accessible (renters) to others (Sovacool et al., 2019, p. 591). However, this also includes the distribution of profits from renewable energy production both territorial and between societal groups, the impact of the transition on the availability of jobs, and the impact of air pollution from energy plants.

3.2.2 Procedural justice

Justice does not only entail a fair outcome but also a fair procedure through which agreements are reached and decisions taken. Procedural Justice concerns the processes and procedures through which such decisions are taken and creates outcome legitimacy if people consider decision-making processes to be fair (Baird, 2001, p. 335). The opinion people hold on the process can thereby be independent of the one they hold on the ultimate outcome (E. A. Lind et al., 1993, p. 226), differentiating it from distributive justice. Nonetheless, there are differences among people on what constitutes a fair procedure, a question that has equally led to a discussion among scholars on how a just procedure should look like. Thibaut and Walker (1975), largely building on Rawls' (1973) work on justice, first tried to create empirical categories for procedural justice. This encompasses a focus on the gathering of

information to make decisions with the option to state one's point of view as central to the perception of fairness. Lind and Tylor (1988) furthered this reasoning by including identities, such as the neutrality of decision-makers and the status of a person within society. Combining these considerations into more practical categories, a procedure is considered fair if decisions are ultimately taken by unbiased actors, if the involved people are respected as equal group members, and if people are able to voice their opinion (Machura, 1998, p. 6). These are, hence, the criteria along which procedural justice should be evaluated. For such an assessment, questions of unequal economic and political power, structural inequalities, and their resulting impact on the procedure are central (Holland, 2017, p. 394).

For a practical assessment, these criteria need to be adapted for the context of the energy transition and the procedures surrounding it. Mundaca et al. (2018) identified three areas relating to procedural justice in the energy transition; information flow/sharing, consultation processes, and decision-making. It, importantly, focuses on the role the local (affected) population has in decision-making procedures and their power to have their voice heard and impact the result. The information sharing includes for example details about planned transition projects or the ability to develop one's own project. Thereby, not only the availability of information but also its accessibility for non-experts must be considered (Mundaca et al., 2018, p. 297). The consultation can include, for example, public meetings or other forms through which citizens can voice their opinion on the planned projects. These can enhance procedural justice by including the knowledge, opinions, and needs of citizens (Paavola, 2008) but their power to impact decisions should be carefully examined to ensure the consideration of citizen inputs in the debate (Holland, 2017). Schlosberg (2012) goes a step further and argues for active public involvement and engagement in transition strategies to recognise the needs of the people, the risks involved, and to develop priorities in the transition process with citizens as equal partners. This step corresponds with the identity of people and considers whether the procedure respects the people affected as equal members of the group, an important factor for people to respect the outcome. Decision-making, lastly, is the complete process consisting of the latter two combined with an impartial and transparent decision that respects the inputs by citizens (Mundaca et al., 2018, pp. 297–299). For a procedure to be just, not only must processes for the participation exist but it is also necessary for all stakeholder groups and their concerns to be treated equally and in a non-discriminatory manner (McCauley et al., 2013).

3.2.3 Recognition justice

Recognition justice, as the third element of energy justice, concerns the recognition of overlooked groups such as marginalised communities. The concept was coined largely by philosopher Nancy Fraser who explored the concept of recognition in justice. Fraser (2000) examines this issue from a cultural angle and places the focus on the difference in the social status of people, preventing a debate among peers. This concerns hierarchies between groups that may or may not also be institutionalised. It can

include cultural domination (e.g. using language that is alien to certain groups, for example by being too technical), nonrecognition (e.g. ignoring input from one group), and disrespect (e.g. the use of stereotypes to prevent people from participating) (van Uffelen, 2022, p. 4). Special consideration is being given to injustices that are a result of the system used. It primarily concerns regularly overlooked groups such as marginalised communities and considers whether their concerns are being taken into account (McCauley et al., 2019, p. 917). Thereby, it is an expansion of procedural justice. While procedural justice can be seen as participation on a formally equal level, recognition justice adds positive action to ensure the non-discriminatory participation of all groups (Pellegrini-Masini et al., 2020, p. 4). The two concepts can, therefore, not be looked at completely independently from each other.

In the context of energy, recognition justice is closely intertwined with previously discussed procedural justice. Hence, it can be analysed with the same categories of information flow/sharing, consultation processes, and decision-making but instead of assessing the existence of these procedures and their effectiveness in allowing participation, recognition justice is concerned with the relative position of different social groups in the process. In the practical application in the energy transition, information flow and disrespect can be major barriers to justice. This, for example, includes the use of technical terms in discussing planned projects, making them inaccessible for people with less knowledge and experience in the topic, or a related form of disrespect for people that are perceived to lack knowledge on the topic and whose opinions are, hence, deemed insignificant (McCauley et al., 2013, pp. 2–3). Such a treatment of groups diminishes energy justice and jeopardises the public support of renewable energy projects.

3.3 Political economy and coalitions for a just transition

The political economy of the just transition is concerned with the coalition-building surrounding just transition and renewable energy policies. It examines the political conditions necessary to adopt climate policies in line with social justice. Hereby, the coalitions that can realise such policies take a central role in the analysis. For example, the involvement of the local community and grass-roots projects in carbon-intensive regions have been shown to replace public opposition with public support for decarbonisation through the resulting focus on community benefits and the inclusion of disadvantaged groups (Newell & Mulvaney, 2013, p. 134). Hereby, it is noteworthy that these coalitions do not necessarily have to form around the common objective of climate mitigation but can likewise be formed around goals such as energy security, increasing competitiveness, creating jobs, or health benefits (Roberts et al., 2018, pp. 305–306). Another factor that can motivate such coalitions, or at least certain members of a coalition, are considerations of justice.

As has been discussed in Chapter 2.2, community acceptance of renewable energy is an important factor for success and considerations of energy justice, in particular procedural justice, are crucial for public support. Hereby a participatory nature is not only positive for procedural justice, but it also increases the social acceptance of renewable energy projects. This effect on public support is important when considering the opportunities for coalitions. Bottom-up participatory processes that enhance justice with more democratic involvement, in addition to green industrial policies such as feed-in tariffs, can facilitate the creation of coalitions for a just transition (Fitzgerald, 2022, pp. 4–5). Hereby, policies such as feed-in tariffs can serve as an additional incentive for increased participation. If fair and equal opportunities for involvement exist, this can not only enhance the overall justice of the transition but also facilitate the creation of new coalitions for the development of new and just decarbonisation projects and policies. Hence, this thesis will examine how community energy can create these opportunities for equal participation and enhance justice in the process of decarbonisation, creating opportunities for new coalitions around community energy.

4 Methodology

This thesis investigates the capability of community energy to create and enhance energy justice in coal regions that undergoing a decarbonisation process. Following the research subquestions, the analysis is structured along distributive, procedural, and recognition justice, with a focus on the key conditions defining the impact of community energy on energy justice. To answer the questions, this thesis conducts an empirical study researching the potential of community energy in creating energy justice in coal regions undergoing the transition to a low-carbon economy. Thereby, two EU coal regions are examined on the conditions that influence community energy's opportunity in addressing their respective energy justice challenges. This includes the analysis of the key conditions suggested by previous research (energy prices, actual participation options, and inclusiveness) applicability to coal regions and is complemented by an explorative approach on additional conditions specific to the challenges of coal regions. This chapter outlines and explains the choice for two case studies with interviews as a central form of data generation.

4.1 Research design

In deciding on the research design, it is important to ensure that the study fits the purpose of the research (Aberbach & Rockman, 2002, p. 675). In this thesis, the purpose is to examine how community energy can contribute to energy justice in decarbonising coal regions by understanding the key conditions defining that impact. To study this impact, an explorative case study approach has been selected, where two regions are qualitatively examined to assess the potential community energy can provide in enhancing energy justice. Case studies can be described as an "*in-depth investigation of (contemporary) phenomena in a real-life context,"* (Blatter & Haverland, 2014, p. 59), which is useful for research that is concerned with the 'how' and 'why' (Yin, 2009a, pp. 1–18). Thereby, explorative case studies are an appropriate research tool in particular in cases, in which the rarity of the phenomenon prevents the application of large-n studies, or the theoretical assumptions are not sufficient for alternative studies, creating a need for more in-depth analysis of the processes at hand (Hall, 2008; Swanborn, 2010).

