(Em)powering Community Energy on Gotland

An exploration of energy justice through a case study of "an island in an island"

Frida Malin Mundbjerg & Marie Bredkjær Thomsen

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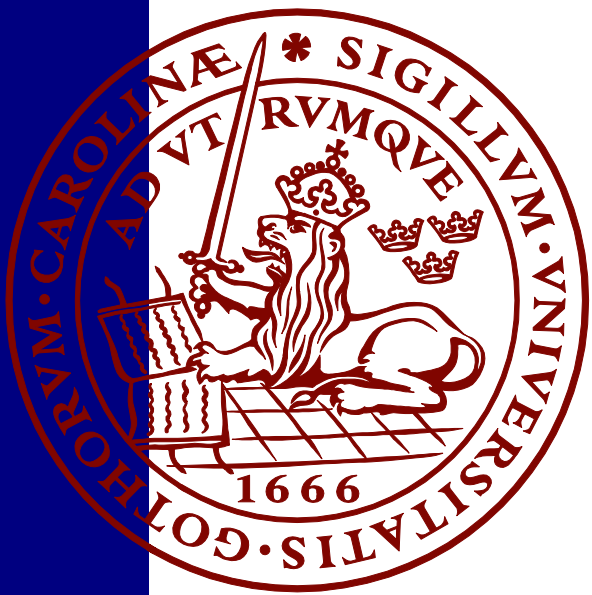

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Supervisor: Henner Busch, LUCSUS, Lund University

Abstract

The energy transition raises concerns about local communities' marginalisation in decision-making and ownership models, leading to justice debates. Community energy (CE) gains attention as a pathway towards energy justice (EJ). Drawing on qualitative data collected on Gotland, we examine how the Austerland CE project delivers EJ. Our findings indicate that despite gender equality among members, there are ownership barriers for low-income groups and age-related disparities causing uneven distributional justice. We identify efforts made towards procedural justice but representation gaps in leadership remain. While vulnerable groups are partly recognised, recognition justice is not fully achieved due to limited efforts to engage them. The project delivers EJ on several parameters, and a strong island identity supports its implementation. However, structural barriers challenge Austerland's ability to deliver EJ fully. Our study reveals that CE projects have the potential to deliver EJ, but structural changes are required to address barriers beyond the project's control.

Keywords: Community energy, energy justice, island identity, local empowerment, energy transition, Gotland

Word count: 11,977

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We admire the dedication among the people of Östergarnslandet towards making a difference both on a local and global scale. Your passion and determination have been truly inspiring. We are grateful for the opportunity to have learned from your experiences and to have been a small part of your journey towards a more equitable energy transition.

During our fieldwork, we came across the opinion that universities are bureaucrats and that the communities are doing the actual change. We would like to acknowledge this point of view and hope, in all our modesty, that with this small contribution and our future work, we will be able to support local projects driven by local enthusiasts and contribute to real change.

Thank you, Henner, for your motivational approach and straightforward feedback. Your expertise in the field of energy justice and community energy has been invaluable for our research.

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Finally, the contributions of the authors of the literature we consulted were essential in shaping our understanding of energy justice, community energy, and the Swedish energy transition. Their extensive body of work has allowed us to build upon existing knowledge.

Table of Contents

Abbreviations

CE	Community energy
CEC	Citizen energy communities
CEP	The Clean Energy for All European Legislative Package
EJ	Energy justice
GEAB	Gotlands Elnat AB
IEMD	The revised internal electricity directive (EU) 2019/944
RE	Renewable energy
REC	Renewable energy communities
REDII	The revised renewable energy directive (EU) 2018/2001

1. Introduction

The energy transition is here, and it is here to stay. While renewable energy (RE) expansion is increasingly presented as inherently good, recent research argues that the proliferation of large-scale RE development promoted by neoliberal environmental governance and industrial interests raises democratic issues due to local communities being marginalised in decision-making processes and ownership models (Guðmundsdóttir et al., 2018; Kirkegaard et al., 2021). Critics argue that energy planning often leads to marginalisation of those most vulnerable to climate change. Concerns about ownership, socioeconomic inequalities, and local acceptance are therefore entering the energy transition field (Labussière & Nadaï, 2018; Warren & McFadyen, 2010). This spurs debate over energy justice (EJ), which includes the right to access affordable and clean energy, the right to participate in the design of energy policies, and the right to access the economic and social benefits of energy production (Jenkins et al., 2016; Sovacool & Dworkin, 2015).

To achieve this, innovative approaches and local initiatives such as community energy (CE) are presented as solutions (Klein & Coffey, 2016; Kunze & Becker, 2015; McCabe et al., 2018). By creating more inclusive decision-making processes and providing citizens with platforms to influence local energy transitions, CE projects can democratise energy systems and promote equitable energy access (Islar & Busch, 2016). But does CE fulfil the promise of delivering EJ? The EJ framework is increasingly applied to study CE in Europe (Hanke et al., 2021; Lazoroska et al., 2021; Mundaca et al., 2018). However, empirical evidence of specific projects' ability to deliver distributional, procedural, and recognition justice (Jenkins et al., 2016) remains limited in a Swedish context.

In this regard, it is relevant to turn to the island of Gotland in the Baltic Sea. With a vision of a fully RE system and carbon neutrality by 2040, Gotland strives to lead the way in the Swedish energy transition (The Swedish Energy Agency, 2019). Gotland has the potential to fully self-supply its energy needs with local production and the island has ideal conditions to turn technical innovation into practice (Energicentrum Gotland, n.d.). This places Gotland in a unique position to explore RE pathways. Therefore, the island has been chosen as a pilot area to lead Sweden's energy transition towards the country's goal of net-zero emissions of greenhouse gases by 2045 (The Swedish Energy Agency, 2019). Gotland's population is used to taking matters into their own hands, and there is currently a growing interest from local communities to experiment with cooperative ownership models (Energicentrum Gotland, n.d.). In

Östergarnslandet in East Gotland, a new CE project named Austerland Skags (hereafter Austerland) is currently being implemented. This makes the island an ideal location for exploring how CE delivers EJ.

Previous research has focused on Austerland's technical dimension (Lindblom, 2022) but the role of CE in delivering EJ on Gotland remains unexplored. We seek to address this research gap by answering the following research questions:

What is the potential of community energy projects for delivering energy justice on Gotland?

- *How does the Austerland community energy project deliver energy justice?*
- *What measures can be implemented to improve community energy projects' ability to deliver energy justice on Gotland?*

By drawing on insights from the EJ literature, as well as local knowledge and experience from the Austerland CE project, our thesis contributes to the literature on CE and EJ. Furthermore, our findings inform the energy transition and provide insights and inspiration for other CE projects on Gotland and beyond.

2. Background information

2.1. Community energy

A range of terminologies that refer to decentralised, locally-led, and collectively owned energy projects have emerged during the last decade (Creamer et al., 2018). CE, however, is the most prevalent term in policy, practice, and academic literature (Creamer et al., 2018). Despite efforts to define it, CE is ambiguously used in both practice and literature as there is no single common definition (Brummer, 2018; Creamer et al., 2018). Nevertheless, CE is identified through the different characteristics outlined below.

"Community" in CE distinguishes between 'communities of interest' based on common interests, and 'communities of localities' confined to local geographical locations (Brummer, 2018). The latter is most often described in the literature (Busch et al., 2023) and our assessed case on Gotland is also a place-based community. CE is strongly connected to the use of RE with a tendency towards small-scale decentralised sources, such as wind or solar power (Brummer, 2018; Creamer et al., 2018). Despite the technical aspects, CE is also categorised by social features such as the absence of direct governmental or big company participation, community participation in decision-making, and community ownership (Brummer, 2018). CE production and consumption often take place in close proximity (Brummer, 2018), enabling communities to become *prosumers* (simultaneously producing and consuming energy) (Szulecki, 2018).

As illustrated in Table 1, CE is linked to several benefits and studies indicate that economic and social benefits are at least as important as environmental considerations in motivating CE projects (Brummer, 2018; Creamer et al., 2018). However, as explained in the table, CE is also associated with challenges and conflicts.

Table 1. Benefits and challenges related to CE

Social benefits	Environmental benefits	Economic benefits
CE facilitates local citizen participation, community mobilisation, and autonomy by engaging with households in the local community (Brummer,	CE provides lower emissions when CE projects replace fossil fuels with RE (Busch et al., 2023). Research points out that when	CE can benefit local communities by generating revenue from energy sales, land/roof rent, and lower energy prices for households while stimulating local

2018; Hanke et al., 2021; Islar & Busch, 2016). Organised collectively, CE has the potential to create social cohesion and a stronger community identity (Brummer, 2018; Islar & Busch, 2016). CE has a central role in the literature on energy democracy and EJ as it can give voice to people who are marginalised by current energy developments (Creamer et al., 2018). By involving the community in decision-making, energy-related decisions become more inclusive and decision-makers more representative (Creamer et al., 2018).	people engage in CE projects, it contributes to behavioural changes, both by decreasing energy use and leading to more political engagement in environmental problems (Brummer, 2018; Busch et al., 2023). CE is also associated with greater acceptance of RE construction which enables quicker RE expansion (Brummer, 2018).	economies by creating jobs (Brummer, 2018; Hanke et al., 2021; Islar & Busch, 2016). CE raises the level of knowledge about RE technologies and contributes to capacity building and the development of social skills (Brummer, 2018; Hanke et al., 2021).
Challenges and conflicts		
Some groups may encounter difficulties participating in or creating their own CE project due to barriers related to finance, expertise, or time (Brummer, 2018; Hanke et al., 2021). Groups with a high socioeconomic status more frequently participate in CE projects, while more vulnerable groups end up being excluded from CE's advantages, which can exacerbate existing inequalities (Creamer et al., 2018) Creamer et al. (2018) note that using the term "community" does not always result in just and democratic outcomes or processes. The impact of CE depends on its mobilisation and implementation, rather than the promise of the term itself. There is no guarantee that local decision-making processes are democratic or equitable (Busch et al., 2023; Creamer et al., 2018). Even when guided by democratic principles, conflicts may arise between supporters and opponents of CE projects, causing tensions within communities (Busch et al., 2023).		

2.1.1. EU and Swedish legislation on community energy

To facilitate the green transition, the European Commission has launched the Clean Energy for All European Legislative Package (CEP) which for the first time under EU law recognizes citizens' rights to engage directly in the energy sector (Caramizaru & Uihlein, 2020; Wahlund & Palm, 2022). CEP provides two CE definitions: Renewable Energy Communities (REC), which are defined through the Revised Renewable Energy Directive (EU) 2018/2001 (REDII) and Citizen Energy Communities (CEC), which are defined through the Revised Internal Electricity Directive (EU) 2019/944 (IEMD) (Caramizaru & Uihlein, 2020). REDII and IEMD require member states to support the development of CE in national legislation through non-discriminatory rights and a levelled playing field in the electricity market (Lowitzsch et al., 2020; Wahlund & Palm, 2022).

