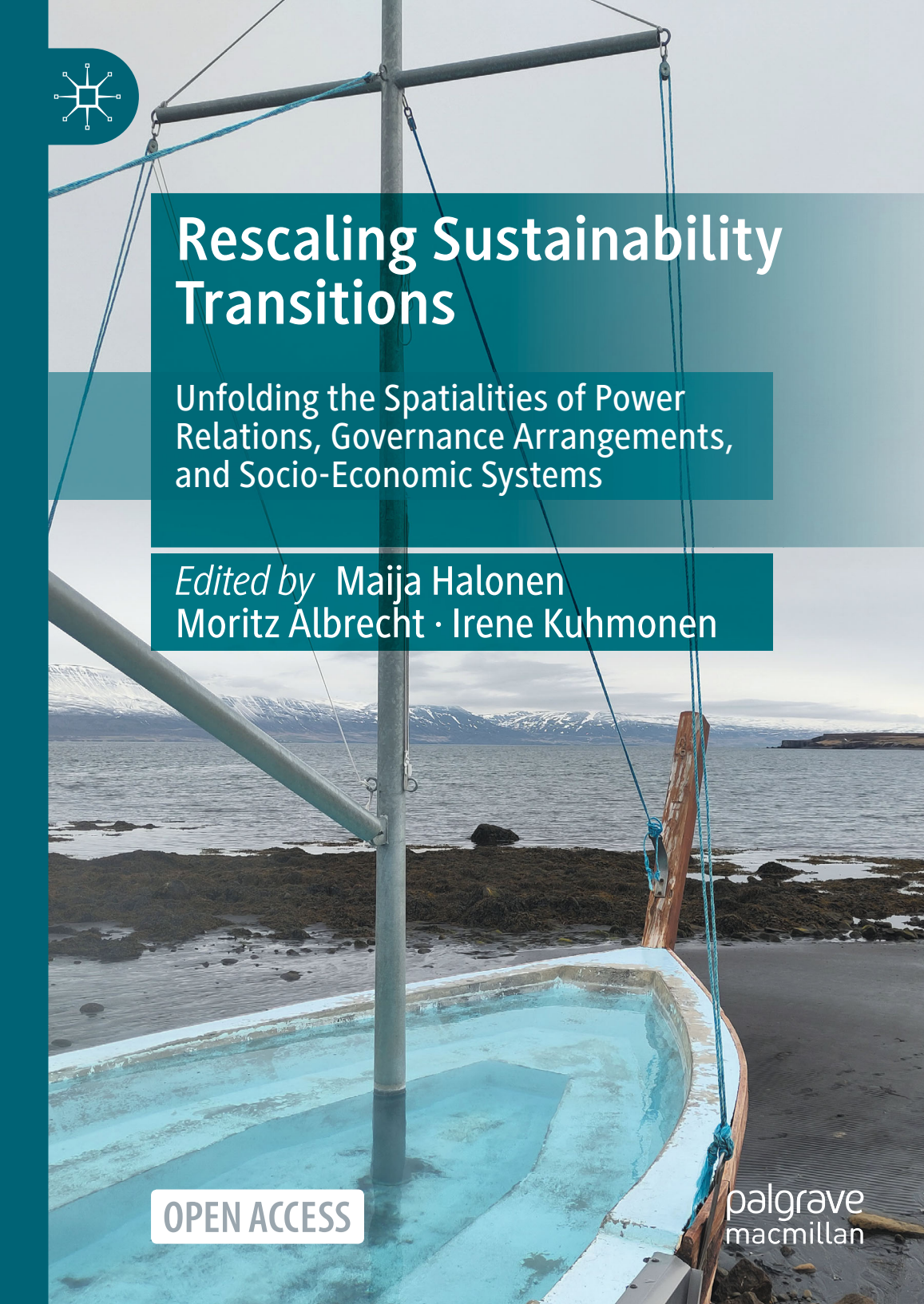
Rescaling Sustainability Transitions
Unfolding the Spatialities of Power Relations, Governance Arrangements, and Socio-Economic Systems
Edited by Maija Halonen
Moritz Albrecht · Irene Kuhmonen
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Preface

The journey to prepare this book slowly took form following the Nordic Geographers' Meeting 2022 at the University of Eastern Finland in Joensuu. The sessions organised by Maija Halonen, Moritz Albrecht, and Irene Kuhmonen related to various aspects of sustainability transitions and their socio-spatial processes piqued the interest of the Geography and Environment book programme at Palgrave Macmillan, which suggested editing a book related to this research interest. Following some debates and considerations, we quickly concluded that focusing on the rescaling of sustainability transitions would be a topic that relates in one way or another to each of our academic interests. Our various academic and conceptual approaches towards the topic sparked some tensions and revealed different perspectives on how to understand and approach both rescaling and sustainability transitions in research. It was exactly these constructive tensions and the supplemental value between different academic points of view that we wanted to highlight in this book. Naturally, these different approaches are visible throughout the chapters as the search for contributors to this book followed the editors' conceptual tastes to a certain degree. Yet, as the reproduction of space unfolds from the multiple frictions and partial alignments of its components, we hope this book and its multiplicity of perspective, provides added value to understand the rescaling of sustainability transitions.

While there have been losses along the way, we are very content that the process resulted in a set of diverse yet aligned contributions

to this book. All of them (Chapters 1–12) have undergone an external peer-review process, containing multiple steps of commenting and revisions. Hence, we would like to thank the valuable contributions of the reviewers for their time, expertise, and constructive comments given for each chapter. We are grateful to Rachael Ballard, Naveen Dass and Chitra Gopalraj and the rest of the editorial team in the Palgrave Macmillan for all their help and guidance throughout the process. Finally, we would like to express our gratitude to the Department of Geographical and Historical Studies (University of Eastern Finland) and the Jyväskylä School of Business and Economics (University of Jyväskylä) for providing the funding to publish this book as an open access publication. In addition, Maija Halonen acknowledges the financial support from the Kone Foundation [Sixth cycle in the periphery, 29.11.2019], and Irene Kuhmonen the Strategic Research Council at the Academy of Finland [Project 'Biodiversity Respectful Leadership (BIODIFUL)', grant number 345884]. We hope this book will provide input for the critical discussion about sustainability transitions, especially their spatial arrangements, power hegemonies, and capacities to provide just and inclusive ways forward.

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Maija Halonen is a university lecturer at the Department of Geographical and Historical Studies, University of Eastern Finland. Her research interest lay at the socio-economic development of peripheries and rural areas—especially from the perspectives of industrial development, resource use, and societal changes. She is particularly keen on adaptation, and local reflections on sustainability transitions. In the current project CYPER (funded by Kone Foundation), she engages in sustainability transitions in regional peripheries, and forest-bioeconomy.

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Martin Mateus currently works in policy development for clean energy transitions. His research examines how off-coal regulations at provincial and federal levels have directly impacted local governments, as well as how local governments engage in innovative and entrepreneurial activities to manage economic transition processes in the face of senior government reform. Martin holds a master's degree in Resource and Environmental Management (Planning) from Simon Fraser University.

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Laura Sariego-Kluge is an early career academic based at the Universidad de Costa Rica. Her studies include a Ph.D. in Economic and Political Geography (Newcastle University, UK); an M.Sc. in Local Economic Development (London School of Economics and Political Science, UK). She has experience conducting research using mixed methods and comparative case studies. Her publications include topics such as Central American economy and integration; cooperatives and fair

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CHAPTER 1

Introduction to Rescaling Sustainability Transitions

Maija Halonen, Moritz Albrecht, and Irene Kuhmonen

Introduction

Sustainability transitions have received burgeoning research interest over the past decade as a response to the accelerating problems of the Anthropocene including climate change, biodiversity loss, environmental degradation and the often-accompanying social injustices (Ciplet & Harrison, 2020; Geels et al., 2023; Köhler et al., 2019; Markard et al., 2012; McCauley & Heffron, 2018). The increased interest to address and conceptualise sustainability transitions and their socio-spatial processes have sparked a myriad of research trajectories framed in various ways.

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Often inducing a normative agenda regarding certain preferred global transition pathways, these transformative processes are manifested, materialised and their consequences lived and experienced through various scalar settings. Within this scientific and public debate, the scope of what sustainability transitions imply, aside from their shifting properties of socio-spatial fabric towards more sustainable performance, has been wide-reaching and includes sectoral (Albrecht et al., 2021; Halonen et al., 2022; Lamine et al., 2019) and socio-economic systems transitions (Kanger et al., 2022), politics of transitions (Avelino et al., 2016; Hess, 2018), sustainable finance (Dörry & Schulz, 2018; Esposito et al., 2019; Geels, 2012) and socio-cultural ruptures (Häyrynen & Hämeenaho, 2020), as well as individual repositionings (Huttunen et al., 2021; Kaufman et al., 2021) to name only a few prominent examples. With a dominance of sustainability transitions approaches framed in a multilevel perspective (MLP) framework (e.g. Geels, 2002; Laakso et al., 2021), research on the variegated processes related to sustainability transitions has created a variety of academic communities with a common rhetoric, yet these communities are often separated by varying epistemologies on how to scientifically approach and interpret them.

At the same time, many approaches to study and conceptually frame sustainability transitions have been found to entail a certain spatial insensitivity in relation to the multiplicity of scalar arrangements and socio-spatial heterogeneity of spaces and places that shape transition governance processes and vice versa, causing researchers to call for their integration (Boucquey et al., 2016; Bouzarovski & Haarstad, 2019; Bridge & Gailing, 2020; Coenen & Truffer, 2012; Coenen et al., 2012; Lawhon & Murphy, 2012). Sustainability transitions research has been criticised for its neglect of acknowledging the spatial complexities, regional aspects, alternative socio-spatial configurations and (trans)local relations. Consequently, a valuable stream of research discussing questions of places, scales and geographies in the context of sustainability transitions pointing to the spatial complexities at play has emerged (e.g. Albrecht et al., 2021; Binz et al., 2020; Dunlap & Laratte, 2022; Feola et al., 2023; Madsen, 2022; Mura et al., 2021). Despite the fact that a relational understanding of sustainability transitions processes is increasingly acknowledged, research in its integration of the socio-spatial dimensions of transitions has remained limited due to a predominantly holistic and conceptual lens, and its focus on urban processes (Hansen & Coenen, 2015; Mans, 2014;

Schwanen, 2018). Especially the role and multiplicity of rural and peripheral areas and their spatial complexities (Halonen, 2023; Munro, 2019; Vale et al., 2023) lacks the attention they deserve as key nodes of the socio-spatial unfolding (Wang et al., 2023) of sustainability transitions. Paradoxically, the shifting and contested power relations attributed to the core of sustainability transitions and their importance within and among different regions, localities and spatial imaginaries of development is merely a side issue on the agenda of sustainability transition research while the continuity of centralisation, urbanisation and techno-innovation based regional developments seems to be taken for granted.

Human dependence on fossil fuels and growth-centric views remain strong in most countries and they have favoured almost unlimited economies of scale and techno-innovative solutions within sustainability transitions framed developments. This has, in turn, contributed to a reliance and focus on large-scale and centralised socio-economic structures and their continuous integration into sustainability transitions processes (Albrecht, 2023; Dunlap & Laratte, 2022; Levidow & Raman, 2020). The result is a deepening divide between centres and peripheries, urban and rural, as well as large-scale and small-scale approaches, related policies and actors throughout a variety of societies, production-consumption chains, power hierarchies and living environments (e.g. Kelly-Reif & Wing, 2016; LeVasseur et al., 2021). The approach in which sustainability transitions are only an arena for materialising techno-innovative advancement, as set in many of its policy representations, has been criticised widely (Albrecht, 2024; Levidow & Raman, 2020). However, sustainability transitions also entail the potential for a shift towards more diverse socio-spatial structures which enable more decentralised, local and inclusive forms of societal organisation and value creation. These potentials of sustainability transitions and their implications for the socio-spatial reorganisation towards localised, and potentially small-scale, inclusive approaches of production and consumption systems have received increasing research interest (e.g. Asara et al., 2015; Feola et al., 2023; Hadjimichael, 2018; Levidow et al., 2012).

The rescaling of sustainability transitions plays out in multiple forms and spaces. Rather than being confined to a streamlined conceptual frame, there is clear value in drawing on an array of partially aligned, yet diverse accounts for unfolding its socio-spatial processes and trajectories. Adhering to such an approach of multiplicity and to forward a somewhat different perspective, this book and its chapters are intended to address

three aspects in particular. First, in line with recent calls in literature (e.g. Bouzarovski & Haarstad, 2019; Bridge & Gailing, 2020; Coenen & Truffer, 2012), the book clearly incorporates an increased sensitivity to the multi-scalar processes and effects of sustainability transitions governance, including the contested socio-spatial framings of governmental processes. Second, the book focuses on the role of localities, while not being limited to rural and/or peripheral places and their (trans)national socio-spatial relations within sustainability transitions processes. Third, the book scrutinises the capacities of sustainability transition pathways to rescale by enabling a socio-spatial shift towards localised, decentralised, small-scale and inclusively distributed production/consumption spaces. As presented below and clearly visible throughout the individual chapters, the book does not aim to promote a particular or 'superior' epistemological approach to study and conceptualise sustainability transitions, or classify approaches in their legitimacy for assessing the same. Instead, it provides an array of valuable accounts enabling a deeper understanding of how sustainability transitions manifest in different spatial contexts, how they are framed by multi-scalar and continuously shifting socio-spatial relations and how the myriad of (contested) spatial imaginaries are entailed in the governmental rationalisation of its development processes and future trajectories. Hence, it provides accounts of how the three above-mentioned parts of rescaling interfere and work for the complex assembling of sustainability transitions.

Rescaling Sustainability Transitions Through Multiple Perspectives

This book explores processes of rescaling in the unfolding of sustainability transitions. The societal changes induced by sustainability transitions assemble as a heterogeneous process reproduced by different socio-spatial contexts and the interplay between scalar constructs. Hence, the practical solutions and impacts of processes framed as sustainability transitions vary between different localities in terms of their natural, material, and human resources, the heritage of the development, their power and market relations, virtual and physical connections as well as shifting individual rationalities—within and across particular continuously transformed spaces (Massey, 2005; Wang et al., 2023). The approaches adopted here provide a twofold perspective in this spatial unfolding and their inherent rescaling processes of sustainability transitions. First, the

topic is approached through a (trans)national lens, which is partially supplemented with a set of regional framings and place-based components (Part I). Second, a set of more specific regional case study types of analysing rescaling processes is presented (Part II). While at times this delineation becomes blurry due to the complex multi-scalar interrelations and reproduction processes, this framing serves as a guide for the structure of the book. Hence, while not representing a restrictive epistemological alignment, the chapters share a conceptual focus on assessing the characteristics and processes deriving from a relational connection among, and reproduction of various scalar constructs with the capacity or intention of rescaling sustainability transitions. The following subchapter provides a brief introduction on the contents of the book, not through an aligned summary of the different chapters in an orderly manner, but by delving into the multiplicity of perspectives along a set of shared framings.

Setting the Rescaling of Sustainability Transitions in Context

Sustainability transitions are mostly framed as societal, systemic, economic, political or governmental changes whose manifestations can only be portrayed through their complex spatial contextualisation—regardless of the subject—as the multiplicity of approaches in this book illustrates. Yet, within this multiplicity there are common topical alignments. For instance, transformations or potential shifts in national and regional energy systems are a widely discussed issue in this book. Sören Becker and Matthias Naumann (Chapter 10) provide insights into the regional transformation processes and scalar politics of Lusatia and Rhineland lignite regions in Germany. Using the regions of Taranaki and Southland in New Zealand, Sean Connelly, Etienne Nel and Danielle Lomas (Chapter 8) exemplify rescaling processes through potential *landing points* for new activities such as renewable energy production. Etienne Nel and Lochner Marais (Chapter 11) enter an account of the transformative challenges of coal-dependent communities and their multi-scalar relations in the Mpumalanga province of South Africa. Tarmo Pikner (Chapter 4) focuses on the complex and contradictory assembling of energy encounters between oil-shale transformations and coastal wind energy developments in Estonia, while Ross Wallace and Susana Batel (Chapter 5) focus on variegated and contested socio-technical imaginaries of renewable energy communities proposed in different expert circles in Portugal.

Another area of interest discussed in this book is the transformative changes in permanent or temporary habitation. Laura Sariego-Kluge and Diana Morales (Chapter 3) address the rescaling of sustainability transition through an account of the spatio-temporal rescaling processes of sustainable tourism development in Costa Rica, while Laura Ryser, Sean Markey, Greg Halseth, Martin Mateus and Lars Hallstrom (Chapter 9) approach the topic through the lens of small town planning governance in the context of amenity housing in Canmore, Alberta, Canada. More (trans)national, yet spatially sensitive approaches are provided by several chapters in the book. Germán A. Quimbayo Ruiz (Chapter 7) discusses the processes and spatial tensions accompanying sustainability transition policies in Colombia, and Irene Kuhmonen, Tuomas Kuhmonen and Annukka Näyhä (Chapter 6) address aspects of rescaling by assessing the future potentials and visions between centralisation and decentralisation within different sectors of the circular bioeconomy in rural Finland.

Additionally, sector-specific and transnational insights further address sustainability transitions exemplified through the European Union (EU) bioeconomy, which also raises this policy field's importance to exemplify institutionalised sustainability transition (policy) processes. Moritz Albrecht and Oliver Klein (Chapter 2) scrutinise socio-spatial imaginaries of becoming and the potentials for small-scale and localised developments in four novel, regenerative EU bioeconomy sectors, while Maija Halonen and Linda Lundmark (Chapter 12) focus on the established forest bioeconomy in regional inland peripheries in northeast Finland and northern Sweden. Aside from their topical depths and case study insights, this array of topics treated through different approaches and the wide range of geographical contexts provides novel insights to unfold processes of rescaling sustainability transitions in a wider sense. The following sections provide an analytical overview of the key aspects of the chapters' endeavours.

Rescaling as a Methodology and a Subject of Research

Throughout the chapters of this book, rescaling describes both a methodological orientation and a research focus. As a methodological orientation rescaling reflects the authors' choices on viewpoints, which are most often interlinked with the subject of the research. For example, rescaling is referred to as processes of localising, contextualising or grounding practices, politics or governance in contrast to rather abstract or larger-scale

transitions. This kind of rescaling by localising can be argued for several reasons. As Quimbayo Ruiz (Chapter 7) points outs, in contexts such as Colombia, sustainability transitions and their adjunct processes of policy design and implementation cannot be understood or promoted without paying attention to the country's complex and mega-diverse geography and the resulting spatially diverse implementation of sustainability transitions agendas. As for Connelly et al. (Chapter 8), Halonen and Lundmark (Chapter 12) and Kuhmonen et al. (Chapter 6), localised rescaling is attached to the need to emphasise rural and peripheral livelihoods over predominantly urban foci. More broadly, rescaling seems to be—implicitly if not explicitly—related to approaches that focus on the (spatially oriented) viewpoints, agencies and values of locals and other stakeholders (Albrecht & Klein, Chapter 2; Sariego-Kluge & Morales, Chapter 3; Wallace & Batel, Chapter 5), especially in resource or amenity communities (Nel & Marais, Chapter 11; Ryser et al., Chapter 9), or in the settings of regions, territories or landscapes (Becker & Naumann, Chapter 10; Pikner, Chapter 4). Assessing localisation capacities or challenges is also a way to address just transitions (Albrecht & Klein, Chapter 2; Becker & Naumann, Chapter 10; Connelly et al., Chapter 8) and reveal power relations (Becker & Naumann, Chapter 10; Sariego-Kluge & Morales, Chapter 3) from a socio-spatial perspective.

Many chapters refer to scales as levels or how (re)scaling exists through hierarchical order or is framed in an institutional scalar setting, like 'governance transitions to municipal' (Ryser et al., Chapter 9), or 'driven by top-down policies' (Sariego-Kluge & Morales, Chapter 3), or making references to multilevel perspectives (Becker & Naumann, Chapter 10; Nel & Marais, Chapter 11). However, this does not imply a simple shift 'from the global and national scales to the local or mere exchanges between them'. Rather, it highlights issues of rescaling based on the shifting relationality between different spatial scales as presented by Nel and Marais (Chapter 11). Whatever the approach and target entity is, sustainability transitions are emphasised as multi-scalar processes where rescaling may occur in different ways and directions even in the same context. For example, while the governance of housing undergoes an institutionalised rescaling from provincial governments to local governments, the same transformation process is accompanied by an upscaling of variegated network relations (Ryser et al., Chapter 9). Furthermore, the energy shifts towards more space-dependent energy production also influence territorialisation dynamics and landscapes bound to energy

production. But at the same time, these processes are, above all else, relational rescaling processes rather than straightforward shifts between scales (Pikner, Chapter 4). Even when small-scale actors are rescaled as a research focus, the large-scale actors cannot be forgotten due to the fact that small-scale operators are a part of the networks of the large-scale actors (Halonen & Lundmark, Chapter 12) or operate within the same policy assemblage (Albrecht & Klein, Chapter 2).

If rescaling by localising emphasises the need for concretising and grounding sustainability transitions, rescaling through imaginaries, expressions and visions underlines the necessity to reach the spaces of thoughts and highlight the governmentalisation aspects of rescaling sustainability transitions. As with Wallace and Batel (Chapter 5), rescaling focuses on the meaning-making, the spatial construction of orders of worth and potential scale jumping in the context of delineating 'local' and 'proximity' as spatial identifiers of renewable energy communities, while Kuhmonen et al. (Chapter 6) seek to unveil the potential rescaling of circular bioeconomy by probable and preferable visions for future implementation. Albrecht and Klein (Chapter 2) argue that the expressive components, hence the spatial imaginaries of transition trajectories, are supplemented by the material components of EU bioeconomy assembling and treat rescaling through complex socio-spatial territorialisation processes to unveil their capacities and challenges.

Finally, in terms of sectoral rescaling, the point of departure may be referred to as the actual shift in or between the sectors or as a methodological choice. As an example of the first, the sectoral shift of Costa Rica's tourism sector did not reflect scaling up of the existing socio-technical system, rather, the rescaling occurred as a gradual transition from one socio-technical system to another, which also entailed rescaling of values and beliefs (Sariego-Kluge & Morales, Chapter 3). As an example of the latter form, Halonen and Lundmark (Chapter 12) rescaled their approach from a focus on large-scale forest actors to smaller-scale entities as their methodological choice. As a combination of the two, Albrecht and Klein's (Chapter 2) critical view towards large-scale bioeconomy development rescales their focus on alternative, localised and small-scale developments representing a potential scale shift within the sector and pairs this ambition with a conceptual rescaling of transition governance.

Conclusion

This book and its contributions highlight the myriad of socio-spatial processes, their alignments, frictions and contradictions for sustainability transitions, and hence, aim to fulfil calls for increased engagement in the scalar aspects of sustainability transitions and their governance. Our argument for rescaling flows from two concluding observations. First, we call for stronger engagement of sustainability transitions research with questions of place and relocalisation practices, their embedded power relations and questions on small-scale trajectories for territorial and economic materialisations in terms of production and market reach as an alternative to the large-scale dominance of resource exploitation and use. Second, we call for increased attention to the relational processes and ontological framings that reproduce mobilities and scalar shifts in governance arrangements that are generated or linked to socio-spatial processes of sustainability transitions. Finally, this book and the diverse range of its contributions show once more that moving beyond the narrow confinements of a particular epistemological research framework carries high value to address the unfolding of socio-spatial becoming in all its complexity.

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PART I

(Trans)national Perspectives

CHAPTER 2

(Re)Territorialising Policy Narratives and their Role for Novel Bioeconomy Sectors in the EU

Moritz Albrecht and Oliver Klein

Introduction

The European Union (EU) circular bioeconomy is a vast policy sphere which is reproduced by a heterogeneous and partially contradictory assembly of policy strategies, visions and sectoral practices. Its unifying rhetoric frames it as an economic policy following a sustainability transitions logic that includes a beneficial greening of bio-based value chain

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systems and potentials for rural rejuvenation (EC, 2018a). The current development of bioeconomy policy and many of its practices have been criticised (e.g. Fusco et al., 2022; Ramcilovik-Suominen et al., 2022), leading to doubts about the bioeconomy and its subordinate sectors' ability to enable a just and sustainable transition. Following this criticism and acknowledging the spatially insensitive representations of development processes in many bioeconomy trajectories (Albrecht et al., 2021; Morales, 2022), the chapter engages with the dominant narratives and spatial imaginaries in four novel European bioeconomy sectors to assess their potentials for socio-spatially inclusive development.

The EU circular bioeconomy is a core component of the European Green Deal (GD) which aims to decarbonise EU economies, conserve and enhance the EU's natural capital, stimulate growth decoupled from resource use and provide means for a just transition that "leaves no one behind" (EC, 2019, p. 3). The EU bioeconomy and its sectors are directly linked to this wider policy framework and its adjunct visions. This key alignment with neoliberal principles of green growth can be seen as denying the European bioeconomy policy the capacity to drive a just and sustainable transition (see Dunlap & Laratte, 2022), while on the other hand its 2018 strategic revisions are credited to 'mature' the EU bioeconomy and address some critical aspects (Kurki & Ahola-Launonen, 2021). Yet, bioeconomy policy and development cannot be understood by simply focusing on its 'own' policy. Recently, numerous related and/or subordinated policy revisions, strategy papers, action plans and novel sectors have been introduced, highlighting aspects such as local value chains, ecosystem services, climate change remediation, community engagement and respect for ecological boundaries (e.g. EC, 2021a, 2022a, 2022b, EUMOFA, 2023). This expressive shift is accompanied by a spatial reorientation beyond territoriality confined to land-based production systems and includes the aqueous spaces of resource exploitation through the blue bioeconomy (e.g. EUMOFA, 2023; Klein et al., 2023).

Hence, we are experiencing at least a rhetorical rescaling of EU bioeconomy governance that opens up to the needs and potentials of multiple localities and stakeholders and encompasses a wider set of potential trajectories and biophysical environments to adjust with and to. However, based on the criticism of the bioeconomy as a spatially inattentive sustainability transition (Albrecht et al., 2021), it requires a perspective that contrasts the expressive rescaling of the EU bioeconomy with more

distinct (policy) narratives and spatial imaginaries of novel bioeconomy sectors. Such perspective allows to assess the openness of the sustainability transition to socio-spatial multiplicity and alternative, inclusive developments or their fixation to narrow imaginaries, practices and development trajectories such as the much-criticised biotech, large-scale and competitive agenda of the bioeconomy (see Albrecht, 2023; Vivien et al., 2019). In this regard, expressive components are of particular value, especially in novel sectors, wherein up-scaled implementation and development trajectories are largely subject to assumptive narratives rather than existing practices (Albrecht, 2023, 2024).

The chapter conceptualises the EU bioeconomy as an assemblage, merging Woods et al.'s (2021) work on translocal assemblages and place assemblages with studies on (policy) narratives and spatial imaginaries as components that reproduce the governmental conduct of sectoral/policy assemblages and their trajectories (Albrecht, 2023; Choi, 2017; Wood, 2016). The value of this conceptualisation is to delineate processes of (re)territorialisation and (re)coding to understand novel spheres of bioeconomy development, their governance and related capacities for sustainability transitions (see also Pikner, Chapter 4). With a focus on assessing the dominant expressive components displayed by spatial imaginaries of EU policies and sectoral representations, the chapter reveals the socio-spatial capacities of place assemblages to engage in sustainability transitions. We focus on four novel sectors engaged in the rhetorical rescaling of bioeconomy governance: seaweed farming, hemp agriculture, recirculating aquaculture systems (RAS) and paludiculture. Possessing very different standings in EU bioeconomy policy, all are considered to contain biophysical and socio-economic capacities to address much of the criticism directed at the EU bioeconomy policy. Thus, the main question of this chapter is to examine whether these capacities are likely to unfold within the EU bioeconomy policy assemblage and its sectoral counterparts—or whether they are diminished by the dominant socio-spatial fixes of EU bioeconomy governmentality.

Assembling Bioeconomies Through Territorialisation of Spatial Imaginaries

Unfolding the assembling of novel EU bioeconomies, this chapter employs a conceptual combination of: (1) policy assemblages and their underlying policy narratives and spatial imaginaries as governmental activities (e.g. Albrecht et al., 2021; Prince & Dufty, 2009; Wood, 2016); and (2) assemblages as socio-spatial spheres of becoming based on their expressive and material components of (de)territorialisation that form temporarily bound yet fluid and open entities of varying scalar reproduction (Albrecht, 2023; Woods et al., 2021). These tightly interrelated strands of assemblage thinking enable an understanding of the governmental processes that delimit the spatial trajectories of (bio)economic governance (Choi, 2017; Prince & Dufty, 2009), and the interaction between translocal and place-based socio-spatial processes (Woods et al., 2021). Combined, they point to the transformative capacities of the places of implementation and the translocal (EU) bioeconomy assemblage. This allows us to display how spatial configurations—in this case the role of the bioeconomy for inclusive sustainability transitions—are maintained or distorted, while also shedding light on potential alternatives of their becoming (Anderson et al., 2012).

Bioeconomy policy narratives reproduce, intentionally or unintentionally, varying spatial rationalisations of economic spaces to be delimited as spaces of development (Choi, 2017, Prince & Dufty, 2009; Winder & LeHeron, 2017; also Wallace & Batel, Chapter 5). Playing a major role as expressive components of assembling (Albrecht, 2023), they are critical to portraying processes of emergence as well as their political consequences (Bear, 2013; McFarlane, 2009). Boucquey et al. (2016, p. 3), point out that this 'narrativizing' of assembling is of particular value to understand newly emerging assemblages, an aspect that is supported by research on policy narratives, their often-assumptive future visions and their effects on assemblage trajectories and spatial practices (e.g. Albrecht et al., 2021; Honeck, 2018).

Expressive components such as narratives and spatial imaginaries of the bioeconomy can be employed to code and territorialise, hence striate spaces of governance towards particular trajectories (e.g. Deleuze & Guattari, 1987). Particularly in an institutionalised frame like EU bioeconomy policy, this is based on narrativising its potential spaces of development through apparently fixed socio-spatial conceptualisations displayed

in documents, speeches and media (see Bugge et al., 2016; Vivien et al., 2019). Woods et al., (2021, p. 9) refer to 'over-coding' of places/place assemblages by their connected translocal (larger) assemblages, for instance through regulations or programmes, thereby delimiting their capacities for development. However, considering the mutual interactions between place assemblages and translocal assemblages, a closer look at the effects of these interactions, varying ontological perspectives, materialities and practices between these spheres must be acknowledged. For instance, in her work on assembling 'rights of nature', Kinkaid (2019, p. 560) points out that while the translation towards different milieus or places is important, their 'back translations' and effects also matter for the formation of translocal assemblages. These processes of interaction between translocal assemblages and place assemblages contain territorialising components as well as de/reterritorialising components affecting the attempted striation of governance spaces and their development trajectories (Albrecht, 2023; Bear, 2013; Woods et al., 2021).