With the research question of this thesis, the case study approach seems appropriate. As the objective is to better understand community energy's impact and assess its influence on energy justice in coal regions, the focus of the research is a better understanding of the procedures contributing to energy justice. This is supported by the low number of coal regions and community energy projects. Considering the limited existing research, an exploratory approach is selected to identify the key conditions shaping community energy's impact on energy justice. Consequently, an in-depth analysis of community energy in coal regions through a case study of two regions is a justified approach to researching the influence on energy justice.

4.2 Case selection – Lusatia and Moravia Silesia

The case selection is crucial for the informative capacity of the study. To maximise this capacity, the selected cases should represent a typical example concerning the key characteristics (Swanborn, 2010). With more than one case the informative value of the study can be increased and the chance of cases being too dependent on individual context reduced (Yin, 2009b). To incorporate the challenges typical for coal regions, two cases with particularly strong transition challenges, Lusatia (Germany) and Moravia-Silesia (Czech Republic), are selected to represent European coal regions. To the degree possible, the two cases are chosen following a diverse case selection proposed by Gerring (2016, p. 62) to represent different historical cultures regarding community energy and different transposition of energy community legislation. The selection, however, is limited by the low level of community energy development in EU coal regions, which is why the selected cases are only an approximation of a diverse case selection and must be regarded as explorative of the issue. Still, the two cases are chosen to represent differing, complementing criteria to test the effect on energy justice with different levels of community energy engagement.

The coal regions are selected according to the classification by the initiative 'Coal regions in transition' (European Commission, n.d.-a) in Figure 3. Therefrom, Lusatia (Germany) and Moravia-Silesia (Czech Republic) are chosen as regions with similar situations regarding sociodemographic and economic indicators as well as similar opportunities for renewable energies are selected. This ensures that natural differences in the potential of renewable energy do not distort the finding. To the degree possible, a diverse case selection is chosen regarding community energy development. Due to the lack of a coal region with very strong community energy development, the choice fell on a region with some degree of community energy and a good transposition of EU legislation and a region with almost no community energy and no transposition of the EU legislation. The transposition assessment is based on the transposition tracker by REScoop (n.d.-b), which keeps track of and assesses relevant legislation in Member States (see Figure 4). Hence, the choice of regions to research is explorative but maximising the informational capacity by showing both if and how community energy is currently contributing to energy justice, and where it has (high) potential to increase justice.

Figure 3: Coal regions in the EU
(own creation with mapchart.net, classification by 'Coal regions in transition' (European Commission, n.d.-a))

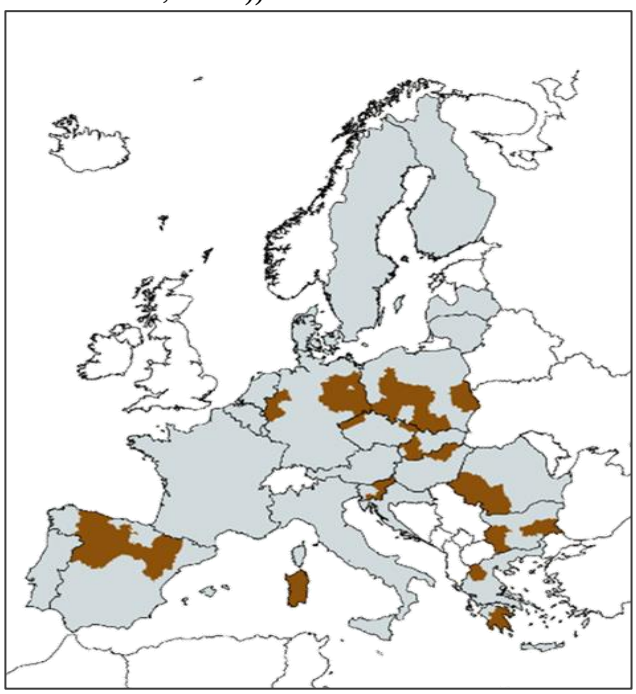
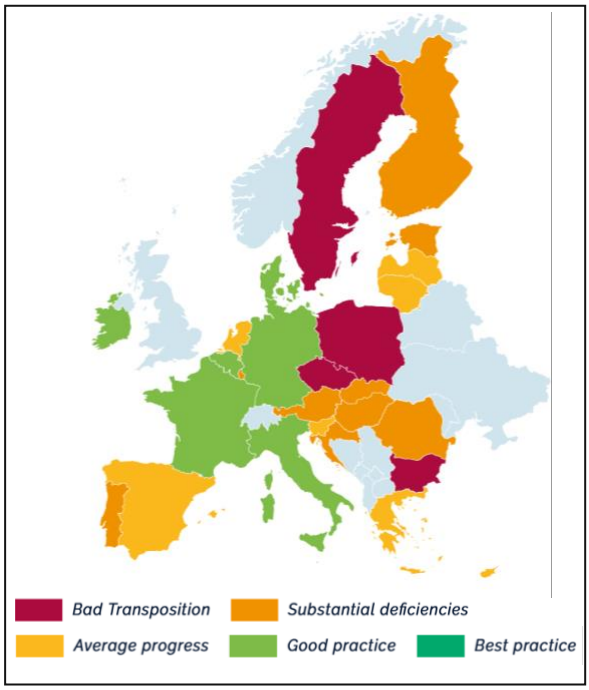


Figure 4: Transposition of EU legislation on energy communities by Member State
(REScoop, n.d.-b)



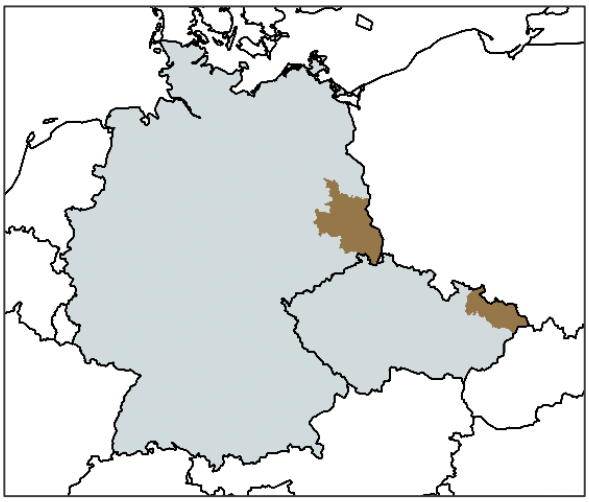
With these criteria in mind, the choice falls on Germany and the Czech Republic as two countries with a high historical and ongoing reliance on coal. Community energy has a long tradition in Germany, going back to the 19th century, whereas it is a very recent phenomenon in the Czech Republic (Güell, 2022; Kahla et al., 2017). The same difference holds for the legislative transposition of energy communities, where Germany is classified as a good practice and the Czech Republic is a case of absent transposition (REScoop, n.d.-b). The Czech case is also interesting for research as its government is in the process of writing and adopting new energy legislation to comply with the European law about energy communities during the writing of the thesis (Čekanová, 2023). Hence, the current situation is still one without transposition, but the timeliness of the issue results in more research and discussion of the topic, increasing the opportunities to study the issue.