In June 2021, all EU member states were expected to have enacted the REDII and IEMD regulations (Lowitzsch et al., 2020). However, Sweden has not yet implemented any laws or regulations that promote CE and it is still undecided what legal form CECs and RECs will have in Swedish legislation (Dahl, 2020; Palm & Boije af Gennäs Erre, 2022).

2.2. Gotland as a pilot project

Gotland has been chosen as a pilot project for rapidly testing and developing solutions that can be implemented nationwide, to achieve Sweden's targets of net-zero greenhouse gas emissions by 2045 and a 100% renewable electricity production by 2040 (Naturvårdsverket, n.d.). Therefore, Region Gotland has developed action plans and programs to accelerate the conversion to RE while aiming at local anchoring (Region Gotland, 2022; The Swedish Energy Agency, 2022a). To support the development, the region has established Energicentrum Gotland (hereafter Energicentrum), which offers free advice (The Swedish Energy Agency, 2019). Officially, the Swedish Energy Agency's role is to coordinate the efforts of the various actors involved and ten projects will receive economic support from the agency – one of these is Austerland (The Swedish Energy Agency, 2019, 2022b). Thus, Gotland is seen as a "Living Lab" for testing new technology and investing in energy infrastructure (Energicentrum Gotland, n.d.) creating ideal conditions for CE projects.

2.3. Gotland's energy system today

Gotland has a population of 61,158 people (Statistics Sweden, 2023). Settlement patterns are uneven and the population is ageing, leading to a reduced working-age segment (OECD, 2022). The island has a growing economy primarily based on tourism and agriculture, which is highly seasonal (OECD, 2022; The Swedish Energy Agency, 2022a). To meet the growing energy demand, Gotland has developed a comprehensive energy system based on a mix of renewable and non-renewable sources. While Gotland depends on imported fossil fuels for heating, electricity, and transport, the island has its own production of wind and solar energy, which has good conditions due to the island's good wind and solar resources. Therefore, Gotland has been a RE pioneer since the 1980s (Energicentrum Gotland, n.d.).

As of 2022, the island's installed capacity of wind power was 180 MW, producing around 0.5 TWh of electricity annually and accounting for around 50% of the island's total annual electricity consumption (Regionfakta, 2023). Gotland's distribution system is connected to the national grid by two submarine cables (Daraiseh, 2020). According to Region Gotland (2019), the regional and local grid needs to be upgraded to handle the increasing amounts of variable RE production. A new cable to the mainland was planned to be operational by 2021 allowing for RE export to the rest of Sweden and beyond, however, this is not yet operationalised. Region Gotland views the new cable as necessary for fully utilising its RE potential and securing reliable operations (Region Gotland, 2019). Therefore, the installation of wind power on the island has temporarily stopped. Gotlands Elnat AB (GEAB) is the grid owner and distribution system operator of Gotland, Vattenfall is responsible for frequency and balance regulation, and Svenska Kraftnät is responsible for transmission on the mainland (The Swedish Energy Agency, 2019).

The island has implemented various measures to reduce energy consumption, such as energy efficiency initiatives and energy management systems and has made large strides towards energy independence (The Swedish Energy Agency, 2019). Additionally, Energicentrum's goal is to enable 50 CE projects on the island by 2040 (Energicentrum Gotland, n.d.). This is key to the electrification strategy and building a flexible energy system on Gotland.

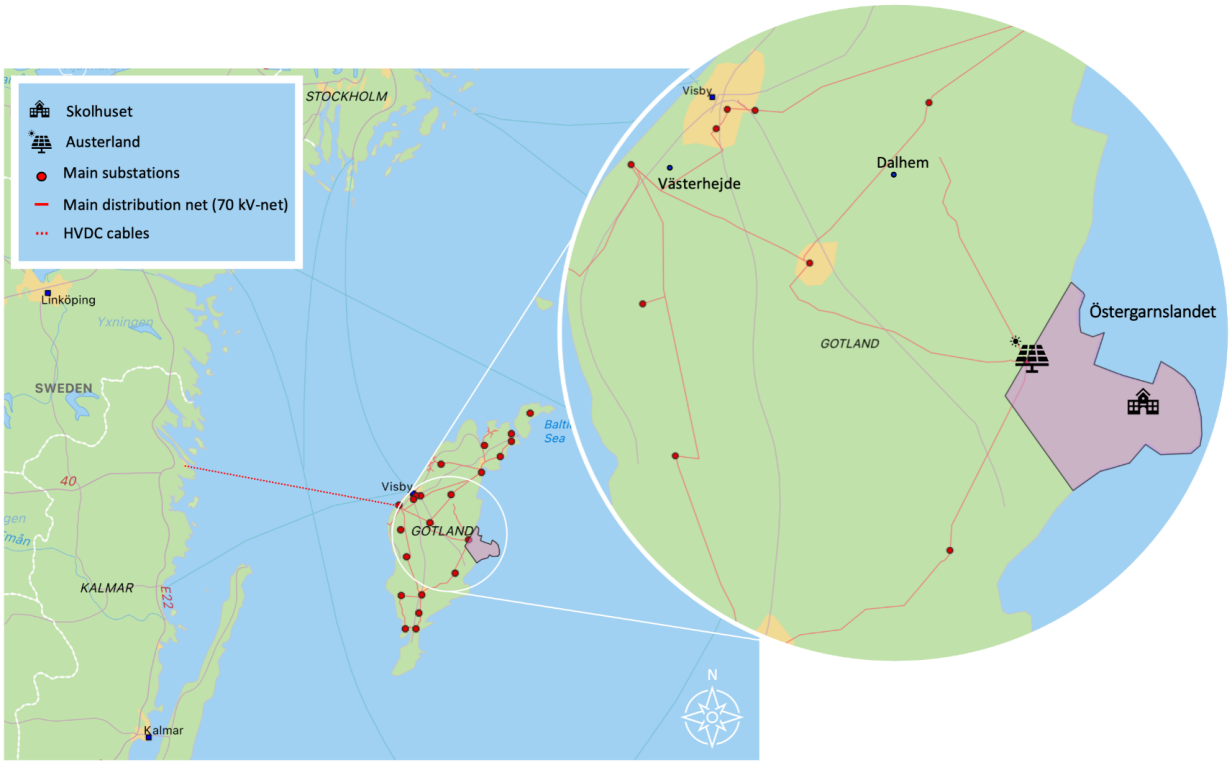

Figure 1. Map of Gotland (own work)

2.4. Case description: Austerland CE project

Austerland is situated in Östergarnslandet on Gotland and is currently being developed. The project aims to establish a local solar PV system owned by local members enabling them to become prosumers (i3). So far, approximately 150 people have signed up to buy a share (i15) and indicated that they will invest 8.5 million SEK in total. The project team believes they will reach 200 shareholders (Larsson et al., 2023). Besides private people, churches and local firms are also interested in investing in the project (i3). Austerland was started by the local development organisation Nygarn Utveckling AB (hereafter Nygarn) in 2016 (i8, i14). Nygarn acquired Östergarn's school, which closed because of a population decline. *Skolhuset* (the schoolhouse) is today a social hot spot housing a café and small companies (i3, i5). Nygarn has been responsible for several development projects in Östergarn during the last 15 years such as setting up fibre internet and a water purification system (i3). Austerland's project team consists of four persons: Project leader Wolfgang Brunner, Per Flink, Gunnar Bendelin, and Mårten Lindstrøm. In spring 2023, Nygarn will withdraw from Austerland and an economic association managed by a board will be formed to lead the

project (i8, i13, i14, i15). Austerland will be connected to the grid so energy can be bought and sold according to needs. Therefore, it is key to the project implementation to have an agreement with GEAB (i3). Austerland has been authorised by GEAB to set up a 2.6-megawatt-producing solar park (i8).

Austerland receives support from several actors. The project has received funding from LEADER (i3), which is a local rural development programme financed by the member states and the EU (European Union, 2021). This finances two part-time salaries while the rest of the project work is voluntary. The project is also part of the European Commission's MASTERPIECE project (i2, i3), which is a platform that supports CE projects (European Commission, 2023). Energicentrum provides technical advice and a reference group provides knowledge to the project. Furthermore, Austerland cooperates with e.g. Uppsala University, Campus Gotland, and Science Park Gotland (i3, i5).

3. Theory

3.1. Energy justice

EJ is a cross-cutting concept that applies justice principles to the energy field (Jenkins et al., 2016). EJ provides a critical theoretical framework that helps us understand the moral implications of collective energy decisions (Sovacool & Dworkin, 2015). The concept of EJ offers a way to analyse injustices in the energy system and identify the social groups affected (Hanke et al., 2021). It further recognises new solutions through which energy-related problems can be resolved (Jenkins et al., 2016; Sovacool & Dworkin, 2015). Thus, EJ rests upon both an evaluative and a normative dimension (Jenkins et al., 2016).

Sovacool and Dworkin (2015) introduce EJ as a conceptual tool that focuses on the ethical and philosophical definitions of EJ. The concept can also be used as an analytical tool to analyse how values influence energy systems, why energy problems exist, and how to tackle them. Furthermore, EJ can be a decision-making tool that assists informed energy choices and enables energy-just decisions (Sovacool & Dworkin, 2015). We apply EJ as an analytical framework to understand whether CE on Gotland is a just solution to RE expansion and to assess and discuss how justice issues unfold and can be resolved.

We follow Jenkins et al.'s (2016) conceptualisation of EJ, which encompasses three aspects. In line with Sovacool and Dworkin (2015), Jenkins et al.'s (2016) EJ conceptualisation includes *distributional* and *procedural* justice, which is based on the works of John Rawls. From the works of Nancy Fraser, Jenkins et al. (2016) add *recognition* justice as a third tenet of EJ. A combined approach including all three justice elements is needed in a holistic assessment as they are interrelated. Redistribution is not just without empowerment and recognition and the same applies the other way around (Sovacool & Dworkin, 2015). Therefore, our approach to EJ builds on a synthesis of all three aspects which will be introduced in the following sections.

3.1.1. Distributional justice

Distributional justice deals with the distribution of material outcomes (e.g. infrastructure), public goods (e.g. clean air), or negative externalities (e.g. air pollution) (Mundaca et al., 2018; Sovacool & Dworkin, 2015). Distributional injustices are recognised by physically unequal allocation of environmental ills, energy harms, and services across time and space (Jenkins et al., 2016; Sovacool & Dworkin, 2015). To achieve distributional justice, it is necessary to obtain even distribution or re-distribution of energy-related

benefits and ills to all individuals regardless of socio-economic background (Jenkins et al., 2016). Distributional justice, e.g. concerns equal access to the outcomes CE provides in the form of benefits and services (Hanke et al., 2021; Jenkins et al., 2016).