From the EU bioeconomy perspective, these interactions require scrutiny as an array of translocal and place assemblages are intertwined under the large, translocal assemblage of EU bioeconomy policy. Interactions and the (de/re)territorialisation capacities of expressive and material components play out between place (including entrepreneurial) assemblages, sectoral (translocal) assemblages and the translocal EU bioeconomy assemblage while being connected to a myriad of relations of exteriority to other assembling processes and their socio-spatial fabric of becoming. Hence, the narrativising and (over-)coding through the translocal EU bioeconomy assemblage, their translations and resulting interactions between the diversity of (sectoral) translocal and place assemblages help to identify *possible futures* based on their components (Anderson et al., 2012; Woods et al., 2021). This allows further assessment of the variegated translation processes and sectoral responses to these spatial interventions, and to delimit the potential role of various sectoral capacities as forces of (de/re)territorialisation for the EU bioeconomy assemblage. Hence, the approach while not aiming to be spatially inclusive, enables the portrayal of some key inert socio-spatial complexities and processes of EU bioeconomy development and their capacities for an inclusive sustainability transition.

Methods and Data

The chapter draws largely on a mixed methods approach combining a stringent qualitative document and web-based analysis of bioeconomy-related policy and the four novel bioeconomy sectors, their policy frameworks and some of their key stakeholder/interest groups' publicly promoted perspectives (see Table 2.1). The analysis is supported by data from previous and ongoing case study research of the respective sectors in particular contexts (e.g. Albrecht, 2023). This aims to provide a multi-scalar venturing into their socio-spatial processes of becoming based on a varying range of expressive components (e.g. Anderson et al., 2012). The choice of the sectors and national/regional examples (FI, GER, NO) is selective and based on the authors' expertise, and aspects of 'policy narrative boosterism' (McCann, 2013) of the sectors in a specific political-(bio)economic context.

The focus of the policy document analysis is on bioeconomy-related EU-level policy documents, strategy papers and reports that act as key expressive components for the framing and directing of bioeconomic development. General bioeconomy documentation is supplemented with

Table 2.1 Overview of materials for (qualitative) analysis

Policy documents (bioeconomy related)
EC (2018a, 2018b, 2019, 2020, 2021c, 2022a, 2022c, 2023a), EUMOFA (2023) (see reference list);
EC. (2021). IMPACT ASSESSMENT REPORT. *SWD(2021) 37 final*. European Partnership for a Circular Bio-based Europe
EC. (2021). On a new approach for a sustainable blue economy in the EU. Transforming the EU's Blue Economy for a Sustainable Future. *COM(2021) 240 final*
EC. (2021). *The European pillars of social rights action plan*
EC. (2021). New European Bauhaus. *COM(2021) 573 final*
EC. (2021). EU Mission Soil Deal for Europe: Implementation plan
EC. (2022). EU strategy for Sustainable and Circular Textiles. *COM(2022) 141 final*
EC. (2023). *Approved 28 CAP Strategic Plans (2023–2027)*
Sectoral strategies & stakeholder reports
EC (2021a, 2021b, 2022b, 2023b), EEB & BirdLife International (2022), EIHA (2020), EIHA (2021), EUMOFA (2020), GMC (2020), JRC (2023), LM MV (2017), GMC & Wetlands International (2021), Seaweed for Europe (2021), UBA (2016) (see reference list);
EIHA. (2020). Hemp & the CAP
EC. (2022). An overview of the algae industry in Europe
Finnish Aquaculture Association 2022. Aquaculture in Finland

sectoral strategies, action plans, position papers and reports as well as key media representations of the four sectors in relation to the exemplifying sectoral/national cases described in this chapter (see Table 2.1). It must be pointed out that in terms of data depth, seaweed farming, due to its prominent role in EU bioeconomy development, entails more data sources and explicit mentioning than the other sectors, while paludiculture is rather underrepresented in EU bioeconomy documentation as a sector on its own and only appears between the lines. While there are dedicated action plans and strategies for seaweed farming and recirculating aquaculture systems (RAS[1]) (e.g. EC, 2021a, 2022b) this is not the case for hemp and paludiculture, and analysis therefore has drawn on intermediate documentation such as position papers from sectoral associations, EC documentation (committee reports, national/regional documentation) and research or development projects to enable sectoral analysis.

Rescaling the Circular Bioeconomy and the Role of Novel Sector Developments

The 2018 revision of the EU bioeconomy policy included a rhetorical rescaling of bioeconomy governance towards more sustainable and social considerations (EC, 2018a, 2018b). Shortly after, it was complemented by the GD objectives to strive for sustainability transition including carbon neutrality, inclusive growth that "leaves no one behind" and to increase the quality of life (EC, 2019). It also aims to deploy local bioeconomies across EU regions to create "growth and jobs at local level" and to enhance biodiversity, avoid land degradation and fight climate change (EC, 2018b, p. 5). The socio-spatial components and aims to rescale the bioeconomy are culminated by the key narrative that "all Europeans can—and should—benefit from having a vibrant bioeconomy nearby no matter where they live" and that attention to the variegated local potentials is required to this end (EC, 2018b, p. 14). Disputed in much research (Albrecht et al., 2021; Eversberg et al., 2023; Morales, 2022), the last bioeconomy progress report (EC, 2022a) has also raised

[1] RAS has been used for some time in production of smolts prior to their placing in open net aquaculture but novel RAS developments aim at the production of full-sized fish.

deficiencies in environmental performance and engagement with stakeholders to bridge policy and realities at the local level. However, while the predominant part of the bioeconomy narrative remains linked to techno-economic innovation to create growth and has a strong focus on the biorefinery as the "holy grail" for value-added progress (Albrecht et al., 2021; also Halonen & Lundmark, Chapter 12), the ambitions for a human-centred just sustainability transition are increasing in EU bioeconomy policy narratives.

Bioeconomy policy as a component of the EU sustainability transition consisting of various strategies, directives and policy priorities promotes this direction, while other policy narratives neatly align and even strengthen the rescaling imaginaries in addition to the GD framework. For the novel sectors discussed, aside from their own narratives, the EU Farm to Fork Strategy (F2F, EC, 2020), the Strategic guidelines for more sustainable and competitive aquaculture 2021–2030 (EC, 2021a), the Blue Bioeconomy Report (EUMOFA, 2023) and the Eco-schemes (EC, 2021b) under the Common Agricultural Policy (CAP) stand out as umbrella documents. They are complemented by the aims and actions of the Five EU missions, especially 'Restore our Ocean and Waters by 2030', 'Soil Deal for Europe' and priorities like the 'New European Bauhaus' and the 'Long-term Vision for the EU's Rural areas' to name the most influential within the EU bioeconomy policy assemblage (EC, 2023a). The Farm to Fork strategy, the Eco-schemes and the Strategic guidelines for aquaculture 2021–2030 raise spatial imaginaries that include agro-ecological practices (including organic farming), environmental co-benefits and food production highlighting SME involvement and short value chains as key aspects of the transition (EC, 2020, 2021a). In line with the Bioeconomy Action Plan (EC, 2018b), these documents highlight the need to address socio-spatial and biophysical (e.g. seed varieties, soil/aquatic nutrition) diversity to tap into sustainability potentials. Concretely, a development that strengthens primary producers' roles in the value chain and pushes for inclusive stakeholder involvement in the planning processes to foster social acceptance are emphasised, and the F2F highlights the upholding of the European Pillar of Social Rights regarding precarious and seasonal employers in production and processing (2022a; EC, 2020, 2021a).

In regard to ecological boundaries and environmental sustainability, there is a growing alignment of narratives that envision production systems not merely as greening, less harmful/intensive or organic forms

of exploitation (e.g. Bugge et al., 2016), but also delimiting developments to entail positive regenerative credentials. Decarbonisation, climate change remediation, reduction of pollution and the preservation of ecosystems and biodiversity are not considered as positive externalities of the production system to be transformed but highlighted as an intrinsic part of production processes and business models such as carbon farming, nutrient sequestration or even the preservation and improvement of habitats through bioeconomic activities (EC, 2020, 2021a). Hence, the promoted narratives make room for a diverse setting of spatial imaginaries of current and future bioeconomic developments, including attention to locality, just distribution of benefits and sustainable performance. As traditional sectors are struggling with more radical transformation due to the socio-spatial path dependencies of their value chain systems, novel sectors should play a key role as indicated in EU policy narratives (e.g. EC, 2020; EUMOFA, 2023).

There is a small but growing development of novel sectors that draws initial forces directly from debates of sustainability transition with clear linkages to the UN SDGs and the EU GD with its myriad of subordinated policies. Recent attention to water-based production systems (e.g. EC, 2018a, 2018b, 2021a, 2022b; EUMOFA, 2023) has spurred new developments such as seaweed farming, integrated multitrophic aquaculture (IMTA) and recirculating aquaculture systems (RAS). Land-based newcomers, although less prominent than their aqueous counterparts within EU policy, have risen in the form of alternative crops such as hemp and dandelion, but also in revised approaches to manage agricultural land such as paludiculture. These novel sectors currently play a minor role in EU bioeconomy production, yet they are envisioned as having large potentials and considered as key components of a bioeconomy-driven sustainability transition (EC, 2018a, 2018b, 2021a, 2022a). The following section dissects the translocal EU narratives envisioned for these sectors, each sectors' development imaginaries and trajectories, and how they contrast with EU bioeconomy rhetorical rescaling that highlights socio-spatial multiplicity and inclusion.

Novel Sector Narratives

The Champion: Seaweed Farming in the EU (Insights from Norway)

Seaweed farming is a rapidly growing bioeconomic sector globally. Growth is largely reserved for Asian countries while European production is merely 1% of the global share (Araújo et al., 2021) yet envisioned to be a key growth sector under the blue bioeconomy (Albrecht, 2023; EC, 2022b). Seaweed is an extremely versatile plant with potentially thousands of species to be farmed and material properties that not only allow for a wide range of products such as food, feed, bioactives (e.g. health & medicinal applications), bioplastics, -textiles and -fuels (Mouritsen, 2013), but it also has strong sustainable credentials including zero input farming, heavy metal and nutrient remediation and CO2 uptake capacities (Ullmann & Grimm, 2021).

The EU policy frame and sectoral narratives directly tap into these credentials and portray seaweed as the champion of a new, sustainable blue bioeconomy. It is raised as a key pillar of development in bioeconomy strategies and reports (EC, 2018a, 2018b, 2021a, 2022a, 2022b), and has its own EC communication "Towards a strong and sustainable EU algae sector" (EC, 2022b) as part of the EU algae initiative. The potentials of seaweed farming within the EU bioeconomy development are aligned with the EU GD, EU F2F strategies and the EC communication on the Sustainable Blue Economy (EC, 2019, 2020, 2021b). The overarching narratives mentioned above become expressive parts in sectoral (over-)coding and territorialisation processes (Woods et al., 2021). Particularly, the ecosystem services and environmental co-benefits of seaweed farming are highlighted in all policy narratives in addition to its role for nutrient provision, reducing dependence on imports and positive socio-economic impacts on coastal communities.

Looking at the sectoral focused policy narratives beyond the spatial imaginaries territorialised by the EU sustainable transition policy assemblages (e.g. GD, F2F, Bioeconomy), a more concrete set of expressive components to shape the future development trajectories appears. While the portrayed motto of EU sustainable aquaculture is "local and fresh" with a focus on short food circuits and local participation (EC, 2021a, p. 14), the social and local implications of seaweed development are largely treated through assumptive narratives of new jobs/business opportunities in coastal communities and the need to create social acceptance and consumer interest through the provision of knowledge of the benefits

of seaweed (EC, 2022b). At the same time, the currently prevailing small-scale production is portrayed as a challenge rather than an opportunity, as it restricts techno-innovative development, access to finance and the development of the large-scale automated systems envisioned as necessary for the aspired growth. Additionally, sectoral narratives employ the capture capacities of seaweed, particularly carbon, but also its regenerative potential for local ecosystems to mitigate phosphorus, nitrogen and heavy metal pollution in water bodies to frame it as a potential flagship of a transformed regenerative bioeconomy (Seaweed for Europe, 2021; EC, 2022b). This narrative is strengthened by the uptake of the algae sector within EU sustainable carbon cycles communication and a potential candidate for carbon farming as a new business model (2021c; EC, 2021b).

When comparing these policy narratives to the industry's proclaimed trajectories about future development, the eco-benefits/techno-innovative growth hybrid represents the main imaginary among the vocal proponents of the sector (e.g. Seaweed for Europe, 2021). A recent study on Norwegian seaweed farming (Albrecht, 2023, 2024) has assessed the impact and interrelations of material and expressive components for the potential development of seaweed farming. Findings have highlighted that the joint capacities of these socio-spatial processes in the sector promote a techno-innovative approach and in spite of their strong rhetoric of inclusive local (coastal) development, they create fundamental obstacles to implement the latter under the current sectoral assemblage. Combining EU policy and sectoral narratives in relation to similar aspects of material complexity, these results are likely to be valid in an EU context as well.

The Better: Recirculating Aquaculture Systems (Insights from Finland)

Recirculating aquaculture systems (RAS) are mostly land-based, closed fish farming systems that allow for a highly controllable growing environment through circulation, filtration and adjustment of water and its material compounds during the farming process (EUMOFA, 2020; Vielmä et al., 2022). RAS farming has been employed for smolt farming, particularly by salmon producers, but is currently developing into a new sector to produce market-sized fish, which is the RAS focus of this analysis. While Denmark and Norway are the countries with the most

(smolt-focused) RAS facilities and technological know-how, the latest two large-scale RAS development for consumer market-sized fish are situated in Finland.

Producing fish with RAS contains the promise of a more sustainable production as its controlled environment requires less chemical/pharmaceutical input to assure fish health, excess nutrients and compounds from feed and faeces are filtered out and provide a potential for side stream products (e.g. fertilisers) instead of being discarded into the environment. It uses up to 99% less fresh water, and its land-based localities can be established closer to key markets thereby reducing transport emissions (EUMOFA, 2020). Hence, RAS addresses many of the problems attributed to traditional open water and flow through pond aquaculture.

Globally, the supply of fish from aquaculture has been increasing rapidly since 1990, yet in Europe it has remained stagnant at around 1.2 M tonnes (JRC, 2023). With the blue (bio)economy as a key trajectory under the EU GD, aquaculture development and upscaling are highlighted in various EU documents such as the Blue Economy report (EUMOFA, 2023), the F2F (EC, 2020), the EU Mission to restore our Ocean and Waters and naturally EU strategic guidelines for more sustainable and competitive aquaculture 2021–2030 (EC, 2021a). The policy narratives in these key expressive components of EU aquaculture portray it as means to improve the self-sufficiency of water-based, low-carbon food and feed supply in the EU, avoid land use conflicts and to provide a more sustainable production of proteins than land-based animal farming. RAS does not play a key role as a champion in these narratives compared to regenerative aquaculture such as seaweed farming, but it is displayed as a promising pathway to achieve increased environmental performance due to its circular approach and its close-to-market production potential (EC, 2021a). While challenges in RAS farming such as high energy consumption and investment costs are voiced within policy narratives, it is nonetheless considered a valuable option for locally and environmentally friendly food production (EC, 2021a; EUMOFA, 2020).

RAS fish farming and its highly technologised controlled environments are very well aligned with techno-innovative policy narratives of sustainable economic transitions in the EU. Strong expressive components for that territorialisation are, for instance, the EU Mission to restore our Ocean and Waters focus on ‘innovative’ and ‘zero-carbon’ aquaculture using blue biotechnologies or the imaginary of an ‘Aquaculture

4.0' as an automated, remotely controlled production environment to guide development trajectories in the sector (EC, 2023a; EUMOFA, 2023). These narratives are followed by Finnish representatives of the novel sector pointing to the environmental benefits and the 'real circular approach' of RAS. The technology and investments required push a clear growth narrative for sectoral production sites and companies which is expressed in terms like "gigafactories" and proud news on large production increases of RAS fish farmed (e.g. Finnforell, 2023). Additionally, future entrepreneurial narratives include not only the growing production of fish but also an export-focused growth as global RAS technology and system providers. The 'Local and fresh' F2F narrative is translated by the sectoral entrepreneurs towards an integrated system approach focusing on fish-to-consumer products in one site (Interviews FI), aligning with the findings of Kuhmonen et al. (Chapter 6). Finally, Finnish RAS proponents clearly delineate RAS as the better aquaculture that produces more healthy fish/food while remediating environmental pressure and pollution of the Baltic Sea caused by traditional aquaculture and agriculture.

The Contradictory: Hemp Sector (Insights from Germany)

The European hemp sector has lengthy historical roots that are being revived as a 'novel' sector. It is divided between hemp as a versatile agricultural plant for food, feed, bioactives, construction materials and textiles versus hemp as a narcotic. This section focuses on the former. While the legal border between these hemp assemblages is separated by a THC limit of 0.3% in the EU (EC, 2023b), the governmental discourses around THC, legalisation or CBD make it a disputed, contradictory sector of EU bioeconomic development. These expressive components hide the non-narcotic potentials within EU policy narratives despite its credentials for regenerative agriculture envisioned in the GD, CAP, F2F and the EU bioeconomy strategy. Nonetheless, EU hemp production increased by 84.3% (20 500 ha–33 000 ha) from 2015 to 2022, with France being the most important hemp producer followed by Germany (Statista, 2023). It has also become a crop eligible for support under the CAP (EC, 2023b). In the absence of hemp-related policy documents, the EC website on agriculture and rural development portrays hemp as being strongly aligned with EU GD narratives due to its ability for carbon storage, natural weed prevention and soil restoration capacities, low/no use of pesticides and support for biodiversity (EC, 2023b). Aside from its protein and nutrient

rich credentials as food and feed, its potentials as material in the textile and building sectors are highlighted as well. Particularly for the latter due to its high CO2 emissions, materials such as hemp concrete or hemp-based insulation materials could function as carbon sequester for the sector (EC, 2023b; Mahmoud et al., 2021).

EU (translocal) sectoral narratives are directly tapping into the EU narratives and have designated hemp as "a multi-champion of bioeconomy" (EIHA, 2021, p. 4), and a sector able to provide a regenerative growth model of production and utilisation. The wide applicability for various products, particularly textiles, building materials and food additives are linked to their environmental co-benefits such as high-carbon sequestration potentials, soil protection and pollution remediation properties (EIHA, 2020). The European Hemp Association goes so far to claim that the growth of hemp agriculture in Europe could revise rural depopulation due to its local socio-economic benefits. Yet, hemp agriculture requires political support as well as legal clarification and alignment to develop its potentials (EIHA, 2021).

In Germany, the production of and demand for hemp products is rising, yet it remains a niche product with contradictory narratives. This becomes obvious looking at the narcotic use leaning focus of the German Hemp Association[2] and the mixed focus of the Sectoral Association of Cannabis Producers (BvCW, 2021). Related to industrial hemp, national narratives push for stronger integration as a prominent bioresource under the EU GD due to its regenerative potential. While trajectories for growth and the need for technical innovation are clearly expressed, the scalability of industrial hemp development is focused on regional and decentralised value chains in the sector's narratives (BvCW, 2021). An exemplifying actor of such development is the cooperatively framed company Hanffaser Uckermark eG, which has created a regional network of hemp production, processing and innovation including farmers, entrepreneurs and researchers (Hanffaser Uckermark, 2023). Promoting a local approach with open knowledge transfer, development has been aided by the uptake of industrial hemp as key topic for the regional agri-food cluster of the State of Brandenburg and a 2021 resolution for the promotion of industrial hemp potentials (Hemp Today, 2021).

[2] See https://hanfverband.de/.

Yet the establishment of (local) value chains remains a challenge. For example, in 2020 the energy corporation LEAG started cultivating hemp on former mining sites in the Lausitz region. Intending to foster structural change in this old-industrial region, the focus on local value chains aimed to create "a kind of countertrend to globalization" (LEAG, 2021). After two years, LEAG stopped the project claiming it was impossible to produce industrial hemp in an economically feasible way. Focusing on the construction materials sector, the company failed to establish robust value chains including processing capacities (rbb24, 2022). This example shows that despite strong political commitment and network activities, the prospects for making industrial hemp a pillar of the bioeconomy are uncertain, require long-term efforts and (economic) perseverance especially in rural/peripheral regions. In this regard, the legalisation of higher THC species might offer more secure economic returns, yet potentially less alignment with bioeconomic trajectories.

The Other: Paludiculture in the EU (Insights from Germany)

Paludiculture refers to agriculture or forestry on wet or rewetted peatlands that assures the production function of the land and the maintenance/regeneration of the peat body (Wichtmann et al., 2016). Most European peatlands have been drained for agriculture, forestry or infrastructure development resulting in large GHG emissions (UBA, 2016). Hence, rewetting and the shifting cultivation of these areas are an important, though contested, issue of the bioeconomy discourse in Europe. The pivotal role of peatlands in mitigating climate change due to their carbon storage function (Wichtmann et al., 2016) is supplemented by the versatile spectrum of bioproducts from paludiculture, e.g. for construction, energy, pulp, bio-based chemicals or bioplastics (GMC, 2020). In addition to this potential for the use of fen biomass (e.g. reed, cattail), low impact, regenerative agricultural practices such as the keeping of water buffaloes are possible (Heinrich-Boell-Stiftung et al., 2023).

Paludiculture is not often mentioned in the key EU bioeconomy policy framework, and there are no strategic guidelines or action plans for its employment as part of the EU bioeconomy. It nonetheless is mentioned as a promising example of regenerative agriculture for carbon farming under the Eco-schemes list, and some of its activities are eligible for financial support under the CAP and related to F2F narratives to enlarge

carbon farming potentials (EC, 2020, 2021b). It is treated in the Technical Guidance Book on carbon farming (COWI et al., 2021) which, rather than promoting development narratives, highlights some potentials and challenges of development under the CAP. Additionally, EU paludiculture narratives are supplemented by a short mentioning in the legal proposal on nature restoration (EC, 2022c), emphasising the win–win aspects of paludiculture including rewetting for environmental protection paired with agricultural and economic gains from the areas. Despite the hidden character of paludiculture in EU bioeconomy policy narratives, it aligns with many of the expressive and material components highlighted.

In the absence of a sectoral voice, the expressive components of the paludiculture discourse derive largely from research institutions, ENGOs and related projects. Shifting from drainage-based agriculture to paludiculture is narrativised as "one of the biggest carbon farming game-changers of this decade" while entailing long-term socio-economic and ecological benefits for rural communities (GMC & Wetlands International, 2021). Since narratives call for implementing paludiculture on most affected sites to meet climate needs, which means an extreme upscaling of paludiculture, this rhetoric does not include industrialist connotations of development but demands stronger policy integration, particularly with the CAP (EEB & BirdLife International, 2022; GMC & Wetlands International, 2021).

One of the strongest voices to promote these narratives is the Greifswald Mire Centre (GMC) which is among the leading institutions for peatland research, protection and paludiculture. GMC as an expressive force has greatly contributed to the technical strategy on "Implementation of Paludiculture on Agricultural Land" (LM MV, 2017) by the Federal State of Mecklenburg-Western Pomerania. Paludiculture is also an important pillar in the regional bioeconomy cluster under the Plant^3 research alliance and is highlighted as a strong asset for a sustainability transition in the region. In recent years, a dense and heterogeneous stakeholder network has been established including representatives of agriculture, forestry, energy, nature conservation, water management including individuals, state authorities, NGOs, academia and society (e.g. Tannenberger et al., 2020). These efforts resulted in a number of collaborative pilot projects such as the Malchin biomass heating plant combining peatland protection with added value creation at a local level (GMC, 2020).

Contrary to the optimistic narratives on its potential and its expressive and material support, developing paludiculture remains a challenge. Aside from technical, biophysical and financial challenges for farmers and entrepreneurs, the complexity of paludiculture value chains requires mostly collaborative approaches (van Hardeveld et al., 2019) that are time-consuming, dependent on personal/financial resources and problematic for economic valorisation. Additionally, the peripheral location of sites with industrial processors (e.g. building materials) located far away, makes it difficult to build up value chains for the expansion of paludiculture due to transportation costs (Klein, 2024). These limitations provide uncertainties to engaged stakeholders and questions whether paludiculture is a promising way to ensure their long-term existence and for a bioeconomic development beyond its protective/regenerative capacities.

Concluding Discussion

Considering the expressive desire of the EU bioeconomy assemblage to rescale its social and environmental trajectories due to (scientific) criticism, the presented sectors and their bioresources contain the material capacities to engage in this process. To varying degrees, they all contain regenerative ecosystem functions either based on their biophysical materiality (seaweed, hemp, paludiculture) or due to their techno-infrastructural set up (RAS). Paired with the capacity to produce a versatile range of sustainable products—whether for food, feed, material or health purposes—they further appear to promote, or at least could enable, variegated locally focused value chains aligned with revised EU bioeconomy narrativising (e.g. EC, 2018a, 2018b). Yet, regarding the distinct narratives attributed to and boosted by sectoral entities there appears to be much friction that deterritorialises the rhetorical attempts to striate the EU bioeconomy assemblage as an inclusive and spatially sensitive sustainability transition.

Overall, the examples of novel sectors display an expressive 'overcoding' capacity by the EU translocal bioeconomy assemblage as all sectoral assemblages align their expressive trajectories with the EU policy narratives related to regenerative, locally focused and beneficial bioeconomic development. Yet, considering the governmental rationalisation of economic spaces through spatial imaginaries (Choi, 2017; Dufty & Jones, 2009), the lack of diversified spatial substance in the EU translocal

narratives renders this an exercise with few direct impacts on the potentials for reterritorialisation and concrete emergence in various sectors. For instance, the trajectory of stakeholder benefit to all, "no matter where they live" (EC, 2018b) is predominantly translated into vague scalar categories such as benefit for 'coastal' (seaweed), 'rural' (hemp, paludiculture) or just 'local' (RAS) communities. To draw from expressive components on sectoral processes of emergence (e.g. Boucquey et al., 2016) requires widening the scope on the diversity of expressive components and particularly the alignment with techno-innovative growth narratives in the sectors and their socio-spatial effects.

A particular role can be attributed to the governmental rationalities tied to the regenerative trajectories of the EU bioeconomy. In all of the sectors the material components that reproduce the regenerative credentials translate into expressive forces calling for a massive upscaling of the sectors to achieve policy aims, resulting in the equation: *more regenerative production = more sustainability = more widespread benefits*. This is further promoted with boosting narratives on carbon farming as a new business model in EU (bioeconomy) policy. Aside from the assumptive and selective character of this 'silver bullet' narrative (compare Albrecht, 2023), the spatial imaginaries that envision this upscaling are reproduced by sectoral spatial particularities and play a key role in reterritorialising the EU bioeconomy.

Seaweed and RAS take a clear industrialist stance of large-scale techno-innovative development in their narratives and paired with their material components reproduce spatial imaginaries that are likely to lead to centralised production facilities with corporate ownership as the dominant set up. While both narratives entail the expressive recoding of the translocal EU bioeconomy assemblage, in their distinct expressive and material components the aspect of inclusive and local development is predominantly delineated through an assumptive trickle-down effect from these industrial developments rather than through actively engaging in an evenly spread attempt to create alternative local solutions or value chains. These assembling trajectories strongly derive from the complex fluidity of their aqueous materialities (Albrecht, 2023), yet, while not discussed above, similar can be expected with industrial hemp development aiming to generate added value by focusing on bioactive products due to the techno-innovative approach required for processing. This means that sectoral growth and (some) adjunct ecological benefits are likely, aside from many insecurities surrounding large-scale impacts on our

ecosystem and climate. However, a reterritorialisation beyond the rhetoric of more social engagement and even spread of socio-economic gains are not among the key development trajectories of these sectors.

Paludiculture and hemp on the other hand portray a more variegated picture in the cases presented above, particularly when bracketing out the use of hemp as a processed bio-stimulant or bioactive product. Their expressive components are a force of reterritorialisation towards a locally operating, widely distributed and collaborative bioeconomy despite their strongly articulated growth intentions. Yet, there is an ambivalence between the aims of an alternative, locally focused sustainability transition and the material and expressive practices of both paludiculture and hemp production to become an economically feasible form of production within the same assemblage. In both sectors, despite successful locally embedded pilots/examples, the up- and out-scaling of such a slow and collaborative bioeconomy approach appears very challenging. Regardless of local/regional institutional support, they fail to provide sufficient expressive and material components to spur these development trajectories despite their alignment with EU bioeconomy narratives. For instance, the mentioning of paludiculture in CAP 2021–2027 may recode paludiculture as a serious alternative in its local/sectoral assemblages of production, yet the currently weak 'back translation' (Kinkaid, 2019) and overall weak expressive representation of both sectors with such ingrained alternative credentials in the translocal bioeconomy assemblage diminish them as forces of reterritorialisation, and are likely to challenge development along those alternative trajectories.

In both cases we can speak of a 'disaligned alignment' of place and sectoral assemblages with expressive components of translocal EU bioeconomy assemblages. For seaweed and RAS the overall expressive alignment of the sectoral narratives is paired with expressive-material forces at the sectoral and place assemblages that disalign development trajectories with the translocal assemblage narratives for spatially just, social cohesive and inclusive development. For paludiculture and (material-focused) hemp sectors, the overall expressive alignment in our cases is paired with expressive-material forces that disalign with the techno-innovative narratives of the translocal bioeconomy assemblage. Looking at the processes of back translations that integrate expressive components from place/sectoral assemblages into the governmental rationalities of the translocal EU bioeconomy assemblage (Choi, 2017; Kinkaid, 2019), only the former 'aligned disalignment' narrative takes a prominent role. Hence,

despite shifting narratives calling for the rescaling of bioeconomy development towards the local with a sensitivity to spatial peculiarities and capacities, the current (dominant) novel sectoral narratives territorialise the socio-spatial fix of techno-innovative bioeconomy development.