Within the two countries, the regions Lusatia[10] in Germany and Moravia-Silesia in the Czech Republic are chosen from the administrative regions of the Just Transition Platform, an initiative of the European Union to support carbon-intensive regions in the process of decarbonisation (European Commission, n.d.-d). Lusatia is located in Eastern Germany at the border with the Czech Republic and Poland,

[10] The geographical area of Lusatia (German: Revier Lausitz) is defined specifically for the challenges in the energy transition and encompasses the counties Görlitz and Bautzen in the state of Saxony, as well as the city Cottbus and counties Dahme-Spreewald, Elbe-Elster, Oberspreewald-Lausitz, and Spree-Neiße in the state of Brandenburg (Brandenburg, 2021, p. 4).

whereas Moravia-Silesia is an administrative region in the northwest of the Czech Republic bordering Poland and Slovakia. The two regions are among those with the highest (expected) job losses in the coal sector between 2020 and 2025 across all of Europe (Alves Dias et al., 2018, p. 58). Hence, they both suffer from stark transition and justice challenges in which the effect of community energy can be measured best. They are also comparable in various social, economic, and geographical factors (Appendix A) briefly summarised hereafter.

Figure 3: Regions selected for analysis
(own creation with mapchart.net)



The social and economic variables suggest a similar effect of the energy transition regarding energy justice, as the initial conditions are comparable. Both regions' GDPs are around 10% below the national average, they have a similar median age and a comparable education level. Lusatia has a larger share of residents with tertiary education but neither has a high share of people with no or very little education. Moreover, the economic activity rate is very similar between the two. While the percentage of the population employed in coal-related jobs is higher in Lusatia, the impact of the loss of these jobs is expected to be similar due to the already higher unemployment rate in Moravia-Silesia (Alves Dias et al., 2018, p. 63). As for the potential of renewable energy sources, the situation is again very similar. Both the Czech Republic and Germany have a similar but low share of under 20% renewable energy in their energy mix and both Lusatia and Moravia-Silesia are currently relying primarily on ground-mounted PV as renewable electricity sources. The geographical potential for renewable electricity, calculated by Kakoulaki et al. (2021), also shows that PV has the highest potential for renewable electricity production in the regions with additional potential for wind power and, in the case of Moravia-Silesia, also hydropower. Hence, the economic and social situations and composition is similar, allowing for a comparability of the energy transition's effect on energy justice and the potential for renewable energy is high in both regions, preventing a distortion of the findings by this variable.

At the same time, the two regions differ in the existence of community energy projects. Lusatia has several pre-existing community energy projects that were mostly developed in the early 2000s and a legislative framework that allows and encourages community energy (Kahla et al., 2017; REScoop, n.d.-a). Moravia-Silesia, on the other hand, has no community energy apart from 2 very recent pilot projects and lacks any legal framework for such initiatives (Güell, 2022).

4.3 Interviews

The choice of data sources is an important part of the research design due to its impact on the information generated and the informational value of the finding. Hereafter, the choice of interviews as a main source of information, the choice of interview partners, and the type of interviews conducted are explained. Interviews are chosen regularly as a method in the case of small-n studies. In this case, the approach is chosen due to their ability to provide an in-depth understanding of a certain issue, including the concrete challenges faced in coal regions and, most importantly, understanding which concrete aspects influence the impact of community energy on energy justice. They, hereby, allow a deeper understanding of an issue, adding to a viewpoint from quantitative data, and can improve the understanding of causalities (Edwards & Holland, 2020, p. 483). Interviews further include the study of a higher share of complexity in the relationships present and the various conditions that influence them (J. Rubin & S. Rubin, 2005, p. 135). Hence, interviews are considered well suited to provide the information for the case study at hand and answer the research question considering the complexity of the issue with various factors of influence.

The choice of interview partners for this thesis should reflect the need for expertise on the topic (Aberbach & Rockman, 2002, p. 673). As the topic studied is rather new and community energy is not yet developed far in coal regions, the number of people with relevant experience is limited. Still, the interview partners are selected to reflect a diverse range of viewpoints, including a research perspective on energy communities, an in-depth experience with the energy transition in the selected regions, and the viewpoint from community energy projects on the ground. Therefore, in the German region of Lusatia, this includes an academic expert on German energy communities, an expert on the energy transition from coal to renewables in the region of Lusatia, and the leader of a community energy project in the region. For Moravia-Silesia, this includes an expert on energy communities in central Europe, a representative leading the policy and design of the Moravia-Silesian energy transition, as well as again a leader of a local community energy projects. The tailored interviews conducted with the aforementioned experts are complemented by interviews conducted in the process of the European Commission project on supporting energy communities in Czech Just Transition region. There, 10 people from universities, ministries, municipalities, NGOs, and community energy initiatives were interviewed on the topic of energy communities in the Czech Republic. While these interviews are not tailored to the topic of energy justice, they still give valuable insight into the state of, and the challenges faced by community energy in Czech coal regions.

The form of the conducted interview was decided according to the nature of the research question and the practical options. The objective of the interviews was to analyse the impact of community energy along the predetermined conditions for distributive, procedural, and recognition justice, while also

considering the specific challenges faced in transitioning coal regions. At the same time, to reflect the complexity of the topic, it was important to keep the interview open to follow up on answers and adapt the direction of the interview according to potential unexpected answers. Hence, the choice fell on semi-structured interviews, in which the interviewer roughly followed the informal question guide (Appendix B) but deviated according to the specific expertise of the interviewee as well as to follow up on promising answers. These interviews were conducted through the online platform MS Teams, following the wishes of the interviewees and practical limits to in-person meetings. The semi-structured online approach, however, was not possible for the interview with the community energy leader in Moravia-Silesia, where, due to language barriers, the interview was conducted in writing following the same interview guide. For the interviews conducted in the process of the European Commission project with another objective, the analysis was conducted based on the interview minutes.

In the analysis of the interviews, a two-stage coding approach was taken (Given, 2008). In that process, the interviews are first analysed through open coding, followed by integrative coding as a second step, in which the themes were combined and selected for their relevance in giving insight into the challenges of the regions and the contribution of community energy to energy justice. Open coding was chosen as a first step to remain open for all inputs by the interviewees and not to be restricted by prior ideas and concepts. In a second step, the open coding was then integrated to combine similar themes in the answers and select the ones relevant to understanding the impact of community energy on energy justice in coal regions (Coding Tree in Appendix C). This approach reflects the fact that the interviewees were knowledgeable in their field and could be expected to give longer and well-structured answers, requiring both an open mind to different themes and a coding system rich in categories and subcategories.

5 Empirical Results

The empirical part of this thesis examines in further detail the potential of community energy in enhancing energy justice following the data collected through the conducted interviews. More specifically, this chapter starts in 5.1 with an assessment of the specific energy justice challenges that are present in the two regions studied, Lusatia (Germany) and Moravia-Silesia (Czech Republic) with a focus on public opinion and existing community energy initiatives. This should serve as a baseline and contextualisation which allows an examination of how community energy can enhance energy justice under these conditions. The impact of community energy on distributive justice, procedural justice, and recognition justice is then discussed in Chapters 5.2-4, based on the coding of the interviews explained in Chapter 4.3 (Coding Tree in Appendix C) and includes the comparison of the results with findings from the previous research (see Chapter 2), as well as the newly identified conditions for community energy's impact on energy justice.

5.1 Energy transition challenges in Lusatia and Moravia Silesia

To start the assessment of how community energy contributes to energy justice in the two regions, the situation regarding energy transition and community energy development is discussed here. Thereby, the state of the energy transition with a focus on public opinion and the cultural importance of coal is explained along with a short assessment of community energy development in the regions. Hereby, the insights from the two regions are first summarised, followed by a discussion of the common challenges. This analysis gives the context of community energy's potential impact on energy justice with the remaining barriers and serves as the baseline for Chapters 5.2-4, where the subquestions are answered.