3.1.2. Procedural justice

Procedural justice concerns processes and elements of decision-making (Mundaca et al., 2018). It refers to equitable procedures that aim to create equal, non-discriminatory access to decision-making processes for all stakeholders (Jenkins et al., 2016; Mundaca et al., 2018). Procedural justice calls for local knowledge mobilisation, empowering people to participate in energy-related decisions and non-discriminatory representation in institutions, e.g. through the representation of vulnerable groups or minorities (Hanke et al., 2021; Jenkins et al., 2016). Procedural injustices can occur through political discrimination and the exclusion of certain groups in decision-making (Jenkins et al., 2016).

3.1.3. Recognition justice

Recognition justice focuses on groups whose needs are ignored or misrepresented (Hanke et al., 2021). It states that "individuals must be fairly represented, that they must be free from physical threats and that they must be offered complete and equal political rights" (Jenkins et al., 2016, p. 177). Recognition justice calls for acknowledging divergent perspectives rooted in social, cultural, ethnic, racial, political, and gender differences (Jenkins et al., 2016). Injustices are recognised by a lack of recognition that occurs as various forms of domination, insults, or devaluation. Injustices can also occur through misrecognition which manifests as "a distortion of people's views that may appear demeaning or contemptible" (Jenkins et al., 2016, p. 177).

Table 2. Elements and indicators of EJ in relation to CE. Adapted from Hanke et al. (2021), Mundaca et al. (2018), Jenkins et al. (2016), and Sovacool and Dworkin (2015)

Justice tenet	Elements	Indicators
Distributional justice	Access to outcomes in the form of benefits, services, and	Ownership model Member diversity

	compensation for burdens	Location of infrastructure Energy services targeted vulnerable groups
Procedural justice	Decision-making	Lack of bias on the part of decision-makers Meaningful participation in decision-making
	Consultation process	Free prior informed consent for energy projects Access to consultation Legal processes for achieving redress Representation in institutions
	Information sharing	Access to high-quality information Mobilisation of local knowledge Information disclosure
	Access to membership	Reduced membership fees Lower share prices for vulnerable groups
Recognition justice	Awareness of vulnerable and/or marginalised groups	Level of knowledge about vulnerable households Awareness of differences in domestic energy needs and living situations

	Engagement with vulnerable and/or marginalised groups	Direct engagement with vulnerable groups Addressing vulnerable groups in the official organisational communication

3.2. Applying the energy justice framework

Over the past decade, literature has increasingly analysed CE through an EJ lens (Gross, 2007; Hanke et al., 2021; Lazoroska et al., 2021; McCabe et al., 2018; Mundaca et al., 2018; Tarhan, 2022). Studies have applied the framework to analyse the potential of CE to deliver EJ for vulnerable groups which face barriers such as limited knowledge about CE and insufficient financial resources for investment (Hanke et al., 2021). Therefore, vulnerable groups are often underrepresented in CE projects (Hanke et al., 2021; McCabe et al., 2018; Tarhan, 2022). Others have explored the role of gender in CE projects (Lazoroska et al., 2021) while EJ movements have promoted CE (Allen et al., 2019). Mundaca et al. (2018) have particularly used an EJ framework to analyse a CE project on the Danish island Samsø. Other studies have analysed CE on Danish islands through the lens of energy democracy (Busch et al., 2023) and ecological citizenship (Islar & Busch, 2016). Our thesis contributes to this research by analysing the CE and EJ nexus in a Swedish island community on Gotland, which has not previously been studied with this framework.

4. Methodology

4.1. Research philosophy

Our approach to philosophy of science is rooted in a critical realist paradigm. We align with an understanding of reality as deep and independent of our knowledge about it as injustices, for example, exist regardless of whether we observe them or not (Fletcher, 2017). With this approach, we furthermore understand the world as socially constructed, meaning that social events must be interpreted through deeper-levelled structures and mechanisms (Fletcher, 2017; Hoddy, 2019). Therefore, we rely on theory to explain whether CE projects are grounded in energy-just structures. EJ is a normative framework that allows us to assess to what extent a CE project is ethically just. The aim of our study is to explain CE's potential to deliver EJ on Gotland and propose measures to increase justice, which aligns with critical realism that is useful for analysing social problems and suggesting solutions for social change (Hoddy, 2019). Thus, our study also aligns with the aims of sustainability science about applying knowledge to support decision-making for sustainable development (Clark & Dickson, 2003). The study adds to sustainability science by offering a nuanced understanding of the interplay between social and environmental factors in shaping just and sustainable energy systems and by exploring local solutions to global problems (Kates et al., 2001).

4.2. Case study

We apply a case study approach as studying individual cases is essential to understand something in-depth and derive connections that can reveal general insights (Flyvbjerg, 2006). We have employed an information-oriented case selection strategy to select our main case, Austerland, and complementary informants working with CE on Gotland. Austerland is a critical case (Flyvbjerg, 2006) since it, unlike other CE projects on Gotland, has made significant progress in its implementation. Thus, it can provide information that permits logical deductions as the challenges faced by this project will likely also be encountered by other CE projects on the island that have not yet come as far. Therefore, Austerland's potential contribution to a just energy transition will likely be relevant for other CE projects on Gotland.

Apart from Austerland, we have conducted interviews with citizens from Dalhem and Västerhejde where smaller CE projects are being initiated. These provide insights that improve our ability to assess whether the case of Austerland reveals something general about Gotland.

4.3. Data collection and processing

Our research is based on qualitative data in the form of semi-structured interviews, a focus group interview, and observations (see Figure 2). The data was conducted during fieldwork on Gotland in March 2023. The interviews draw on methodology from visioning workshops to allow our informants to imagine and describe their ideal local future (Marzouki et al., 2022) which is essential as energy terminology used in formal hearing processes and energy planning can be less accessible for non-experts (Mourik et al., 2021). This approach thus helps us provide the basis for inclusive and participatory future planning (Diedrich et al., 2011).

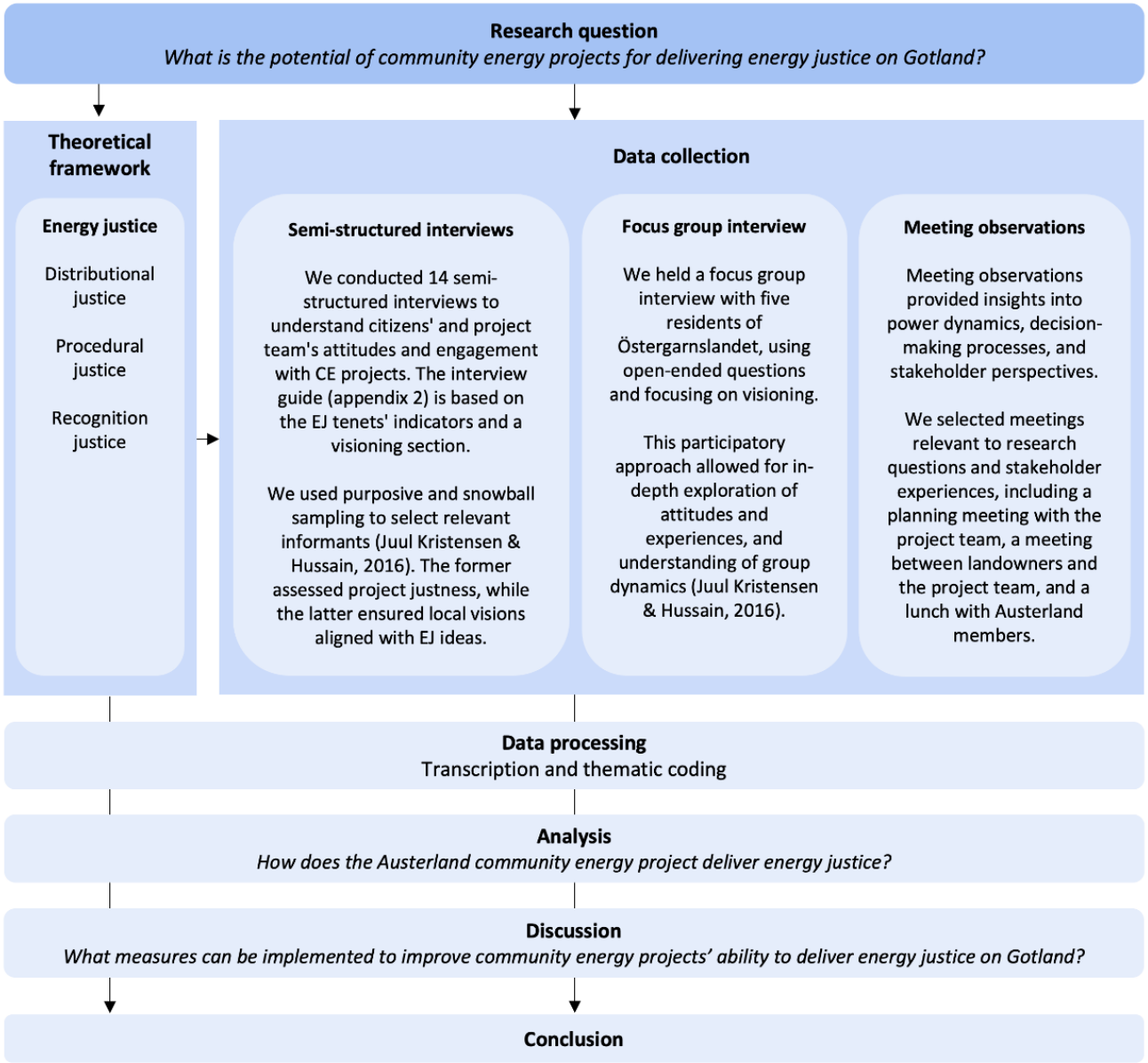

Figure 2. Illustration of research strategy (own work)

All interviews were recorded and transcribed and will be referred to by their number listed in the overview of collected data (Appendix 1). We have thematically coded all interviews based on the EJ framework. Our theoretically informed interview guide and coding strategy reflect our deductive research approach as the collection and processing of data are interpreted through an EJ lens. Despite our deductive approach, our coding has been open and flexible which has allowed us to observe new aspects of our data. Our analysis is structured around themes identified after coding our data.

4.4. Ethical considerations and limitations

We have worked with a high degree of confidentiality, where all informants except Austerland's project team are fully anonymized. The purpose is that the informants do not withhold information in fear of exposing the project team and risking their reputation. This way we ensure that we are not singling out specific people, which is important for not compromising the quality of the content or the relationship with our informants. We have clarified the degree of anonymity at the beginning of each interview to increase the informants' confidence and honesty and informed consent was obtained from all informants (Carr & Worth, 2001).