Consequently, cooperative agro-ecological and small-scale value chain approaches that require locally embedded social capital and innovation continue to be marginalised despite a rhetorical rescaling in the EU bioeconomy assemblage. The current lack of inclusive participation in most sectors of the bioeconomy, including hemp and paludiculture, further narrows the capacities for alternative developments from the bottom, as it appears more desirable to address challenges through techno-innovative approaches than by slow, locally embedded transition pathways. This is in line with Friedrich et al., (2023, p. 223) who argue "that genuinely sustainable and inclusive transformations to a post-fossil economy require a much stronger role for currently marginalised practices that are at odds with the dominant growth-focused policy models". While the continued reliance on the techno-innovative growth approach in the EU bioeconomy does not necessarily contradict the equation of *more regenerative production = more sustainability*, it clearly diminishes its own expressive desire for inclusive and just development. This externalises suitable bioeconomic approaches such as paludiculture or less technological localised production and consumption systems to the policy assemblages of nature protection or to the fringes of agricultural support mechanisms that are barely suited for the required economic development of a bioeconomic sector.

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CHAPTER 3

Tourism and Sustainability Transitions: A Scalar Analysis of Agency in Costa Rica

Laura Sariego-Kluge and Diana Morales

Introduction

Costa Rica is a small country located in Central America that holds approximately 5% of the Earth's biodiversity within its 51,100 km^2. Its diverse ecosystems include mangroves, forests, moors, and wetlands, covering approximately 56% of the nation. However, this has not always been the case. By the early 1980s, forest coverage was only 40% of the territory (MIDEPLAN, 1984; Sánchez-Azofeifa, 2015), with some studies suggesting it had fallen to as low as 26% (SINAC, 2015). The shift

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from a predominantly cattle and agriculture-based regional economy to tourism has played a major role in the improvement in coverage. Indeed, the tourism industry has reinforced the importance of conservation efforts at the national scale and particularly in Chorotega (Fig. 3.1), this chapter's regional case study. The economic transformation of the region has been a long-term process influenced by a variety of strategies, the agency of multiple actors, and macroeconomic and political shifts. Innovations and changes driving the transformation come from multiple scales and their benefits have been unevenly distributed across the region.

Chorotega has undergone a socio-economic transformation that deviates from the conventional understanding of sustainability transitions (ST) (see review by Kohler et al., 2019), as it did not occur within the same socio-technical system and was not initiated through the scaling-up of technological innovations. Rather, the region went through a gradual transition from one socio-technical system (cattle and agriculture) to another (nature tourism), primarily driven by top-down policies implemented during the country's efforts to consolidate its economy

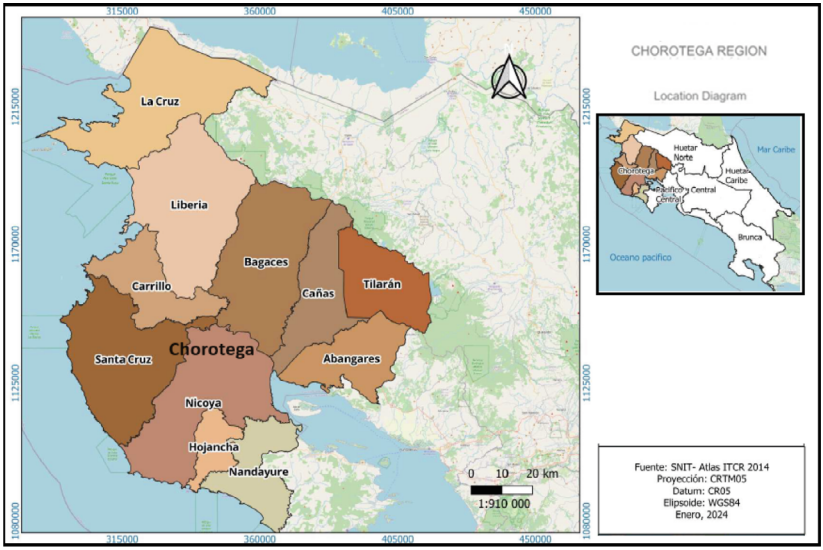

Fig. 3.1 Costa Rica: Chorotega region (*Source* Authors based on SNIT [National Territorial Information System]—Atlas ITCR 2014, CRTM05)

throughout the twentieth century. Influenced by interactions among different levels and actors that promote environmentally friendly and conscious modes of service delivery, the transformation has been disruptive and brought about structural change in the regional economy.

In this chapter, we draw from ST and economic geography literature to examine how various scales have influenced the process of transition, using the concept of agency (Grillitsch et al., 2023; Isaksen et al., 2019; Ramos-Mejía & Balanzo, 2018). We argue that agency is a key to explain ST when such processes are driven by top-down policies and are supported by an industry that benefits from environmental conservation. Agency allows exploring how initiatives and policies driving such transitions emerge and adapt across different scales. Understanding the relationality of those interactions, actors, and power constellations, can shed light on how changes occurring in one scale can alter the dynamics at another scale. Our analysis shows that when interests align among actors in diverse scales and sectors, and are coupled with individual efforts and interactions (system agency), the forces that influence change appear to support ST.

This case is particularly relevant because, first, Costa Rica is an early adopter of environmental policies and pioneer of the longest-running programme of payments for environmental services from tropical forests (Arriagada et al., 2009) yet socio-economic and environmental challenges are still substantial. Second, the case illustrates the efforts to combine environmental conservation with economic development. Third, the case allows us to see how different scales have played and continue to play a role in this transition. Fourth, it shows how a multi-scalar, multi-actor concerted and continuous push for an industry that benefits from conservation can lead to processes of ST in regions from the Global South.

The research applied a case study research design, and qualitative methods for data collection and analysis. Secondary data was obtained from previous research on tourism in the region (see list of references), official statistics, policy documents, and government and business reports. Primary data was obtained from 15 interviews conducted in situ during July 2022 and online May–June 2023. Interviewees include local and national government representatives, businesses, chambers of commerce, academics, and workers. The questions were designed to better understand past and present regional processes relating to the emergence and development of the tourism industry.

Scale in Sustainability Transitions

Sustainability transitions (STs) are characterised by changes in the economy, specifically, in the modes of production, transport, consumption, and their governance, as well as in values and beliefs (Kern & Smith, 2008; Köhler et al., 2019). STs are not linear processes initiated in a protected space and scaled up. Rather, they are intertwined within societal, economic, and cultural multi-scalar conditions that change in different contexts (Coenen & Truffer, 2012; Geels, 2011; Köhler et al., 2019). Critics explain that investigating STs requires a geographical analysis that acknowledges space as bound to the processes of change, where social, economic, cultural, and natural interactions occur and shape social processes, and not as containers of industries and technologies (Hansen & Coenen, 2015; Heiberg et al., 2020; Markard & Truffer, 2008).

The context in which STs occur is not limited to local and regional scales or a given socio-technical system. STs are also embedded in relational geographies, global networks of capitalist production and other socio-technical systems embedded in local and global regimes (Coenen et al., 2012). The concepts of local and global regime make an explicit reference to how the global scale influences processes anchored in territories. This offers valuable insights to explain how socio-technical regimes embedded in specific territories are influenced by globalised structures. Accordingly, the global regime establishes international rules, norms, and best practices that dictate production standards in locations distant from the origin of those rules and practices. It also endorses or rejects the changes through investment, political or technical support (Miörner & Binz, 2021). The global scale can be represented by consumer's pressure and the international sustainable development agreements (Bauer & Fuenfschilling, 2019), or by international sustainability standards such as certifications, which guide and legitimise changes within sectors (Sengers & Raven, 2015). On the other hand, the local regime refers to the place-specific actors and networks that create knowledge and novelties. The local scale is often represented by business practices and interactions among local firms and is influenced by place-specific conditions like a culture of collaboration.

Geographical approaches complement ST's local–global dimensions arguments by explaining why STs are more likely to occur in one place and not in others. For example, STs are more likely to occur in industries located in well-connected, institutionally thick, and economically

diversified core regions, where technological development and diffusion of innovations are facilitated by market and institutional advantages (Martin, 2020). STs, however, are also needed in regions with lesser connections and where alternative institutional arrangements can mediate socio-economic relations (Ramos-Mejía et al., 2018). In these cases, interventions from planners, policymakers, or other actors are required to find the links that connect local economies to regional and extra-regional networks and facilitate economic, technological, social, and environmental upgrading (Klooster & Mercado-Celis, 2016).

STs have been mostly studied within pre-established scales, such as countries or regions, without fully exploring the interactions between these scales (Miörner & Binz, 2021). Further, the processes through which the local scale receives, adapts, or resists the rules, standards, and practices brought by upper scales, as well as the spatial implications of this interaction, remain relatively unexplored. In this chapter we set out to explore the role of agency in those connections and their spatial implications (for agency, see also Kuhmonen et al., Chapter 6).

Agency in Sustainability Transitions

In ST research agency has two important roles. First, it initiates and sustains change. Second, it serves to recognise how lived experiences can influence individuals' choices to adapt, or resist processes of change (Köhler et al., 2019; Koistinen et al., 2018; Ramos-Mejía & Balanzo, 2018). Thus, in ST research agency is manifested individually (change agents), collectives, alliances, and various entities capable of instigating transformations to achieve a sustainability objective (Ramos-Mejía & Balanzo, 2018); and refers to the intentional actions of individuals that have both intended and unintended consequences (Grillitsch & Sotarauta, 2020). Micro-level agency is also manifested through entrepreneurship. Several studies highlight ethical, ecological, and social concerns as motivations for individuals and firms to innovate and create businesses (e.g., Calvo et al., 2020; Panzer-Krause, 2019; Ramos-Mejía et al., 2021; Rastogi & Sharma, 2018; Rosado-May et al., 2018).

In economic geography research, agency is seen from a macro-level, referring to the broader structures, networks, and institutions that are mobilised to produce change. Research has shown that change is not driven by the actions of an individual but by the interaction of various actors and institutions (Grillitsch & Sotarauta, 2020; Grillitsch et al.,

2023; Isaksen et al., 2019; Kurikka et al., 2022). Accordingly, agency is a collective attribute and a mechanism that operates multiple times over time and space, as well as along the diversity of actors involved. Applied to ST, this implies that transitions are dynamic processes that can initiate from the actions of change agents and continue evolving, adapting, and changing through time after the change (technological or otherwise) has scaled up (Kirshner et al., 2019).

This type of collective agency can take several forms. Of interest for this chapter are institutional entrepreneurship and system-level agency. Institutional entrepreneurship refers to the role of agency in creating or transforming institutional arrangements by mobilising resources, competences, and power to establish new rules or practices (Boschma et al., 2017; MacKinnon et al., 2019). Institutional entrepreneurship can come from a multiplicity of actors and sectors. System-level agency supports innovation and path development on a wider scale (regional) (Isaksen et al., 2019). It refers to the collective actions, interactions, and influences exerted by various actors and institutions operating within an economic system. It involves the combined efforts and impacts of multiple entities that contribute to path development. Its influence on path development depends on the type of regions and on how radical is the new path, being increasingly important for institutionally thin regions and radical paths (Isaksen et al., 2019).

Our examination of the shift from livestock to nature tourism in the region underscores the multifaceted nature of this economic transition, as well as showing the complexity and contradictions of ST. Chorotega's socio-economic restructuring has been primarily driven through the interaction of top-down policies, shaped by various strategies and public initiatives, with industry initiatives at the regional level. Moreover, this transition has been significantly influenced by macroeconomic shifts and international actors, fundamentally altering the local and regional dynamics. Understanding agency is pivotal in comprehending how strategies for transition operate at different scales.

Costa Rica, Chorotega, and its Tourism Industry

Costa Rica is divided into 7 political provinces (by Constitution), and 7 socio-economic regions (for national planning purposes). The Chorotega region lies in the northwest of the country and encompasses 11 cantons, each with its own local government. It occupies 19.9% of the national

territory and holds 8.2% of the country's population (INEC, 2024). Chorotega covers most of the Guanacaste province (about 86.5%). Featuring the Guanacaste Volcanic Range, the Tempisque River plains, the Nicoya Peninsula hills, and the Coastal Plains along the Pacific Ocean, Chorotega has moderate rainfall and warm temperatures of about 27 °C, which make it highly attractive for tourism. Nonetheless, the region also experiences intermittent dry spells every few years that can have devastating effects on communities, agriculture, and animals, particularly when underground waters are depleted.

The evolution of Costa Rica's tourism industry unfolds in four stages (early, incipient, emerging and consolidation). First, its **early stage** began by the arrival of United Fruit Company's (UFC) steamboats in 1885, starting tourism on the country's Caribbean coast (Karnes, 2008; Rivera & Arrieta, 2008). This prompted the establishment of the 'Beautiful View Anonymous Society' by political and economic elites from San José aiming to offer new tourists access to thermal waters, hospitals, and hotel stays in the city, laying the foundation for health and rest tourism. In 1930, a national regulation and the 'Beauty Costa Rica' campaign were introduced to promote Costa Rica as a destination for tourism and permanent residency. In 1931 the National Tourism Board (NTB) was established to organise and institutionalise the nascent yet profitable economic activity (Rivera & Arrieta, 2008). National promotion of tourism centred around small and medium hotels in the San José central valley, positioning the area as a haven for relaxation and healing for ill-ridden tourists. Notably, Guanacaste was absent from these campaigns. Moreover, it suffered from public health challenges, inadequate infrastructure, and lack of suitable roads (ibid.).

Between 1934 and 1955, the 'No chimney industry' was established as a tourist attraction slogan, emphasising the clean air and nature of the country. This period saw an increase in international influence, particularly from the United States Chamber of Commerce of Latin America. This liberal organisation, whose purpose is advocating for investment and trade, actively encouraged the Costa Rican government to promote tourism (AACCLA, 2024; Rivera & Arrieta, 2008). Local and international mass media also played a key role in this initial stage. Costa Rica's main newspaper *La Nación* and the USA's *Skinner* magazine advocated for the economic benefits of tourism and emphasised the need of promoting foreign direct investment (FDI) to develop the required infrastructure (Rivera & Arrieta, 2008).

In 1935, the first initiatives to promote tourism in Guanacaste appeared in the local newspaper 'El Guanacaste', distributed by Casa Guanacaste—a recently established regional tourism board operating under the NTB directive (Buska, 2006; Rivera & Arrieta, 2008). This was a result of a decline in exports post-World War I and the economic crisis of 1929. Faced with these challenges, economic actors sought alternatives for production in the region, where large firms primarily dominated the economic landscape with commercial cattle for the beef and milk industries (subsidised by the Costa Rican government, the region held 40% of the country's cattle). Other economic activities included timber extraction (e.g., high value timber such as mahogany exported to the United States), agriculture (primarily sugar cane), and subsistence farming (Calvo-Alvarado et al., 2009). The local newspaper aimed to influence the central government (Buska, 2006) by proposing that Guanacaste could provide an 'authentic' Costa Rican experience (Rivera & Arrieta, 2008). Articles listed the region's challenges and identified areas in need of investment to promote tourism. Nevertheless, the regional perception of neglect by the central government led to a decline in enthusiasm about the industry in Guanacaste (ibid.).

In the **incipient stage** (1955–1987), Costa Rica took significant steps to develop its tourism sector. For example, the country signed the United Nations International Treaty for Tourism, which prohibited racial discrimination and established the Costa Rican Tourism Institute (ICT). The goals were to promote the industry and to attract FDI for job creation, to dynamise the economy, and to acquire foreign exchange (ICT, 2024; MIDEPLAN, 1984). Simultaneously, alarmed by the escalation of deforestation rates in the country, the first forestry legislation was enacted in 1969, as well as the creation of the conservation areas system. The impetus for these conservation measures partly came from the rise of 'science tourism', with foreign and local scientists initially advocating for conservation (MacKenzie & Gannon, 2019). Eventually, these conservation efforts played a crucial role in reversing the loss of over two-thirds of the country's forest coverage (Calvo-Alvarado et al., 2009; Sánchez-Azofeifa, 2015).

During the 1980s, Latin America experienced a severe financial crisis; Costa Rica's debt rose to over 120% of its GDP. In response, by 1985, the International Monetary Fund (IMF) and the World Bank (WB) agreed to provide loans if several neoliberal reforms, collectively known as the Washington Consensus, were implemented. These reforms were aimed at

promoting the external economy, including nature-based tourism. Consequently, substantial shifts in conservation practices continued, and the tourism industry took off.

In the **emerging stage** (1987–2000), tourism infrastructure and real estate FDI had a significant expansion, notably of second homes owned by foreigners. Local micro-enterprises and community or rural tourism movements also started to emerge. As a result, the region began experiencing shortages of the once sufficient renewable natural resources, particularly water (Morera & Sandoval, 2010). A combination of hydrological conditions, land use changes, and lack of effective planning policies led to competition and conflict expressed as complaints and protests by organised communities (Ramírez Cover, 2012).

Finally, in the **consolidation stage** (2000–onwards), industry leaders began to recognise the importance of collaborating with communities and incorporating the concept of sustainability in their services (14_Firm_Interview, 2022). The sector expanded to include numerous small and medium firms which now dominate the number of available beds (Morera & Sandoval, 2010). By 2012, public policies on tourism almost doubled from the previous stage (ICT, 2024; Morera & Sandoval, 2010). Foreign investment in tourism and real estate also surged, going from less than USD $ 50 million in 2000, to over USD $ 900 million by 2007. The recently introduced Certification of Sustainable Tourism (CST) by the ICT gained popularity, with the number of certified establishments doubling from 2003 to reach 635 by 2022. Moreover, this certification expanded its scope beyond hotels to other industry stakeholders (ICT, 2024). By 2019, the country welcomed a little over 3.1 million tourists, contributing approximately USD $3980 million to the economy. For Chorotega, this transformation resulted in a substantial shift from traditional economic activities to a focus on tourism (See Table 3.1). Simultaneously, it has also meant socio-environmental conflicts over water scarcity and contamination; an increase in drug distribution and consumption, prostitution, and crime in some coastal areas (Arias & Coronado, 2010); and a community perception of inequality (Blanco, 2017). Yet, overall, in Guanacaste, residents have a positive perception about the impact of tourism in the region (Espinoza-Sánchez, 2019).

Table 3.1 Costa Rica and Chorotega—Shifts in tourism and the traditional economy (1980s and nowadays)

	Early 1980s	*Nowadays*
Tourism in Costa Rica		**2019**
Proportion of CR's exports (%)	*NA*	17.5%
% of GDP	*NA*	4.5%
Revenue (rounded, USD $, millions)	100	4000
Direct employment (% labour force)	*NA*	6.9%
Indirect employment (% labour force)	*NA*	20.7%
Accommodation establishments in Guanacaste (units)	72	837
Traditional Economy in Costa Rica		**2023**
Proportion of CR's exports (%) (coffee, banana, beef, sugar)	69%	10%
… in Chorotega		
Forest coverage	23.6%	37%
Cattle coverage	72%	28%
Cattle headcount	517,654	281,000
Cattle hectares	731,400	284,000
Agriculture	9,9%	10%

Source Authors based on ICT (2024), Robinson (2003), MAG (2020), MIDEPLAN (1984, 2021), Calvo-Alvarado et al. (2009)

Scale and Agency in Chorotega's Transition

Supranational and National Level—Driver Through Policies

Both supranational organisations and the national government have played crucial roles in promoting a tourism industry centred around the enjoyment of natural resources. As mentioned, Costa Rica engaged in loan negotiations with the International Monetary Fund and the World Bank in response to economic challenges in the 1980s (Robles-Rivera, 2010). To ensure that the country would be able to promote growth and therefore comply with the payments, the loans acquired were accompanied by formal expectations for structural adjustments in the economy. These adjustments included shifting from an inward, import-substitution strategy to an export-led development approach. By implementing policies such as the reduction of import taxes and adding export subsidies, facilitating the free movement of capital, offering guarantees to foreign investment, and actively promoting non-traditional export products and services, such as tourism, Costa Rica began to change the structure of its economy and diversifying production (Robles-Rivera, 2010).

In the 1980s, Chorotega's population numbered approximately 250,000 people. At that time, a fifth of the population could not read nor write; employment opportunities for graduates at both high school and university levels were limited; and the educational system and labour market were misaligned (MIDEPLAN, 1981). In 1982 around 72% of Chorotega's land area (7314 km^2) was dedicated to cattle ranching. Agriculture, primarily focused on rice (450 km^2), sugar cane, and corn, constituted the second most significant economic activity. Fishing was also important, as it involved approximately 800 small, local, artisanal fishermen. At that time, there were 24 operational sawmills, and the region held 2026 km^2 of forests (474 km^2 were under protection). Poverty affected slightly over two-thirds of the population (66.5%), the highest regional proportion in the country (MIDEPLAN, 1984).

During this time, there were no diagnostics about the region's capacity for tourism. Only one study done by the supranational Central American Integration Bank (BCIE), highlighted the tourist potential in the Papagayo gulf, a 1,658-ha area in Guanacaste. Later, this land became an area where the national government granted concessions to large investors for elite tourism (for housing in the form of tourism communities, see Ryser et al., Chapter 9).

In 1990, it became evident that tourism held significant growth potential in the region, but concerns arose regarding the limited benefits for the region and the local population, primarily due to foreign-dominated investments. According to MIDEPLAN (1994), the concerns were, first, low community involvement and participation due to deficient organisation capabilities, lack of training, and financing for the communities. Second, numerous conditions for approving tourism projects in the region posed challenges for the establishment of local, smaller firms. Third, the setting of cattle and agriculture farms in hills near the beaches destroyed the 'touristic resource' (p. 93), i.e., the region's biodiversity and forests. Fourth, exceeding carrying capacity of the 'natural resources' due to inadequate planning in nature tourism. Moreover, the national government's regional office for Chorotega wrote:

> It is common to see contamination with rubbish and the construction of hotels and marinas without environmental permits. This has led to the degradation of the scenery and the environment, and consequently, to the progressive loss of the touristic potential. Despite of the regulations on exploitation, development, and expansion of tourism; it lacks control

> and a strict sanctioning authority against those who commit offenses. (MIDEPLAN, 1994, p. 93, own translation)

The conditioning of international funding for Costa Rica, and the view of nature and the environment being a finite resource that is best preserved for the growth of the tourism industry, was an important driver to mobilise the national government away from the core region of San José. The extent to which agency was exerted across the national government can be questioned, as the power imbalance between the government and international funding organisations of the size of the IMF and the WB is important. However, the narratives of economic growth and the results seen from the initial stages of the industry were also strong enough for the government to embrace the reforms from the Washington Consensus and to further the neoliberalisation of the economy.

So far, agency was exerted collectively across governmental organisations from the national level under the influence of external and international organisations. Numerous policies, norms, and regulations have been set up over the span of almost 40 years to try to balance the attraction of foreign investment and the growth of the industry, as well as the involvement and benefits for the surrounding communities and the protection of the environment (see Blanco, 2019). Policies that favour growth goals include investing abundant resources in promoting Costa Rica as a tourist destination abroad. In the 1990s efforts included guidance for Corporate Social Responsibility policies, several types of tax exemptions (since the 1980s), strengthening the ICT, developing a country brand, or promoting tourism for health (ICT, 2024).

Sometimes the goals for promoting tourism converge with the country's development goals. For example, the government's training programmes related to the industry (such as English as a second language, food safety, cooking, tour guide, boat captain, mechanic, etc., see INA, 2024) help trainees have a better chance to find and keep a job, as some of these skills are also useful to other industries, and the tourism industry gets a wider skilled pool of labour. Other examples include the Payment for Environmental Services (PES), a programme aimed at incentivising landowners with cattle farms to reforest their land (Arriagada et al., 2009); the strategies to connect local food producers with the industry, implemented by the regional branches of the Ministry of Agriculture (04_MAG_Interview, 2022); or the construction of roads by the national government (02_LocalGovernment_Interview, 2022).

A notable initiative the national government aimed at reconciling both economic and development goals, is the sustainable tourism certification (CST). Since 1997, this certification assesses social and environmental impacts, including factors such as water and fossil fuel use, jobs creation, employee training, community engagement, and support for local businesses by buying local, etc. Compliance is reviewed by the ICT, and a public–private commission assesses each case to determine certification eligibility. Originally targeted at hotels it was promoted by the private sector and developed in collaboration with the ICT (03_ICT_Interview, 2022). Nowadays the CST has evolved to encompass various industry sectors such as transportation services and restaurants. Notably, the certification process is free (03_ICT_Interview, 2022).

Research in Costa Rica has shown that obtaining a similar certification called Bandera Azul (Blue Flag), provides economic advantages for new hotels that acquire it (Blackman et al., 2014). Experience with the CST shows that companies invest both time and resources to meet the certification's requirements, leading to a shift in production practices towards more sustainable methods (03_ICT_Interview, 2022). Since 2016, reaching the higher levels of the CST also involves encouraging other firms within their value chain to adopt sustainable practices (ICT, 2024).

The combination of ecologic goals with economic growth goals represents the national perspective today (e.g., recognising the need for a sustainable use of resources). This vision, taught in schools (MEP, 2023), is present in short- and medium-term planning strategies for the region and the country, as it can be observed in the annual National Development Plans and longer-term strategies such as the 2030 Agenda (Benavides, 2020). These plans have been supplemented by policies that recognise the rights of local residents to access all beaches; overseeing hotels, marinas, transportation, maritime-coastal area development; and promoting rural community tourism (ICT, 2024). Although, the policies for initial stages of the transition were more focused on economic growth rather than sustainability, macro-level agency, led to the implementation of a series of reforms that began to legitimise the industry.

Irrespective of the convergences and contradictions in public policy, in a long-term perspective, agency has been exerted with the aim of directly influencing the development of the industry. This has been done by influencing the actors and organisations through regulations, strategies, and certificates, creating spaces for more regional actors to be part of the

industry's innovation system, and offering directionality to coordinate other national and regional economic growth policies.

Regional Adaptation—Catching Up with Policies

Macro-level agency is also mobilised at the regional level. During the emerging stage, regional actors such as the ICT, regional branches of national agencies, public education organisations, international and national firms based in Chorotega, and community organisations gained relevance, as, up until then, most of the national government's efforts were not directed towards this region. In this period, regional actors began to recognise tourism as a potential catalyst for transforming the local economy.

The regional vision for the industry in general aligns with the top-down view around sustainability, i.e., that it is a key characteristic for competitiveness:

> [T]he future wellbeing of the nearby communities is the stability of businesses. […]. (11_Hotel_Interview_2022)
>
> We have always had the vision that everything has to grow at the same rate, we cannot ask for more flights coming in if the destination is not ready to receive people in the best possible way, nor can we overexploit the resources that we have, that's why we believe in sustainable development, so that firms can hire local people […]. (01_Chamber_Interview_2022)

Regionally, the organisation and collaboration between actors has been particularly important to advance the consolidation of tourism in Guanacaste. In this sense, in liaison with regulations and policy guidelines, regional institutions play an important role in shaping and legitimising the transition (Grillitsch et al., 2023).

Firms have sought to organise themselves into different chambers, for example, the Guanacaste Chamber of Tourism, which was founded in 1994 (CATURGUA, 2023). Firms have also developed the ability to work together towards shared objectives. One of their common objectives is infrastructure improvement and institutional entrepreneurship is employed to mobilise resources for this purpose. An illustrative accomplishment by regional businesses was the successful establishment of a USD $3 million private escrow to cover potential losses associated with the first flight of an international airline arriving to the Daniel Oduber

airport in the city of Liberia, Guanacaste. This initiative was undertaken because the ICT lacked the capacity to fulfil this role (01_Firm_Interview, 2022; Madriz, 2023).

The collaboration goes beyond firms. Government and education organisations also collaborate with the private sector. Businesses are active in engaging with the National Technical Institute (INA), and regional branches of national universities teach programmes such as sustainable tourism since the early 1990s. Seeking to lower costs and risks, some larger firms in the industry collaborate with communities to hire local workforce, creating additional sources of income for local residents, a public recognition of the importance of the business; and an opportunity to convey a sustainability message, both verbally and by adopting environmentally friendly practices such as recycling (11_Hotel_Interview_2022). These examples show how macro-level agency, and particularly institutional entrepreneurship was mobilised to create new institutional arrangements.

Local Responses and Spatial Exclusions

Agency has been materialised through the responses of the local governments, organised communities, families, and individuals to the growth of the industry and the accompanying policies. In addition to institutional entrepreneurship and system-level agency, evidence of micro-level agency is observed at this scale, and it is exerted by both, entrepreneurs that join the industry, and other local actors who oppose it.

Findings in this respect are observed in shifts in individual practices and values. This has been partially driven by local governments ensuring businesses' compliance with regulations. Local governments acknowledge that sustainable tourism is generally beneficial for the region and its communities and provide support to local entrepreneurs and oversee construction permits and compliance with environmental regulations. During inspections, if environmental irregularities are detected, they may assist the company in understanding the value of compliance (02_LocalGov_Interview, 2022). However, despite the industry's overall promotion of sustainability, some rogue firms may choose not to comply.

At the community level, the vision about nature and its preservation has been changing due to improved access to education and the possibility to make a living *with* nature as opposed to *out of* nature. For example,

> People were studying and sought alternatives to working in sugar cane fields. Once the Cipancí Refuge was established, they turned to the river (which had been a nuisance flooding their land) and, pursued tourism projects with their motorboats. (Paraphrased, 02_LocalGov_Interview, 2022; Fig. 3.2)

As the quote above shows, the local inhabitants had taken the river for granted. Upon realising the economic value of nature, however, communities, often led by community leaders, experienced a change in perspective acknowledging potential economic gain from nature and cultural experiences. This has altered the way people perceive nature, from a nuisance to an opportunity for economic prosperity:

> Contact with tourists has changed our mentality of destroying and destroying [forests], because tourists come and say, 'what a beautiful tree!', […] so if we cut the forest, we have many difficult [economic] situations. (07_Worker_Interview, 2022)

Fig. 3.2 Tempisque River and boats for tourists in Guanacaste (*Source* Authors)

Yet, while Costa Rica is well-known for its efforts in building a sustainable tourist industry, at the local level the transition is not free of contradictions and conflicts, underscoring the complexity of economic transitions (Fletcher, 2023; Force et al., 2018). Chorotega's experience shows that the spatial effects of tourism development are uneven. For example, the coastal town of Tamarindo, which experienced a boom in construction without adequate regulations, now faces problems of water contamination, insecurity, drug abuse, and gentrification (03_ICT_Interview_2022; Blanco, 2017). Another example is the contrasting case between inland communities of Bolsón and Guatil. In the case of Bolsón, entrepreneurs and community leaders have been able to establish different types of activities along the Tempisque River, including eateries, museums, and experiential farms visits, among others (05_Firm_Interview, 2022). They have managed to connect with larger hotels that offer these activities to their guests. Micro-level agency played a role in this success, although other influencing factors are also at play, as elaborated below. On the other hand, the Guatil community, renowned for its hand-made pottery (Fig. 3.3), has struggled to organise themselves to derive benefits from tourism, despite the support from various governmental and higher-education entities (08_Firm_Interview, 2022).