Lusatia:

Lusatia has a strong - though decreasing – dependency on coal, impacting public opinion on the energy transition. The region produces 6.978 MW[11] of coal energy, with 13.000 jobs and € 1.200 million of economic activities directly or indirectly dependent on the coal industry (Brandenburg, 2021, pp. 7, 10). The phase-out of coal is planned for 2038[12] but the historical dependency results in a cultural and emotional attachment to coal energy among the local population. The interviews showed that coal is perceived as an important source of employment and stability in the region, as well as a source of investment for local social and cultural events and establishments, adding to the emotionality and perceived uncertainty of the energy transition. While the interviews also showed that this attachment is

[11] Data on slightly larger NUTS2 regions DED2+DE04 (Gonzalez et al., 2019).

[12] The current government is pursuing ambitions to change the date to 2038 (Bundesregierung, 2023).

primarily observed in close proximity to coal mines and quickly decreases after the closure of such when the threat of uncertainty is eliminated, it results in scepticism and uncertainty among citizens surrounding operating coal mines. With the closure of coal mines and coal power plants, renewable energy sources are increasingly being built in the region. This development is generally supported by the population, in particular after the war in Ukraine highlighted energy dependency and increased energy prices. For concrete renewable energy projects, however, strong opposition from the local population remains. This opposition is observed mostly with the development of wind parks, where the opposition is regularly connected to scepticisms towards beneficiaries of the project and fears of losing nature and/or the loss of property values. Photovoltaic energy developments face opposition due to similar concerns in case solar fields are proposed, whereas rooftop solar fields are not usually contested by people but considered to fall into the realm of private decision-making. Other renewable energy sources are discussed less frequently, which is why no clear public opinion emerges.

As for community energy, there is an advanced legal framework but less experience in the region. In Germany, community energy initiatives have a longstanding tradition and, accordingly, European legislation on it is largely transposed. The German renewable energy act (EEG 2023) includes a definition of energy communities that requires the influence of local residents and creates additional funds and preferential treatment for tender requirements for energy communities (Deißler & Weinke, 2022). Still, some aspects of EU legislation, namely options for energy sharing and the category of citizen energy communities, are not yet included in the national legislation (REScoop, n.d.-a). Despite these limitations, the current legislation already allows a wide variety of community energy projects. Nonetheless, Lusatia, formerly being part of the German Democratic Republic, does not have such a strong tradition of community energy. There are only a few initiatives, in which communities are jointly taking part in the energy generation and the energy market. There are so far no communities established that fall under the EU definition of energy communities, but there are a few energy cooperatives that were established in the 2000s and which can be considered to fall under the broader term of community energy used in this thesis. Through those, citizens are jointly operating renewable energy plants, primarily in the form of photovoltaic power plants. These cooperatives, however, are limited in size and, first and foremost, build small rooftop solar power plants. Therefore, their impact on the energy transition remains small. Nevertheless, they give a base for the analysis of their impact on energy justice in Chapters 5.2-4.

Moravia-Silesia:

Despite efforts to reduce the dependency on coal with the phase-out planned for 2033, coal remains the primary source of energy for Moravia-Silesia.[13] To reduce emissions and replace this energy, and while considering the importance of energy affordability, the region pursues a path towards a mix of renewable energy and nuclear power with gas taking a temporary transition role (Moravskoslezské Energetické Centrum, 2020). Nonetheless, the development of renewable energy sources in has been very slow.[14] The energy transition is facing further difficulties as big parts of the population oppose renewable energy sources. Coal has a longstanding tradition in the region with coal mining going back to the 18th century and taking up an important role in the region's history (Moravskoslezské Energetické Centrum, 2020, p. 26). Due to positive experiences with and a culture related to coal, many people continue to have a positive opinion of fossil energy sources despite their negative impact on the environment, adding a mental barrier for alternative energy sources. This creates a heightened challenge for the social acceptance of renewable energy projects in Moravia-Silesia. What has gained more importance, however, and which can serve as an additional push for renewable energy sources, is the price of energy. With the war in Ukraine and the following energy crisis, this aspect has become even more influential. The Czech Republic experienced one of the highest energy prices in Europe in 2022, more than doubling within less than a year (Eurostat, 2023). This effect impacted the mindset of the population and created support for measures that reduce and stabilise energy prices. As the price increase came from the sudden unavailability of fossil energy sources, higher support for renewable energy, which provides cheaper energy, can be observed since.

For community energy, the Czech Republic has no established form, as the approach is unusual for the country's centralised energy system. So far, Czech legislation does not contain specific clauses on definition, rights, or obligations held by community energy, subjecting such initiatives to the same requirements as all other energy actors. This missing legal framework for community energy complicates the development of community energy in the Czech Republic, as the applicable energy act is directed at large energy actors rather than smaller bottom-up initiatives, setting high administrative and financial barriers for community energy. Amendments to the energy acts are planned in the form of the legislative proposals Lex OZE 2 and 3, which will adapt the current act to transpose the European Directives REDII and IEMD, including specific references and treatment of energy communities. However, these changes are still in development and the details as well as the final timeline remain

[13] In 2021, coal accounted for 60% of total electricity and 44% of total heat in the region (Energy Regulatory Office, 2022b, p. 20, 2022a, p. 9)

[14] While the electricity from wind and hydro has increased in recent years, electricity generation from photovoltaics remains steady, and the overall share of renewable energy sources as part of electricity has only reached 17%, with biomass taking up the most substantial share (Energy Regulatory Office, 2022b, pp. 20, 28)

uncertain. This uncertainty complicates the establishment of community energy, as the legal framework and the regulations governing the activities of an energy community remain unclear and any planned activities contain the risk of an imminent change of legal conditions. As a result, sound planning is impossible and the search for investment complicated. A clearer legislative framework is, hence, needed for accelerated development of community energy.

Nonetheless, Moravia-Silesia has two community energy pilot projects that started in 2021 and 2022. With public authorities and local action groups in the lead, they allow municipalities, SMEs, and individuals to join and collectively build renewable energy installations, coordinate renewable energy sharing, and provide consultancy on energy efficiency and individual installation of renewable energy sources (Freiberg, 2021; MAS Jablunkovska, 2023).

Discussion:

To conclude, both regions have commitments in their energy transition to phase out coal energy and increase the installation of renewable energy sources. However, both regions also show low support for the switch to renewable energy along with a strong cultural attachment to coal. This creates an additional barrier for the energy transition and renewable community energy, as prejudices first need to be overcome. It also highlights the facts that political ambitions are pushing the energy transition with limited public support, potentially creating tensions. In that transition, community energy does not play a major role in either region, but the situation still differs. Germany has established a legal framework for community energy and, despite their limited impact on the transition, there are community energy initiatives in Lusatia. Moravia-Silesia's legal framework is still in preparation and community energy is so far limited to municipality-led pilot projects. In the following chapters, the (potential) impact of community energy is evaluated considering this environment.

5.2 Community energy and distributive justice

Distributive justice in the energy transition encompasses two levels. For one, there is an effect on the overall region. This entails the question of whether the region receives a net benefit or loss in the energy transition, for example in the form of local investments and newly created jobs or through an outflow of profits. The second level entails the effect on different groups within the population. Hence, it is concerned with the question of whether the distribution of benefits and losses within a region is just. Hereafter, subquestion 1 "SQ1: *Under which conditions does community energy improve distributive justice in the face of specific challenges faced by EU coal regions in the energy transition?*" is discussed following the insights from the interview analysis. More specifically, the insights from the two regions are first summarised, followed by a discussion of the results considering the importance of reduced energy prices and their accessibility suggested in the literature and newly identified conditions.

Lusatia:

In Lusatia, the energy transition incorporates a strong risk for distributive justice on an interregional level. With the disappearance of coal, a significant part of the local economic capacity disappears and with it also their reinvestments in the local social life such as theatres or sports clubs. This is potentially relocated elsewhere in the country. The analysis of the interviews shows a strong potential for community energy to prevent this and contribute to interregional justice despite a potential risk in the case of land ownership by non-residents. The interviews have also shown that this aspect is an important argument influencing public opinion on renewable energy projects. When residents feel that community energy can replace the energy security and the economic stability offered by coal and that their region profits from the project, they are more likely to support it.