While our combined qualitative methods provide insights into how CE can deliver EJ on Gotland, there are some limitations to our approach. One limitation is the accessibility of informants. It has been challenging to identify and recruit individuals willing and able to participate in interviews and informants may have their own biases and experiences that do not reflect the broader community. This may result in a biased sample, where only those with strong opinions or vested interests participate. Additionally, the data may only represent a small subset of the stakeholders engaged in CE projects on Gotland, and thus may not capture the full range of experiences and perspectives.

Another limitation is that Austerland still is at an early stage of its implementation. This has limited the extent to which we have been able to observe and analyse how it delivers EJ. To mitigate these limitations, we have identified and recruited participants with different perspectives and experiences with CE projects on Gotland. Despite the limitations, we have gathered valuable data that provide insights into the potential of CE to deliver EJ on Gotland.

5. Results

As the three justice tenets are highly intertwined, we have clustered certain results for the elements and indicators and analysed them under different headings to show the connections and gain greater insight into *how Austerland delivers EJ*.

5.1. Distributional justice

5.1.1. Expected outcomes

Our informants expect that Austerland will provide several positive outcomes which have motivated the project leaders to establish the project and the members to join.

An important motivating factor is the expected *economic* outcomes. The vast majority of our informants expect to save money by being a shareholder (i4, i6, i8, i11, i13, i14), while one is confident to also earn money (i15). The project is expected to provide jobs for local people which will benefit the local economy (i2, i4).

The informants also emphasise many expected *social* outcomes. Joining Austerland is highlighted as a way to support and engage in the local community (i4, i9). Our informants hope the project can attract younger people to Östergarnslandet. A new generation is accordingly important to keep the community "alive" and improve the economy (i5, i13). The project is also important for building empowerment because "if we have that energy and that confidence, then we can also change other things" (i5).

Furthermore, *environmental* outcomes motivate engagement. The project leader, Wolfgang, expresses that the project is "a local manifestation of the Paris Agreement" (i4). The informants emphasise the importance of producing environmentally friendly electricity (i15), benefitting future generations (i12), and being self-dependent as further expressed in the following quote: "[I]f we are going to survive on the planet, we have to be more concentrated on local projects, where self-dependence is very important" (i12).

For many of our informants, the social and environmental outcomes are valued higher than the economic ones (i2, i3, i9, i12, i14). Some informants already have solar panels on their roofs and do not need more energy but want to buy shares to support the project (i2, i3, i9, i15). Likewise, it is not solely economic outcomes that drive the CE project in Dalhem forward: "It doesn't necessarily have to be very, very, very lucrative economically, but it feels good to do something. Do what we can do on a small level. So, idealism is a part of it" (i7).

5.1.2. Ownership model

Austerland has a business model where they offer 1000 shares. To become a shareholder, you must buy at least one share, which currently costs 11,000 SEK (i8). Everyone living in Östergarnslandet is invited to become a shareholder (i5). Approximately 150 shareholders have at this point indicated that they want to buy 800 shares in total (i8). GEAB will measure the shareholders' energy use and reduce their bill according to the number of shares the respective shareholders have (i3, i6, i8). GEAB will buy energy deficit while energy surplus will be sold and the revenue will be delivered to the shareholders (i3).

Only people with financial resources to buy a share get access to the produced energy. Since buying more shares is rewarded with a correspondingly lower electricity bill, people who buy several shares will economically benefit more. This creates unequal economical access to the outcomes Austerland provides. Austerland is not planning to have adjusted energy tariffs based on e.g. the number of shares or economic background, which could contribute to a more equitable model. Other economic measures targeting vulnerable groups will be discussed in 6.2.

5.1.3. Member diversity

Member diversity in CE projects reveals to whom the project's outcomes are distributed and whether there is an overrepresentation of certain groups (Hanke et al., 2021). At this point Austerland does not operate with 'members', but with people who have submitted expressions of interest in buying shares (i4). We will therefore present the diversity among those who are interested in becoming shareholders according to our informants.

Age

There is consensus that the majority of interested shareholders are older people (i2, i5, i9, i11, i13). Östergarnslandet is in general characterised by an ageing population, indicating that older people in Austerland are not necessarily overrepresented compared to the local demography. It might, however, be easier for the older generation to become shareholders as they usually have stronger financial means than the younger (i9, i13). Younger people with jobs and families are usually busier than retired people, and lack of time to join meetings about Austerland can be a barrier to engaging (i1).

Economy

The informants express that the interested shareholders are an economically diverse group. As Wolfgang

phrases it, both rich and poor “have the possibility to be part of this” (i3). Some, however, comment that there are people that do not have the money to buy a share, but that it is very few (i11, i12, i14). Östergarnslandet is a popular summer house area with 65% summer houses and most of the people that have signed up for a share have summer houses in the area (i3). The people that cannot afford to buy a share are mainly people living there permanently (i11). On the one hand, the summer house owners’ willingness to invest benefits financing the project. However, as a result of the many summer house owners, house prices are very high compared to other parts of Gotland which concern most of our informants as expressed in this quote: “That makes me angry. When the houses get so unaffordable that people can't stay here anymore” (i5). Especially young people cannot afford to live there which skews the demographics (i5, i9, i13). From a distributional justice perspective, this tendency is problematic, as lower-income groups are excluded from moving to the area if they did not buy a house there before the prices started increasing (i15) and thus are also excluded from getting access to Austerland’s benefits. The summer house owners from the mainland, only living there part-time, are better economically equipped and have easier access to join the project than permanent residents which creates a distributional justice issue. In contrast to the summer house owners, the permanent residents have their primary energy consumption in the area year-round and do not have the opportunity to get access to affordable and clean energy elsewhere. As long as permanent residents are not prioritised over the summer house owners, the project thus does not optimally deliver access to affordable and clean energy.

Education

According to our informants, people in Östergarnslandet are on average more educated than other areas on Gotland, and some have the impression that the interested shareholders have a higher education level than average in Östergarnslandet (i9, i12, i15). Energicentrum experiences that lack of education can be a barrier to joining a CE project since a lack of knowledge disengages people (i2). Compared to setting up private solar panels, joining Austerland is emphasised as a better option for those that lack technical knowledge or interest in the installation and maintenance of solar cells (i12, i13).

Gender

None of our informants express an imbalance in gender representation among the interested shareholders. Wolfgang mentions that more women have signed up than he expected (i4). Gunnar emphasises that a lot of women are coming to the meetings: “I think it's not only the man, the technical one, who is interested in this” (i14). Thus, the preconception that fewer women would be interested has

been disproved. In this way, Austerland differs from other CE projects in Germany and Sweden which usually are dominated by male members (Lazoroska et al., 2021; Radtke & Ohlhorst, 2021).

5.1.4. Location of solar panels

Austerland originally planned to install floating solar PV on irrigation dams at Skags farm in Östergarn. This would avoid using farmland and reduce evaporation from the dams (i3). However, the floating solar PV was too expensive, and the location was rejected by GEAB because the grid connection was too weak at that spot (i2, i4). Instead, the panels are planned to be deployed on the ground next to a transformer station in Kräklingbo in Östergarnslandet where the net utility is better (i2) and the PV system will be more profitable and efficient (i13, i14). During a meeting between Austerland's project team and the landowners of this location, two of the owners appeared sceptical in the beginning but after receiving more information their attitude changed positively (i14, o1). Austerland will compensate the owners economically for using their land (o1). At the time of writing, it has not been confirmed if the landowners have agreed.

The informants are generally positive about the location in Kräklingbo (i6, i8, i11, i13, i14). Some expect it to engage more people as it will be more visible (i8, i11). Wolfgang describes that people will pass by when entering Östergarnslandet: "[T]hat is what I want to achieve. That they point out from the car, 'oh there you see, this is ours'" (i4). In Östergarnslandet, most local activities are happening in Östergarn and, therefore, it is from Gunnar's point of view "good to have something happening in Kräklingbo", so they also feel that they are a part of the transition (i14). Others believe it will be less visible, which is highlighted as a positive thing (i13, i15).

A few downsides of the new location are also mentioned. Some question if it will influence people's feeling of belonging to the project and sense of ownership (i5). One informant e.g. "feel[s] very sorry" for the new choice of location (i12). She is a close neighbour to Skags farm and would enjoy having the PV system close by as she is proud of it and wants to feel connected to it but adds that the most important thing is that the project comes through. Another informant, however, expresses that she prefers not to be the PV system's closest neighbour (i9).

Despite minor criticism, none of our informants are opponents of the new location. Some expect that there will be criticism (i6, i13) but others believe that there will not be much (i11, i12). People in Kräklingbo will be able to share their opinions about the location in a local meeting (i4, i8, i16). However, it will likely

be difficult to change the location if someone opposes it as the project team will try to convince people by explaining the technical and economic reasoning behind the choice of location rather than reconsider it (i4, i6).

The new location can cause problems for authorities like Region Gotland and Länsstyrelsen, which need to approve the land use, as it is taking up farmland (i13). However, as the area is small and not very productive farmland, the project team hopes that it will be approved (i4, i15).

5.2. Procedural justice

5.2.1. Leadership and decision-making

The project team has initiated the process of establishing a board and acknowledges that it is desirable to have a diverse group of people to move forward with different perspectives and competencies (i3, i8). As explained by one informant, the worst thing you can have in a board is full agreement "because in that way you don't have any development" (i11). However, the board's composition will give priority to people with experience in economics, technology, and law (i8). They mention that the first step is to establish a "pre-board" which, in cooperation with the project team, will decide who becomes part of the board (i3, i8). The pre-board will be responsible for securing broad representation in terms of both gender, age, knowledge, and "voices from the different villages" (i14). This suggests a focus on competency and qualifications in decision-making rather than a biased or preferential selection.

Half of the interested candidates for the board are pensioners who can volunteer without payment and the majority are men (i3, i11). Thus, there is a gender representation gap with fewer female board candidates (i3, i4, i9, i13). Some candidates are farmers seeking energy savings, some have experience from Vattenfall or are "technique freaks", while others are socially motivated as they enjoy collaborating with the community (i3).

The informants value the role of local enthusiasts who contribute to the project unpaid (i7, i11). The project team is composed of such individuals with a diverse range of skills. As one informant notes, "[n]one of them could have done it themselves" (i15). Wolfgang is described as a passionate "visionary" who strives "to make it a better world" and has a big-picture perspective (i13, i15). Per "has a lot of interest in technique and the economic part of it" and brings management experience to the team (i13, i15). Gunnar is seen as a "doer", while Mårten is described as knowledgeable and action-oriented (i13, i15). Despite

their differences, the project team is a relatively homogenous group of men, where most are retired, and all work with “strong dedication” (i12). One informant calls these passionate people “eldsjälar” – directly translated as “fiery souls” (i12). The informant explains that eldsjälar are the base from where the development is “going out to all the people in the society” as they “know the soul of the community. They know everyone, they know what is going on everywhere. (...) without them you won't succeed” (i12). Both the CE projects in Västerhejde, Dalhelm, and Austerland are driven by such eldsjälar (i2, i8, i10).