Moreover, fundamental problems took place at the early stages of the development of the industry that still have repercussions today in Costa Rica and Guanacaste. Morera and Sandoval (2010) identify at least four areas of rupture caused by the industry: land (expropriation, forced sales, and coastal areas increasingly expensive for locals); water (overconsumption limiting its availability for locals); social networks (mega tourist projects sometimes become enclaves disconnected from the local economies); and environment (ocean contamination, national parks saturation).

Discussion and Conclusions

Tourism in Chorotega has had an important role in a challenging sustainability transition process for the past forty years. The shift from a primary industry to tourism has enhanced the sustainability of the region by substituting pastures for forests and job shortages for labour offers. Based on the natural beauty of the country, and the idea that conservation was the key to attract tourists, the industry took off and consolidated.

Fig. 3.3 Pottery from Guatil. Produced using local materials and ancestral practices (*Source* Authors)

We identify that both micro- and macro-level agencies have driven this forward, particularly, initiation agency, experience agency, and system-level agency. As we have shown, the transition began when local interests (domestic—economic and political) pushing for tourism in the region finally aligned in the 1980s, with supranational (IMF and WB conditional funding) and national government interests (policy—initiation agency). In turn, these aligned with foreign capital's interest to invest in the tourism industry, as per the awareness of tourists increasingly seeking sustainability options (international, through lived experience agency).

Chorotega, being a remote region from San José with thinner institutionality, found its shared interests, coupled with funding, vision, and policies from various scales and sectors, resulting in a system-level agency that strengthened formal and informal connections for collaboration. These inter-scalar, inter-sectoral efforts to promote the industry are concerted like with no other industry.

The country and the industry's discourse of a green and sustainable Costa Rica, coupled with interactions with foreign tourists, has gradually seeped into locals' values and beliefs, favouring social and environmental sustainability. This exemplifies how an industry can initiate a shift in cognition and values through experiential human interactions, particularly when tourists seek cultural experiences involving engagement with local communities and purchasing their goods and services (Fig. 3.4). However, these evolving values and beliefs are often based on economic gains rather than for the intrinsic importance of ecosystems.

In general, efforts across all scales and most sectors prioritise growth over sustainability, which may help explain the limited and slow nature of the transition. The limitations of the sustainability transition in Chorotega have to do with several issues. *Economically*, the industry's vulnerability to global shocks has increased the region's economic vulnerability, as evident during the COVID-19 pandemic. Chorotega was the most

Fig. 3.4 Small restaurant, museum-farm in Bolsón. Tourists share with the locals, learning about their traditions and eating local cuisine (*Source* Authors)

affected region in the country during that period, with poverty levels rising from 20.3% in 2019 to 31.7% in 2020 (PEN, 2023).

Socially, despite FDI policy that stipulates lower taxes in return for hiring or buying local, this may not suffice. Few firms go beyond their obligations to actively get involved with communities, fund projects, offer training, or assist in community organisation. Moreover, the industry may employ exclusionary practices that lead to gentrification and forced migration (03_ICT_Interview, 2022; Cañada, 2010). Thus, tax exemptions can be an ineffective way of distributing income (Cañada, 2010). In this sense, the governance of the industry seems to privilege firms over communities, a point of considerable academic critique (*e.g.*, Blanco, 2017; Cañada, 2010).

Environmentally, while global consumers are increasingly demanding sustainable tourism services that preserve the landscape, environment, natural and cultural heritage (Pavione & Pezzeti, 2016), these demands are less prevalent in sun-and-beach tourism, a highly popular activity in Guanacaste (ICT, 2024). In addition, addressing sustainability in transportation, particularly the aviation industry, poses a significant challenge. The industry relies heavily on foreign visitors arriving by air travel, yet aviation remains one of the world's most polluting industries in the world (Transport_Environment, 2024). While beyond the chapter's scope, this is a critical issue that has the potential to greatly offset efforts towards the sustainability of the industry (See Higham et al., 2022 for policy recommendations).

Consequently, the transition has been limited in terms of shifts in production, consumption, values and beliefs, and governance, affecting environmental sustainability and the social justice aspects of the transition (also Ryser et al., Chapter 9). Our research suggests that Costa Rica's primary efforts towards economic growth has slowed down the transition. In Chorotega, the transition began within a financially strained national government in need to prioritise growth. This dynamic persists today, given that the country's fiscal debt has surpassed 60% of its GDP and laws for austerity are in effect. Sustainability transitions can be more challenging in middle-income countries attempting to balance their finances, deliver development, economic prosperity, and reach environmental goals. Policy design, implementation, and oversight often require more funds than those available.

While an industry may help initiate a process towards a sustainable transition in a region with the engagement of other actors from different

scales, this is not enough to support a sustainability transition across time. Therefore, it prompts the question: at what point do we begin to scrutinise the sustainability of the transition? In this context, a significant challenge lies in the state's capacity to formulate a vision for the well-being of its population and environment that transcends economic growth and opportunity. Such a vision should be all-encompassing, considering those often marginalised due to their geographic and income distance from the centres of power. Lastly, concerning policy implications, our analysis suggests that Chorotega's sustainability transition is at risk of entering a declining phase. This implies that the environmental and social actions undertaken by new investments may not be sufficient to propel the transition forward, unless radical changes are made in the ways income is distributed.

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CHAPTER 4

Energy Transition as Space Making: Rescaling of Accelerated Transformations in the Context of Estonia

Tarmo Pikner

Introduction

Recent crises and disruptions in global systems shed light on the wider interdependences between society and energy. Energy is pivotal to the maintenance of modern freedoms and energy as a matter indicates entanglements between civilisation and Earth. Climate crises vividly show how the planet is not just a passive framework of human action, and landscapes are likely sites of geo-social negotiations about possible futures (Latour, 2018). Energy can be seen as an important mediator of relations between humans and natural environments. The European Union's (EU's) Green Deal and the war in Ukraine have accelerated processes towards energy transition, which can be understood as a contested and multi-scalar process towards low-carbon societies (Kanger & Sovacool, 2022). However, the connected scales of energy transition entail various spatial factors, including categorisations, flows, and experiences of change

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(Bridge & Gailing, 2020, see also Wallace & Batel, Chapter 5). This chapter focuses on the complex spatiality of energy regime by bringing together territorialisation dynamics and anticipated landscapes in rescaling processes. The main question is what kind of spatial relations between energy and society are imagined and enacted in rescaling of energy futures and of transitions? I examine the diverse interdependencies and tensions in the energy transformation processes of Estonia, specifically in the oil shale and offshore wind energy issues.

The chapter elaborates the conceptual framework along vignettes about decarbonisation and decentralisation of Estonia-related energy production. Estonia provides fruitful insights because climate crises and EU requirements have pushed towards policy design and measures to generate alternatives to the current energy regime, dominated by centralised oil shale production and a single industrial region based energy system. This remarkable transition reconfigures energy provision from 'energy for space' to 'energy from space' (Thrän et al., 2020) connecting renewable resource potentials, ecologies, related infrastructure, and humans. This shift towards more space-dependent energy production is mobilised along rescaling of low-carbon transition, which will be discussed through three set of relational processes (Bouzarovski & Haarstad, 2019; Bridge, 2015): politicisation of existing regime; ways of engagements and knowledge exchange; hybridisation along co-constituting of human and non-human agencies. The chapter examines these relational processes of rescaling by problematising and analysing the dynamics of territorialisation and landscapes bound to energy production, which need more attention in sustainability transitions. Landscapes can be seen as key constellations in repolitisation assemblages of energy-bound resource-making, infrastructure, and society (Kirshner et al., 2020).

The thematic study is based on the encounters of energy transition rescaling in context of Estonia. Here, 'encounter' entails an examination of social and material assemblages of life, with a critical focus on the contradictions, durations, and interventions bound to contemporary transformations, particularly in terms of their enacted categories and difference (Wilson & Darling, 2016). The situated encounter approach involves discursive knowledge and materialised processes bound to energy. The chapter examines how ongoing and possible transformations appearing in public imaginaries and landscapes link spaces, time, and affects to energy-society assemblages. I study the situated encounters within two main spheres of energy transition in Estonia: negotiated

fossil fuel (mainly oil shale) dependencies and territorialisation of offshore wind resources. By combining these spheres of low-carbon trajectories, we can connect rescaling processes simultaneously to legacies and to emergent characters of energy landscapes. A public architecture installation, an oil shale bound carbonscapes, and a thematic map of offshore energy planning are starting points to bring public imaginaries, narratives, and contested landscapes about energy transition down to Earth in the sense of more-than-human entanglements. The chapter analyses the narratives presented in the largest Estonian daily newspaper *Postimees* in the period January 2022–November 2023. These narratives are considered part of subjective experiences and as communicative acts based on practices, socio-cultural meanings, and events linking narrators/participants within societal webs of meanings (Gubrium & Holstein, 2009). However, thematic narratives about low-carbon societies and energy futures co-exist with wider terrestrial entanglements and anticipated changes in surrounding environments (see also Albrecht & Klein, Chapter 2; Wallace & Batel, Chapter 5). Thus, the study combines situated encounters and narratives as thematic vignettes to make the particular dynamics of rescaling and landscapes of energy transition visible.

The first section elaborates the conceptual framework about relational rescaling and landscapes in energy transition, used later to analyse spheres of low-carbon transitions in Estonia. The second part valorises the role of public architectural installations to problematise geopolitical energy interdependencies, which link terrestrial and marine spaces, and indicate durations of contested infrastructure. The third section discusses spatialisation of just transition measures to deal with consequences of oil shale mining in the Ida-Viru region. The fourth part approaches the rescaling dynamics in the planning of marine space for offshore energy. The fifth part draws conclusions discussing Estonia-based dynamics along the three dimensions of rescaling in low-carbon energy transitions.

Territories, Rescaling, and Landscapes Within Energy Transition

Imaginaries and practices related to energy resources form our environments, social realities, and imaginations of the future. The freedoms and projected future environments in modern societies are co-constituted by accessibility to energy matter (Szeman & Boyer, 2017). Energy can be seen as the prime mediator in human-nature relationships, therefore

understanding power imbalances arise from these interactions (Tornel, 2023; see also Hornborg, 2020). The climate crisis and the war in Ukraine have pushed change towards renewable sources and indicated vulnerabilities of current energy assemblages. Connecting energy and society entails consideration of wider entanglements to the Earth's atmosphere, ocean, and underground. Thus, the spatiality of energy transition should describe and reflect on these volumetric three-dimensional spaces reaching beyond landscape as a terrain surface (Elden, 2013). By examining territorialisation and territories through the lens of volumetric and voluminous terrains is to decentre human agency and to take the geophysical agency of Earth into account in becoming part of complex assemblages of living and maintaining of life (Elden, 2021; Latour, 2017).

The problematisation of energy-society relations and its entanglements to Earth is about (re)scaling. Relational thinking means that a fixed scale alone is insufficient to explain these processes the production and negotiation at any scale involves other spatialities such as flows, connections, networks, sites, places, and materiality (Leitner et al., 2008). According to relational understanding, scale embodies political, social, and discursive processes that cannot be reduced to a particular institution, and social practice can hardly be understood without considering cross-scalar relations (Bouzarovski & Haarstad, 2019). We approach rescaling of low-carbon transformations through the following three sets of relational processes (Bridge, 2015; see also Bouzarovski & Haarstad, 2019): (a)politicisation, expressed by the ability to challenge established power relations, ideological systems, and logics of capitalist reproduction beyond narrow territorial location; (b) enrolment as interaction, knowledge exchange, and engagement with actors operating at multiple levels of governance, and involving state and non-state organisations; (c) hybridisation, involving the co-constitution of human and non-human agencies in the technical infrastructures for the provision and regulation of energy. Additional to these sets of relational processes, I add complex (dis)continuities and durations to the politicisation within rescaling of energy transition.

The rescaling of low-carbon transition comes together with multiple flows and ways of spatialisation. Bridge and Gailing (2020) argue that sites, scales, and spatialities of energy systems are key contemporary nodes of struggle through which broader questions of political economic governance are negotiated. Multi-scalar reworking of energy systems is related to geopolitical and geoeconomic imaginaries and practices (Le Billon &

Kristoffersen, 2020). 'Territory' and 'landscape' are useful concepts to analyse complex spatiality of energy transition. Territory entails areas of strategy and power constructed through inside-outside relations, such as the processes of territorialisation (e.g. bordering, bounding, or parcelisation of energy spaces) and the organisation of special and political power over space in and through energy systems, and at a variety of scales (Bridge & Gailing, 2020). Territorialisation can involve diverse knowledge and visual representations (e.g. maps) in emphasising and negotiating new and existing assemblages between energy and society. The territorialisation of energy sources can include volumetric dimensions, e.g. offshore wind parks are bound to underwater habitats, cultural milieus, materialities of emissions, and flyways of rare migratory birds, which can appear in various knowledge forms and imaginaries.

Territorialisation and bordering of energy-society relations takes place in cultural contexts. The cultural dimension of energy transitions appears within projected and experienced landscapes, which can be seen as a character of each territory. 'Landscape' describes the generative assemblage of natural and cultural features, and experienced tensions between humans and the worlds across diverse time horizons (Bridge et al., 2013; Pikner & Palang, 2021; Wylie, 2007). According to J. Wylie (2005, p. 254) 'landscape might best be described in terms of the entwined materialities and sensibilities with which we act and sense', thus we approach 'landscape as perceived-with' (Wylie, 2007, p. 217). Thus, landscape entails the policy-technology nexus of human perception and interaction with the material world, a nexus that needs broadened notions of path dependence and lock-in to include landscapes around us and our attachment to them (Calvert et al., 2019; see also Tuvikene et al. 2022). Nadaï and van der Horst (2010) argue that the focus on landscapes provides a situated point of view, which helps us grasp the way in which technologies and energies, although linked to the European grid, are still embedded in territories and local communities. Traditionally, landscapes are approached in energy transition as socio-materiality of energy production and consumption over given space (Bridge et al., 2013). According to new approaches, landscape can indicate repolitisation of energy sources and process of resource-making and infrastructuring (Bridge & Gailing, 2020; see also Kropp, 2018). Energy landscapes are not just a visual record of the political economy of the energy system (Kirshner et al., 2020) but become key constellations in the repolitisation of assemblages between energy and society, including tensions between territorialisation of sources and

experienced (or expected) change in living environments. Therefore, it is important to study 'how novel energy landscapes—combining both new energy systems and remnants of the old—are produced and reproduced' (Bridge & Gailing, 2020, p. 1040).

The rescaling bound to energy is related to wider sustainability transitions because the discussion about (not) valuable environs and collapsing regimes becomes likened to discourses of energy futures and trajectories of change. Sustainability is 'the commitment to the long-term continuity of that which is valued, maintaining the best of what is there already but allowing and often promoting certain types of change' (Morén-Alegret et al., 2018, p. 254). The study of decarbonisation dynamics contributes to sustainability approaches by bringing 'multiple ruptural points' of the global system into a condensed, generalised concern for the future (Brown, 2016, p. 130). Real and anticipated ruptures bound to energy-society assemblages become part of (re)scaling necessary changes and adaptations.

Transnational Energy Dependencies and Perspectives in Time: 'Reality Check'

Energy matter and infrastructure co-exist with geopolitics, thereby binding ideologies to the Earth. These entanglements between energy and terrestrial can become visible through events of emergence and of disturbance, which reveal trajectories of politicisation and hybrid socioecological networks. The explosion of the Nord Stream undersea gas pipe in spring 2023 suddenly exposed the internalised biopolitics of geopolitics and capitalism. The hidden network of energy was repositioned on the transnational scale of wartime disturbance and failed diplomacy based on rationality that trade can supplement peace. The gas pipeline in the Baltic Sea, established to connect Russia and Germany, was problematised through an Estonian artist's installation in Venice Architecture Biennale back in 2008. Art can visualise dispersed and complex associations of becoming realities, which can involve energy landscapes. The installation built up 63 metres of yellow pipe in Guirdiani Park (Fig. 4.1) to problematise relations between vertical architecture as an 'iceberg' and the invisible horizontal energy infrastructure. The aim of the provocative installation connects future scenarios to landscapes as following:

> Gas Pipe installation works as a reality check in the context of the biennale. […] The installation will also address the reality of contemporary landscape more and more defined by large-scale infrastructure and intermingling of the technological and the natural. Infrastructural networks are flows building up a world of motion in itself, generating their internal systems of rules and regulations. […] The question of different future scenarios of energy will render all these landscapes quite different. (Ruudi, 2008)

The weaponisation of energy and related infrastructure was implied in the Gas Pipe installation, but this risk became explicit in Russia's war with Ukraine. The destruction of the Kahhovka hydro-electric dam by Russia scaled up the ecological damage in space and in time because the consequences will last for decades. The danger of nuclear catastrophe related to destabilising power plants in Ukraine has been constantly present in the war situation, increasing the calls for decentralising energy infrastructure in post-war Ukraine. The risks of energy cuts forced home generators

Fig. 4.1 Installation 'Gas Pipe' in the Venice Architecture Biennale in 2008 (*Photo* Salto Architects, 2008)

and wood-heating ovens in Estonia as well. The dependencies on large-scale fossil assemblages have appeared as part of geopolitical insecurity and localised vulnerabilities in different periods. The instability of energy infrastructure has valorised 'politics of things' (Latour, 2005), which indicate that politics is not limited to humans and involved objects become matter of concern and of wide-scale transformations.

The energy question links marine space, land use, and urban change. The urbanisation of the Baltic Sea through extending infrastructure was articulated in the shared Baltic pavilion of Architecture Biennale in 2016. In context of the pavilion, Couling (2016, p. 176) argues that the space of the Baltic Sea has become fully urbanised through the intensification and acceleration of interactions, and these tendencies generate 'seascapes as modified ocean landscapes, *scaped* and cultivated by human interaction'. She makes the reference to Nord Stream gas pipe as well in urbanisation of sea. Sea urbanisation is based on similar perspective as planetary urbanisation (Brenner & Schmid, 2015), which incorporates diverse places, matter, and landscapes through extended forms into a global urban fabric. However, the drawing together of wider energy transitions and of related landscapes exclusively through urbanisation needs further studies.

These discursive architecture installations indicate the politicisation of energy through focusing on hybrid materiality of infrastructure, which establishes contested geopolitical relations connecting EU places to Russian power and gas fields. The undersea links indirectly problematised the distinctions between land-based city planning and marine space. The later installation revealed the hybridisation of transnational energy. Critical perspectives and worries about geopolitical energy dependencies in Estonia become more apparent (see also Pikner, 2010) if to take into account the unused and exploded Nord Stream gas pipe in year 2023. Thus, extended duration, ruptures, and hybridisation are vivid characteristics of rescaling of energy transitions.

(Dis)continuity of Oil Shale as Resource: Rescaling Along 'Just Transition'

Estonia's highest emitter of CO_2—oil shale production and use—is concentrated in Ida-Viru. In 2019, the oil shale-related industries produced more than 50% of total Estonian CO_2 gases. It was estimated that 48% of the world's oil shale yearly output (in 2010) was mined in Estonia (Gavrilova et al., 2010), although this share has decreased

during last decade. The ash-mountains generated by oil shale mining and processing are visible characteristics of Ida-Viru. The peaks of the hills (Fig. 4.2) offer an insight over the 'carbonscapes' (Haarstad & Wanvik, 2017), which extend beside the terrain surface to underground mining tunnels and to dispersed energy grids connecting villages and cities to the fossil material. The empty tunnels affect significant terrains around towns of Kohtla-Järve and Kiviõli, and the partial stability of these terrains is annotated on Estonian Land Board maps. The mining affected energy landscapes indicate past and negotiated futures about possible trajectories of energy transitions. The EU-initiated Green Deal framework limits the viability of oil shale-based energyscapes. The (geo)political shifts pushed more ambitious revisions of Estonia's climate policy principles to formulate that Estonia will achieve carbon-neutrality in 2050, and the readiness to adopt to climate change would enable to decrease the negative impacts of climate change (Estonian Parliament, 2023). To reach the carbon-neutrality aim, the CO_2 emission should be decreased 70% in 2030 and 80% in 2050 compared with the emissions in 1990. This ambitious low-carbon transition in Estonian context is going to significantly affect Ida-Viru through sharp decline of oil shale mining related jobs and wealth. According to policy design (Sepper & Michelson, 2020), the process of transition will impact employment possibilities, social integration, migration decisions, environmental condition, health of people, energy security, budgets of municipalities, and perceptions of the region (see also Nel & Marais, Chapter 11 for a South African context).

The politicisation of oil shale-based carbonscapes is constantly present in public discourses about energy and green transition. The continuation of oil shale-based industries is presented alongside strong criticisms on finding alternative uses for oil shale. The two following discursive arguments (from Estonia-wide broadcast) present the oppositional positions about trajectories and time-dimensions of energy transition:

> This oil factory is meant to produce oil from oilshale. The burning of it forces climate changes. […] Currently we are deep in climate crisis. Estonia together with other countries have promised to act that the climate warming would stay in limit of 2 degrees. For that we must hold all fossil fuels in the Earth. We can't afford to establish any new oil factory, and we already have working oil factories. (Kertu Birgit Anton, 2023, Fridays for Future)

Fig. 4.2 Oil shale mining related carbonscapes in Ida-Viru (*Photo* Saara H. Mildeberg, 2021)

> Climate neutrality is economic and technological utopia. In the history of humankind, each new large technology has been cheaper, more effective and more comfortable. The energy production technology of Green Deal is not. The technology imposed on us is not suitable for development of energy production, except maybe nuclear energy. […] Climate catastrophism is a political propaganda. Here is needed to get sober, because otherwise the utopia will happen. (Parts, 2023, former prime minister of Estonia, cit Karnau, 2023)

Both arguments position energy transition in relation to climate crisis. Fridays of Future's argument 'to keep all fossils in the Earth' because of climate urgency is contrasted by the blaming of technological utopia and ironic narrative of catastrophism. These articulated arguments indicate destabilisation and stabilisation of current energy regimes within wider societal changes. Kangert and Sovacool (2022) have studied public media debates on different energy futures in sustainability transitions and valorise tensions between regime stabilisation, regime destabilisation, and acceleration of new niches. They argue that: 'Energy justice (and claims

about it) can therefore be interpreted as a power struggle who gets to set the direction of the current energy transition and reap the future benefits' (Kanger & Sovacool, 2022, p. 10). Current controversies in public debate on energy futures ask the inhabitants of Ida-Virumaa to choose between the combination of higher incomes, environmental degradation, and adverse health impacts on one hand, and the threat of job loss and regional decline on the other.

Oil shale mining has been linked to the military-nuclear complex of Soviet Union, which burdened nuclear waste in Ida-Viru for the next millennium (Pikner, 2024). This fact shows the binds of deep time to energy matter, which usually gets ignored in the shorter time horizons of transition politics. The discourses of energy transition indicate complex and controversial entanglements between past legacies and desirable futures.

Kanger and Sovacool (2022, p. 11) indicate a complicated temporality of energy transitions in which 'a probable direction of transition, despite of its manifest benefits in relation to alternatives, might nevertheless end up being crushed between the extended present and anticipated future choices'. Thus, the strong pressure to continue the oil shale-based energy regime affects trajectories of sustainability transition. The war in Ukraine has mobilised narratives that question accelerated speed of decarbonisation, as domestic production of oil shale could contribute to energy autonomy in geopolitically turbulent world.

Rescaling oil shale dependencies involve engagement and participatory dynamics. The formation of the 'just transition' programme in the Ida-Viru region (Ministry of Finance, 2022) provides one example of these processes; it combines the state-level action plan and regional development strategy of Ida-Viru county, and according to the strategical framework of achieving climate neutrality, the use of oil shale will be determined in energy production in year 2035 and its industrial use stopped completely in 2040. This is presented as bold cornerstones in achieving climate neutrality of Estonia in 2050. The scales of sustainability transition appear together with temporal milestones and projected unsure trajectories of achieving the targets. The info materials of the ministry coordinating the just transition programme, bring regional scale of transition together with planetary sphere: 'Earth does not need saving. Just a human being cannot survive on the changing planet. To avoid powerful transformations, instead of life-spans there is need to think along life-circularities and to hold planetary scale as most important' (Ministry of

Finance, 2020a). This explicit extension of scale surprises in the preparation phase of the policy programme, although it appears tacitly in various graphs explaining the regional question along curves and milestones to wider climate goals.

The regional scope of the just transition programme indicates that 5800 people work in the core companies of the oil shale sector of Ida-Viru County and nearly 16,000 people live in the households of those employed in the sector. Together with household members, at least 8000 people are at direct risk of falling into poverty. Inhabitants of the region noted in the public feedback (Ministry of Finance, 2020b) that they are mostly missing well-paid jobs, development-driven municipalities, and good opportunities for youth. People expressed their satisfaction with clean environments, sightseeing places, and cultural richness of the region. The creation of new functions for former mining spaces and related wastelands was seen as a very important driver in economic development. One study (Michelson et al., 2020) estimates that half the workforce (2,800 people) will need in-service training as their jobs are closely related to the specifics of oil shale. The thematic applied study analysed the following cases for knowledge and good practise transfer in generating Ida-Viru measures of post-oil shale transition: Asturias (Spain), Silesia (Poland), Houthalen-Helchteren (Belgium), and the Ruhr and North-Rhein-Vestfalen regions (Germany) (see Becker & Naumann, Chapter 10 for rescaling processes within the latter). The noted cases are approached along a reflective prism, reflecting the potential in understanding social problems and possible revitalisation dynamics. Beside diversification of economic sectors, the policy recommendations highlight (Michelson et al., 2020) the generation of new functions for (polluted) industrial sites and changing living environments in shrinking areas through demolition of empty buildings for public space initiatives. From the bottom-up perspective, young people of the Ida-Viru region associate environmental care with the valuation of nature and tangible things like winters without snow or disregarded waste (Solnik et al., 2021). Post-mining trends lead to wider shrinking of the region and tensions between ethnic groups in Estonia. Young people tend to think that climate changes do not affect them directly but may affect future generations later. The concept of 'just transition' remains too abstract and unclear, and associated of looser-narrative (Solnik et al., 2021). The transition process should accommodate a perspective centred on those who will face unsecure future.

EU grants and Estonian NGOs have been involved in supporting bottom-up and lay knowledge integration to energy transition. Estonian first climate-themed public assembly or youth climate assembly took place in autumn 2021 focused on Ida-Viru region and was moderated by Rohetiiger NGO. The assembly was formed by the representative sample of 40 young persons (age 16–29) of Ida-Viru to evaluate the regional plans of just transition during three-day workshops. The assembly delivered suggestions to the state-level ministry and to the regional union of municipalities and will monitor the application of proposals. The assembly pointed out the tensions between reality and wishes appearing in shrinking cities, difficulty of small entrepreneurship, missing secure buffer for transition and real job opportunities after re-education. The proposals to revise the just transition are mostly focused on the regional scale, e.g. the improvement of education opportunities, social security of affected people by providing new opportunities, and advancing of local and green entrepreneurship (Rohetiiger & Eestimaa Looduse Fond, 2021).

Hybridisation in rescaling process appears in multiple entanglements which bring together social change and the (under)ground issue of oil shale and energy futures. The forestation of former mines has been one strategy of naturalising visual appearances. Some mines are used as part of recreational assemblages for rowing, downhill skiing, and recreation. Applied initiatives explore how to distil valuable metals out from the oil shale ash-mountains. The co-constituting of materialised landscapes and sustainability transitions bound to energy appears through industrial legacies and scars. The environmental legacies of oil shale mining are articulated in the debate as one reason to accumulate further impacts of energy transition on the previously disturbed landscapes of Ida-Viru (Pikner, 2024). This tendency appears in territorialising future possible nuclear energy production sites in Estonia, which is influenced by one company and state-level expert group. The expert group published in September 2023 the report (Nuclear Energy Working Group, 2023), which visualised geologically and socio-economically suitable areas for a nuclear energy plant. These suitable areas include coastal terrains across Estonia, including the Ida-Viru region. This report is used as input to clarify possible nuclear futures in the context of Estonia, and in 2024 the Estonian government and parliament decide about this possible trajectory of energy transition. However, nuclear energy is presented in public discourse as a reliable alternative to oil shale. Paradoxically the potential sites of production and possible technological solutions for nuclear

energy are presented before the wider engaging public debates and political agreement about Estonia-based nuclear energy complex. Thus, technological and terrestrial frames of forming nuclear energy futures come before or parallel with politicisation in linking the contested energy complex to Estonia and localised sites of production.

Winds of Change—Spatialising Marine Offshore Energy

Larger and smaller pieces of fluid marine space are marked on the map (Fig. 4.3) as part of processing building rights on the sea. These marked territories indicate potential areas for offshore wind parks and related cables. Main development pressure of wind energy will be accumulated around the islands of Estonian west coast. The territorialisation of wind energy sources has proceeded through the national-level maritime plan, which was approved on May 12, 2022 after years of participatory processes involving expert knowledge and the wider public. The territorialisation of marine space for offshore wind energy usages and navigating different concerns between functions of marine space has been one rationale of Maritime Spatial Planning (MSP). The plan was carried out on the state level because this scale is responsible for the owning and planning of marine space. However, the projection of borders of potential offshore wind areas has affects across the scales including coastal municipalities and inhabitants. Thus it is important to understand rescaling dynamics, which indicate ways the projected territories of wind sources emerge as voluminous terrains in diverse knowledge production practice and in contested landscapes.

The planning of marine space for wind energy drew certain boundaries of possible long-term functions on open sea. The rescaling appears through the politicisation of marine space and wider renewable sources in energy transition, which are often contrasted with the current regime of oil shale dependencies. The media discourse presents wind sources as the way to destabilise current energy regime and accelerate new niches of energy transition (Kanger & Sovacool, 2022). The Estonian MSP processes indicated that local municipalities are motivated to have more power in planning coastal terrains but would need additional knowledge for it. The current landownership and planning regime means that municipalities stand with their backs to the sea having limited capacities to face challenges of coastal change.