Community energy contributes to interregional justice in up to three ways. (1) It ensures that the value created in energy production, including energy-related jobs and tax revenues, remains in the region. (2) It can, unlike other forms of local renewable energy, also ensure that the financial profits remain in the region, as the members are local citizens, SMEs, or municipalities instead of large investors from other parts of the country or abroad. (3) In the specific case of Lusatia, another aspect becomes influential here, land ownership. In Lusatia, a significant share of the land is owned by non-residents such as people living in Western Germany. As the owners of the land on which renewable energy plants are built benefit from rent payments, profits potentially flow out of the region and can reduce interregional justice, even in the case of community energy. If, however, the land is owned by the municipality or residents, the benefits remain in the region, positively influencing interregional justice. In conclusion, community energy usually increases interregional distributive justice by keeping the benefits in the form of jobs, tax revenues, and financial profits in the region, though the influence of land ownership can potentially reduce this effect.

Apart from interregional justice, local distributive justice needs to be discussed. Here, the interviews highlighted the importance of distributive justice for a broad social acceptance of renewable energy, an aspect critical in a region with high rates of scepticism towards concrete renewable energy projects. Community energy's contribution to distributive justice is primarily dependent on (1) the membership composition, (2) the access to reduced prices, and (3) the role of the municipality. The main benefit of community energy for distributive justice is the distribution of profits to residents instead of shareholders of large corporations and the prioritisation of social over financial objectives, as is even mandated by the EU legislation on energy communities. However, this impact is dependent on the composition of the members, the main beneficiaries, and incorporates the risk of members representing a privileged part of society, an aspect discussed in more detail in Chapter 5.4 on inclusiveness. Community energy can, hence, not automatically be equated with creating more distributive justice.

The interviews, however, still showed paths through which distributive justice can be enhanced despite an unbalanced membership base. A lower energy price for residents has been mentioned repeatedly as a key factor that can increase support of renewable energy and community, while simultaneously increasing distributive justice. However, this solution is currently limited by German legislation preventing price discounts for all residents and complicating any form of direct energy sharing. An alternative solution is a central role for municipalities as representatives of citizen interests and recipients of any profits, which can support a fair distribution of benefits through governmental activities benefiting all citizens. However, municipalities acting as an amplifier of distributive justice in this case requires them to be free from capture by special interest.

Moravia-Silesia:

The analysis of the situation in Moravia-Silesia has shown a positive impact of community energy on interregional justice, though less pronounced than in Germany. In the smaller country with less pronounced regional disparities, the interviews have shown a less politicised situation regarding interregional distributive justice. Hence, interregional justice has not been mentioned as an important aspect for the interviewees and its impact on the social acceptance of renewable energy is low. Consistent with the findings in Germany, however, there is an identification of the region with coal and uncertainty about the future. Here, community energy can serve as a replacement, ensuring (1) the continued availability of jobs and tax revenue as well as (2) profits that remain in the region and can be reinvested instead of flowing to other parts of the country or abroad. While the importance of interregional justice is less influential, it still gives the region economic certainty and opportunities. Furthermore, (3) it ensures the continued local energy generation, an aspect positively perceived considering the historical cultural importance of energy and serving as a potential to form a new energy-related identity.

On the matter of local distributive justice, the key conditions are (1) access to reduced prices, (2) the role of the municipality, and (3) the design of support schemes. The prevalent topic of discussion in the region on the impact of community is the energy price. The Czech energy market has recently displayed high energy prices that particularly affect lower-income households, where energy costs take up a higher share of the budget, severely. Here, community energy encompasses a high potential to provide affordable and, crucially, price-stable energy due to the reduced costs of renewable energy sources and the non-profit character of most initiatives. Still, it remains important to consider the access to these prices. In Moravia-Silesia, community energy is largely centred around municipalities, giving all residents equal access to lower energy prices and a public beneficiary of potential profits. Nevertheless, for future community energy projects not centred around municipalities, the composition of the membership base needs to be considered and the resulting access to reduced energy prices assessed for

its impact on distributional justice. Furthermore, the current legislative restrictions on energy sharing and the design of support schemes encompass a risk of favouring houseowners with easier access to grants for renewable energy installations. As these support schemes are also used in the process of community energy, they facilitate community energy projects by houseowners over tenants, potentially favouring on average higher-income residents in accessing reduced energy prices.

Consistent with the high relevance of energy prices in the region, the interviews also showed the influence of this factor on social acceptance, an aspect accelerated by the spike in energy prices following the war in Ukraine. The secure and stable access to reduced energy prices from renewable sources is sufficient to receive support from most people. However, knowledge on the topic remains limited among residents and more information dissemination is needed to convince residents of the potential of renewable energy, not only as being environmentally beneficial but also encompassing a potential for energy cost reduction.

Discussion:

For research subquestion 1, community energy's impact on distributive justice is two-fold. The analysis showed it as a well-suited option to maintain interregional distributive justice by ensuring that the energy generation, including linked employment, tax revenues, and profits remain mostly within the region, allowing local reinvestment and preventing an economic flight from the region. The importance of this finding for public support, however, differs widely between the regions. In Lusatia, where interregional justice is highly politicised, the analysis found high importance of this effect for public support. In Moravia-Silesia, however, the focus was laid on energy prices instead, and the interregional effect was limited to a positive perception of continued local energy generation.

For local distributive justice, community energy also shows potential in the form of reduced energy prices for the local community by cutting out big investors, prioritising non-financial objectives, and using cost-effective renewable energy. The actual impact, however, is dependent on key features of the concrete project. Hereby, the importance of balanced membership and equal access to benefits (i.e. low prices) suggested by previous studies has been confirmed in both regions. As a new finding, both regions also showed a high potential for municipalities to play an active role in increasing distributive justice of a project by ensuring a community-oriented fair distribution of benefits with equal access to reduced prices for all residents.

5.3 Community energy and procedural justice

The contribution of community energy to procedural justice is determined by citizen involvement in the form of information, consultation, and impacting the decision-making of energy projects. Hereafter,

subquestion 2 “SQ2: *Under which conditions does community energy improve procedural justice in the face of specific challenges faced by EU coal regions in the energy transition?*” is discussed following the insights from the interview analysis. Due to the limited existence of community energy in both regions, the analysis hereafter is focused on the potential impact of community energy and the conditions required for such an impact. The insights from the two regions are first summarised hereafter, followed by a discussion of the results considering the influence of different levels of involvement and participation options suggested in the literature.

Lusatia:

For procedural justice in the Lusatian energy transition, community energy is an option to give citizens an active role in the energy transition with an impact on the decisions and the design of projects. Thereby, the interviews showed the importance of citizen interest and the key role of information events in stimulating such interest. Without citizens interested in participation, opportunities for consultation and impacting the decision-making remain void and procedural justice low. The interviews showed (1) that both knowledge and interest of citizens in the energy transition and concrete energy projects are low but rise considerably when information events are offered. They also showed that (2) information events lead to a desire of citizens to be further included in the process, actively requesting opportunities to be consulted on projects and participate financially. While information events on renewable energy projects are successful in raising interest for citizen participation, the interviews also showed that such events and the options for participation are rare in the region. Lastly, the interviews also highlighted (3) that there is limited citizen ambition in leading community energy initiatives.

In the case participation is possible, a differentiation between actual community energy and participation options offered by for-profit energy plant operators is necessary. While the latter case is increasingly made available – not least to gain support – an actual influence by citizens is not observed. Participation is usually limited to opportunities for small-scale financial investments exclusively for residents and some consultations without the power to influence decisions. Hence, the impact on procedural justice is very limited. For actual community energy, the impact is higher. In the few existing community energy initiatives, citizens are informed about all activities and can influence the direction of the community through voting for the executive board members and by actively taking part in the search for sites. However, while opportunities for influence exist, membership engagement is limited to a few active members who engage in the cooperative beyond financial participation. Still, there is support for the people making decisions and options to influence decision-making in case of dissatisfaction. Hence, distributive justice exists in the form of potential for influence on decision-making with the lack of engagement only slightly reducing the effect. The existing energy cooperatives also experience a demand for membership with financial participation significantly above their

capacity, whereby expansion is currently limited by human resources. This, once again, highlights the interest in involvement among the public, given the chance to do so.