5.2.2. Meaningful participation

The project team is aware that local participation is crucial for the successful development of the project. Gunnar stresses that people should feel ownership and therefore the project team must involve them “from the very beginning” and incorporate local ideas (i14). However, as another informant notes, it can challenge the progress of the project if too many people are involved (i13).

The project has generated strong interest and involvement from the local community (i14). Bygdegården (the community centre) plays an important role in this as a physical meeting point (i13). Here, the project team has held open meetings with 50-100 attendees, which shows local interest (i12). One informant stresses that these meetings attract more people than other meetings in Bygdegården, possibly due to the project’s relation to the planet’s future, which is something that people also discuss privately (i12). Through these meetings, Austerland manage to involve a broad group of people who are used to attending meetings at this location about other topics as well which might explain the gender equality among the interested shareholders. Other informants emphasise that Austerland has been initiated "to do something for yourself and for the community" (i13) and that “these small projects, they can be part of really broadening the democracy and the way of thinking in democratic ways” (i5). This is in line with the main drivers behind local engagement identified by the project team: the economy and being part of something good for the neighbourhood, future, and climate (i3).

Despite this, an informant notes that some citizens might want to wait and see how the project develops before joining as they think “[i]t sounds a little bit crazy” (i9). However, the project team remains focused on taking action to keep people engaged. As Gunnar explains, “[n]ow you really have to start building something (...) because otherwise people get tired” (i14).

The project team is actively seeking local ideas by involving the community and sending out inquiries (i4, i8, i14). However, one of the challenges is the high share of summer houses, making it difficult to have

meetings which engage the whole community (i4). Additionally, concerns have been raised about the influx of new people building summer houses in the area, particularly regarding their potentially disproportionate influence on local development decisions (i5, i11, i14). While some informants suggest that it is important that the majority of the board live on the island year-round to represent their interests adequately (i5, i14), some summer guests are involved in government and national administration, which could add value to the project (i4, i11). Nevertheless, the project team acknowledges that both groups' perspectives must be taken into account, so they try to have meetings during the summer when many people move to their summer houses (i3).

To avoid conflict, the project team stresses the importance of having dialogue with involved actors, including the entire community, farmers, the school, and the church (i4). Therefore, the project team called for a meeting with landowners to discuss the project and involve them in the process (i4, i14). The informants also highlight the importance of careful consideration of different viewpoints to make the best decisions and avoid regrettable situations in the future (i3).

Despite these efforts, there are no formal mechanisms for community involvement in decision-making. Thus, the community relies on the project team, whom they trust and admire for their professionalism and communication skills (i9, i11). Even though some informants state that they have not shared their opinions with the project team, they do not express any dissatisfaction about not being involved: "I've been able [to share my opinion], but I haven't done it. Because I really don't have the need for it now" (i9). Even though people are used to having meetings in Bygdegården, some individuals may not want to speak up in big meetings and prefer to contact the project team in person (i15). Nonetheless, the informants believe that their viewpoints are being heard, and they feel comfortable sharing their opinions (i6, i12, i13, i15).

5.2.3. Access to information

The interviews provide insights into various aspects of information flows and the project participants' perceived level of information. An aspect highlighted is the individual's responsibility and ability to ask for clarification: "all they have to do is ask. (...) How should anyone know that you need information when you don't say anything? So, you had to take some own responsibility" (i13). Another informant acknowledges that she sometimes thinks, "why didn't I know that?" but then realises that if she had been more active, she would have known as the project team is "trying in a very good" way to inform people at the open

meetings and by email (i12). This suggests that some participants may feel that they are not receiving enough information but that they consider it their responsibility to address this gap by reaching out to the project team from whom people can always “get a very good answer” (i6).

The informants highlight the importance of physical meetings and face-to-face communication in disseminating information about the project. The project's unique infrastructure, in the form of physical meetings in Skolhuset and Bygdegården, is seen as crucial in enabling this communication (i4, i5, i12, i13). This also suggests that the citizens value interpersonal relationships and direct communication over more formal modes of communication, such as email or the project's website, which the project leader has not prioritised to keep updated (i3). In addition, the informants highlight the importance of informal settings, such as conversations over lunch in Skolhuset, in disseminating information about the project (i4, i6, i13). This type of communication is seen as essential, which suggests that the informants value informal conversations with the project team and other participants about the project.

The project team expresses that Energicentrum serves as an important expert and facilitator in information flows, aiming to strengthen collaboration with Austerland and other stakeholders such as GEAB, other CE projects, universities, and organisations (i1, i5, i14). Despite their central role in the island’s transition, Energicentrum, however, experiences a lack of expected support and information from the Swedish Energy Agency on how energy goals should be implemented on Gotland (i1). Furthermore, many informants express frustration about lacking information sharing from and cooperation with GEAB, which has caused bottlenecks and sudden changes in plans about the location of infrastructure (i4, i12, i15). This will be elaborated further in section 6.5.

5.3. Recognition justice

5.3.1. Knowledge about vulnerable groups

Gotland has an ageing population and some rural parts of the island experience a decline in permanent and an increase in part-time residents (Region Gotland, 2021). Furthermore, education levels and incomes are lower on the island compared to other regions (Region Gotland, 2021). Even though the increasing interest in the island’s coastal areas is leading to raising house prices and average income in Östergarnslandet, these issues are also present in this area creating inequality in terms of income and education (i4, i15).

Our informants are aware that some households are economically vulnerable which is exacerbated by high energy prices for both electricity and car driving, particularly for those who e.g. work in Visby and have to commute 100 kilometres daily (i3, i4). As a result, some people in the community do not have the financial means to become shareholders (i4, i9). Our data reveal that economy and knowledge are barriers to joining Austerland and vulnerability in Östergarnslandet, mainly affecting groups with low levels of education and income. The acknowledgement of barriers faced by these groups is limited but some informants note that not everybody may be able to invest in the project and suggest finding a solution (i4, i8, i9).

5.3.2. Recognition of women's role in leadership

Informants recognise the gender gap in the board and perceive it as a result of specific gendered characteristics, as men are considered more likely to be interested in the project since many of them are "technical nerds" (i4) who are more confident in their abilities and interested in technology, while women, according to our informants, may doubt their competence to be part of the board (i4, i9, i13). One informant expresses that this type of project is "not a woman project. (...) It's not the environment. Environment are women projects" (i11). This informant's gender description reflects a stereotypical representation of women and men that distinguishes between technical projects associated with men and environmental projects associated with women. Although such descriptions are repeated both directly and subtly in several interviews, they may attribute false values or opinions to women, which is an example of misrecognition of women's competencies and interests (Jenkins et al., 2016; Lazoroska et al., 2021). According to Eagly and Steffen (1984), stereotypes are related to unequal distributions of social roles, and both represent and distort reality. We are not in a position to judge to what extent the stereotype gender representations reflect reality and will instead discuss solutions to factors that according to informants affect the gender imbalance in section 6.3. However, while the project team recognises the importance of having gender balance in the board (i4, i11) and wants to "headhunt women into the board" (i3), engagement with financially challenged groups is perceived as more sensitive (i4).

5.3.3. Efforts to involve vulnerable groups

Vulnerable households often lack access to information and knowledge about CE projects due to limited access to social networks or individuals engaged in the project (Hanke et al., 2021). Gunnar acknowledges the importance of having individuals with both academic and practical skills involved in the project, as it

can ensure that the information shared is accessible to a wider range of people (i14). He suggests that some people may struggle with academic language or PowerPoint presentations and that it is important to make information broadly accessible (i14). Some informants confirm that there could be more information about the project and possibly a solution with a financial institution to enable these people to buy a share (i8, i11). As of now, the project team has not done anything to engage these groups specifically as "it's a tricky thing to do" due to the stigma associated with poverty: "Oh, you are so poor. Could I help? I mean, that approach. So you have to be careful" (i4). This shows that the project team is aware that knowledge sharing and advice should not become condescending and that sensitivity to and respect for different levels of education and income is crucial (Jenkins et al., 2016). Because of the sensitivity of the issue, there is in this case also a fear of addressing vulnerable groups directly, which precludes efforts to involve them.

There has been no report of conflicts with those who do not participate in the project (i12, i14) but there seems to be an openness to find ways to engage and address these groups who might need a little extra push to get involved (i8, i9). The project team could enhance recognition justice by proactively engaging with vulnerable groups while continuing to be mindful of stigma. This would allow them to access the benefits of Austerland.

5.4. Island identity

Previous studies have found that being located on an island is an advantage for implementing CE on the Danish island Samsø (Islar & Busch, 2016; Mundaca et al., 2018). Our data add to these findings as we have identified characteristics of the local culture, history, and mentality as well as a certain island identity on Gotland and in Östergarnslandet that favour the implementation of Austerland.

Östergarn is a vivid and active community where many social and cultural events take place (i9, i12). Informants describe that there is a strong tradition in Östergarn where the community "do things together" (i9) and "take care of things by themselves" (i13). As one informant expresses "there's a lot of doers", which the implementation of the water purification and fibre internet, the acquisition of the local school and Austerland are examples of (i15). This local mentality comes from the community's experience of not getting sufficient support from the municipality in Visby why they are used to taking responsibility if they need something (i4, i5, i8). Informants explain that this independence has to do with living in the countryside where people have to take more action and be independent of local authorities (i4, i5, i11,

i13, i15). The distance to Visby is thus an important factor in developing strong local activity (i4, i5, i14). The informants describe that living in a small community often means that you know your neighbours and their competencies well, which is important for starting a CE project (i7, i11).

Despite living in the countryside, the strong feeling of independence is also connected to being an islander:

> "[I]f you're living on an island with a barrier, with the sea going around, then I think that it's maybe more natural that you get closer together inside the island (...), you have to have a lot of things working on the island, and you can't be all the time very dependent on things coming from outside. (...) [T]here is a special mentality on an island." (i12)

Some informants emphasise that people on Gotland are proud to live there and of what they can do themselves (i8, i15). Some also emphasise that living on an island makes it important to be "resilient" (i6, i7). As one informant phrases it, "[i]f you have some chickens and some potatoes you could still eat if the ferries won't come for two weeks" (i7). The same informant adds that "sometimes the electricity goes out for the whole island" and therefore locally produced energy is important. Another informant describes that "there is an island identity on Gotland and an island in an island identity in Östergarn" (i6). Being located in the countryside *and* on an island are thus two important factors that favour initiating the Austerland project. Despite this, being on an island is not necessary for creating these favourable conditions for implementing a CE project since in "[s]ome remote districts of Sweden, you can have the same feeling of being a little bit isolated and connected" (i4). Island identity thus not only occurs on islands isolated by water.