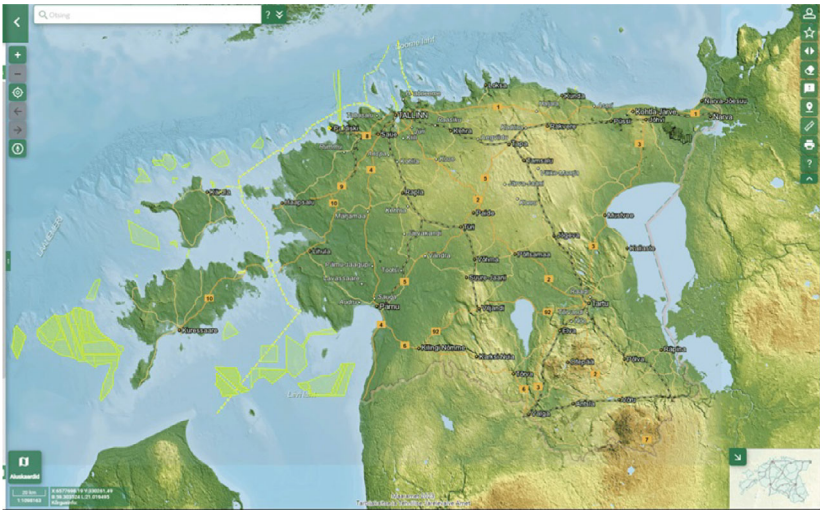

Fig. 4.3 Applied areas for building on the sea (Estonian Land Board, 2023)

The rescaling of low-carbon transformations in the context of wind energy has pushed towards participatory engagements and knowledge creation involving state and non-state actors. The regional dimension in the state-level plans appears through the two (excluded) formerly pilot-planned maritime regions of Estonia, the regional 'portraits' of maritime areas and organising public feedback meetings (Pikner et al., 2022). These regional coastal portraits were formed through socio-cultural mapping including 37 object types of valuable landscapes, infrastructure, cultural events, heritage sites, and marine practices. These mapped objects or nodes on the shore indicate attempts to translate statistical data and stories into visualised facts for marine planning along diverse challenges. Such mapping of marine-coastal cultural values and sketched regional portraits was elaborated further in the impact evaluation process towards five generalised 'land-sea clusters' of functional specialisation (Kutsar, 2020). Clusters appeared as very broad regionally generalised fields of functional specialisation in tourism and blue economies. It is significant that 'blue growth' is linked only to one cluster around Saaremaa island, which became a hot-spot of the state's climate neutrality policy for allocating new spaces of sea wind parks and its questionable niche-tourism.

According to the MSP, these clusters would make it possible to use maritime places in a sensible way in holistic development of whole regions.

The relational process of engagement in rescaling has caused tensions that indicate significant gaps between the state-level territorialisation and place-based anticipated landscapes. These tensions concentrate on the two larger islands of Estonia (Hiiumaa and Saaremaa). The inhabitants of Hiiumaa and their voice via NGO Hiiu Tuul contributed significantly to the court case against the developer and the Estonian state, which postponed the wind park planning but did not stop the whole process. The Hiiumaa case of offshore wind energy planning has influenced the role of marine data in spatial planning and presents a potential to consider the conflicts along blue justice framework (Tafon et al., 2023). Diverse interest and tensions about energy futures are affected by the ongoing war in Ukraine. The island municipality of Hiiumaa is mainly worried about the energy security, which is endangered because of weak infrastructure and geopolitical condition of war. The state pushes offshore wind energy initiatives that are seen as one vehicle to achieve carbon-neutrality and provide stability in geopolitical turbulences. The majority of island inhabitants are moderate about the topic, but the initiative group of Hiiu Tuul clearly argues against the industrialisation of island landscapes. The argument of visual and extended impacts has decreased and possible negative effects on non-humans caused by wind-turbines became more important. One exemplary claim articulated by the members of Hiiu Tuul (interview in April 2022) has been following: why does our island have to be ruined because of producing green energy to other countries. And the island-based NGO successfully slowed down the planning processes and shrank the chances that the first (and only) offshore wind park of Estonia will be built near Hiiumaa shore. Beside Hiiumaa, the contested process of wind park planning has appeared in context of Saaremaa island as well (see Fig. 4.3).

The contested plans of wind energy production indicate the importance of landscapes in rescaling dynamics. The territorialisation of energy sources in planning co-exist with (anticipated) landscapes as entwined materialities and sensibilities (see Wylie, 2007) that valorise care and worries about contingent transformations in surrounding environments. The concerns about planetary climate crises and need for low-carbon energy transition appear directly linked to place-based experiences. Government plans for accelerated growth of renewable wind energy will not be realised without motivated participation of local people. This

indicates that infrastructure and energy linked to the European grid are simultaneously embedded in places and local communities (Nadaï & van der Horst, 2010).

The rescaling has caused hybridisation where non-humans became part of energy futures and contested landscape changes. The territorialisation of marine space for extracting wind energy includes sea volumes along deep underwater, seabase, surface conditions, and aerial space. These voluminous characteristics appeared in the ecological analysis and mobilised knowledge translated into contesting of offshore energy plans. For example, flyways of rare birds have been important arguments of shifting borders of potential wind energy territories. The importance of protecting nature-habitats have been much stronger than arguing about potential threats to human well-being in case of Hiiumaa court case (Tafon et al., 2023). The hybridisation of human and non-human relations in establishing wind energy infrastructure comes together with open ends of technology. This aspect appears in the constant increase of wind turbine heights reaching already 250 m in distance of about 12 km from Hiiumaa and Saaremaa island. The technological constellation is left open in the first-level marine plans and this generates bases for unsure futures within landscape changes.

Conclusion

The low-carbon trajectories of change reconfigure relations between energy, terrains, and societies. Alongside the centralised resources and transnational infrastructure are localised sites of energy production and related effects. This chapter focused on imagined and enacted spatial relations between energy and society that push the rescaling of energy futures and of transition. Rescaling was approached through relational spatiality (Bouzarovski & Haarstad, 2019) that scales cannot be directly linked to a single institution, and scales should be not assumed to easily find their fixed place in a nested hierarchy. It means that scales of governance, networks of action, and experienced environs come together in rescaling dynamics bound to low-carbon energy transition politics. The rescaling in energy transition was analysed through three connected dimensions: politicisation, enrolments, and hybridisation (Bouzarovski & Haarstad, 2019; Bridge, 2015). The role of territorialisation and landscapes in the rescaling processes became elaborated along thematic narratives in

context of Estonia, which valorise explicitly tensions between oil shale dependencies and applying renewable wind energy sources.

The first dimension of rescaling, politicisation of low-carbon energy transition, challenges the continuity of oil shale centred systems and negotiated perspectives of renewable wind resources in the Estonian context. The territorialising of wind energy and of just-transition regions has generated borders influencing further initiatives in sustainability transition process. The scale of governance appears together with particular terrains and contingent energy flows. The space making in energy system functions together with time-dimensions (Tamm & Laurent, 2019) articulating urgency and certain rupture-points in projected energy futures. Territorialisation in energy transition co-exist with bordering in time, which forms particular milestones, accelerated phases, and open unknowns. The bold curve of decarbonisation in the coming decades is present although the politicisation in rescaling indicates many open trajectories of energy transition in context of Estonia. There are projected wide terrains of potential offshore wind energy, but the realisation of the territorialised resource is dependent on place-based concerns and capital. The place-based concerns arguing that one wind park should be enough for whole Estonia indicate unbalanced territorialisation of impacts and possible wider benefits of transformations. Thus, the transition towards low-carbon futures has a challenge to link anticipated changes or even sacrifices in surrounding environs for a planetary common good. The nuclear futures are discussed in expert fields and continuation of contested oil shale processing takes forms beside electricity production. The technological component and turbulent war situation have become part of contingent trajectories of energy transition.

The second dimension of rescaling, the dealing with post-mining realities and application of wind energy sources, enrolled actors from multiple level of governance, including state and non-state organisations. The politics towards low-carbon futures intensified communication links between the state and non-governmental organisations while partly reconfiguring the role of local municipalities. The state has ordered expert knowledge reports about various dimensions of marine ecologies and about economic effects of oil shale mining determination. The lay knowledge and cultural place-based context in planning of energy transition trajectories in less presented. This appears in organising the region-based climate assemblage meetings and the thematic mapping of community-based nodes on the seashore. Marine planning has indicated the issue about which

kind of knowledge will actually count in policy design, and there is lack of translating story-based knowledge into spatial representations of planning (Pikner et al., 2022). The lay knowledge often co-exists with emotional affinities to places involved into energy transition as space making. Thus the bordered territories of resources become essential part of 'landscapes as lens for perceiving with' (see Wylie, 2007) contested energy futures, and critically posing an issue: who and which places should bear the accumulated effects of energy transition. The problematisation of accumulated impacts within landscapes brings up challenges in connecting sustainability transitions simultaneously to Earth and to meaningful places.

The third dimension, hybridisation in rescaling of energy transition, appears along the co-constitution of human and non-human agencies in infrastructure planning and maintenance. This hybrid co-constitution entails three-dimensional voluminous terrains of sustainability transition extending beyond land surface towards marine spaces, air, and underground. The formation of these voluminous terrains are part of territorialisation and of nature conservation, and these terrains become part of politicisation of energy futures. It is important to notice that hybrid relations between non-humans, humans, and projected energy infrastructure can become central issues in contesting trajectories of energy transition. The hybridisation and related terrains indicate that territorialisation of new energy sources is entangled to haunting legacies of landscape scars and anticipated sacrifice zones. This demonstrates the need to acknowledge wider agencies, which decentre humans and urbanised structures in sustainability pathways. The rescaling of energy-society relations is projected and mobilised along diverse ruptural points (Brown, 2016) in sustainability transitions, which are contested in thematic discourses. Paradoxically in the Estonian case, oil shale benefits from the present and possible nuclear benefits in the future could override renewables (Kanger & Sovacool, 2022). The condition of war in Ukraine has its role of shaping the position oil shale and wind in the energy transition. The geopolitical uncertainties and spheres of climate crisis adaptation become part of landscapes as tensions between present-day environs and negotiated energy futures.

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CHAPTER 5

Rescaling Renewable Energy Communities in Portugal: Expert Imaginaries of Business-As-Usual, the Empowered Citizen and the Smart Network

Ross Wallace and Susana Batel

Introduction

As the climate crisis intensifies, growing demands for an acceleration of Europe's transition to renewable energy have led to the institutionalization and "upscaling" of disparate and local practices of community energy (European Commission, 2018). The new legal concept of "Renewable Energy Community" (RECs) provides an interesting context to study the discursive aspects of energy-related legal changes amidst a push to decentralize energy transitions. More generally, it provides the opportunity to examine the role of different types of expertise in both the

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institutionalization phase of legal innovation and the mediation of these innovations to the public. Adopting a pragmatic sociological perspective, this chapter thus explores the representations of new energy community laws by Portuguese energy experts. We investigate how these experts perceive this concept as a solution to energy transition and climate change challenges and the varying narratives and imaginaries that are shaping their responses. Emphasis is placed on how these experts align their understanding of RECs with different definitions of the common good and principles of worth (Boltanski & Thévenot, 2006). By analysing the spatial, temporal and moral aspects of expert representations, we uncover the nuances of legal innovation concerning RECs. In the next section, we will introduce the concept of REC in more detail, setting out the broader empirical and theoretical context. This will set the scene for the analysis and discussion that will follow.

Background

Renewable Energy Communities and the Portuguese Energy Transition

Renewable energy communities take diverse forms but are usually thought of as place-based initiatives, where local groups engage in energy-related activities, such as renewable energy generation, in order to achieve socio-economic and environmental objectives, such as local development and carbon footprint reduction (Savaresi, 2019). With their institutional "upscaling" in the EU's recast Renewable Energy Directive (REDII) (European Commission, 2018), RECs have been increasingly associated with at least four main justifications. Firstly, they have been viewed as a means to generate "social benefits," alleviate energy poverty and to deliver a democratic, just and inclusive energy transition (Savaresi, 2019). From this perspective, discourses of "energy democracy" (Szulecki, 2018) and "energy citizenship" (Devine-Wright, 2012) are seen as key drivers of RECs, though they themselves are ambiguous and sometimes contested concepts (Lennon et al., 2020). Secondly, promoting community energy and other forms of citizen participation has been seen as a way to counter so-called "Not In My Back Yard" (NIMBY) reactions associated with the development of renewable energy generation plants and increase the "public acceptance" of renewable energy in general (Azarova et al., 2019). Thirdly, RECs and other forms of "decentralized" or "distributed" forms of renewable energy generation have also been viewed as a means to

leverage investment in the low-carbon transition (Kampman et al., 2016). Lastly, the decentralization of electricity networks is seen as a way to make those systems more efficient, thereby increasing their resilience and guaranteeing energy security (Moroni et al., 2019). RECs are, thus, increasingly positioned as a solution to the "energy trilemma" of affordability, environmental friendliness and security of supply. Yet, the tensions between these goals and their associated competing interests, logics and values are often overlooked.

Beyond these justifications, REDII defined a REC as a legal entity which, "is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity" (European Commission, 2018). Their shareholders or members can be natural persons, SMEs or local authorities, and their primary purpose is to provide environmental, economic or social community benefits rather than financial profits. These principles are open to interpretation by Member States and the latter were expected to transpose REDII into their own legal and policy frameworks by July 2021. Portugal partially transposed REDII in 2019 and then fully in January 2022 (Presidência do Conselho de Ministros, 2019a, 2022), with new regulatory frameworks for the national electricity system published between 2020 and 2023 (ERSE,). The Roadmap to Carbon Neutrality and the National Energy and Climate Plan (Presidência do Conselho de Ministros, 2019b, 2020a) contained proposals for increased citizen participation, with the latter signalling the intention to develop an enabling framework for RECs (Rescoop, 2023). RECs in these policy documents are seen as complementary to large-scale solar systems and as a solution to issues like energy poverty, with public participation being a central goal. However, their expected contribution to Portugal's renewable energy objectives has not been explicitly defined. Moreover, the country's continued emphasis on large-scale, centralized renewable energy installations and a new vision of a green hydrogen economy (Presidência do Conselho de Ministros, 2020b) has meant that progress in the development of RECs has been slow (Scharnigg & Sareen, 2023).

Theoretical Perspective: A Pragmatic Sociological Approach to Sociotechnical Imaginaries

In recent years, the social psychology of legal innovation and research on "sociotechnical imaginaries" of the energy transition (Batel & Devine-Wright, 2015; Carvalho et al., 2022) have highlighted the importance of processes of meaning-making and communication when it comes to constructing the legitimacy of technoscientific and legal change. In particular, the social representations and future-orientations of expert "intermediaries" are of critical importance, not only in the processes of legal institutionalization itself, but also in the "generalization stage" when these new ideas and practices are "upscaled" via dissemination and propagation to the public (Castro, 2012; Scharnigg & Sareen, 2023). In these communicative processes, meaning-making is entangled or "co-produced" with the spatio-temporal dimensions of sociotechnical change and power relations (Batel & Devine-Wright, 2015; Jasanoff & Simmet, 2021, see also Pikner, Chapter 4).

One of the main ways this has been examined is with the concept of sociotechnical imaginaries, defined as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff, 2015, p. 4). Research from this perspective has been fruitful in identifying the main directions in which energy futures are being envisaged, contested and strategically deployed (Hess & Sovacool, 2020), and has been highlighting that in the Global North renewable energy transition imaginaries tend to emphasize "business-as-usual" and "techno-market fixes" (Levidow & Raman, 2020, see also Albrecht & Klein, Chapter 2), but that recently alternative imaginaries have also started to emerge, such as those that emphasize the importance of "energy democracy" and citizen empowerment (Hudlet-Vazquez et al., 2023), and those that emphasize the potential of "smart" technological transformation and a new industrial revolution (Strengers, 2013; Vicente & Dias-Trindade, 2021).

While the sociotechnical imaginaries approach is relevant in identifying what those imaginaries are made of in terms of representational contents, they pay less attention to the moral projects they are trying to achieve or project into the future. As such, some researchers have recently sought to nuance these imaginaries with concepts from the pragmatic sociology

of engagements and critique (e.g. Ballo & Rommetveit, 2023; Cowell & Devine-Wright, 2018; Laes et al., 2023; Nyberg et al., 2017; Rommetveit et al.,; 2021; Wallace & Batel, 2024) namely the concept of "orders of worth" (Boltanski & Thévenot, 2006)—the plurality of social representations of the common good that people use to make justifications and critiques in everyday situations and that can also be objectified in material environments and institutions. Pragmatic sociologists originally identified six orders of worth circulating in Western liberal democracies: domestic, civic, inspired, industrial, market, fame, with the later addition of the projective and green orders which emerged in response to contemporary critiques of capitalism (Boltanski & Chiapello, 2018; Boltanski & Thévenot, 2006; Thévenot et al., 2000). Orders of worth are particularly insightful for our purposes because they bound together representations of space, temporality and the public with a notion of what is deemed to be the *common* good (as opposed to a *private* good, i.e. self-interested or for a particular group) (Table 5.1).

In this chapter we therefore aim to enrich the concept of sociotechnical imaginaries with concepts from pragmatic sociology, positing imaginaries as an assemblage of disparate ideas, objects and practices that can, in turn, pre-figure other new ideas, objects and practices (Bialasiewicz et al., 2007). Along with other types of discourse, orders of worth are posited as a key component of imaginaries as they help explain how and why different imaginaries come into conflict or rapprochement with each other (Chiapello & Fairclough, 2013). In addition, because a single imaginary can bring together different orders of worth, the latter can also

Table 5.1 Orders of worth and some key dimensions

Order of worth	*Principle of worth*	*Time formation*	*Spatial formation*
Inspiration	Flash of inspiration	Ruptured	Moving
Domestic	Hierarchy, tradition	Customary	Local, proximal
Fame	Opinion of others	Trends	Communication channels
Civic	Solidarity	Perennial	Evenness of the public sphere
Market	Competition	Short-term	Global marketplace
Industrial	Efficacy, performance	Long-term	Cartesian grid, system
Projective	Flexibility, connectivity	Immediate	Networked
Green	Sustainability	Future generations	Planet, ecosystem

help explain how an imaginary takes shape (or not) and why some are more powerful than others. We therefore follow approaches which ascribe actors with an agency to parse through various imaginaries, choosing some legitimizing imaginaries to be materially enacted over others (Jessop & Oosterlynck, 2008; Watkins, 2015).

Within this conceptualization of an imaginary, the implicitly or explicitly envisioned "scale" of RECs is a function of the spatial representation that is mobilized in conjunction with other important representational objects, for example "the local" and "the public" (Barnett et al., 2012; Walker et al., 2021). Practices of rescaling can thus be defined as involving the supplanting of one order of worth by another. New proposals for RECs can begin to be understood as implicated in practices of "scale jumping" because they are situations where certain conceptions of scale are negotiated, challenged and politically contested (Smith, 2004). Our main theoretical premise is thus that rescaling is initiated in "testing moments" that arise in the midst of uncertainty. In this sense, this study approaches RECs as something virtual or "not yet," whose future possibilities must be reflexively envisioned by actors.

Methods

To examine imaginaries of RECs in the Portuguese energy sector 23 semi-structured interviews with different types of energy sector expert—legal/policy experts, academic researchers and representatives of administrative/regulatory bodies, industry associations, environmental NGOs, cooperatives and private companies/utilities—were conducted between 2020 and 2022, with each lasting between 1 and 2 hours. While the sample was neither representative nor exhaustive, these experts occupy some of the key positions in the Portuguese energy sector. The resulting data was then subjected to a pragmatic discourse analysis (Batel & Castro, 2018). This implied, as a first step, performing a thematic analysis to identify the main meanings—i.e. imaginaries and orders of worth—in the interviewees' discourse. Then, as a second step we performed a rhetorical analysis of the data (Billig, 2003), focusing on *how* the meanings were conveyed. This allowed us to identify particularly if and how specific ways of representing the future were tied into the identified representations of RECs, as well as to explore associated psychosocial processes in representing the future.

Results and Discussion

Analysis of the interviews revealed three imaginaries about the role of RECs in Portugal's energy future. First, an imaginary oriented to maintaining "business-as-usual" was predominantly articulated by energy system bureaucrats, legal experts and, to a lesser extent, representatives of energy companies. The second imaginary was based on the idea that RECs are about "empowering citizens" and was mainly articulated by representatives of cooperatives and social science academics, but also occasionally by representatives of administrative authorities. Thirdly, an imaginary of RECs as agents of the "smart network" was strongly expressed by interviewees who held elite roles in the renewable energy industry or who were associated with companies operating with cutting-edge technologies and business-models.

Despite these three imaginaries, it is important to preface this analysis by stating that they were not completely distinct and did not map directly on to certain types of actors. Rather, interviewees were discursively "polyphasic" (Batel & Castro, 2018)—their social representations were not always consistent with each other, and sometimes were even contradictory. Nevertheless, rather than looking for a common denominator in the form of a single shared imaginary of RECs, we have instead attempted to reconstruct the plurality of more or less coherent "semiotic orders" (Watkins, 2015) and examined the relations between them, as summarized in Table 5.2.

While each of these imaginaries is constituted by a wide range of issues, objects, practices and meanings, to establish how they rescale RECs, the following analysis will focus on two key issues. First, we will unpack the legal concept of "proximity" and the different representations of "the local" that it facilitated. Secondly, we will examine how participation in RECs was conceived in the different imaginaries and the representations of "the public" that it depended on. In the third part of the analysis, we will examine the different ways that the scalar dimension of the imaginaries—based on representations of the local and the public—is discursively used to open up the future to multiple possibilities or, rather, to close down alternative possibilities, restricting the future to a single inevitable outcome.

Table 5.2 Expert imaginaries of RECs in Portugal

Imaginaries	*Business-as-usual*	*Empowered citizen*	*Smart network*
Main orders of worth	Market, Industrial, Fame	Civic, Projective, Domestic	Projective, Inspired, Market, Industrial
Representation of the public	Self-interested entrepreneurs and passive consumers	Active citizens	Passive/active user
Representation of the local	Local as complementary to the national; site of efficiency and security	Local as place of community; site of citizen participation	Local as strategic point in the network; site of interconnection of everything
Representation of the future	Future as continuous, stable and complementary with the past; discourse of cautious planning	Future as contingent; multiplicity of potential futures; discourse of critique	Future as discontinuous with the past; discourses of transformation and inevitability

Proximity and Representations of "The Local"

When the concept of RECs entered the Portuguese legal and regulatory context in 2019, one of the main uncertainties was the concept of "proximity." As it was defined in REDII, this concept entailed that the physical infrastructure owned and operated by an REC should be located within its geographic boundaries, as should its members. In our interviews, the concept of proximity was a key object of discussion and it facilitated three different representations of "the local."

The Local as the Site of Technical Efficiency and Grid Security

In the business-as-usual imaginary, regulatory authorities preferred a local approach to RECs for improved grid resilience and efficiency. They aimed to prevent unfair costs for everyday consumers and sought RECs that required minimal grid investments. This vision favoured continued economic growth and high energy use, limiting "self-sufficient" RECs to small areas with pre-existing domestic or industrial ties. As one regulatory authority representative put it:

> We're combining in the local all these chances for providing flexibility to the grid and reducing the use of the grid, promoting zero carbon energy

> communities and buildings so that they can be somehow self-sufficient. (P5, regulatory authority, engineering)

Importantly, the decree-law of 2022 had a clause allowing exceptions for projects in the national interest, which was viewed with scepticism by stability-focused administrative authorities. They believed energy community members should be local residents, not large businesses, to ensure fair tax incentives. However, the administrative authority's focus on stability through proximity was perceived by other actors as limiting innovative models like "virtual energy communities" which were at the centre of the "smart network" imaginary.

The Local as the Site of Community

In the "empowered citizen" imaginary, RECs were anchored in lost cooperative traditions, implying that genuine RECs should resonate with this history. Instead of being novel, they're tied to a people-driven energy past. By anchoring them in history, the function was to validate and redefine RECs, setting them apart from both centralized systems and market decentralization. As one social scientist put it,

> Community energy has been around for quite a while, and in some countries in Europe, I mean even in the US, a lot of regions in the US were electrified by local villagers and by rural associations. So the history of energy is filled with moments where you have this community driving everything, you know? (P9, academia, social science)

As illustrated above, the *domestic* order of worth was thus used to represent RECs as small and locally bounded practices. Comparisons were made with practices in other domains, such as supermarket co-ops and traditional community practices for sharing natural resources, with an analogy made between river and electricity management. Whereas the civic order of worth values the rule of law, this perspective valorized the self-regulation of a community (*"what you would find was that the newcomers, who did not know the rules, sometimes felt the need to acknowledge them and discover how to implement them"*). Thus, in the empowered citizen imaginary, representations were fundamentally prefigured by questions of spatial scale. However, while genuine RECs were envisioned as citizen-led, their portrayal as small, local groups aligned with the administrative goals of grid stability in the business-as-usual imaginary (see above).

The Local as the Site of the "Optimization of Assets"

RECs, in contrast to common smart network concepts like smart homes and grids, focus on both producing and consuming energy. Discussions with engineers from new energy firms revealed that in the smart network context, "local" was not just about reducing losses or citizen participation, but also means technological interconnectedness and the emergence of new, more optimized markets:

> I feel Renewable Energy communities are more linked to, let's say, in a more vague way, the optimization of local energy assets. But they could be also like the grids. But like in a more localized way. And I would say optimization of local energy assets because of course, like, it could be also involving electric vehicles, storage, whatever other types of, even, in theory, even heating infrastructure connected to, for example, solar collectors, or biomass, or boilers, whatever, just inventing and showing that, in theory, like, the scope it shouldn't be just like, collective self-consumption, it should be wider. And that's why I'm saying an optimization of local assets because it's not only production. It should be also about, demand response and all these fancy new things. (P12, renewable energy co-op, engineering)

This excerpt highlights the shift in understanding of RECs, from traditional market and industrial viewpoints to a more complex "techno-epistemic network" (Ballo & Rommeveit, 2023). In this context, "local" signifies a strategic point in a network of energy assets rather than a tight-knit human group. This perspective broadens the legal and policy framework for RECs, going beyond the common notion of production, public involvement and grid efficiency. Proponents of this view saw RECs as both catalysts for and reliant on modern innovations, encompassing new financial markets, efficiency technologies and human roles.

Participation and Representations of "The Public"

The issue of participation in RECs was a complicated one from the outset. Although REDII mandated that members should reside near the infrastructure, it did not bar external entities or private firms, and Portugal's new laws thus leaned towards including these external parties. Subsequently, how the interviewees represented participation was influenced by perceived public and private sector values and motivations.

Self-interested Companies and Passive Consumers in the Marketplace
In the business-as-usual imaginary, the key assumption was that the public are essentially "passive"—uninterested in becoming involved in energy production, let alone management or governance. This was expressed by a project developer:

> The consumer doesn't want to be active. 99% of the consumers, they just don't want to and that's it […] I get the idea, but the consumers don't want to change and don't want to get involved. They just want the problem solved, just in the same way that I don't want to get involved, for example, in the accounting of… whatever. "OK, just solve it already and leave me alone." It's the same. Or the lawyer issue. "I don't want to know. Please don't explain it to me. Solve it and it's OK." (P15, energy company, engineering)

The depiction of a passive public regarding RECs contrasts with the usual portrayal of individual self-consumers as savvy entrepreneurs. This discrepancy stems from a scaling perspective where such entrepreneurial traits were attributed to the private firms expected to expand RECs nationwide. From this viewpoint, passivity and self-interest coexist, especially when market value takes precedence. Likewise, a leading legal expert on REDII rationalized allowing profit-driven firms to participate by deeming the notion of people joining RECs purely for altruistic reasons as a "romantic idea."

Active and Knowledgeable Citizens in the Public Sphere
In the "empowered citizen" imaginary, participation extended beyond mere membership or financial gains from energy projects. The underlying belief was that initiatives like RECs can transform people's relation to energy and to the environment. They should encompass more than just energy production and consumption, a sentiment echoed in an interview with an energy co-op representative:

> Even me, I heard in some conferences, that well, "We think in this collective self-consumption for industry and parks with companies of services. Not for people, because this is too complicated for people." No, it's not supposed to be. That is not the spirit of the directive. Even now that we have the European Commission in our side, helping, they really want that the citizens participate in this energy transition, then we have the national government saying this is too complicated. No, it's not. We are not dumb.

> We can do. We know how to do it. Well, we are European citizens. We have knowledge, we know how to make questions. Come on, don't look at us as dumb, because it's like that: the national government and the other entities that have obligations in this sector look to the citizens like that. For example, in Portugal you cannot discuss the issue about a cooperative starting to manage the grid. It's really complicated. Nobody believes in that. (P4, renewable energy co-op, engineering)

This discourse pivoted on defining citizenship based on knowledge rather than on the capacity or willingness to invest. Contrary to the business-as-usual view, the public is oriented towards the common good and possesses the knowledge and eagerness to participate. Still, they require state support in terms of financial and bureaucratic means. What's missing from these discussions, though, are specific suggestions on facilitating this, as well as the common arguments for collective ownership and autonomy. Interestingly, even among expert advocates for citizen empowerment, some disputed the notion that citizens should actively engage in decision-making and project initiation.

Prosumers in the Digital Network

The representation of RECs in the smart network imaginary attempted to transcend the active versus passive narrative found in both the business-as-usual and empowered citizen imaginaries, while ignoring the moral question of self-interest vs. common good. The representation was twofold: people are both active and passive, but viewed through the lens of digital network users or "agents" rather than marketplace consumers or public sphere citizens, as is seen in the following:

> But the future: it's the interconnection of everything. It's the creation of local energy markets. It's exploiting local assets in a more comprehensive manner, in a more optimized manner, and just learning and understanding how it should monetize things at the user level. So basically it's transforming very passive energy consumers into very, very active agents in energy markets, with the support of the technology that we have been developing. (P10, energy company, social science/engineering)

Thus, in this imaginary, the rhetoric of both the business-as-usual (markets, monetization) and empowered citizen (active, rather than passive, consumers) imaginaries are integrated to form the representation of the active agent in local energy markets—the prosumer. But while the

business-as-usual imaginary appealed to the self-interest of investors and the empowered citizen imaginary to the knowledge of citizens to make use of public finance, the smart network imaginary viewed support as primarily coming from digital technology.

Representing the Future to Discursively "Jump Scale"

The business-as-usual imaginary presented RECs, on the one hand, as a *business opportunity* in order to attract external investment and, on the other hand, as a means of ensuring energy security by reducing use of the grid. The key insight was that each of these dimensions of the business-as-usual imaginary—which constitutes the hegemonic representation of energy and energy transition (Batel & Rudolph, 2021)—not only enabled the future of RECs to be represented along particular lines; it also constrained it—so much so that tensions between different ideas and actors threatened the stability of its hegemony. Thus, while the business-as-usual imaginary represented RECs as a "point of continuity" (Krishnan & Butt, 2022) between the past and the future in order to maintain stability, the other imaginaries were oriented to the future as *discontinuity* and *multiplicity*. In this section, we will examine in more depth how representations of the local and the public were used together in order to re-imagine the future in the smart network and empowered citizen imaginaries.