The lack of active engagement, however, is a repeatedly observed aspect in the discussion on distributive justice. While information events are stirring a desire for involvement, the interviews also highlighted a lack of leadership to start and organise own initiatives in the public, preventing the emergence of more community energy initiatives. An increase in information events could increase demand for participation, though the experience does not suggest a strong increase in citizen leadership. Hence, the role of municipalities should be explored. These can act as leaders and organisers of community energy projects, disseminating information and organising consultations. While not as immediate as in other forms, the democratic election of municipal leaders still allows for influence in decision-making. This influence can be further increased by opening the community up for residents to join as independent members, for example by starting a cooperative.

The discussion on procedural justice of community energy in the interviews also showed an unavoidable link with public acceptance as well as the influence of the local coal-related identity which renders the energy transition an emotional topic. This creates an additional need for procedural justice that involves citizens in the process. Hence, opportunities for participation significantly increase the support of renewable energy installations among members, their surroundings, and the residents in general. This aspect has become important enough that most renewable energy installations in the region now have some sort of financial involvement option for residents to ensure public acceptance. However, as discussed previously, the financial participation of residents in for-profit renewable energy installations does not usually include an influence on decision-making and, hence, does not constitute procedural justice.

Moravia-Silesia:

For procedural justice in the Moravia-Silesian energy transition, community energy is an option to give citizens an active role in the energy transition with an impact on the decisions and the design of projects. From the conducted interviews, participation interest and the role of municipalities emerged as the key conditions for community energy's impact on procedural justice. Due to the limited progress of community energy in the region, an assessment of the relation to public support was not possible.

The interviews showed (1) a low interest by citizens to take part in the process of the energy transition or even take up a leading role in the establishment of community energy. Such interest, however, is crucial for procedural justice and the success of information, consultation, and influence in decision-making. It is possible that interest can be increased in the form of information events as was found in Germany, but the lack of such events renders an analysis of the effect impossible. The interviews further

brought up the option of an uptake in citizen interest once the new legislation allows more community energy operations, an aspect that could be studied in the future. As a possible explanation of the lacking interest, the interviews also brought up a potential scepticism towards community energy due to an association of 'community' with the communist past of the country. While this point should not be overstated, a different terminology of projects could already reduce such associations.

However, the interviews have also shown (2) that there is already a high interest in community energy among municipalities in Moravia-Silesia. While many municipalities still lack the knowledge to establish community energy, the participation of municipal representatives in information events is considerable and a high motivation is observed to start projects as soon as the prepared legislative updates are adopted, and the legal framework established. For municipality-led community energy, the procedural impact can be in the form of democratic elections or more concretely on the topic by allowing residents to become members of the community. In either case, procedural justice is largely dependent on the independence of municipalities from special interests and their reactiveness to public opinion.

Discussion:

Regarding research subquestion 2, community energy tends to have a positive impact on procedural justice, but a lack of knowledge and interest among citizens has been identified as a barrier to such an effect. Previous research suggested the level of participation options to be crucial for the impact on procedural justice. While the analysis in the regions confirmed this impact, limited information sharing and the lack of knowledge and interest among citizens in the two regions constitute barriers and limits to this effect. The analysis in Lusatia showed a high potential for information events targeted at residents to create public support for concrete renewable energy projects as well as interest in citizen participation. Despite a desire for involvement, there remains limited active leadership from citizens. This, however, should not be a problem for procedural justice if there are credible possibilities for influence. In Moravia-Silesia the lack of such events prevented any conclusions but similar events for municipal representatives have had large attendance with many municipalities planning the creation of community energy initiatives under their leadership. In both regions, this showed a potential for municipalities to take over the leadership in community energy and allow citizens to participate in consultation procedures, through municipal elections or through membership. In conjunction with increase support through information events, coalitions to start community energy initiatives by municipalities could be attained. This indirect procedural justice, while not necessarily perfect and dependent on municipalities acting in the community interest, still poses a realistic opportunity to improve procedural justice in regions lacking citizen leadership.

5.4 Community energy and recognition justice

Recognition justice concerns the inclusivity of community energy initiatives. Hereafter, subquestion 3 "SQ3: *Under which conditions does community energy improve recognition justice in the face of specific challenges faced by EU coal regions in the energy transition?*" is discussed following the insights from the interview analysis. More specifically, the insights from the two regions are first summarised, followed by a discussion of the results considering the difficulty of meeting entry requirements for community energy suggested by previous studies and additional identified conditions.

Lusatia:

The analysis showed that recognition justice depicts a limit for community energy's contribution to energy justice, where specific measures are needed for the inclusion of vulnerable groups. Thereby, knowledge and financial resources proved to be the primary conditions limiting the inclusivity of community energy. The first barrier, which is especially pronounced in Lusatia, is the lack of knowledge on renewable energy or the option of such initiatives among citizens, limiting their ability to influence decision-making. This gives a strong advantage to higher-educated people, especially those with a technical background. The finding is confirmed by this group – also being primarily male – making up an overproportionate share of the members in existing community energy initiatives. The second big influencing factor is financial resources. The existing initiatives in the region require initial financial investments to gain membership. While they do offer members the opportunity to invest different amounts of money (€ 500 – € 10.000), it still prevents people with low economic means from participating. While this highlighted a bias towards better educated and financially stable people the existing energy community initiatives still showed a broad range of ages.

Due to the limited number and the small size of existing community energy, this analysis should not be considered conclusive, but it still showed the limits of community energy's inclusiveness and indicated knowledge level and financial resources as conditions playing an important role in whether community energy can be considered to enhance recognition justice. For community energy to recognise these limitations and become more inclusive, information events could increase the capability of less knowledgeable people to become involved in the topic – an aspect currently limited by the limited resources of community energy – and reduced membership contributions for low-income households could allow more vulnerable groups to participate.

Moravia-Silesia:

In Moravia-Silesia, the lack of existing community energy significantly inhibited the analysis of recognition justice in community energy. The analysis primarily showed that community energy is not

yet developed sufficiently to analyse inclusivity in depth. Still, there were some indices on the aspects that might influence the impact in the future. Firstly, the current central role of municipalities can be regarded as a positive aspect for recognition justice. While there is a potential issue of minorities lacking influence in local politics, municipalities are also required to consider all interests, not discriminate in their actions, and give all citizens equal opportunities in consultations and access to community energy. Still, there is an expected unequal impact according to knowledge level and skills. Lower-educated people lack the skills and knowledge on the topic, limiting their ability to influence projects to an equal level.

In the case of community energy not centred around a municipality, this issue is supplemented by unequal financial resources. Lower-income households lack the resources to invest in community energy and benefit from membership profits. Their ability to participate might be further limited by their housing situation. The current Czech subsidy schemes for renewable energy favours house owners, giving them an advantage in installing their own energy sources and jointly operating them. Hence, for community energy to enhance recognition justice, these barriers must be accommodated for. For example, more information events, reduced membership fees for lower-income households, or projects targeted at apartment blocks could create recognition justice in community energy.

Discussion:

Regarding answer research subquestion 3, the low number of existing community energy initiatives and, especially in Moravia-Silesia, the missing legislative framework, impeded the analysis. Still, the analysis suggests significant barriers to recognition justice. Especially a lack of knowledge on renewable energy and community energy as well as the regular necessity of financial investments to gain membership, limit the inclusiveness of community energy. Higher educated and more affluent households have an advantage in influencing decision-making in community energy, becoming members, and benefitting from resulting advantages. This confirms previous studies that found an imbalance in community energy membership towards higher educated and affluent individuals as well as the problem of financial entry barriers. A stronger role of municipalities, which are supposed to act in the overall public interest, as well as opportunities for low-income households to join with reduced financial contributions, could counter this imbalance and improve recognition justice in community energy. Thereby, the plans for municipality-centred community energy could circumvent the pitfall of lacking inclusivity and create more inclusive initiatives.