The island-in-an-island mentality appears to have sparked a strong tradition in Östergarn of working together and being independent. The active community is fuelled by local associations like *Hembygsgården, Bygdegården, Skolhuset* and *Nygarn*, which create an important social infrastructure that makes the establishment of Austerland possible. In this way, the local mentality and island identity enable the project to be implemented and thereby enable the delivery of EJ. The experiences gained from Austerland, which are connected to the local culture, history and mentality can, therefore, be challenging to use in settings without the same degree of social cohesion and feeling of independence.

5.5. How does Austerland deliver energy justice?

In relation to *distributional justice,* the ownership model is somewhat unequal as it may create barriers for those with lower financial resources since more shares correspondingly lead to more economic benefits.

However, most people in the area have few barriers to joining. Our data indicate that the distribution of interested shareholders reflects the local community, which is characterised by a relatively old, educated, and wealthy population. The high share of summer houses causes increasing house prices in Östergarnslandet, which exclude young low-income groups from moving to the area and being a part of the project. Furthermore, it is mainly permanent residents who cannot afford to buy a share. The location does not appear to be controversial in the community or disproportionately disturb certain groups, but it can be problematic if criticism arises as there seems to be no option to move the location due to the grid connection. Overall, the majority of the community has access to the benefits provided by Austerland, but the project does not fully deliver distributional justice, as young low-income groups appear to remain underrepresented.

The project team is making genuine efforts towards *procedural justice* by trying to ensure a lack of bias in decision-making and by recognising the importance of having diversity in the board and prioritising people with skills and interests. However, still there is a representation gap in the leadership with a majority of retired men engaged. The project team is aware that local knowledge mobilisation and participation are crucial for the successful development of the project, and the project has generated strong interest and involvement from the local community. The social infrastructure around Bygdegården and Skolhuset plays an important role as a physical meeting point, but there is room for more formal mechanisms for community involvement in decision-making.

Particularly in relation to low-income groups, the project does not fully deliver *recognition justice*. Informants acknowledge economic and educational vulnerability as a barrier for some households to become shareholders, which is perpetuated by high energy prices. The project team is aware of the need to be sensitive and respectful towards different levels of education and income, but due to the stigma associated with poverty, proactive efforts to engage with these groups are lacking. Furthermore, the informants perceive the gender gap as rooted in gender-specific characteristics, where men are perceived as more interested and confident in their abilities due to their technical skills, while women may doubt their competence.

Whereas many of these findings confirm previous research on CE's potential and challenges in delivering EJ (Allen et al., 2019; Hanke et al., 2021; Islar & Busch, 2016), they also reveal novel perspectives. Specifically, we find an equal gender divide among members, with more women in the shareholder group than expected, which is atypical in CE projects. However, the unintended consequences that a high share

of summer houses have on distributional justice for particularly young, low-income groups suggest that measures are needed to ensure that CE does not exacerbate existing inequality in the community. Additionally, a strong island identity, which favours project implementation is identified, with Austerland being an island in an island. Furthermore, the community perceives GEAB as a conservative bottleneck, and there is a notable focus on the climate and environment, unlike Islar and Busch's (2016) study, which found that economic benefits were the primary motivation for the CE projects.

Our results give rise to a lot of new questions: How does a high share of summer houses influence the way we define community and the valuation of different opinions in decision-making? Why are women underrepresented in CE leadership when they are equally represented among the members? What is the role of local social infrastructure in establishing CE projects? Are the barriers to CE implementation technical, legislative, or a question of mindset? And what changes are needed to overcome barriers to participation rooted in lack of time from everybody of working age? In section 6, we will discuss these questions and where we, from an EJ perspective, see a potential for improvement based on our findings.

6. Discussion

As evidenced by the Austerland case, there are challenges for CE to deliver EJ. While the project leaders can influence how inclusive and equitable the project process and model are, it is essential to recognise that some factors are beyond the project's control and require systemic changes. Drawing on the analysis, local visions from citizens in Östergarnslandet, Dalhem, and Västerhejde, and other related studies, we will discuss measures that can be implemented *to improve CE projects' ability to deliver EJ on Gotland.*

6.1. Local visions

The informants envision a community-oriented and holistic approach to the local energy transition on Gotland, with more CE projects, improved energy infrastructure, and integration of RE sources into local economic activities (i8, i15). They emphasise the need to overcome legal and regulatory obstacles and increase local involvement, with a focus on inclusivity, cooperation, empowerment, and pride in local initiatives (i4, i9, i11, i14). Local engagement, ownership, and community cohesion are key themes in their vision, with a desire for self-sufficiency and a fossil-free future (i5, i6, i7, i15). They highlight the importance of local prosumers in a decentralised model (i4, i14, i15) and the role of storage facilities and automation in energy usage to allow for a balanced and efficient energy system (i10, i15). Using schools as a platform for educating children about sustainable energy is also mentioned (i4, i15).

These visions are in line with the EJ framework and should be included in the energy transition to promote energy democracy and community engagement (Braunholtz-Speight et al., 2021; Johansson et al., 2022), leading to a higher degree of acceptance and strategies tailored to local energy needs (Brummer, 2018; Gross, 2007).

6.2. Resourceful communities: A double-edged sword

We have identified a distributional justice issue as the summer house owners are economically better equipped to live in Östergarnslandet and join Austerland than permanent residents. The summer house owners, however, also contribute with economic value and knowledge which benefit Austerland.

Informants emphasise that Östergarnslandet has a good mixture of people who have lived there for generations, who know and care about the local community (i4, i6, i8), and "people from outside that come with new perspectives, new ideas, but also with maybe a little bit of money" (i4). Together with the

community's island identity identified in section 5.4, the population mix creates extremely good conditions for establishing a CE project. Austerland thus follows the general trend of an overrepresentation of resourceful persons in CE projects (Hanke et al., 2021). Therefore, it is not coincidental that Austerland is located in Östergarnslandet. It would likely be difficult for similar projects to emerge in socially vulnerable neighbourhoods with low income and education, especially if there is also a lack of time, energy, and social cohesion as these are all important factors that enable CE implementation. From an EJ perspective, this is however problematic as vulnerable groups are more in need of CE's benefits. Therefore, CE projects in vulnerable neighbourhoods could make a greater impact on delivering EJ.

An informant refers to summer house owners as "a double-edged sword" (i6) due to the positive and negative impacts they bring. Questions such as who belongs to the community, who has priority to use the area's energy resources, and whether summer house owners should have the same say in decision-making are therefore relevant for the community to reflect on together to ensure that permanent residents are prioritised in the project.

Changes in Austerland's ownership model, such as offering more shares with lower share prices, equal access to outcomes irrespective of the number of shares, and adjusted energy tariffs based on economic capital could improve access for vulnerable groups. Currently, the project team considers cooperating with a financial company to offer loans to individuals who cannot afford a share, which can be an option for people with poor banking relationships (i8). This cooperation is, however, uncertain as it has not been implemented yet (i4, i8). Still, it shows efforts to improve access for low-income groups, even though this solution creates higher total costs for borrowers due to interest payments. The underrepresentation of young low-income groups in Östergarnslandet is, however, beyond the control of Austerland as the problem is more structurally rooted. Young people are interested in living there but are pushed out because of the rising house prices (i6). In order to solve this problem, requirements for houses to be used as year-round residences could be introduced, as has been done on the Danish island Bornholm (Bornholms Regionskommune, n.d.). The Swedish state or region could facilitate the engagement of vulnerable groups in CE on Gotland by utilising support schemes such as subsidies and feed-in tariffs and promoting awareness of these financial support options, particularly in socially vulnerable neighbourhoods (Stewart, 2021).

6.3. Women's representation in leadership

Our findings show that women are underrepresented among board candidates, which is a common problem in CE projects, which tend to be dominated by men (Lazoroska et al., 2021). Several prevailing stereotypes of men and women dominate our informants' understanding of gender imbalance. It is a common perception that women often do not believe they have sufficient knowledge to become a board member (i4, i9, i13). In the following quote, the informant answers our question on how she thinks more women can be included in the board:

> "[M]aybe it's so easy just to ask them. And they say, 'oh, I'm not the engineer. Oh, Pelle, he's so well-educated'. 'Yeah, but now I ask you. I don't ask Pelle, I ask you. Because I want to have you on the board'. Instead of saying 'OK, she doesn't want. Pelle, come'." (i9)

Her answer indicates that complicated measures are not necessarily needed to solve the problem and that women simply need a direct invitation to join the board. Since the problem is rooted in deeper structural gender inequalities, it is, however, worth questioning whether it is as easy to solve the problem as it may appear.

Erlandsson (2019) finds that there is a pro-male bias in the Swedish labour market where male recruiters contact male applicants more often than female applicants. It is not unlikely that similar social mechanisms will take place when the board members are chosen. The project team's prioritisation of board members with skills and good reputations (i14) will likely favour people they know personally or through others. As communication about Austerland often takes place as informal discussions (i4, i6, i13), it potentially contributes to a biased selection of board candidates where the pre-board and project team headhunt their friends or acquaintances. To avoid this, it is important that the selection of board members is based on a formal approach. A democratic selection of board members, where all shareholders can vote, will not necessarily solve the problem given the social dynamics in Östergarnslandet where more men than women appear to be willing to run as board candidates. One solution to solve the unequal gender representation is to use selection methods known from deliberative democratic processes, such as citizen assemblies selected through stratified sampling. In stratified random samples of citizens, the selection is bounded or adjusted by democratic quotas to ensure the sample matches those of the population (Gastil & Richards, 2013). If Austerland's board was selected through stratified random samples based on Östergarnslandet, the gender representation would match the local population. Other variables such as age, education, income, and parish could also be added to the selection to strengthen the representative selection.

6.4. Time for change?

As reflected by the project team and board candidates, Austerland is primarily led by retired men. Informants explain that retired people's willingness and ability to work voluntarily are crucial for Austerland's success (i5). The two initiators of the CE project in Dalhem also emphasise that it is essential that the male initiator "has so much energy and drive and he's retired" as the female initiator is busy with her "[f]amily, kids, dog" (i7). In this way, time is an important factor in the overrepresentation of retired people among the leaders of the CE projects.

Lack of time can also be an explaining factor for women's underrepresentation among Austerland's leaders. As Lazoroska et al.'s (2021) study about gender representation in CE projects shows, women spend more time on care labour at home than men, and therefore men might have more free time. This can explain why men have a higher probability of doing voluntary work than women and why men tend to take the lead in voluntary organisations such as CE projects (Lazoroska et al., 2021).

In addition to time's impact on gender representation, our findings also indicate that time creates a misrepresentation of younger people among CE shareholders. As emphasised by a representative from Energicentrum, it is harder to engage "younger people who just had children (...). They are so busy in their life at the moment. They will not have time to think about these things" (i1). This shows that it is difficult for many people to balance a full-time job and family life with active participation in CE activities.