Discontinuity and Confirmation

As should already be clear, RECs in the smart network imaginary were represented as something entirely new and discontinuous from the past. When asked about how they saw the future unfolding, interviewees espousing this imaginary would typically talk at length about *what was going to happen*. That is, they did not allow for any uncertainty and were overtly *descriptive* rather than *prescriptive*. This *prophetic* "discourse of inevitability" (Leonardi, 2008) only recognized a single possibility: the supplanting of the business-as-usual imaginary by the smart network imaginary. However, this transformation was represented without being explicitly critical and instead deployed the *inspired* order of worth to create enthusiasm and build excitement but, as is seen in the following accounts, about a range of different objects:

> And so, this is going to bring a huge paradigm shift. It's going to probably bring you less emissions of course, as it is expected and mitigation of debt. And you are going to have a lot more participation of the citizens and the families and the corporates on the energy transition. Basically, this is what I see. I see continuous increase of the renewables share in the electrical power. […]. And so, I think this is going to be completely different, this is going to generate new markets, new companies, some of them probably will not survive the energy industrial revolution. And the participation of people, I think people are going to be more demanding on what they purchase in terms of environmental impact. I think they are going to be more demanding and understanding the traceability of where their energy consumption is coming from. I think even if you buy a shirt or a pair of trousers or some sneakers, you´ll still want to know if this is being done sustainably from the source of the raw materials, but also in terms of how you do all the value chain, the supply chain and what type of energy you use to generate this. So, I think this is a social revolution as well as an industrial revolution. (P20, industry association, engineering/business)
>
> Well, I'm a positive person and I should say that the transformation has already begun. If you notice, some years ago the rule was big projects centralized with distribution, transportation, a trade company and consumers. Now we are talking about prosumers, we are talking about decentralization. […] We are talking about proximity. We are talking about proximity between the productions and between the consumers. We have also some experience, like in Germany, like in Spain and like in, I suppose Brooklyn in the United States, of the use of blockchain, and peer to peer energy contracts. So, the change is going on. And I believe that we will have a mix between gas and renewable energy, in my opinion, without nuclear, and we will have more and more prosumers. (P3, law firm, legal)

As can be seen, the representation of RECs in the smart network imaginary transcended both the passivity of *market* consumers and the *industrial* scale of centralized projects. But rather than active participation in energy community operations or governance, the public's *activeness* was primarily attributed to their demand for information. Similarly, the emphasis on local proximity primarily pertained to the use of advanced digital technologies like blockchain. Beyond these semantic aspects, the prophetic discourse of inevitability can be characterized by three main features: first, metaphorical language was employed to paint a vivid picture of the future and create enthusiasm. While aiming to show the future's distinction from the past and present, these metaphors often repurposed and echoed past utopian technological ideals, as noted by

Strengers (2013). Secondly, the sense of impending, inevitable change was reinforced through repetitive phrases (e.g. "we are talking about") and future-focused verb forms (e.g. "you are going to have"). Thirdly, the way that the discourse interchanged between using "you," "they" and occasionally "we," establishing a relationship between the speaker and the audience, not only prevented any conflicting viewpoints but also created a sense of detachment (Moscovici, 2008). This detachment, combined with the portrayal of predictions as inevitable outcomes, lent them an authoritative, factual air. In essence, the smart network narrative reframed the roles and expectations of the public in the evolving landscape of RECs, emphasizing inevitability and the transformative nature of the future.

Multiplicity and Critique

By contrast, in the empowered citizen imaginary, interviewees would typically reply with a question of their own: *"what I think the future should be or what I think the future will be?"* The bifurcation of the future between *prescriptive* and *descriptive* orientations established the discursive context for representations in which the *present* future was contested because it was excluding beings considered important in an alternative order of worth. These so-called radical critiques (Boltanski & Chiapello, 2018) were those in which the key uncertainties which constituted RECs were re-evaluated and a *multiplicity* of possibilities were recognized. These radical critiques were primarily aimed at the industrial order of worth—the format of the current trajectory of the energy transition based on "large-scale renewable power plants"—but from different perspectives:

> Well, I'm not very proud of energy policies in this moment, about the energy transition. I think, what I see is that we are replacing fossil fuels by large, large scale renewable power plants, wind, and now photovoltaic. But we are not-. We should take this opportunity to make the energy sector fairer and with more justice, and just to the citizens. So, for me and for the cooperative, the renewable cooperative perspective, this transition should not be only a question of technology: You take the fossil fuel power plants and just put PV and wind power plants. It's not only about that. It's about the engagement of the citizens. The empowerment of the citizens to consume and produce their own energy and be an active citizen or active participant in the energy sector. And I don't see that in Portugal in this moment. (P4, renewable energy co-op, engineering)
>
> What I would like to see is kind of the opposite. I would like to see Energy communities popping up everywhere and creating synergies, local

> municipalities also supporting a lot of these activities and projects. And also medium sized systems, because medium sized systems can be really interesting. I like this kind of synergies between agriculture and mining regions. Mining regions are mines that could have local energy being produced for the energy being used for the mining process, kind of. So I, I think medium size or even in degraded lands, lands that you know cannot be used for agriculture for a few decades because the land is so degraded. Then you could try and put solar panels there and at the same time work the land so that it's rested, it gains strength again and nutrients again. So I don't know, there's a lot of things you could do. This is what I would love to see, but I don't think it's going to happen. I think the trend is going to be what's going on in Cercal, unfortunately.[1] (P9, academia, social science)

These two extracts reveal several relevant aspects to our analyses. First, that different orders of worth are used, depending on the situation being discussed—for instance, the first leans on the civic order of worth, emphasizing empowerment and citizen participation, while the second adopts a more versatile approach, combining the projective order (favouring medium-sized projects) with the green order (reviving deteriorated lands), and to a lesser extent, the civic order. This multifaceted approach mirrors Thévenot et al.'s (2000) idea of "pragmatic versatility," suggesting the adoption of varied values depending on the situation. However, something transversal to these discourses, was that they presented the present moment as a critical juncture, an "opportunity" to diverge from the dominant market-industrial value systems. This framing paved the way for envisioning alternative futures and critiques. The first extract's more traditional social critique posits large-scale industry against empowered active citizens, emphasizing values like fairness and justice. In contrast, the second extract's pragmatic critique compares large-scale renewables to medium-sized systems, emphasizing their potential for synergy across industries and values. This divergence illustrates the shift in perspective from localized, citizen-led projects to broader, integrative systems that can bridge various sectors. Thus,

[1] Cercal do Alentejo, a parish in the South of Portugal, is the site of a proposed large-scale solar park and very high voltage power line. The latter will connect the installation to the nearby Sines industrial complex, where it will be used to sustain a data Carolin and to produce "green" hydrogen—one of the country's main bets for the energy future. Such projects are provoking increased indignation about the way Portugal's energy transition is being pursued and, as in the case of Cercal, are generating a sustained social movement to imagine and implement an alternative energy future (see Brás et al., 2024).

while these experts advocated for a departure from large-scale, centralized renewable projects, they differed in their envisioned alternatives and the values they foregrounded. The first championed local, citizen-led initiatives, while the second emphasized pragmatic, medium-sized solutions which involve citizens but in collaboration with a range of other "stakeholders."

Conclusions

The three imaginaries of RECs that we have identified in expert discourse in Portugal were constituted by a wide range of issues, meanings and material objects. In this chapter we have chosen to principally focus on the issue of the imagined *spatial scale* of RECs, and how this was represented in relation to *future expectations*. In particular, the representation of the possible scale of RECs within each of the imaginaries centred on uncertainties regarding the role of "the public" and other actors and the meaning of "proximity" or "the local"—both key aspects of the original definition of Renewable Energy Community in the EU's Directive. We stated at the beginning of our analysis that these imaginaries were not completely autonomous from each other but were, rather, relational. In this final section we shall summarize some of these relations.

Firstly, in the business-as-usual imaginary, it was seen how RECs were primarily viewed within a discourse of complementarity (Trencher & van der Heijden, 2019) and as a "point of continuity" (Krishnan & Butt, 2022)—they were expected to be important as technological substitutes for fossil fuel imports and old hydroelectric installations, but their role would be limited in comparison to large-scale solar projects that would be the backbone of the new "green hydrogen" economy (Carvalho et al., 2022). Thus, RECs were not seen to be in conflict with incumbents or a threat to their market share. Instead, they were seen as just another stakeholder of the energy market "ecosystem." In this way, RECs "jump scale"—they are local activities represented as supporting national energy strategies (Devine-Wright, 2022; Levidow & Raman, 2020). Tensions were palpable in this imaginary, however, not least in relation to the re-signification of "the local" via the legal definition of proximity, thus highlighting the importance of meaning-making in attempts to rescale community. Furthermore, a representation of the public as passive and uninterested—hegemonic in energy governance (Chilvers & Longhurst,

2016)—was maintained and this justified the re-signification and rescaling of RECs as private initiatives which could pursue profit.

It was this prospect that led to the concern—explicit in the citizen empowerment imaginary—that the concept of RECs was in danger of becoming diluted or even co-opted by large commercial energy companies (Roberts, 2019). This imaginary was based on both recollections of lost traditions of collective action and civic ideals of empowerment and active citizen participation. However, while these representations were effective launchpads for critiques of the status quo, their adherents were often uncertain about how this citizenship would work in practice or how it would link to broader issues such as energy poverty. This raises the separate question of their broader role in society: which vision of the collective future are RECs anchored in? Which larger political imaginaries do they awaken? As was seen above, this was another area where the empowered citizen imaginary fell short, instead depending on worn out and empty signifiers of "empowerment" without explicitly identifying the actors who currently hold power or elaborating alternatives to the continuation of "business-as-usual."

This perspective reveals an affinity between the discourses of empowerment and liberalized self-consumption at the centre of the business-as-usual and empowered citizen imaginaries of RECs (Anfinson, 2023; Laes & Bombaerts, 2022; Lennon et al., 2020). The issue is that adherents of the latter were unable to adequately differentiate their vision of RECs from practices of individual investment decisions. Furthermore, radical environmentalist discourses were notably marginal in the empowered citizen imaginary. While academics and environmental NGO representatives did refer to the "principle of sufficiency" and ecological issues associated with large-scale projects, there was no coherent anchoring of the concept of RECs into emerging political rationalities such as "degrowth" (Demaria et al., 2019). Instead, the environment was imagined as just another element to be integrated into the smart network.

By contrast, techno-economic elites were able to imagine a coherent future about the role of RECs in society. As such, the "smart network" imaginary can be seen as a direct response to the limitations of the other two imaginaries. At a semantic level, it did this through a re-signification of the local and of the public which had the effect of rescaling RECs in line with the spatial metaphor of the *network* as well as with a future imagined as a discontinuous and *inspired* rupture, that is, as a (technical) *revolution*. These metaphors show that while prophetic actors

clearly emphasize that the future will not be the same as the past or the present, their visions also "resonate and repackage technological utopian ideas from the past" (Strengers, 2013, p. 2).

In sum, our analysis of expert imaginaries highlights the importance of "the local" and "the public" as objects of social representation. However, in contrast to other contexts where "the local" is given a specific meaning based on the socially constructed characteristics of a particular place (Walker et al., 2021), expert imaginaries at the institutionalization stage of renewable energy innovation are operating at a more abstract level of representation, where experts are able to discursively "jump scale" (Smith, 2004) by deploying different orders of worth.

Lastly, in this chapter we have aimed to complement the concept of imaginaries with the pragmatic sociological framework of orders of worth to enrich and nuance the analysis of how sustainability transitions are currently being "rescaled." This theoretical synthesis has been useful for two principle reasons. Firstly, it has provided a template of the plurality of orders of worth and this has aided with identifying tensions, compromises and changes in discourse. Secondly, because each of these orders of worth is an assemblage of different representations—including of space, time and the common good—the framework has been useful for identifying the objects of representation that matter and their discursive interrelations. Our use of this framework, however, has undoubtedly focused on the representational rather than the material. As such, there are ample opportunities to continue this research in other empirical contexts, using the full gamut of pragmatic sociological concepts such as "tests" and "regimes of engagement" (Thévenot, 2005) to explore how imaginaries of the energy future are being rescaled and transformed as they are disseminated in society and accepted or contested by different actors.

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CHAPTER 6

From Centralisation to Decentralisation? Transition Visions of Circular Bioeconomy in Rural Finland

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Introduction

Fossil metabolism is the primary cause of the majority of the escalating sustainability problems that humanity is currently facing. Fossil energy is fuelling climate change and the accelerating pace of resource use, which have led to transgression of most of the planetary boundaries (Richardson et al., 2023). At the same time, the fossil economy has created a steep division between the urban and the rural, with rural areas serving as

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providers of resources, labour, ecosystem services and recreational spaces to be consumed by the growing urban class (LeVasseur et al., 2021). Indeed, the increasing prominence of urbanisation and the concurrent marginalisation of the rural should be seen as the result of centralising tendencies arising due to fossil-fuelled, neoliberal capitalism.

The fossil economy needs to be replaced by more sustainable sources of energy, materials and modes of social organising in order to return to the limits of planetary boundaries. Circular bioeconomy (CBE; D'Amato et al., 2019; Stegmann et al., 2020), referring to the frugal exploitation of bio-based resources and the application of cascading principles, offers an alternative, plausibly more sustainable, metabolic basis for the economic system. As the metabolic nature of the fossil economy and CBE are fundamentally different, the transition from the fossil-fuelled economy towards a CBE implies a radical metabolic shift. Such a metabolic shift is likely to entail the spatial processes of social organising, thus offering possibilities for rescaling the decidedly centralising tendencies of fossil metabolism (see also Becker & Naumann, Chapter 10).

The potential for rescaling brought by the transition from the fossil economy to a CBE is relevant from the point of view of rural areas. Fossil metabolism builds on a centralised metabolic model, in which energy sources are derived from unevenly located pointwise sites of extraction: fields (oil and natural gas) and mines (coal). By contrast, the materials and energy utilised in a CBE are more evenly distributed, which makes its material foundations decentralised in nature. Consequently, metabolic transitions hold the potential for transformation in terms of scaling down and localising not only the material reality of social systems but also the institutions and power relations that govern these systems (Castán Broto, 2016; Heinberg, 2015; Kuhmonen & Kuhmonen, 2023). These relations extend from geopolitics to the ownership of critical resources and the distribution of value within supply chains as well as welfare (Heinberg, 2015; Tynkkynen, 2023; Urry, 2014).

The CBE transition can thus change the spatial relations of many societal activities as well as shake the contemporary power relations that are cemented within fossil metabolism. This potential shift opens up important avenues of exploration from the point of view of rural and peripheral areas and actors (Clausen & Rudolph, 2020). However, even though rural actors have direct access to many of the critical resources necessary for a CBE, it is unclear whether they have the capacity to act on the possibilities offered by the CBE transition. Furthermore, the way many

of the transition processes are currently unfolding seems to deepen rather than counteract the prevailing trends that ensure the success of urban agglomerates and marginalise rural and peripheral areas (Golubchikov & O'Sullivan, 2020). As argued by Albrecht and Klein (Chapter 2), the potential for rescaling a sustainable bioeconomy transition exists, yet the process is facing much friction that is likely to reinforce a centralised production structure and corporate ownership instead of more local and/or territorial forms of organisation.

Therefore, in this research, we seek to understand the processes related to a CBE transition that either maintain or challenge the centralising tendencies of contemporary social structures in Finland. More specifically, we ask what kinds of visions of a CBE would be (1) probable in terms of contemporary trends and (2) preferable from the point of view of rural areas. Such a rurally preferable future vision would enable a rurally just transition towards a CBE through promoting rural livelihoods and, more generally, rural prosperity. In this context, rural prosperity should be understood broadly; thus, instead of being confined to the frame of economic development, it should enhance the well-being and resilience of rural areas and actors (Rivera et al., 2018). To do this, we utilise futures studies' methodologies for exploring future visions that elaborate the spatial organisation of the post-fossil economy. Futures involving human action are open in the sense that humans always have some latitude for choice (Bell, 1997). This means that despite tendencies towards one way or another, the spatial organisation of the metabolic shift is not predetermined. Therefore, analysing the prospective transition pathways can contribute to societal envisioning about normatively desirable future states.

To explore the transition processes from the point of view of rural areas and livelihoods, we analyse the prospective visions of spatial organisation in a number of CBE manifestations. Our empirical context is Finland, a high-income industrialised country in Northern Europe characterised by a steep urban–rural divide. We selected 10 cases that are relevant for both the post-fossil transition and rural livelihoods and that should scale up or fundamentally transform along the metabolic shift. The cases relate to food, energy and forest-based resources (for forest sector and rural development, see also Halonen & Lundmark, Chapter 12). We operationalise the structure of alternative future states for a CBE in relation to two dimensions: centralised vs. decentralised structure and non-local vs. local ownership and governance.

Centralisation, Decentralisation and Sustainability Transitions

Rural and peripheral areas have so far received only negligible interest in transition studies (Häyrynen & Hämeenaho, 2020; Isaksson & Hagbert, 2020; Sareen & Shokrgozar, 2022). Much of the existing research on rural areas in sustainability transitions concerns energy transitions (Clausen & Rudolph, 2020; Golubchikov & O'Sullivan, 2020; Klaniecki et al., 2020). Many studies have observed that rural areas host promising niche-level manifestations of the post-fossil economy (Hansen & Koenen, 2015; Trahan & Hess, 2022). However, whether the rural actors can host rapidly growing, extensive, novel and in part strongly reformed (e.g. non-fossil-based farming) systems is a question that has not been widely discussed. Indeed, ample examples exist in which rural areas have not been able to exploit the window of opportunity offered by sustainability transitions due to factors such as political underrepresentation, the absence of economic agglomeration advantages and backward technologies and practices (Golubnikov & O'Sullivan, 2020). Rural areas are facing a contradictory situation in which "there is a general discrepancy of scale: while international recommendations predominantly draw on small-scale RE (Renewable Energy) cases to justify RD (Rural Development) possibilities, the current political desire is for large-scale developments" (Clausen & Rudolph, 2020, p. 7). Thus, rural areas are clearly facing the risk of becoming not only spatial peripheries but also resource and energy peripheries (Tirado-Herrero & Fuller, 2021).

At the same time, while transition processes are expectedly geographically uneven (Carr & Affolderbach, 2014; Coenen et al., 2012), they also have the potential to shake the power constellations of contemporary societal structures (Avelino & Rotmans, 2009; Brisbois, 2020; Truffer et al., 2015). Many scholars have suggested that the diversity and multiplicity of spaces should have a more visible role in transition studies (e.g. Hansen & Koenen, 2015; Munro, 2019; Murphy, 2015). The elements, patterns, rhythms and ploys of transitions are likely to take different manifestations in different kinds of places due to the variability of resources, capabilities, infrastructure and production and consumption activities (Binz et al., 2020; Golubnikov & O'Sullivan, 2020). As long as the ploy of the future is not fixed or foreseeable, there is a new "struggle surface" (Carr & Affolderbach, 2014, p. 568): what might be sustainable in one context might not be sustainable in another. Furthermore, what is

considered sustainable may differ between the locals and the non-locals, and the sustainable solutions offered by local initiatives may be resisted by the mainstream or incumbent actors (Carr & Affolderbach, 2014; Eaton et al., 2014). Different actors have different views of the future, and societal discourses may reproduce peripheralisation or provide new narratives for rural agency (Phillips & Dickie, 2014; Willet, 2020). For example, within the Finnish forest-based sector, a variety of conflicting views about the CBE transition coexist among the involved societal actors. Some of these views highlight the potential for a transformative shift of centre–periphery relations, while others align with the reproduction of the status quo (Halonen et al., 2022; Näyhä, 2019).

The calls for just sustainability transitions in rural areas give floor to alternative storylines about how to implement transition policy in an inclusive way (also Connelly et al., Chapter 8): if and when the sustainability transition is a must for all societies, the costs and benefits incurred by it should be allocated on a just basis (e.g. Wieliczko et al., 2021). How the benefits and costs of the transition processes are distributed is affected by the models of ownership and governance. Questions of ownership are linked to questions of rural livelihoods as well as political power (Brisbois, 2020; Scoones, 2009). While rural communities might be struggling to receive benefits from, for example, renewable energy projects that operate at broad spatial scales, local modes of ownership could offer a means for increasing the income streams directed to rural areas (Munday et al., 2011). Roesler (2019) argues that local modes of ownership and governance, such as bioenergy cooperatives, "improve local value creation and strengthen local enterprises" (p. 273). For these reasons, attending to the nature of transition processes, which either strengthen rural livelihoods or deepen the process of peripheralisation, requires attention not only to the process of centralisation vs. decentralisation but also to questions of local vs. non-local ownership and governance.

Finnish rural actors are intrigued by the CBE transition as a means to improve their livelihood opportunities (Halonen et al., 2022). However, to date, the evidence about the implications of CBE and low-carbon transitions for rural areas indicates that both the discourses and practices related to such transitions seem to perpetuate rather than reverse the process of peripheralisation and the marginalisation of rurality. Low-carbon energy transitions entail "ownership by large financial actors, decision-making at high levels away from citizen interests and agency, and infrastructural arrangements suited to maintaining centralised control"

(Sareen & Shokrgozar, 2022, p. 1). Many transition processes in fact risk hindering rather than boosting opportunities for rural livelihoods. For example, the dietary shift towards plant-based foods has been estimated to reduce rather than increase the scope of rural livelihoods (Huan-Niemi et al., 2020; Lehtonen et al., 2022). Eversberg et al. (2023) argue that bioeconomy discourses are deliberately used to sustain the status quo and, at the same time, perpetuate the process whereby the role of the rural diminishes as one of resource providers.

Data and Methods

In this study, we utilised the futures studies methodology to understand how the CBE transition can either bolster rural viability, empowerment, positive development patterns and livelihoods or reproduce the process of marginalisation and peripheralisation of rural areas. In doing so, we were looking for the probable and preferable visions (Dator, 1993; Schirrmeister & Warnke, 2013) regarding the manifestations of the post-fossil economy. While the probable future entails the continuation of current development patterns, the preferable future is a normatively defined vision, which, in this case, means maximising the well-being and livelihood opportunities of rural areas and actors. We did not focus on static categories, such as rural/urban and periphery/centre, but instead aimed to capture the development patterns in which rural areas become more dependent on centres and, at the same time, more disconnected from them, as Fischer-Tahir and Naumann (2013) describe the process of peripheralisation.

We chose 10 manifestations of CBE that should scale up and/or grow in importance with the metabolic shift and that have relevance for rural areas. We then asked expert interviewees to anticipate both probable and preferable futures for these manifestations. Preferable futures were defined as improving the livelihood opportunities and income streams of rural areas. Studying the visions that CBE experts hold in this kind of facilitated procedure can reveal insights into the unfolding transition processes and the position of rural areas in them. The studied CBE manifestations represented agriculture and the food system, the energy system and the forest-based sector (Table 6.1).

To capture the rural relevance of the diversity of the possible future visions, we operationalised the possible future states for each of the cases in relation to two dimensions: centralised vs. decentralised structure and

Table 6.1 The study cases by system

Case	*System*
Energy supply of rural premises	Energy
Wind energy	
Biogas	
Nutrients in agriculture	Food and agriculture
Alternative protein sources	
Domestic fish	
Biofibres	
Non-wood forest products	Forests
Forest ownership	
Wood construction	

local vs. non-local ownership and governance (Fig. 6.1). This strategy produced a four-cell matrix, *a vision map*, which was then adapted for each case to observe its specific features (Table 6.2). This adaptation was based on relevant literature as well as the authors' knowledge of the cases. Thus, the future visions of the cases in similar quadrants were not direct matches of each other; rather, they reflected the specific features and characteristics of each case as a manifestation of the CBE transition.

We conducted 60 interviews with professionals who have expertise in the cases, representing (1) businesses, (2) administration and governance, (3) research and development organisations and (4) advocacy groups. For each case, six interviews were conducted, with the exception of biofibres (five interviews) and energy supply of rural premises (seven interviews). The interviewees were selected based on a matrix, in which each type of expertise was represented in each case by one or two experts. We pursued a regionally balanced mix of interviewees. The interviews were conducted via a remote connection between June 2021 and February 2022. Of the interviews, 59 were conducted in Finnish and one in English. The interviews lasted between 60 and 90 minutes. The interviews were recorded, and during the interviews, notes were written down on Google Jamboard, which was also used to share the vision map depicted in Fig. 6.1.

The interviewees were first primed with a short general description of the transition towards a CBE. They were then asked about the *most probable* organisation of the case in accordance with the vision map as depicted in Fig. 6.1 and as specified for each case in Table 6.2, assuming the continuation of current development trends. After this, the interviewees were asked to identify the *most preferable* arrangement from the

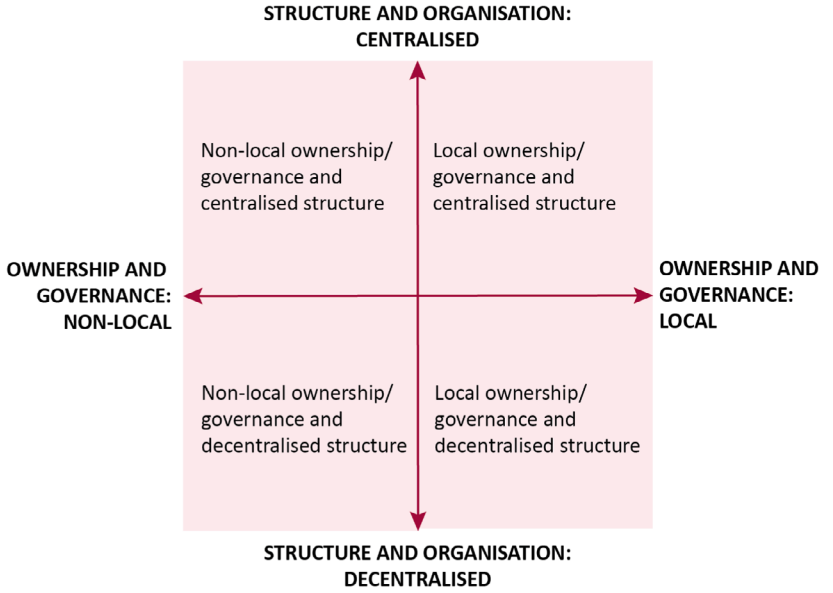

Fig. 6.1 Vision map with four alternative future visions: centralised vs. decentralised structure and local vs. non-local ownership and governance

perspective of rural areas in Finland, in which the vitality of rural areas was to be maximised in terms of livelihoods and income.

The interviewees were asked to place both the probable and the preferable visions in the vision map. In the analysis, percentages were counted for each quadrant of the vision map: (1) for each interview, (2) for the probable and preferable future visions separately and (3) for each case on average. If the probable or preferable future vision was seen to reside in only one quadrant of the map, it was assigned a 100% compatibility for this interviewee. If the probable or preferable future consisted of several quadrants, the percentages were assigned accordingly, with the total amounting to 100%. Notes regarding the nature of the probable and preferable future visions were also documented.

Table 6.2 Vision map adapted for each CBE case

Case	*Non-local & decentralised*	*Local & decentralised*	*Non-local & centralised*	*Local & centralised*
1. Energy supply of rural premises	Decentralised energy supply serving the national grid	Local energy communities, estate-specific energy production, local energy networks	Centralised energy supply serving the national grid	Energy supply organised by local firms and communities, local energy networks
2. Wind energy	National grid, many owners and producers of wind energy	Local energy networks, estate-specific energy production, prosumer wind energy	National grid, large-scale wind farms owned by a few firms	Local energy networks, locally owned large wind farms
3. Biogas	Networks of biogas plants owned by large companies	Many village- and farm-based biogas plants	Central plants owned by towns and large companies	Regional central plants
4. The nutrient economy in agriculture	Diversified production, many specialised operators in nutrient businesses	Diversified production, local agroecological symbioses, manure, legumes	Specialised production, nutrient businesses operated by a few large companies	Specialised production, nutrient businesses operated by local actors
5. Alternative protein sources	Decentralised production, high value added, protein-rich food components and food products	Decentralised production, low value added, legumes etc	*Food without agriculture*, laboratory food	Production units for mushrooms, insects, etc
6. Domestic fish	Fish farms owned by large companies, hired fishers	Diversified fishing for domestic purposes, professional fishers and fish farming	Large fish farms owned by large companies and hired fishers	A few professional fishers and large fish farms
7. Biofibres	Diversified fibre production, centralised processing in large plants	Diversified fibre production, small-scale processing	Production of a few selected fibres, centralised processing in large plants	Production of a few selected fibres, small-scale processing

(continued)

Table 6.2 (continued)

Case	*Non-local & decentralised*	*Local & decentralised*	*Non-local & centralised*	*Local & centralised*
8. Non-wood forest products	Diversified harvesting and processing operated by several regional or national operators	Citizens collect a diversified harvest for domestic use and for sale	Harvesting and processing of a few cash crops operated by a few wholesale companies	Many locally owned units that buy, process, pack, store and sell products
9. Forest ownership	Non-local forest owners, urban forest owners	Diversified family forests/farms	Institutional owners: state, companies, funds	Centralised forest ownership, large forests/farms
10. Wood construction	Decentralised community structure, wooden houses built by regional or national actors	Decentralised community structure, wooden houses built by local actors	Centralised community structure, wooden houses built by regional and national actors	Centralised community structure, wooden houses built by local actors

Results

Overview of the Results

The visions of the probable and preferred futures differed considerably (Figs. 6.2 and 6.3). Taking a look at the average across all 10 cases, the most probable structure of ownership and governance in the CBE manifestations was centralised and non-local (51%), followed by decentralised and non-local (22%). In other words, the interviewees anticipated that in the transition towards a CBE, 73% of the CBE manifestations would be owned and/or governed by non-local actors and that 64% would take place with a centralised structure.

This situation was in stark contrast to the most preferable *pro-rural* futures, in which the vitality of the rural areas was to be maximised upon the transition. To enable a rurally just transition towards a CBE, the most commonly cited mode of organisation in the CBE manifestations was a decentralised structure together with local ownership and governance (34%), followed by a centralised structure with local ownership (29%). As many as 62% of these rurally preferable visions of the CBE manifestations featured local ownership and governance, while 58% featured decentralised organisation.