6 Conclusion

This thesis studied the potential of community energy to enhance energy justice in transitioning EU coal regions. Through as case study of two coal regions, Lusatia (Germany) and Moravia-Silesia (Czech Republic) with expert interviews as main source of data, it examined the transferability of findings from limited previous research onto coal regions and identified key conditions for community energy to enhance energy justice in coal regions. Hereafter, the main findings of the thesis are summarised and discussed, followed by the study's implications for policymaking as well as the limitations of the approach and recommendations for further research.

6.1 Discussion of main findings

The study of the two regions showed the high importance and relevance of energy justice in coal regions. Due to the specifically stark challenges resulting from an economic restructuring away from coal and the resulting risk and uncertainty for residents, there is a comparable higher importance for energy justice and a citizen-centred energy transition in these regions compared to non-coal regions. This importance is compounded by the cultural and emotional attachment of the population to coal and the connected continued strong scepticism towards renewable energy sources. The assumption from previous studies in other regions that suggested a potential of community energy to enhance energy justice has generally been confirmed for the analysed coal regions, while the starker challenges of coal regions and the cultural aspect increase the potential impact of community energy. Overall, the case study also confirmed important conditions suggested by previous research on community energy's impact on energy justice, (accessible) energy prices, potential for participation and an inclusive design. However, it further identified a lack of knowledge and interest among citizens preventing the full effect of community energy and highlighted the additional importance of information events and the potential of municipal leadership in community energy.

On distributive justice (SQ1), the case study confirmed the potential of community energy to enhance distributive justice through lower energy prices if equal access to these prices is available. It complemented it with a high potential of community energy to maintain interregional distributive justice, as well as the opportunity of creating equal access to benefits through a leading role of municipalities. Success in creating this distributive effect also significantly reduced public opposition to renewable energy projects. The thesis, furthermore, revealed a strong opportunity for creating procedural justice (SQ2) through active citizen involvement but highlighted a lack of local interest and initiative as barriers to this effect. Again, the analysis revealed a potential of municipal engagement to replace this leadership. Furthermore, it showed that information events, while not regularly held, significantly increase both public support and desire for participation, though not necessarily leadership,

among residents. Lastly, the analysis showed limitations for recognition justice (SQ3), where the lack of knowledge among citizens and financial entry requirements create a significant barrier, resulting in a dominance of higher-income and more knowledgeable individuals. Nonetheless, targeted information events and low entry hurdles can lessen these differences, and a municipal leadership that considers minority interests can reduce injustices.

Community energy can, hence, serve as tool to enhance distributive justice, procedural, and (to a lower degree) recognition justice if it meets certain inclusivity conditions. This confirmed the claims made that community energy enhances justice and showed that the challenges of coal regions can be addressed well through community energy but also highlighted additional conditions for such an effect. Overall, both regions show that a lack of knowledge is barrier but desire for involvement exists, that such opportunities and overall justice increases the low public support of renewable energy, and that municipalities can play an influential role in community energy's enhancement of energy justice. If projects are designed to increase energy justice, include information events, and allow citizen involvement, they can also expect to benefit from higher public support. This facilitates the creation of coalitions for renewable energy projects, which are highly dependent on public support, a resource that remains scarce in the analysed coal regions. In order to realise this effect, municipalities can play an integral role in acting as promotors of community energy. In line with theory on Green Industrial Policy's idea of government-induced broad societal change, considering the social aspect of decarbonisation, municipalities can support a broad and social energy transition by starting and leading community energy initiatives. Thereby, a central role for municipalities also encompasses high potential to improve energy justice and reduce the pitfalls of lacking inclusivity, as long as municipalities are acting in community interest and are not captured by special interest.

6.2 Looking forward – Practical and policy considerations

The findings in this thesis have various implications for policymaking on European, Member State, and local level as well as practical implementation of community energy initiatives that are outlined hereafter. Most importantly, the thesis showed the benefits of information events, an active involvement of municipalities as leaders of community energy, and the necessity of social and inclusivity considerations to maximise community energy's positive impact on energy justice. This effect can be supported by adequate design of community energy initiatives and incentivised by policies.

For community energy to fulfil its high potential to increase energy justice, especially in coal regions, it needs to be designed to ensure equal access to benefits for all citizens. To be precise, this means open access to energy prices with low hurdles for membership, both financially and in terms of knowledge and skill, to maximise the effect of community energy on energy justice. This can be supported inter

alia by low or inexistent fees to join a community, giving residents unconditional prioritised access to locally produced energy (e.g. through energy sharing), and organising informational events to reduce knowledge gaps. The inclusion of such measures in community energy initiatives can also be supported by policymakers.

From a legal side, to enable prioritised access to energy for local residents, provisions must allow such forms of energy sharing. Furthermore, authorities can encourage social community energy through government funding. By adding social inclusiveness criteria in applications for government funding, as is not currently practice (Stefanova et al., 2023), an additional incentive could be set up for community energy initiatives to pursue social objectives and inclusiveness. This could be done, for example, by requiring community energy projects applying for funding to identify and prove paths through which inclusiveness is pursued (e.g. waived membership fees for low-income households, special reduced energy prices for residents, educational information events targeted at residents, etc.) and prioritise funding to community energy initiatives that positively impact energy justice.

The findings of the study also show the benefits of municipalities acting as leader and initiators of community energy. In particular in the absence of local citizen leadership, municipalities can allow citizen participation in the energy transition by starting community energy initiatives. Active support for municipalities from regional or national authorities to act in such a manner, for example through facilitating legal frameworks, in the form of capacity building, technical assistance, and knowledge exchange, or by expanding access to community energy funding onto municipality-led initiatives, could increase municipalities' ability to act as community energy initiators and leader, eventually increasing energy justice in the energy transition.

Lastly, for the energy transition, and particularly concerning local renewable energy projects, the findings underline the benefit of an increased utilisation of information events. Events that are targeted at both municipal representatives and, crucially, the local population in coal regions can be expected to increase public support of both the energy transition as a whole and concrete renewable energy installation, facilitating the activities of a community energy project. They are, moreover, a driver for interest in citizen participation, a critical aspect for energy justice that constitutes a major obstacle for community energy in coal regions. Hence, both local community energy initiatives and regional authorities benefit from more regularly held information events.

6.3 Limitations and areas for further research

The approach taken in this thesis, restricted by the low number of community energy in coal regions, limits the external validity and generalisability of the findings in this thesis. The case study of two EU coal regions, containing the risk of findings being too contextual, restricts the direct application of the

insights onto other European regions unless the region shows considerable similarity to the studied regions. This inherent limitation in the research design constitutes a clear constraint that was obvious from the beginning of the thesis but was warranted due to the topic of analysis being new and requiring an in-depth study of specific cases. As the findings are based on expert interviews, it should also be noted that there is a potential that the findings reflect some bias from interviewees and their individual experiences. While the interview partners were purposefully chosen to reflect different viewpoints, the low number of people with knowledge on the topic and the desire to go in-depth, limited options to increase the number of viewpoints with more interviews. Moreover, the low development of community energy in the studied regions limits the reliability of the findings, as assessments within the regions had to be made based on existing developments and potentials for impact. While the analysed community energy developments could constitute outliers once more community energy develops, the findings of this thesis still form reasonable assumptions based on the present situation.