If elderly men have more time to participate in CE leadership as our findings and previous research suggest (Lazoroska et al., 2021; Radtke & Ohlhorst, 2021) it challenges CE projects' ability to acknowledge divergent perspectives and provide access to outcomes and decision-making for all groups and thus deliver EJ. If women are to have more time to engage in CE projects, the division of labour in the home should be addressed to free up more time for women to volunteer. Promoting and normalising part-time work could further free up time for younger people for local democratic engagement such as CE projects. To ensure that this does not exacerbate economic disparities it would require that wages do not decrease correspondingly, as those with greater financial resources are more likely to be able to work less. These suggestions can, however, not be solved by CE projects alone, but requires wider societal changes in gender roles and the work culture.

6.5. Technical limitations, legislative barriers, or conservative grid owner?

Austerland faces several external barriers to its project implementation, which will most likely also challenge future CE projects on Gotland. Even though these are multifaceted, they mostly come across as frustrations over conservative grid ownership. Some informants express disappointment with the poor cooperation with GEAB who does not actively support local CE:

> "[T]hey have been a turd, a dog shit under our shoe the whole time. They've been really not helping whatsoever. (...) they're used to a certain sort of process and we're doing the absolute opposite. I mean, they're used to providing energy for us (...) but we're a lot of people who want to provide energy to them." (i15)

There is an understanding that GEAB may be occupied with running the grid due to past grid failures on Gotland just as they do not have a dedicated "development unit" (i3). However, Wolfgang remains hopeful that they can strengthen the cooperation with GEAB to realise their visions (i3). Some informants believe that GEAB will have to "adapt to what EU says" and develop a net plan that supports a more flexible energy system with local prosumers to not fall behind (i2). This challenge, however, partly goes beyond regional disagreement between GEAB and the community.

According to REDII, member states must assess existing barriers to developing RECs, but no such assessment has been made in Sweden. In Bill 2021/22:153 Genomförandet av elmarknadsdirektivet, the Swedish government states that the current legislation does not hinder CE implementation and that new regulation to meet the requirements of REDII is not needed (Palm & Boije af Gennäs Erre, 2022). The government refers to the legal change in the IKN law, which allows the installation of ground cables between production facilities and nearby buildings for sharing or storing energy, making it easier for CE projects to share electricity (Energimarknadsinspektionen, 2021; Palm & Boije af Gennäs Erre, 2022). However, there are no regulations for virtual grids, which would facilitate the exchange of energy among community members without "digging 800 meters and putting down cables when you really don't need it" (i7). Even though the Swedish government is positive towards CE, the country's current legislation does not specifically promote CE and a study concludes that the challenges outweigh the opportunities in the Swedish context (Mattsson, 2021). Austerland is therefore at the forefront of development and "pushing the legislations" why they feel the need to "get GEAB in [their] corner" (i15).

This suggests that the lack of support from GEAB may be a result of limited resources allocated for development and the absence of a clear legal framework and regulations for virtual grids and CE in

Sweden. It emphasises the need for new national agreements to deal with the conditions created by CE projects.

6.6. Recommendations

In Appendix 2, a causal loop diagram visualises the causalities between central findings from sections 5 and 6. Below, we recommend the implementation of several measures based on our findings which will strengthen CE projects' ability to deliver EJ on Gotland.

Some of the barriers faced in this regard can be addressed by CE project leaders. These include changes in the ownership model such as offering more shares with lower share prices, equal access to outcomes despite the number of shares owned, and adjusted energy tariffs based on economic capital, which can improve access for vulnerable groups without stigmatising them. To improve gender equality in leadership, we recommend selecting board members based on a democratic formal approach e.g. with inspiration from deliberative democratic methods such as stratified random samples of local citizens.

Other barriers for CE to deliver EJ are, however, beyond the control of CE projects and require broader structural and cultural changes. To avoid young low-income groups on Gotland being marginalised from ownership because of increasing house prices, requirements for houses to be used as year-round residences could be introduced by the region. We recommend that the Swedish government or region apply support schemes, such as subsidies and feed-in tariffs, to improve access to CE for vulnerable groups. Improved gender equality in society demonstrated by reduced gender stereotypes and equality in care labour at home could contribute to women's representation in leadership. Previous studies also indicate that women can inspire other women to engage in energy-related activities (Łapniewska, 2019; Osunmuyiwa & Ahlborg, 2019). Changes in the work culture that promote and normalise part-time work could also improve equality in care labour and improve younger people's time to engage in CE. To improve cooperation with GEAB, we recommend that a development unit is established within GEAB with national support to strengthen the capacity to support the development of CE. Furthermore, the Swedish government could support CE projects by enacting the EU directives REDII and IEMD and developing regulations for virtual grids.

7. Conclusion

In this thesis, we have examined the potential of CE projects for delivering EJ on Gotland by drawing on data from the Austerland CE project collected during fieldwork on the island in March 2023. We find that Austerland's ownership model creates barriers for low-income groups to become shareholders, but most people in the area have few barriers to becoming shareholders. The distribution of interested shareholders reflects the local community, which is characterised by a relatively old, educated, and wealthy population. However, the high share of summer houses and increasing house prices in Östergarnslandet exclude young low-income groups from moving to the area and being part of the project. The project team has made efforts towards procedural justice by prioritising diversity in the board, generating strong local interest and involvement, and utilising social infrastructure. However, the gender gap in leadership persists, with women being under-represented, which is perceived to stem from gender-specific characteristics. Economic and educational vulnerability are to some extent recognised as barriers to becoming a shareholder, but the project team lacks proactive efforts to engage with these groups. While these findings highlight that Austerland demonstrates efforts to deliver EJ in relation to all three justice tenets, they also reveal that there are issues with fully delivering EJ, especially regarding distributional and recognition justice.

Drawing on our case study, we recommend implementing measures which will improve CE projects' ability to deliver EJ on Gotland more broadly. CE project leaders can address barriers to distributional justice by implementing changes to the ownership model that will improve access for vulnerable groups, while gender equality in leadership can be improved through democratic formal approaches to the selection of board members. Barriers to delivering EJ beyond CE projects' control require structural and cultural changes. To address these, the region could, in Austerland's case, require year-round residence for housing to prevent the marginalisation of young low-income groups due to increasing house prices. To improve access for vulnerable groups in CE, the Swedish state or region could apply support schemes such as subsidies and feed-in tariffs. Improved gender equality in society, women inspiring each other to engage, and work culture changes could enhance leadership diversity. To improve cooperation with GEAB, we argue that a development unit should be established with national support just as the Swedish government will enable smoother implementation of CE projects by enacting EU directives and developing virtual grid regulations.

The Austerland CE project is an example of how meaningful community participation can increase local acceptance and drive the success of a RE project. This confirms previous research on CE, but our study also reveals novel perspectives. The equal gender distribution among members is atypical in CE projects, and the high share of summer houses has unintended consequences on distributional justice for young, low-income groups. The island identity is particularly evident and unlike previous studies that found economic benefits as the primary motivation, we identified a notable climate and environmental focus.

The EJ framework has served as a guiding analytical tool useful for mapping justice potentials and challenges in our data. The framework's comprehensiveness allows a holistic assessment of justice dimensions revealing how justice issues are highly interconnected. Focusing on one of the tenets could offer a more in-depth analysis, but this would leave out important justice aspects.

Overall, our findings highlight the potential and challenges of CE projects in delivering EJ on Gotland. We argue that while CE has a huge potential to deliver EJ on Gotland and beyond, this can only be fully realised if barriers are addressed with regional and national support.

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Appendices

Appendix 1: Overview of data collection

Interviews

Interviewee	Organisation	Role	Date	Interview type	No.
Anonymous	Energicentrum Gotland	Technical project leader	02-02-2023	Individual online interview	i1
			06-03-2023	Individual interview	i2
Wolfgang Brunner	Austerland	Project leader	02-02-2023	Individual online interview	i3
			07-03-2023	Individual interview	i4
Five residents of Östergarnslandet	Austerland	Community representatives	02-03-2023	Focus group interview	i5
Anonymous	Austerland	Interested shareholders	02-02-2023	Individual interview	i6
Anonymous	Dalhem	Project initiators	03-03-2023	Joined interview	i7
Per Flink	Austerland	Project team member	04-03-2023	Individual interview	i8
Anonymous	Austerland	Interested shareholders	04-03-2023	Individual interview	i9
Anonymous	Västerhejde	Project initiator	08-03-2023	Individual phone interview	i10

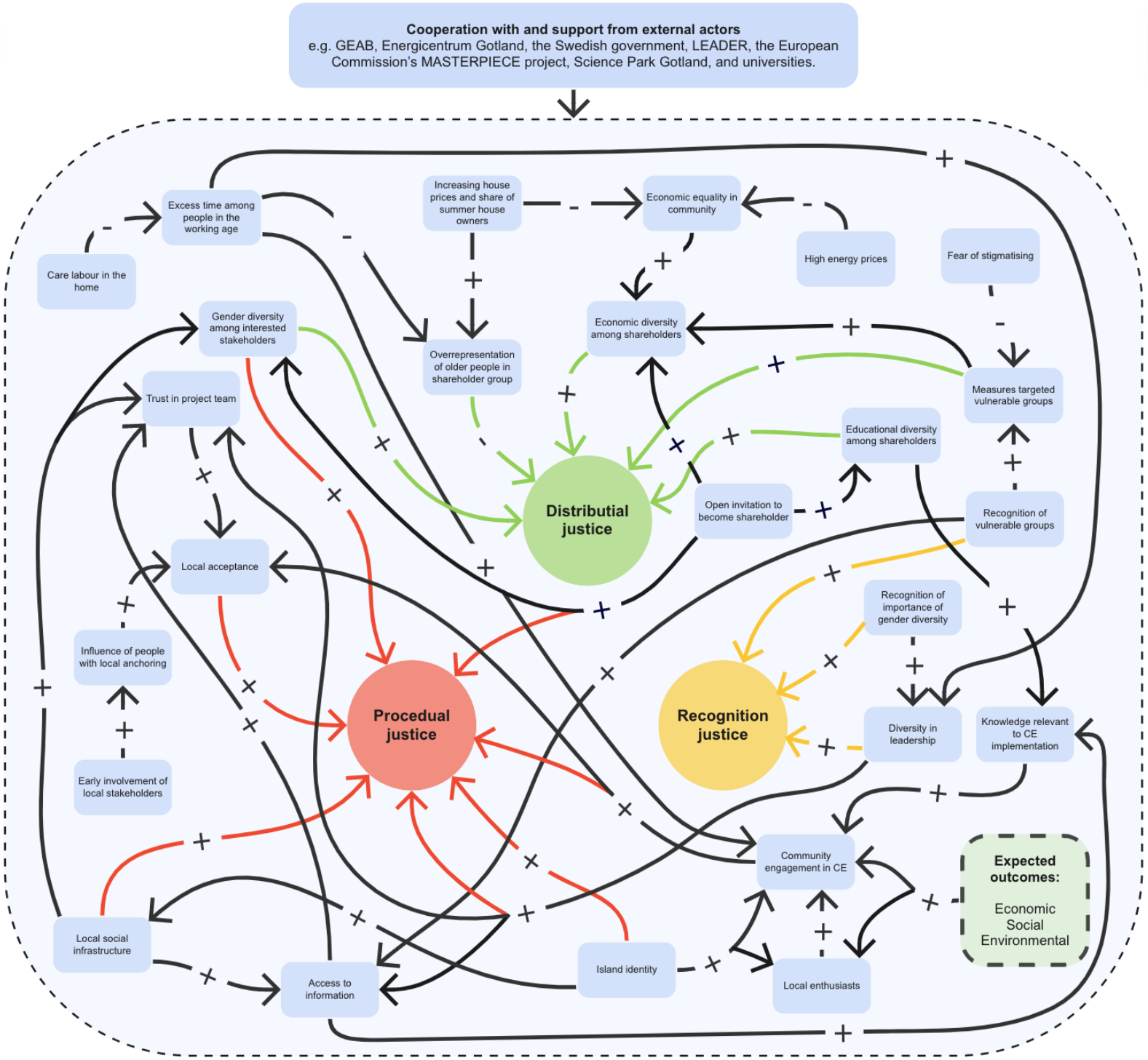
Anonymous	Austerland	Interested shareholders	09-03-2023	Individual Interview	i11
Anonymous	Austerland	Interested shareholders	09-03-2023	Individual interview	i12
Anonymous	Austerland	Interested shareholders	09-03-2023	Individual interview	i13
Gunnar Bendelin	Austerland	Project team member	10-03-2023	Individual interview	i14
Anonymous	Austerland	Interested shareholders	10-03-2023	Individual interview	i15