Transition visions of CBE manifestations

The arguments that the interviewees provided for their choices of probable vs. preferable futures offered insights into why the observed CBE manifestations would or should develop in the directions mentioned above. In the case of the energy system, the probable development patterns for the energy supply of rural premises and biogas were more diversified than for wind energy. The development of *wind energy* is locked within a trajectory in which large non-local actors dominate the field due to economies of scale. While the interviewees saw the economic feasibility of this model, in the rurally preferable vision, decentralised and local modes of organisation would have more prominence through the development of estate-scale wind turbines and modes of local ownership, which would also improve the local acceptability of windmill parks. The *energy supply of rural premises* includes both electricity and heating, as a result of which there was greater variability in both the probable and preferable futures. The role of burning biomass in heating was expected to decrease, while the role of electricity in heating was expected to

Fig. 6.2 Organisation of the visions for probable futures (%)

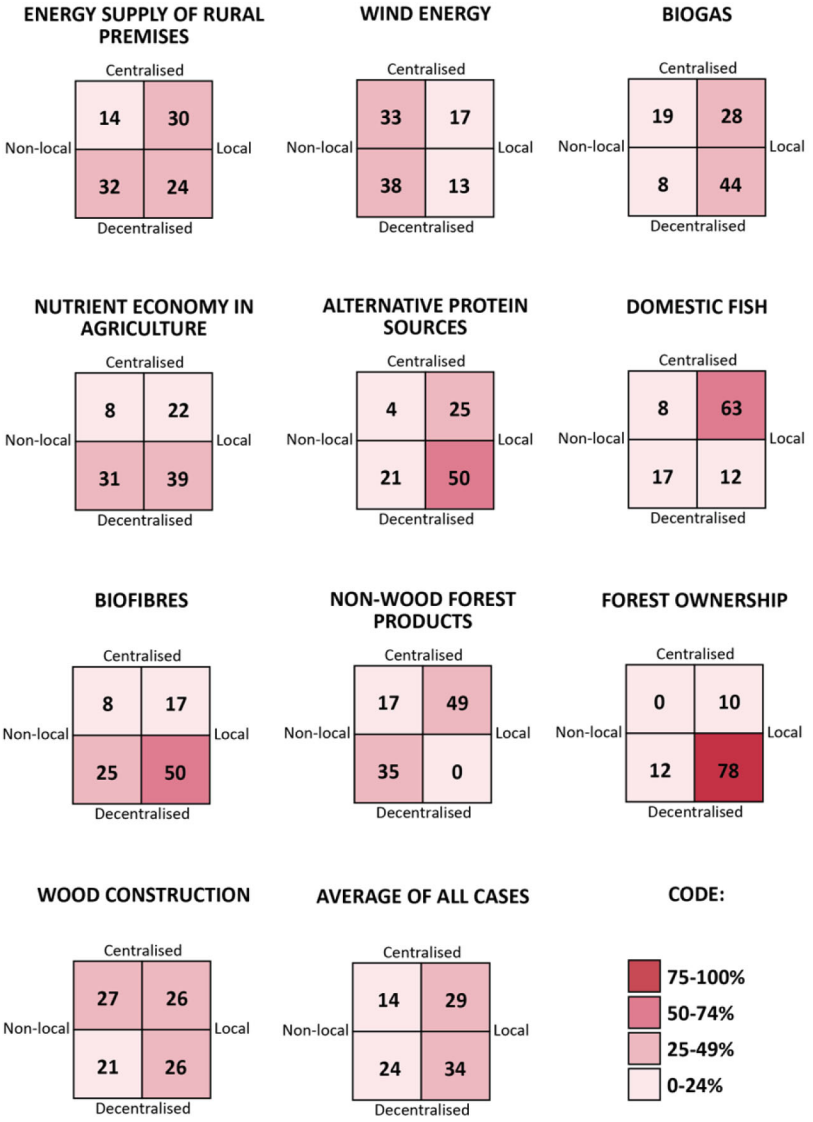

Fig. 6.3 Organisation of the visions for preferable futures for rural areas (%)

increase, although burning biomass for heating would still be prominent in rural premises. However, the transition to renewables is going to require a systemic transformation of the energy system with respect to demand elasticity, the changing role of consumers, ways of storing energy, etc. There was also a notable tension between the priorities at the EU and national levels that the interviewees identified. The EU is committed to supporting community-level renewable energy production, but at the national level, the interests of energy incumbents, which entail a centralised mode of energy production, dominate the transition discourse. Accordingly, a recurring tenet regarding the preferable future was related to democratising the Finnish energy system.

Biogas was expected to grow mainly via a centralised–non-local trajectory. This is largely due to the role of biogas production in waste management facilities, but it also reflects the ability of large non-local actors to invest in biogas plants. The preferable vision, by contrast, demands that the versatile benefits that biogas production can bring are acknowledged: as a source of energy or as a source of nutrients alone, biogas may not be the most competitive option, but its value lies exactly in its multi-dimensional sustainability and in its transformative potential in relation to the metabolic shift. Biogas production is closely related to the *nutrient economy in agriculture*, as biogas production offers a potential way to increase the efficiency of nutrient recycling instead of constantly adding nutrients from virgin deposits or nutrients manufactured with fossil fuels to the fields. The most probable vision for the nutrient economy was seen to reside in the centralised–non-local quadrant, in which production is strongly regionally specialised and the recycling of nutrients is operated by only a handful of companies. In this case, there was the strongest unanimity among the interviewees about the centralised–non-local quadrant being the most probable future vision, with 96% of the visions indicating this structure. As the strong regional segregation of agricultural production is a major cause of accumulation of nutrients and the consecutive problems with nutrient leaching and eutrophication, addressing the nutrient question within a centralised structure would require large, capital-intensive technological solutions for recycling nutrients within the food system. A more diversified model of agricultural production would, however, make it possible to utilise the synergies between various lines of production through agroecological symbioses and the integration of animal and crop production. Decentralised and diversified modes of agricultural production were also largely

seen as being more preferable by the interviewees, and only 8% of the preferable visions entailed a centralised–non-local vision, which was still deemed to be the most probable.

Production of *alternative proteins* was most likely seen to take place in the decentralised–non-local quadrant, in which the production of raw materials (e.g. legumes) is decentralised, but the upgrading takes place in large, centralised and non-local units. Such a consumption-oriented model is a natural continuum of the current consumer-led dietary shift towards more plant-based diets, in which food processing innovations play an important role. These innovations, in turn, require a large capital base for the processing equipment in factories. The preferable future, by contrast, would consist of local modes of governance in either centralised or decentralised structures. In practice, this would mean consuming more such proteins that can be produced at the farm level, as well as locally owned production units for protein alternatives such as mushrooms and insects.

An important sustainable protein source that was discussed as a case of its own is *domestic fish*, including both cultivated and wild fish. The most probable future for fish was seen to take place via centralisation, in which the number of actors does not increase or increases only moderately. The trends leading to centralisation within the value chains for fish are numerous. Fish farms are increasingly being moved to the open sea to avoid eutrophication of the coastal waters; as a result, operating them is costly and requires leaning on economies of scale. Inland fish farms, while still a new business model, require a large capital base and similar economies of scale to operate profitably (see also Albrecht & Klein, Chapter 2). Open sea fishing has already moved into the hands of foreign operators, and the number of fishers in inland waters and coastal areas of the Baltic Sea is rapidly decreasing due to various factors. These include profitability problems, problems caused by seals and cormorants, the difficulty of finding successors and difficulties in acquiring funding and accessing consumer markets. The preferable future for domestic fish would also entail more decentralised modes of organisation, enabling, for example, the profitability of fishing less-valuable fish species for food.

Biofibres entail a versatile group of fibres (e.g. hemp, linen, nettle, common reed, moss, wood-based fibres and wool) that can be used to produce textiles, packaging materials, biocomposites, animal bedding and hygienic and medical products. As the range of materials and products

is wide, their development also requires a versatile set of upscaling pathways. The most probable future was seen to be non-local and centralised, but decentralised futures were also deemed to be probable. Centralised, large-scale processing was deemed to be a fast way of detaching from unsustainable, fossil-based materials. The most often-cited preferable future was, by contrast, in the local–decentralised quadrant. The preferable future was seen to consist of utilising a very versatile set of fibres, offering possibilities for the re-industrialisation of Finnish rural areas.

Non-wood forest products entail a variety of resources growing in forests, such as berries, mushrooms, lichens, wild and semiwild plants, herbs, sap, resin, spruce tips and birch leaves. They can be either collected on the basis of everyman's rights (berries, mushrooms and herbaceous plants), or their utilisation requires permission from the landowner. Most of the companies operating within the sector are very small, but there are also a handful of large companies that operate the collection of wild berries with guest workers. Collecting berries for one's own use is also very common in Finland, but commercial collection has mostly shifted to guest workers. This setting is reflected in the most probable vision for the sector, dominated by a non-local and centralised upscaling pathway. The preferable vision, by contrast, was situated in the opposite quadrants of the structural model, indicating a preference for the stronger role of small businesses and the versatile use of non-wood forest products.

The collection of many of these non-wood forest products requires the owner's permission, and, most importantly, forest owners are the group deciding on the use of the wood harvested from forests. *Forest ownership* thus plays a central role in the transition towards a CBE. Currently, the majority of Finnish forests are privately owned by citizens, especially in the southern parts of the country. However, due to urbanisation, an increasing share of forest owners live in urban areas, geographically detached from their forests (Karppinen et al., 2020). Moreover, the proportion of institutional owners, such as funds, has been increasing rapidly (Viitala et al., 2022). Consequently, the most probable future vision for forest ownership was in the centralised–non-local quadrant, reflecting the growth of such ownership models. However, other forms of ownership were seen to persist as well. By contrast, the local–decentralised ownership model was seen as the most preferable way of organising for both rural livelihoods and multifunctional forest management.

There is a long tradition of *wood construction* in Finland, and it is regarded as an important means to promote long-lived carbon stocks

in the infrastructure. In particular, replacing buildings traditionally built from concrete with wood offers a means to increase the role of such stocks and replace carbon-intensive concrete buildings with wood. This was also regarded as the most probable scaling-up pathway for wood construction, taking place in the centralised–non-local quadrant. This mode of organisation was also thought to offer possibilities for rural livelihoods, as the manufacturing plants were anticipated to be located in rural areas, close to the raw material source. However, in the preferable future, more local and decentralised modes of organising would increase in importance, especially due to the increasing role of repair construction, conservation and the more decentralised community structure.

Summary of the Results

In summary, the most probable visions for the 10 important manifestations of the post-fossil economy were generally more centralised and non-local than the most preferable visions. The visions fostering rural vitality were more decentralised than the probable visions, especially in the cases of the nutrient economy in agriculture (70% vs. 0% decentralised) and forest ownership (90% vs. 54% decentralised; Fig. 6.4). Overall, more than half of the visions concerning the preferred futures of forest ownership, biofibres, alternative protein sources, domestic fish, biogas, the nutrient economy in agriculture, energy supply of rural premises and wood construction were based on local ownership and governance, and only wind energy (71%) and non-wood forest products (52%) were expected to be non-locally owned and organised in the preferred futures. The most striking differences between the probable and preferable visions took place in the context of the food system, in which the trends of centralisation and geographical specialisation are currently very strong.

Discussion and Conclusions

The metabolic transition from a fossil economy towards a circular bioeconomy is at the centre of the sustainability transition. Such a metabolic transition could offer new sources of livelihoods for rural areas, as the production systems would no longer operate on the logic of the linear economy, which tends to reduce the role of the rural to that of a resource periphery. However, our results concerning the CBE transition in Finland indicated that this promise is likely to remain largely unfulfilled. This

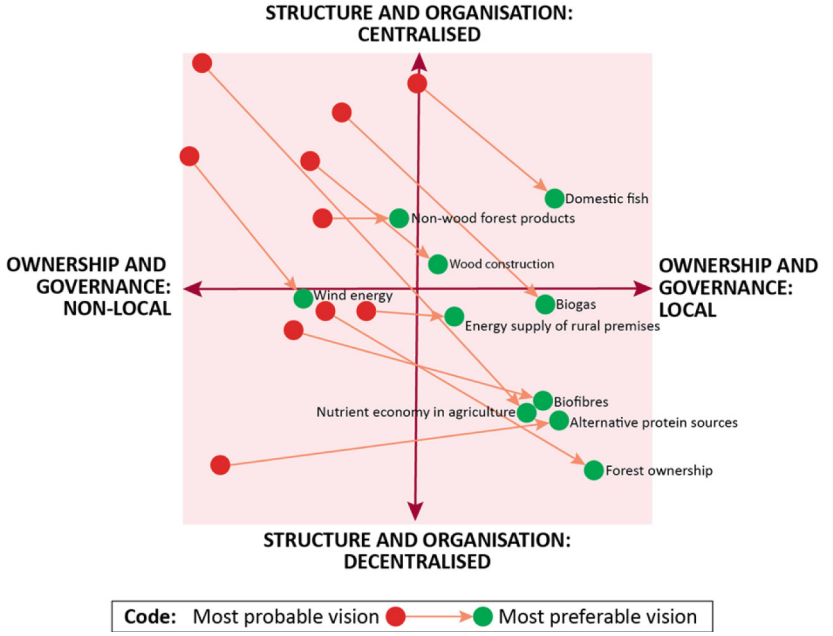

Fig. 6.4 Comparison of the most preferable and most probable visions in the 10 cases

is due to the fact that the transitions, as they are currently unfolding, are not systemic, despite being portrayed as such. Instead, they reproduce the same centralising tendencies that characterise the fossil economy. Exploring the future visions of CBE manifestations revealed that non-local ownership and governance, on the one hand, and a centralised structure, on the other hand, were perceived by the expert interviewees as the more probable vision in all 10 cases of CBE manifestations compared to local ownership and governance and a decentralised structure, which would be more preferable from the point of view of rural livelihoods.

How transitions unfold, and whether rural areas can prosper in these processes, is not simply a matter of justice, uneven development or political–normative preferences about the type of futures that should be pursued. Our results can be seen as a reflection of two underlying narratives that by and large characterise the debate over transition pathways: whether a CBE transition is best facilitated by focusing on technology,

green growth and incremental adjustments or whether there is a need to fundamentally transform the social systems and localise them on the way (Ahlqvist & Sirviö, 2019; Eversberg et al., 2023). According to the results of this study, the unfolding of the CBE transition is currently coupled with trends related to increasing returns from economies of scale, investments requiring large capital bases and increasing specialisation. These development patterns are likely to reinforce, rather than reduce, the current injustices and power imbalances between cores and peripheries. At the same time, due to their focus on economic growth and increasing intensity of resource use, these developments are not likely to lead to the economic system staying within the planetary boundaries.

The agrifood system serves as a fitting example of this discrepancy between the unfolding of transitions and the preconditions for a sustainable CBE. The contemporary trajectory of structural development within the Finnish food system is towards larger scale, concentration and specialisation (Kuhmonen, 2023). Accordingly, the CBE solutions explored here were anticipated to develop along this line by exploiting or adapting to centralised scale economies. However, a significant part of the transformative potential of CBE manifestations such as biogas, nutrient recycling and alternative protein sources is lost along such a trajectory. The focus on economies of scale and structural development can even prevent the food system from transforming from a linear model to a circular model. A food system based on the circulation of nutrients between cropping and animal husbandry systems and closer integration of energy and nutrient metabolism should be organised around agroecological symbioses that operate on a local–regional level and require a regionally diversified rather than specialised (as is currently the case) production structure (Koppelmäki et al., 2021).

Similarly, domestic fish could provide sustainable protein for human food and clearly has room for sustainable upscaling, especially on the part of commercially less-valuable and thus far underutilised fish species, such as roach. However, small-scale fisheries, in particular, are facing a vicious cycle of decline. Organising the commercial fishing of wild fish in inland waters and coastal areas according to the logic of economies of scale is an ecological and technological impossibility. Thus, the survival of the livelihoods associated with small-scale fisheries is one of the key ingredients for a just CBE transition in Finland (Salmi & Svels, 2022).

Within the energy system, small-scale, locally organised energy production is an important ingredient of energy transitions, but the vision

regarding such modes of energy supply is shady (see also Wallace & Batel, Chapter 5). Currently, the system is proceeding on a strongly centralising pathway, which seems to resist other forms of energy production, such as community energy solutions. In EU policies, community energy initiatives are believed to both contribute to the energy transition and strengthen the economies of marginalised communities, but the spreading of these initiatives is facing challenges across the EU, partly due to the lack of visions and goals guiding the policy development (Busch et al., 2021).

In the forest-based sector, the probable future visions were strongly aligned with the centralised model dominated by the incumbent forestry companies. Such a model relies on the pursuit of increasing output and economic growth, which has been enabled by the growth of the tree stock that has lasted from the 1950s up to recent years (Korhonen et al., 2021). At the same time, Finnish forests are facing conflicting demands: while the pressures for using wood are increasing, so are the demands for alternative uses of forests as carbon sinks and conservation areas of biodiversity (Takala et al., 2020). According to Majava et al. (2022), the increasing use of (wood) biomass required by the carbon-neutrality targets of the Finnish industry exceeds the limits of sustainable use of forest resources. This discrepancy was acknowledged by some of the interviewees, who pondered the possibility of sufficiency-oriented lifestyles in which forest-based livelihoods could play a role.

CBE transitions promoting rural livelihoods seem to form a connection between locally oriented production systems and an economic model aimed at sufficiency. As Rivera et al. (2018) argue, the definition of (rural) prosperity should be widened so that it is understood in broader terms than simply economic success, which seems to include the idea of indefinite growth and progress. In this way, approaching sustainability transitions from a rural lens also comes close to the need to redefine well-being on a societal level. Many of the livelihoods in rural areas are connected to the utilisation of natural resources—directly or indirectly—and the prosperity of these areas is related to income streams derived from natural resources. At the same time, the focus on economic growth, transmitted as increasing cost pressures, is pushing rural primary producers towards overexploiting these resources. If the tendencies transmitted from the societal structures offer few alternatives in terms of obtaining livelihoods in rural areas, it is difficult to break from the unsustainable trajectories (Haider et al., 2018). Thus, creating structural conditions for rural livelihoods based on natural resources to be operated profitably

without leading to environmental degradation and overexploitation is of utmost importance for a rurally just transition.

Many of the experts we interviewed are also involved in the making of the transition processes we studied here. This brings forth the question of the role of these actors as transition agents: to what extent do they see their role as aligning to a structure that is given, and how much do they perceive themselves as having the agency to change this very structure? While our results could not explicitly shed light on these questions, they highlighted the importance of elaborating on the structure–agency nexus in relation to sustainability transitions (for agency, see also Sariego-Kluge & Morales, Chapter 3). In many of the interviews we conducted, a general sentiment could be read between the lines, in which, instead of committing to action with the intention of changing the operational environment, the experts perceived this environment as something to be adapted to. This led to the interviewees talking mostly about problems confined to the dominant paradigm, such as how to utilise the export potential of CBE products, instead of focusing on how to lead a change that could alter the domestic metabolic flows built around the fossil economy and thus create a demand for these products. It is obviously understandable and reasonable that the actors aim at operating efficiently within the choice space that they realistically perceive themselves to have, but at the same time, this leads us to ask where the potential for transformative change towards sustainability is, if not in the fields themselves.

From the point of view of rural areas, the CBE transition seems to be centralising power in the hands of the few rather than allowing a diverse set of actors to become active agents in such a societal change. Transition from the fossil economy towards a CBE does not automatically translate into improved rural livelihoods; rather, there is a risk that the rural resource periphery will prevail regardless of the nature of the resources utilised in a post-fossil economy. In other words, a rurally just transition towards a CBE would ask for radical changes in policies as well as in the distribution of power, resources and capacities. Decentralisation and downscaling of CBE manifestations could promote rural livelihoods and also work in alignment with an economic model aimed at sufficiency, thus building a CBE that is designed to operate within the planetary boundaries.

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CHAPTER 7

Grounded Sustainability Transitions: Unfolding Controversy Towards a Policy Implementation in Colombia

Germán A. Quimbayo Ruiz

Introduction

In this article, I document the emerging controversies in Sustainability Transitions (hereafter STs) practices, strategies, and policy implementation in Colombia, as well as their rescaling at different levels and across different geographies. Colombia's complex and mega-diverse geography makes it an interesting case to analyze the spatial rescaling of STs policies for both energy issues and climate change adaptation measures. In 2024, the national political agenda aims to achieve just transitions, particularly

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in the energy sector. The current government administration, led by President Gustavo Petro and Vice President Francia Márquez (2022–2026), is the first leftist and progressive one in national history. Although their discourse and intentions differ from those of previous administrations, their strategies and practices appear to reflect continuity.

This article does not aim to comprehensively evaluate the various issues and viewpoints on socio-ecological transitions in Colombia, nor does it discuss the socio-ecological transition agenda of the current national government (2022–2026). Instead, it serves as an overview for those interested in exploring these issues further. It also highlights the contradictions and controversies that can arise in policy formulation and implementation in recent times.

For this chapter, socio-ecological transitions toward sustainability can be broadly understood as the "[…] management processes that, based on knowledge, can be agreed by society, in order to achieve the desired conditions of the territories to transform them into "resilient territories", promoting changes in the trajectories of change" (Andrade et al., 2018, p. 10).[1] Moreover, a convergence between decolonized and situated alternatives to transitional practices and contemporary socio-ecological design trends is needed to materialize proposals that pose an ontological remaking of the human (Escobar, 2017). In sum, STs are broadly understood as the set of practices and strategies that lead to the systemic and affirmative transformation of dominant socio-ecological conditions toward more just environments (Alarcón et al., 2022).

Mainstream debates on climate change are increasingly acknowledging the social justice and economic inequality dimensions of STs (for energy policies). Therefore, Just Transitions (JTs) approaches have begun to play a central role at the intersection of climate mitigation and socio-economic transformations, incorporating environmental justice criteria and recognizing existing solutions in science and traditional knowledge (Akono et al., 2022). Assessing any policy attempt toward socio-environmental transformations requires revealing the social reproduction of existing economic, social, and gender inequalities through low-carbon interventions (Sultana, 2022). These perspectives on JTs destabilize normative approaches that focus on recognition, procedure, and distribution to

[1] Original in Spanish, free translation by the author.

highlight struggles for egalitarian politics and shared environmental commons.

Both STs and JTs are dynamic and contested concepts that are in a relational condition with a diverse range of interests and actors. However, as these concepts spread, they may be co-opted. Multiple understandings of scientific and technological practices, strategies, and their policy implementation coexist or even conflict with one another in different spatial (territorial) contexts. This process localizes and politicizes these practices and strategies, while considering socio-ecological differences. Rescaling sustainability practices and strategies is crucial for understanding the socio-technical challenges of STs in mega-diverse contexts, such as Colombia. Spatial scales and their politics are not fixed, but are constantly redefined, contested, and restructured in terms of their socio-ecological interrelations (Swyngedouw, 2004).

Different scalar plans on how to place STs involve different ways of producing space (territories) and socio-natural networks. Moreover, this depends not only on the quality of territorial proposals in specific geographies, but also crucially on the support and power of multi-scalar socio-technical and scientific spatial reconfigurations (cf. Boelens et al., 2016). To enable politics in everyday practices, it is crucial to consider how different spaces are produced. In addition, global concerns are contested and produced in everyday practices through socio-ecological differences (Massey, 1992; Mosquera-Vallejo, 2020). Environmental conflicts have multiple causes and drivers, as materiality cannot be separated from its symbolic dimensions in everyday practices of territorialization (Ojeda, 2016).

Academic debates on STs have often focused on their formulation through international negotiating rounds in the United Nations arena and on the achievement of the Sustainable Development Goals (SDGs) (Sachs et al., 2019), while the impact of policy implementation on STs has been less evaluated (Espinosa & Rangel, 2022). Moreover, there is a preponderance of literature focused on European and Anglo-American contexts (Bouzarovski, 2022). It is worth noting the growing interest in these issues in Latin America and the Caribbean, particularly in Colombia (Pacto Ecosocial e Intercultural del Sur, 2023).

The main STs measures that the Colombian state has been working on under different government administrations are the fight against deforestation, the impact of both the internal political conflict and the action of multi-crime structures of illegal mining, land grabbing for cattle and

illicit crops for drug trafficking in ecosystems and local communities; improving the security situation of environmental defenders, water-based spatial planning, and energy transition. Despite the documented critical environmental and social impacts of extractive industries in the country (Rincón-Ruiz et al., 2019, 2022), the national economy is still largely dependent on oil industry revenues, including state-owned extractive activities.

On the other hand, Colombia, without being a major polluter, has also committed as a nation-state to reduce carbon and greenhouse gas emissions to net zero by 2050 and to develop carbon tax policies (World Bank, 2023). Such policies can enable climate justice measures that go hand in hand with various adaptation strategies (i.e., climate-smart spatial planning and land use). However, many of these measures remain uncertain in terms of their successful implementation, as this article aims to document (i.e., clean energy projects or carbon offsetting strategies).

This article is divided into the following sections. First, a brief methodological note will be presented. Next, four key socio-ecological dynamics that may influence socio-technical approaches to STs implementation in Colombia will be discussed. Following this, an overview analysis will be provided, based on a critical review of documents and press reports, and informed by a set of unstructured interviews with environmental practitioners and activists. The following section will examine and address some of the challenges outlined in the context section. Ultimately, concluding remarks will be presented.

A Methodological Note

It is important to note that this article provides a descriptive, analytical, and critical analysis of the current situation of socio-ecological transitions in Colombia. However, it does not offer a comprehensive assessment of the various perspectives on this topic or the policy agenda of the current National Government Administration (2022–2026). The analysis is based on a qualitative strategy that includes a set of unstructured interviews with environmental practitioners and activists, participant observation techniques, and a critical review of documents and press reports.

The unstructured interviews (N = 6) were conducted with the intention of exploring the implementation of the STs policy from an

expert-driven and situated approach[2] and a respondent-driven sample (cf. Döringer, 2021). The interviewees were asked to answer and comment freely on two open-ended questions in dialog with the interviewer: Based on their experience and position, how do they think ST has been understood in different sectors of the country? How would they evaluate the implementation of policies related to ST in the country and in their field of work? I have withheld the names and identities of the interviewees to protect their privacy.

The review of documents involved a critical content analysis of academic, gray literature, environmental campaigning publications, and press and journalistic works related to socio-ecological transition issues. These resources were cited as literature for the development of this article and were retrieved from online repositories. Some of the interviewees also referenced these resources. As a participant observer, I attended four events in Colombia related to socio-ecological transitions, three in person and one virtually. The research activities took place between January and October 2023.

STs in a Challenging Environment

Colombia has a mega-diverse geography with exceptional biodiversity, as well as a complex social, cultural, and political context. This context is troubled by extreme social inequality, which drives multiple social and violent conflicts. The purpose of this text is not to provide an in-depth description of recent geo-historical issues in the country, as better documentation is available elsewhere (Beuf, 2023; Comisión de la Verdad, 2022). This section introduces Colombia and explains the emergence of potential controversies. It covers four key aspects: (1) biodiversity, ecosystems, and climate conditions, which are crucial for understanding STs in a mega-diverse geography; (2) the national energy grid, energy production, and consumption figures, along with their socio-environmental implications; (3) socio-ecological transformations and drivers in response to a changing climate; and (4) the socio-political, cultural, and institutional setting, which helps to make sense of policy implementation.

[2] Expertise is also part of situated practices of environmental and legal activism in socio-technical controversies (cf. Whatmore, 2009).

Biodiversity, Ecosystems, and Climate Regime

The country[3] is located in the Intertropical Zone and is close to the equator, between the Amazon basin, Panama, and the Pacific and Caribbean coasts. It is also crossed by the Andean mountain range, which is split into three major mountain systems. This causes a great variety of climates and ecosystems. Colombia has more than 8000 natural and transformed ecosystems, with significant differences in flora and ecosystem characteristics, even at small scales (IDEAM et al., 2017). The country is estimated to be home to 200,000 species, with 75,157 observed species, with birds, reptiles, amphibians, mammals, and plants standing out in terms of quantity and number of endemisms (SiB Colombia, 2023).

The natural regions of Colombia are divided into five continental regions: the Amazon, the Andes (which includes the inter-Andean valleys of the Cauca and Magdalena rivers), the Caribbean (including the coastal plains and the non-Andean mountains), the Pacific Coast (including the coastal plains and the non-Andean mountains), and the Orinoco. Additionally, there is one maritime and insular region, which includes the Colombian islands that are not considered coastal islands: the San Andrés and Providencia Archipelago are located in the western Caribbean Sea, while Malpelo Island is situated in the Pacific Ocean.

The climate in these regions varies significantly due to differences in altitude rather than seasonal changes. Approximately 40% of the regions are mountainous, with altitudes ranging from sea level to almost 6 km above. The climate and precipitation regimes also vary between the Orinoco region, the Amazon, and the Pacific rainforest areas compared to the Andes region. The country is often impacted by the El Niño and La Niña phenomena (ENSO oscillation), which have a significant effect on meteorological conditions, particularly during strong or severe events. The climate emergency poses a significant risk to both environmental conditions and biodiversity levels.

[3] This section synthesizes information from various sources, primarily from the Geographical National Institute 'Agustín Codazzi' (IGAC) and 'Colombia en Mapas'. https://www.colombiaenmapas.gov.co/.

Energy Grid and Energy Consumption

The energy grid depicted in Fig. 7.1 is composed of various sources, including 41% oil, 20% gas, 13% mineral coal, 13% hydropower, 6% wood, 5% sugar-cane bagasse, and 2% from other renewable sources (UPME, 2023; Departamento Nacional de Planeación (DNP), 2023).

Despite the documented negative environmental and social impacts of extractive industries (Rincón-Ruiz et al., 2019, 2022), the national economy still depends on revenue from oil, coal, and gas extraction. This includes state-owned extractive activities by the national oil company, Ecopetrol. This dependence is the result of the interaction of three dimensions: productive, fiscal, and balance of payments. Like other Latin American countries, Colombia has primarily relied on a pattern of economic development based on raw materials (for a similar type of context, see Nel & Marais, Chapter 11). This has resulted in activities with low added value but high profitability rates (Ministerio de Minas y Energía, 2023). The electricity grid is considered 'clean' because 58% of the energy is generated from hydropower sources, 30% from thermal sources, and the remaining 6% from solar and wind energy. However, there are concerns about the negative socio-ecological impacts of hydropower, solar, and wind energy projects in the country (Barney, 2023; Martínez & Castillo, 2016; Roa-García, 2017).