Despite these limitations, the findings are a sound starting point for research on community energy's potential to enhance energy justice in decarbonising coal regions. This thesis is the first time the potential was academically analysed for coal regions, and it was able to confirm suggestions of previous studies and add new conditions and barriers for community energy to act in such a way. More research is needed to see if community energy's ability to address specific energy justice challenges in coal regions and the identified conditions to do so also apply in other coal regions as well as whether they can be transferrable to coal+ regions (i.e. to peat and shale oil regions). The ongoing development of community energy legislation in the Czech Republic and in other Member States as well as further community energy development, will allow for more research, including larger-n studies, to test these findings. With more community energy in coal regions, it will furthermore be interesting to study how many community energy projects fulfil the conditions to enhance energy justice and the ability to incentivise social inclusiveness through legislation and governmental support schemes.

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Appendix A – Comparison of case study regions

	Lusatia	Moravia-Silesia
Total Population[15]	1.140.000	1.160.000
Area size[16]	11.677 km	5.427 km
Coal Power Generation[17]	6.978 MW	2.733 MW
GDP/capita[18]	€ 30.274	€ 15.500
GDP/capita relative to national average	0.87	0.89
Economic activity rate (25-64 yrs.)[19]	85%	83%
Unemployment rate (2021)[20]	3.2%	4.6%
Coal-related jobs (in % of all employment)[21]	13.000 (3.3%)	8.000 (1.3%)
Education Level[22]	Level 0-2: 6% Level 3-4: 62% Level 5-8: 32%	6% 71% 23%
Median age of population[23]	49	45
Primary RES Source(s)[24]	Ground PV	Ground PV
Primary RES Technical Potential [25]	Rooftop PV Ground PV (Wind)	Ground PV Rooftop PV (Wind & Hydro)
Share of RES countrywide (regional)[26]	19% (NA)	18% (17%)
Community energy development	Several energy cooperatives established in the 2000s	2 Pilot projects

[15] Eurostat (2023e).
[16] Eurostat (2023a).
[17] Lusatia: data on slightly larger NUTS2 regions DED2+DE04 (Gonzalez et al., 2019); Moravia-Silesia: (Energy Regulatory Office, 2022b, p. 20)
[18] Eurostat (2023d).
[19] Eurostat (2023b).
[20] Eurostat (2023i).
[21] Lusatia: (Brandenburg, 2021, pp. 5, 7); Moravia-Silesia: (Alves Dias et al., 2018, p. 63)
[22] Eurostat (2023f): Level 0-2: Less than primary, primary, and lower secondary education; Level 3-4: Upper secondary and post-secondary non-tertiary education; Level 5-8: Tertiary education.
[23] Eurostat (2023g).
[24] Kakoulaki et al. (2021)
[25] Kakoulaki et al. (2021)
[26] Eurostat (2023i); Energy Regulatory Office (2022b, p. 20)

Appendix B – Question Guide

Energy transition challenges

- How do you experience the public acceptance/support/interest of the energy transition and concrete renewable energy projects?

- How strongly do you assess *the region's* economic and cultural dependency on coal?

- How common is community energy in *the region* and how commonly is community energy discussed in the (future) energy transition of the region?

Distributive Justice

- In the energy transition, do you perceive that certain groups profit more than others?
    - Who profits primarily from renewable energy projects in the region?

- How do you perceive/see a potential that community energy influences this situation?
    - Do you think it can contribute best to fairer outcome for all? If so, how?
    - Are different people profiting? What is the difference?
    - Is there an influence of energy prices?
    - How is the access to (reduced) community energy prices in existing/planned community energy?

Procedural Justice

- How involved are citizens in the energy transition? (e.g. in the development of new renewable energy installations)
    - Is information about renewable energy shared with and accessible to residents?
    - Do citizens have the option to share their opinions?
    - Can citizens influence/make decisions about the development of renewable energy?

- How does existing/planned community energy in *the region* allow citizens to participate in the process?
    - Who is included in community energy?
    - Is information about community energy and its activities readily available?
    - What kind of options do citizens/members have to give inputs?
    - Can citizens/members influence decisions? If so, how and to which degree?

- How high is the interest among citizens to participate in the process?
    - What do you perceive to be influencing that interest?

- How do perceive participation options to influence public opinion/support?
    - Of the energy transition
    - Of concrete activities?

    - Of community energy?

Recognition Justice

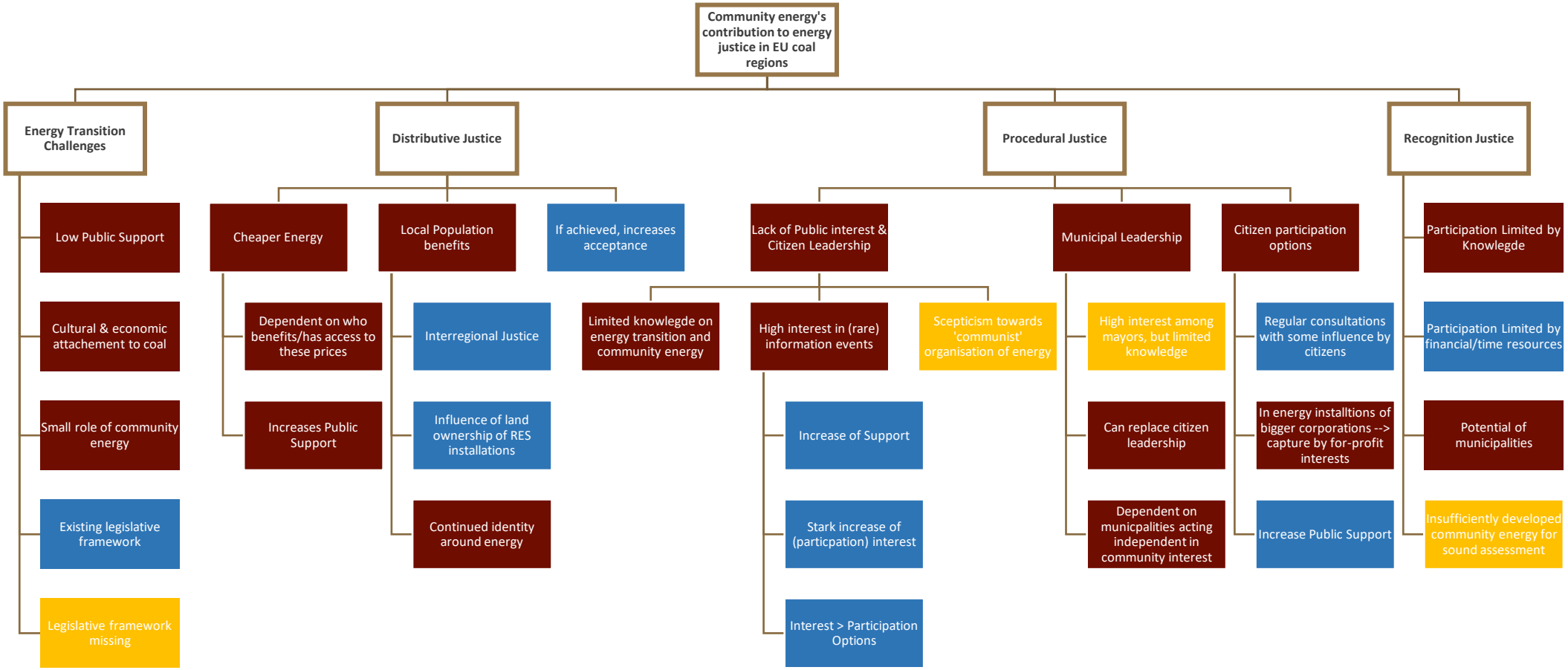
- Are there differences among different groups in the distributive outcome and procedural involvement?
    - Is there an influence of financial resources/knowledge and education/being part of a minority group? Are such groups equally represented?
    - If so, how do you explain such differences?

- Are community energy initiatives actively trying to reach/include certain disadvantaged groups?

Additional Remarks

- Is there any other important aspect how community energy influences a just energy transition that you want to share?

Appendix C – Coding Tree



Legend:

Both regions | Lusatia | Moravia-Silesia