Observations

Setting	**Location**	**Date**	**No.**
Meeting with Austerland incl. landowners regarding the new location for the production facilities	The old fire station, Kräklingbo	05-03-2023	o1
Meeting with the leading group regarding the next steps incl. information to the community, the establishment of the economic association, and technicalities regarding the size and location of the solar park	Skolhuset, Östergarn	10-03-2023	o2
Lunch with members of Austerland	Skolhuset, Östergarn	02-03-2023	o3

Appendix 2: Findings visualised in a causal loop diagram

To sum up, we have visualised casualties between central findings in the causal loop diagram (CLD) below. The CLD shows how factors and elements analysed and discussed in sections 5 and 6 are connected and interdependent in a system. Gotland constitutes the CLD's system boundary. Influencing factors highlighted in our data that go beyond this system boundary are illustrated outside the dotted line. By identifying relationships between structures and behaviour, we shed light on how the system works which is necessary for recommending effective solutions (Meadows, 2008). The systems approach that this CLD model offers, provides one lens to analyse how elements are connected in a system and depict a simplified version of reality (Meadows, 2008). By highlighting how our findings are interconnected, the CLD also illustrate that possible interventions to solve justice issues potentially will impact other parts of the system, which must be taken into consideration when planning measures to improve energy justice.


Cooperation with and support from external actors
e.g. GEAB, Energicentrum Gotland, the Swedish government, LEADER, the European Commission's MASTERPIECE project, Science Park Gotland, and universities.
Excess time among people in the working age
Increasing house prices and share of summer house owners
Economic equality in community
Care labour in the home
High energy prices
Fear of stigmatising
Gender diversity among interested stakeholders
Economic diversity among shareholders
Overrepresentation of older people in shareholder group
Trust in project team
Measures targeted vulnerable groups
Educational diversity among shareholders
Distributial justice
Open invitation to become shareholder
Recognition of vulnerable groups
Local acceptance
Recognition of importance of gender diversity
Influence of people with local anchoring
Procedual justice
Recognition justice
Diversity in leadership
Knowledge relevant to CE implementation
Early involvement of local stakeholders
Community engagement in CE
Expected outcomes:
Economic
Social
Environmental
Local social infrastructure
Island identity
Access to information
Local enthusiasts

Appendix 3: Interview guide example

Informants: Local community members in Östergarnslandet, Gotland.

Briefing	
Presentation of the interviewers and the purpose of the project	We are currently writing our thesis project in Environmental Studies and Sustainability Science at Lund University. Our thesis is about the energy transition in Gotland and how the local community is represented and involved in the process. Our focus is on community energy also called *Energigemenskaper.* Therefore, we are interested in learning more about Austerland and your engagement in the community energy project and your experiences with being a member, if you are one. Is it OK that we record the interview? X will be leading the interview and X will observe and ask follow-up questions. We will use the interview as data for our thesis, and if you prefer you can remain anonymous. We are interested in your experiences and opinions, so there are no wrong or right answers. If something is unclear, please ask. The interview will be in English, but if there are words you don't know in English, you can always switch to Swedish. Do you have any questions before we start?

Research elements and indicators	Interview questions

Introductory questions about the informant's relationship with Austerland	First, we would like to know a little about you:
	● How old are you?
	● Where do you live in Östergarnslandet? For how long have you lived there?
	● What is your educational background?
	● What do you do for a living?
	
	● Have you signed up to be a member of Austerland Energigemenskap (hereafter Austerland)?
	  ● If yes → What motivated you to sign up?
	
	● Have you been engaged in other ways in Austerland?
	  ● If yes →
	  ● How did you get involved?
	  ● When did you join the project?
	
	● How would you describe Austerland to someone who does not know it?
	
	● Do you think there is anything about the history, culture or mentality of the people living in Östergarnslandet that may have favoured the setting-up of the project?
	● Is there a sense of island identity amongst the citizens of Gotland more broadly?
	  ● If yes → Do you think this has favoured the setting-up of the project?

Block 1: Distributional justice	
Research elements and indicators	**Interview questions**
Element: Access to outcomes in the form of benefits and services Indicators: ● Ownership model	● How does Austerland work in terms of ownership? ● Have you bought a share in Austerland or are you planning to do so? ● If yes → ● How big will your share be and how much will you invest? ● Do you expect that you will save or earn money on energy by being a member?
● Member diversity	● Do you know if there are people of different ages, gender, educational background and interests that have shown interest in being a member of Austerland? ● Would you describe it as a diverse group? ● Can you describe the average member?
● Location of infrastructure	● Where will the solar cells be located? ● What do you think about this location? ● Were the members and the other local residents in Östergarn able to share their opinion about the choice of location?
● Energy services targeted for vulnerable groups	● Do you know if everyone will pay the same in energy tariffs (*energiavgift)*? ● Do you know if there will be schemes (for example specific loans or solidarity funds) to enable poorer people in the community to participate?

Block 2: Procedural justice	
Research elements and indicators	**Interview questions**
Element: Decision-making Indicators: ● Lack of bias on the part of decision-makers	● Who have been the key people running the project? ● What skills and characteristics do they have? ● What is your impression of the team leading the project? ● How are decisions about the development of the community energy project made?

● Meaningful participation in decision-making &	● How is the relationship between the group leading the project and the people living in your community?
	● Have you shared your ideas or opinions about Austerland, if you have had any, with the project leaders?
	  ● If yes → Do you feel like your viewpoints are being heard and considered in decision-making?
	● Have the project group involved you in decisions about Austerland?
	  ● If yes → How?

_____ **Element: Consultation process** Indicators: ● Free prior informed consent for energy projects	● Are there any opponents or critics of the siting of infrastructure? ● If yes → How did the project group respond to this?

● Representation in institutions	● Wolfgang has told us that a board has been established. Do you know of this?
	  ● If yes →
	  ● How would you describe the average member of the board?
	  ● Would you describe the board as a diverse group?

_____ **Element: Information sharing** Indicators: ● Access to high-quality information ● Mobilisation of local knowledge ● Information disclosure _____ **Element: Access to membership** Indicators: ● Reduced membership fees ● Lower share prices for vulnerable groups	● Do you feel well-informed about the development of Austerland and the energy transition in your area? ● How do you mainly receive information about this? ● Do people from the local community have the opportunity to bring their local knowledge about Östergarn into the discussions about Austerland's development? ● Is there, to your understanding, any procedure for how this knowledge is collected and shared? ● Have you experienced that action has been taken to engage the people living in your community in order to get them on board as members (e.g., actions to attract their attention, gain trust or meet their needs)? ● Do you know if there are any mechanisms incorporated into the project which makes it easier for people, who might not otherwise become a member, to join? (e.g. reduced membership fees or lower share prices for vulnerable groups)

Block 3: Recognition justice	
Research elements and indicators	**Interview questions**
Element: Awareness of vulnerable and/or marginalized groups Indicators: ● Level of knowledge about vulnerable households ● Awareness of differences in domestic energy needs and living situations _____ **Element: Engagement with vulnerable and/or marginalized groups** Indicators: 1. Direct engagement with vulnerable groups	● Do you know of any groups in Östergarn who might not have the skills or resources that are needed in order to become a member of Austerland? ● If yes → ● What do you think their main barriers to becoming a member are? ● Do their living conditions influence their energy needs differently than other citizens in the community? If yes to the first question in this block: ● How is the relationship between the group of people who lead the development of Austerland and the people living in your community who are not able to become a member? ● Have there been any efforts to engage with these groups regarding Austerland? ● Have there been any conflicts with the people in your community who are not able to be a member? ● If yes→ How were they addressed?

2. Addressing vulnerable groups in the official organisational communication	● Have these groups of people to your understanding been addressed directly in official communication about the project? (e.g., in reports or on the website)

Block 4: Visioning	
Research elements	**Interview questions**
Representation of local visions	
For Austerland	● Try to imagine Austerland as a successful community energy project ten years from now - what would it look like? *(e.g. related to the physical facilities, the organisational structure, or the distribution of economic benefits)* ● Who would need to do what to make this vision possible?

For Gotland	● What are your wishes for how Gotland's energy transition should develop in the future?
	● What are the most important things to focus on when transitioning the island's energy sector?
	● Who would need to do what to make this vision possible?
	● What role do you think community energy should play in Gotland's transition?
	● Now try to imagine that several new community energy projects are about to be established all over Gotland.
	  ● Based on your experiences from Austerland, what would you recommend other community energy projects to include or be aware of?
	  ● What would you recommend other community energy projects to avoid or do differently?

Debriefing	
Rounding up the interview	Thank you, I think you gave us a lot of very important information. Is there anything you would like to comment on or elaborate on? Is there a question we did not ask that you think is very important?
Practicalities	Is it okay that your responses are included in our final paper which is posted on the Lund University database and potential scientific publications (you will remain anonymous if you prefer)? Is it okay if we contact you later in the process if we have follow-up questions? Thank you very much for your help and time! Please feel free to contact us later if you have any questions at a later date.