According to official figures (Ministerio de Minas y Energía, op. cit.), Colombia exports over 60% of the primary energy it extracts. However,

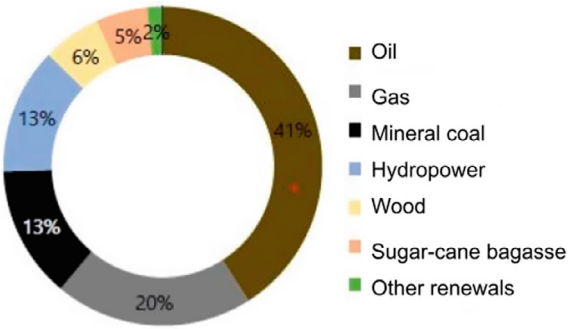

Fig. 7.1 Colombian energy grid (*Source* DNP (2023, p. 141), modified by the author

future export scenarios are uncertain and will depend on national and international climate actions, as well as other geopolitical and climate contingencies. Energy exports consistently grew between 1980 and 2015 in line with primary extraction. However, between 2015 and 2019, there was a decreasing trend in coal and oil exports. The decrease in coal exports is attributed to the global decrease in demand resulting from decarbonization processes in different countries. Similarly, the reduction in oil exports is due to the decline in national production caused by the depletion of existing fields. Coal and oil exports decreased by approximately 30% in 2020 and 2021 as a result of the COVID-19 pandemic. From 2010 to 2019, the production of coal, oil, and natural gas remained stable, with a tendency toward reduction, particularly in coal and natural gas. But, in 2020, there was a sudden decrease due to the global demand drop during that period.

Renewable sources, such as hydropower, account for only a small percentage (between 3 and 6%) of primary energy extraction, despite the increasing demand for electricity. On average, the country imports 12% of its final energy consumption, with almost all of these imports being liquid fuels for the transportation sector. These fuels have represented an average of 30% of the country's liquid fuel consumption in the last 10 years (Ministerio de Minas y Energía, op. cit.). There is a national debate about whether natural gas and various hydrogen sources can be considered as just transition alternatives for energy (Aldana Rivera & León Peñuela, 2022; Benavides, 2022). Initiatives exist to enhance the national wind energy network, but they have faced controversies and environmental conflicts (Barney, 2023).

Socio-Ecological Transformations and Drivers in the Context of a Changing Climate

The territory that occupies today Colombia has undergone constant land-use and ecosystem transformations for several centuries. In the last century, these changes have accelerated, resulting in a significant increase in the human footprint across the country. This increase is particularly noticeable in the Andean and Caribbean regions, where most of the population resides (Etter et al., 2022; IDEAM et al., 2017). Rainforests, savannas, wetlands, and high Andean moors (*páramos*) have all been replaced by pastures, crops, human settlements, and infrastructure (Márquez, 2001). Due to environmental restrictions, socio-economic

factors, and political internal conflict, the land surface available for agricultural activities is limited and has been overused through overexploitation (UPRA-IGAC, 2015).

Deforestation is the main cause of ecosystem degradation in Colombia. In the last two decades, the country has lost almost 3 million hectares of forest, an area equivalent to that of Belgium. According to the Global Forest Watch initiative (n.d.), the total area of primary humid forest decreased by 3.5% between 2002 and 2022. From 2001 to 2022, 25% of forest mass loss occurred in areas where deforestation was the dominant driver of loss. The primary causes of deforestation are the expansion of agricultural frontiers, including agro-industry and illegal economies, illegal land use and occupation, extractive industries, and urbanization (for deforestation related with forest industry, see Halonen & Lundmark, Chapter 12).

The Colombian Amazon region has accounted for 60–70% of national deforestation in recent years, making it the area with the highest rates of deforestation in Colombia. Over the past decade, deforestation in the region has significantly increased. The peace negotiations between the Colombian state and the FARC insurgency in 2016 marked a turning point for forest cover in the region. Following the declaration of a permanent ceasefire, the areas controlled by the insurgency underwent a significant increase in deforestation.

FARC demobilization "[…] also presented an opportunity for narcotraffickers and other criminal organizations [e.g. FARC's dissident groups] to increase capital accumulation by monopolizing the labor force and means of production of coca leaf and paste, gold mining, logging, and other illegal activities in the region" (Sánchez García & Wong, 2024, p. 190). In 2014, 140,358 hectares were deforested, and the following year, deforestation increased by 44% compared to the previous year. In 2016, it increased by another 23% after the guerrillas demobilized (Prem et al., 2020). From 2017 to 2021, an average of 175,000 hectares were deforested each year. Deforestation decreased by 29% in 2022, but it remains at unacceptable levels (Wiesner, 2023). The forest was cut down for cattle ranching and livestock by powerful actors, some of whom were armed, who employed labor from impoverished rural communities to initiate the process. These activities are intertwined with legal and illegal economies (Sánchez García & Wong, 2024).

On the other hand, according to a national assessment on climate change vulnerability and risk (IDEAM, 2017), all Colombian municipalities exhibit levels of climate change risks, which might affect human and environmental health. The assessment identifies large urban centers, including the capital Bogotá, and the coastal areas as the most vulnerable. Despite the country's abundant water resources in its different hydrographic regions, there are multiple warning signs. Surface and underground water resources, as well as the entire hydrological cycle, are affected by conditions of vulnerability, climate risks, and social and economic activities (IDEAM, 2023). This was evident with the conditions of extreme drought and raising temperatures in several parts of the country in the first half of 2024, exacerbated by the El Niño phenomenon. These conditions increased the risk of forest fires, in addition to decreasing water levels in hydropower dams and drinking water reservoirs, forcing serious water rationing measures such as those implemented in the Bogotá region in April 2024.

Socio-Political, Cultural, and Institutional Setting

Colombia has a high level of biological diversity and a significant amount of ethnic and linguistic diversity. The National Constitution of 1991 recognized the importance of cultural differences and their relationship with environmental issues, leading to increased awareness. In 1993, Colombia established the National Environmental System (SINA, in Spanish) through Law 99. The Ministry of the Environment leads the SINA, which includes authorities at the regional, departmental, district, and municipal levels. Decentralized environmental research institutes provide technical and scientific support to the SINA. The progress in the field of the environment has been facilitated by the recognition of rights struggles of different social sectors and citizens, both rural and urban, and of different social, cultural, and ethnic backgrounds. This normative and institutional progress has been achieved through the efforts of various groups.

In a historical context of armed and political conflict, it is important to understand the relationship that different actors have had with the state in relation to environmental defense. Environmental issues have often been marginalized and stigmatized as 'enemies of development' (cf. Olarte-Olarte, 2019). Disagreements on environmental management and licensing, particularly regarding the responsibilities and accountability

of local and regional authorities, have arisen due to political practices involved in these processes. However, instead of adopting a confrontational stance toward state institutions, environmental movements, organizations, and collectives have chosen to apply political pressure to change state action. This approach challenges the supremacy of 'expert' knowledge held by state power (cf. Quimbayo Ruiz, 2021) and addresses the ambivalent interventions of the state in environmental and climate action (cf. Camargo & Ojeda, 2017).

Colombia has consistently ranked as the worst place to be an environmental defender, despite institutional progress. The Global Witness 2022 report (2023) shows that the country recorded 60 killings in 2022, more than a third of all killings worldwide. The report acknowledges the political will of the current government administration (2022–2026) to prevent and investigate attacks against defenders, as well as its support for the ratification of the legally binding regional Escazú Agreement in October 2022. Yet, the number of reported killings in 2022 has nearly doubled from the previous year. Since 2012, Global Witness has documented at least 382 killings of defenders in Colombia, making it the country with the highest number of reported killings in the world during this period.

Institutional Transitions *vis-à-vis* Situated Alternatives

In recent years, the Colombian government has committed itself to various international sustainability agreements. The current government administration (2022–2026) has proposed an ambitious environmental and energy policy agenda that focuses on STs and addresses many of the challenges presented in the previous section. It has also aimed to position the country as an international leader in environmental issues and socio-environmental transition,[4] which was highlighted by all interviewees as a common aspect compared to previous administrations. However, social, economic, cultural, and political tensions have contrasted these intentions in terms of implementation and materialization.

[4] The country, for example, was chosen to host the 16th Conference of the Parties (COP) of the Convention on Biological Diversity (CBD), to be held at the end of October 2024 in Cali, Valle del Cauca.

A case in the Colombian Caribbean, which deserves its own research article, illustrates the challenges that STs policies encounter in specific geographies. At an academic event on the social impacts of climate change held in Santa Marta in March 2023, a Wayúu indigenous leader stated:

> I come from the land where we have everything, but we own nothing.

The Wayúu people live in La Guajira, a region in the northern Caribbean of Colombia. This area, along with part of the neighboring Department of Cesar, has experienced the most violent effects of coal mining. National and transnational investments have led to large-scale coal mining, resulting in severe environmental destruction and humanitarian injustices that need to be addressed and repaired. The El Cerrejón and La Jagua de Ibiricó mining sites and extractive fronts are the most emblematic cases. This region, which is already one of the most vulnerable to the impacts of climate change, has experienced a socio-ecological collapse (see: *La Guajira Le Habla al País* campaign). Interestingly, this region has also become the hub of the national wind energy network (Barney, 2023). Efforts to reduce carbon emissions and generate 'cleaner' energy, nevertheless, have led to a new phase of (green) extractive displacement (Ulloa, 2023).

Colombia's national political context has posed challenges and obstacles to the implementation of the STs policy, similar to the case of La Guajira. Powerful economic sectors, such as energy and extractive industries, have opposed the implementation of comprehensive STs policies. This has raised concerns among civil society organizations focused on just transitions. Furthermore, ambiguous statements by government officials have further complicated the situation. The state's bureaucratic apparatus, socio-ecological inequalities, global economic recession and geopolitical wars, all present obstacles and challenges.

In this context, the data collected and the expert insights from the interviews conducted provide clues for analyzing the rescaling of STs on two fronts: (1) energy transitions and energy transformations, and (2) adaptation to climate change through ambivalent nature-based solutions. The critical situation faced by Colombian environmental defenders could also condition actions on these two fronts.

Energy Transitions and Energy Transformations

President Gustavo Petro's inauguration in 2022 marked the beginning of a new government agenda focused on STs. This agenda was proposed in the National Development Plan for the government's term (2023–2026). The Ministry of Mines and Energy conducted 27 dialogues with various territorial and economic sector actors over a period of 7 months, from September 2022 to April 2023, in different regions. The purpose of these dialogues was to define the route to the Just Energy Transition. The government is proceeding with this approach based on the principles of equity and democratization, gradualism, binding social participation, and knowledge-based decision-making (Ministerio de Minas y Energía, 2023).

According to Gómez (2023), the current government administration proposes a gradual de-escalation of economic dependence on oil and coal. The proposal involves a planned and gradual reduction of dependence on fossil fuels over a period of 15 years, while allowing for the necessary production of fuels and derivatives during the transition period. In cooperation with national environmental authorities, no new licenses for hydrocarbon exploration will be granted, and the extraction of current fossil fuel reserves will be for internal consumption and guided by knowledge-based criteria. This will allow for greater efficiency in their use and a higher rate of energy return. It is also proposed that Ecopetrol plays a leading role in the transition.

In addition, it is necessary to ensure the country's fuel supply for the next 15 years, provide inputs and derivatives for petrochemicals, support research, science, and the development of technologies for the transition to cleaner energy. This objective should be supported by establishing a broad social dialogue. This dialogue should consider both the desires of the communities impacted by fossil fuel extraction and reparations for the environmental conflicts caused by over a century of extractive activities. Furthermore, the Colombian Congress is currently making progress in prohibiting the exploitation of unconventional resources, specifically targeting fracking pilot projects and offshore deposit development.

Some of the interviewed experts find the transition plan challenging in a country with a long history of conventional hydrocarbon extraction. One expert even suggested that political actors who favor rentier capitalism as the vehicle of the national economy are contributing to the challenge. The transition plan has been strongly resisted by traditional

and powerful economic actors. Despite the current vulnerability of the energy matrix, which is still largely dependent on dwindling fossil fuels, it is urgent and essential to implement measures to reduce demand.

Furthermore, substantial changes are required to meet the current contractual conditions. In this context, it is important to establish an Energy Transition Fund that includes: (i) a surcharge on the exploitation of non-renewable natural resources; (ii) a compensation rate for water usage in extractive projects, whether taken from the surface or phreatic aquifers; and iii) the funds from the elimination of state subsidies or support for the country's oil sector, which amounted to approximately $1.34 billion in 2021 (Energy Policy Tracker cited in Gómez, op. cit).

To establish a proposal of this magnitude in practice, it is necessary to review most aspects that support modern life in Colombia. Despite good political will, government officials have fallen into mismanagement and communication pitfalls, sparking unnecessary controversies that have been capitalized on by political opposition actors. This complicates further steps toward a just socio-ecological transition (Garzón, 2023). One interviewee stated that the current administration is open to discussing transition and energy communities. However, their methodology and application of public policy is still inconsistent.

This political environment has created an opportunity for a policy engagement forum to discuss a just transition to clean energy. The Permanent Council for the Just Energy Transition in Colombia (*Consejo Permanente para la Transición Energética Justa en Colombia* -CEPTJ-) [5] is an articulation of organizations with extensive experience working on the issue of energy transition, which seeks to influence the construction of public policies and promote concrete actions in this matter. It is an independent advisory body that acts with a sense of collectivism and autonomy.

On the other hand, the promotion and strengthening of community-based alternatives has been developing in Colombia for many years (for localized energy alternatives, see Connelly et al., Chapter 8). Low-carbon solutions and environmental alternatives are embodied in a plethora of networks and situated communities of practice called the Community-based Energies (CE) [*Energías comunitarias*], which are themselves defined as (Censat Agua Viva et al., 2023):

[5] CEPTJ website: https://consejotransicion.org/.

> We understand (CE) [*Energías Comunitarias*] as the set of knowledge, practices, and processes of socio-environmental transformation in the production and consumption of energy and food, which favor the creation of decent living conditions for the most vulnerable communities, which respect all forms of life present on the planet and that contribute to the climate crisis mitigation, peace-building and the reconstruction of the social fabric.[6]

As one of the activists interviewed suggested, these networks and movements are proposing energy in a more holistic way. CE are focusing not only on creating energy sovereignty, but also food and water sovereignty and community-based ecological restoration in their areas of action. However, despite their recognition by the current government administration, these alternatives remain marginalized in mainstream debates and policy implementation. The same activist argued that prioritized transition proposals at the local level are still very much dependent on market dynamics as opposed to CE.

Adaptation to Climate Change: Ambivalent Nature-Based Solutions

Several adaptation strategies, such as climate-based and water-based spatial planning, and their relationship with the energy transition, as well as land use or market-based carbon initiatives and offsetting, such as Payment of Ecosystem Services (PES) schemes or initiatives to reduce emissions from deforestation and forest degradation mechanisms (REDD +), have been considered for policy implementation. An expert interviewed on ecological restoration issues noted that socio-ecological transition initiatives have primarily focused on energy grid transitions, neglecting adaptation and nature-based solutions like ecological restoration. While multiple nature-based solutions have been developed for spatial planning, land use, and addressing deforestation and ecosystem transformation, their effectiveness has been mixed. Unjust land tenure, resulting from historical social and armed conflict and inequality, presents the greatest challenge to ecological restoration initiatives and biodiversity conservation processes.

Ecological restoration initiatives have been developing since the early 2000s and have increased in recent years due to local initiatives in

[6] Original in Spanish, free translation by the author.

response to the biodiversity conservation and climate change agenda (United Nations framework). Many initiatives depend on international cooperation, mainly US-AID and the European Union, as well as multilateral banks. There have been interesting initiatives where the focus has changed over the years toward a vision of sustainable use of land resources, in addition to the recognition of indigenous and ancestral knowledge. Notable innovations in agroecosystems, sustainable livestock production, and productive ecological restoration include the experiences developed by the Center for Research on Sustainable Agricultural Production Systems (CIPAV, Spanish acronym). There is even a national law (2173), issued in 2021, that regulates ecological restoration, where several actors can develop practices and initiatives on the matter.

Nevertheless, there is a mismatch between the timing and demands of policy objectives and the timing of ecological and ecosystem processes in different territories. According to the expert interviewed, interventions in lowland areas and ecosystems in the Amazon and Orinoco basins still dominate over those in the high Andean mountains, even though the latter are strategic ecosystems for water resources, especially the *páramo* ecosystem. This delay may be due to implementation challenges. In addition, there is a lack of biodiversity monitoring strategies, and tensions exist between 'experts' and community knowledge. However, joint efforts have been made to reconcile both types of knowledge and experiences. Moreover, there is a significant delay in strengthening urban-regional ecological restoration initiatives. Although there have been some initiatives in the wetlands of the Sabana de Bogotá region (cf. Quimbayo Ruiz, 2021), these experiences are still considered marginal.

Regarding carbon market initiatives, the country has implemented various programs, including Payments for Ecosystem Services (PES) and mitigation initiatives for artificial capture and biomass, as well as mechanisms like REDD + . While some studies have shown potential for innovation (Lliso et al., 2020; Maca-Millán et al., 2021; Rincón-Ruiz et al., 2019), PES schemes have yielded mixed results. The economic sectors have received these positively, while several conservation initiatives have achieved pragmatic positive results (Moros et al., 2020). Yet, controversy surrounds these mechanisms and their role in exacerbating persistent environmental conflicts, particularly with water resources (Duarte-Abadía et al., 2023). While there are potential contributions to the REDD + front, such as The REDD + Community Portfolio (2023), the overall

REDD + mechanism is not free of conflicts and controversy (Díaz & Ruíz-Nieto, 2023).

PES and REDD + mechanisms have often been controlled by powerful and unscrupulous actors, or have tended to favor powerful stakeholders by default. Authorities at all levels (national, regional, and local) have not been able to ensure environmental justice, which would allow these mechanisms to truly contribute to the restoration and social and ecosystem sustainability of the territory. Corporate actors and political and economic elites have engaged in state capture, viewing the environment solely as an impediment to capital accumulation in the name of development (CLIP, 2023).

Situation on Environmental Defenders

The situation of violence in Colombia extends beyond the stigmatization and persecution of environmental defenders to include those whose livelihoods contribute or could contribute to the sustainable management of specific ecosystems. I would like to return to the situation of deforestation in the Amazon region as an illustrative case. During the administration of former President Iván Duque (2018–2022), it failed to stop the high rates of deforestation. To tackle this trend, the military Operation *Artemisa* was deployed as the main strategy against the actors driving deforestation activities, but it turned out to be a force of persecution and criminalization against impoverished peasants, without significant consequences for those ultimately responsible. The current national government of President Gustavo Petro has decided to enter into dialogue with the communities to build an alternative process that promotes human rights guarantees, since militarization strategies have generated conflicts between peasants and the Colombian state authorities in recent years.

The dialogues and agreements reached by the Ministry of the Environment with peasants in some areas of the Colombian Amazon have certainly been crucial to achieving a reduction in deforestation in the 2022–2023 term. A special group was created within the ministry to pursue the large capitals that fuel deforestation and to move away from a strategy of judicializing the peasants (Paz Cardona, 2023). This dialogue strategy has been evaluated for implementation in other areas of Colombia, since, according to expert sources interviewed for this

article, attention should also be paid to forest loss in regions such as the Caribbean and the Andes.

The previous case, while not a perfect or definitive policy formula, offers an alternative to the unfortunate precedent of the relationship between communities and state authorities in environmental controversies in the country, when there are historical patterns of abuse of power against environmental defenders. The use of physical force by various actors, including the state's public force, to suppress legitimate social protests in disputed territories is a concerning issue. Additionally, the work of environmental defenders is often criminalized and stigmatized. There is also an abuse of regulatory force, with a double standard in terms of legal security. Economic actors attempting to settle in these territories with their megaprojects are treated differently than the communities defending their rights. These communities are not only criminalized but also excluded from information, participation, and equal access to justice (Olarte-Olarte, 2019; Roa-García & Murcia-Riaño, 2021).

The implementation of STs policies will require addressing power structures and respecting human and environmental rights, as well as generating knowledge and alternative solutions to current challenges. One of the activists interviewed acknowledged the political will of the current government to protect environmental defenders, but also pointed out the urgency of addressing the unfavorable situation of defenders. There is a will to finally support the regional Escazú Agreement, which consolidates the minimum commitments of the nation-states regarding environmental rights.

In any case, it is naive to believe that the Escazú Agreement will allow the construction of scenarios of genuine participation of the communities affected by extractive projects. This is due to the nature of the instrument inserted in the neoliberal project, which appropriates the language of democracy of social movements and incorporates mechanisms of social participation that are politically emptied under the pretext of extended democratization (Roa-García & Murcia-Riaño, 2021). Based on a significant diversity of knowledge frameworks and pluralist approaches, it is important to acknowledge socio-ecological complexity in order to achieve strategies of change (cf. Zurbriggen et al., 2022), including violence and addressing the fulfillment of human and environmental rights.

Concluding Remarks: Rescaling STs and Beyond

Any STs policy implementation process should recognize the social production of scale (cf. Massey, 1992; Swyngedouw, 2004). The marginalization of certain aspects within a heterogeneous socio-spatial processes could lead to limitations and dependencies in STs policy intentions and implementation, as the Colombian case shows. In a neoliberal and still fossil fuel-dependent context, the various extractive industries and their different scales of activity are highly attractive. These include coal, copper, and gold mining; and fossil fuel extraction with conventional deposits like oil and gas, and non-conventional extraction like fracking and rare and bituminous sands. But these resources are already limited, and there is an imperative to decarbonize the economy. Therefore, key data is needed to contextualize and characterize the mining-energy and national sectoral context.

In addition, environmental liabilities (i.e., major mining impacts) need to be addressed first, as the existing tensions between narratives, theoretical discourses, and public policies still ignore persisting social and environmental inequalities. Another challenge in the transition is the current state of extractive reserves and their relation to the demands of society at large. This is often neglected in public debates, as it is related to specific economic sector issues, such as solutions to mobility and transport dynamics with clean and sustainable energies or even lifestyles.

It also lacks more concrete support in the form of rules and regulations. There is also a risk of reproducing the same practices of previous governments and national administrations. Therefore, the Colombian case shows how STs should be rethought from the perspective of social production at different scales and socio-ecological processes. In fact, low-carbon solutions and ecological alternatives are already in the making in different rural and urban territories, such as community-based energies (*Energías Comunitarias*). A path based on an economic system that supports human and non-human life forms, the cessation of fossil fuel dependency, the restructuring of future necessities in the forthcoming years, the principles of solidarity, democracy,and justice, in addition to an institutional framework, is essential for a comprehensive socio-ecological transition (Censat Agua Viva & Others, 2022).

In summary, to engage in critical practice and policy, it is necessary to question the involvement of nature, society, and capitalism in addressing the ongoing climate challenge. Any policy related to STs should consider

the local scales that produce socially situated alternatives challenging the rules and processes of the established order and the political economy of transitions. Yet these alternatives are on the margins of mainstream discussions and policy implementation. Ignorance of the interdependence of ecology and culture undermines the possibility of just transition proposals. The call to recognize the social production of scale in STs is not only a conceptual rescaling, but also highlights the demand for a more locality-sensitive approach to rescaling STs. These processes need to be reimagined politically as a strategy for rescaling transitions in Colombia and beyond.

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PART II

Regional Perspectives

CHAPTER 8

Exploring 'Just' Transitions in Regional Aotearoa New Zealand: Cases of Taranaki and Southland

Sean Connelly, Etienne Nel, and Danielle Lomas

Introduction

In an increasingly climate-challenged world, concerns with respect to sustainability and the need to transition our socio-technical systems, resource, and energy use have become even more urgent (Kohler et al., 2019). While the need to advance 'sustainability transitions' is critical to help advance system changes to achieve more sustainable production systems and human behaviour (Geels, 2010), it is important not to lose focus on the social dimensions of any transition. Sustainability transitions

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and transitions in energy production, will, invariably, have impacts on communities which either host old, now potentially redundant forms of resource extraction and energy generation, or those places which are the landing points for new activities such as renewable energy production. As such, the notion of 'just transition' needs to feature prominently on the agenda of any moves to achieve effective energy and sustainability transitions (Gerrard & Westoby, 2021; Newell et al., 2023). Such localised impacts of closure bring to the fore both the need to understand the implications on impacted communities (Marais et al., 2022), while also illustrating the degree to which global level agreements and commitments cascade down to national choices and decisions, which in turn directly impacts what happens at regional and local scales (Coenen et al., 2012). This is not to say that local and regional places do not have agency over the outcomes of decision-making, but rather this illustrates the fundamental scalar connections which need to be recognised in the process of effecting just and sustainable transitions.

This chapter examines these evolving realities in New Zealand (NZ), paying attention to national commitments to international agreements, while also exploring, how at lower spatial scales, these commitments are playing out and to what degree regions and localities are passive recipients of top-down decision-making or whether they can mediate processes, with potentially 'just' outcomes. Particular attention is paid to two regions, Southland and Taranaki, which the government has prioritised as lead regions in its efforts to transition to a low-carbon economy. Our analysis is based on a review of central government just transition policies, regional planning documents and initiatives, media articles and conversations with key stakeholders in each region undertaken over the period of 2019–2023.

Literature Review

While there has been a noteworthy focus on 'just' transitions, 'sustainability' transitions, and 'low-carbon' transitions in recent years, processes of transition have been an inevitable part of human development over centuries, reflecting the social, cultural, and technological shifts that lead to systematic changes to societal systems of resource use (Elzen & Wieczorek, 2005). Transitions reflect and inform human–environment relations and are shaped by the outcomes of debates about what is being transitioned, the purpose of transition, and who benefits across space

and in particular places (Boone & Klinsky, 2015). Given the mounting environmental concerns across geographic scales, there is increasing recognition that societal transitions are also required to achieve sustainability outcomes (Agyeman et al., 2003; Raworth, 2017). The spatial organisation, distributional impacts, and outcomes of transition processes are inherently geographical (Bridge et al., 2013). They have implications both within and between places and they shape relationships and the distribution of costs and benefits across scales, from the global to the local. In this context, resource-dependent rural regions are a particularly important unit of analysis (also Kuhmonen et al., Chapter 6), as it is often rural communities that bear the cost of transition through economic restructuring of the resource base, yet they often struggle to break out of path dependence (Tonts et al., 2014). Despite these challenges, the relationship between place-based development and sustainability transition suggests that there are openings (and resistance) to regional change that build on the ability of resource-based communities to exercise agency about their future (see also Halonen & Lundmark, Chapter 12).

Sustainability Transitions and 'Just' Transitions

The diverse and contested meanings of sustainability are well documented (Williams & Millington, 2004), and are often based on competing views of how environment, society, and economy relationships are defined and the resulting implications. These competing interpretations have led to a diversity of perspectives on the methods by which a sustainability transition might be achieved, including various combinations of technocentric innovations, radical social change, expert-led policy development, bottom-up community development, or market-based approaches to green the economy (Jacobs, 1999). The ambiguous ways that sustainability has been deployed have been critiqued (Robinson, 2004), but common to the many different interpretations is at least some agreement of doing things differently, or a societal transition.

The process by which transition occurs is equally well debated. There is a diversity of views about the way outcomes and plans are defined, and how these have implications for individual and community wellbeing, across gender, ethnicity, socio-economic status, or place of residence (see also Ryser et al., Chapter 9). Specific attention to justice in sustainability transitions is increasingly recognised, in terms of both outcomes and processes to account for the uneven ways that the costs and benefits of

sustainability transitions are allocated (Agyeman et al., 2016). Far too often, the planning, management, and outcomes of transition are focused on narrow, sectoral components, with an emphasis on the things that will be transitioned, such as technologies, energy sources, or resource bases. However, the wider context in which systemic social change operates is equally important (Shove & Walker, 2007), providing opportunities to insert fairness and equity concerns into transition processes.

Greater attention to these wider social concerns has been captured through the concept of 'just transitions', which emerged from the labour movement in the United States in the 1970s and 1980s to ensure that workers were protected from processes of restructuring by protecting jobs, providing retraining and compensation for workers in industries undergoing transition, and ensuring the process of transition results in fair outcomes for workers and for their wellbeing (McCauley & Heffron, 2018). The rhetoric of just transitions is now a prominent feature in efforts to move towards a zero-carbon future. In a report for the OECD, the Just Transition Centre calls for efforts that ensure "environmental sustainability, decent work, social inclusion and poverty eradication" (Smith, 2017, p. 1). Alongside commitments to limit long-term temperature rise to below 2 degrees Celsius, the Paris Agreement (2015) states that carbon reduction efforts will include "taking into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities" (UNFCCC, 2015, p. 21).

The inclusion of the concept of just transition in global climate agreements, based on the efforts of international labour unions, has led to many national governments adopting the concept to guide their efforts to transition away from dependence on fossil fuels. By including justice-related goals in transition efforts, space has been created to place greater emphasis on equity and fairness considerations beyond the initial focus of impacts on workers, placing equity concerns alongside economic and environmental aspects of transition (Boone & Klinsky, 2015). At a conceptual level, just transition incorporates the multiple and overlapping justices—environmental, climate, energy, and social, among others (Hazrati & Heffron, 2021; McCauley & Heffron, 2018; Sovacool et al., 2019).

Scale and Transition

The geographical nature of sustainability transitions (Bridge et al., 2013) highlights how outcomes have direct impacts on particular places—while they are local in nature, a series of decisions, activities, and processes that range across scales simultaneously shape those places, from the local to the global. The multi-level perspective provides a way to examine these relations across space (Geels, 2010, 2019). Taking a multi-scalar approach to the analysis of sustainability transitions provides opportunities to highlight the gap between local initiatives and large-scale transition efforts and the tensions, conflicts, contradictions, and commonalities across scales.

For example, evidence suggests that sustainability transitions that are large-scale, technological in focus, and led by the state provide uniform focus to transition efforts, particularly when accompanied by regulatory changes and support from non-state actors (Mah et al., 2013). In the context of transition to low-carbon energy, national-level policy interventions such as regulatory changes, feed-in tariffs, or carbon taxes are used to shift market rationalities and spur innovation that will crowd out high emission energy sources (Johnstone et al., 2010). The scope of the necessary transition is so large that international financial markets, access to technology and innovation, and capacity to transform practice require mobilisation at the highest scale. However, there also exists a multitude of small-scale, decentralised, and community-based efforts at transition. These localised efforts are often more responsive to local needs and sensitivities of the impacts and outcomes of transition in particular places. Again, in the context of energy transition, it is often local authorities, community groups, and NGOs that are the key actors in shifting social, political, and economic resources and technologies towards low-carbon alternatives (Fudge et al., 2016; MacArthur, 2016; for localised energy alternatives, see Quimbayo Ruiz, Chapter 7).

A multi-scalar approach also highlights that the location of efforts to transition is not distinct and fixed. Rather, the relationships between technology, politics, purpose, capacity, and direction of transition cut across scales. Sustainability transitions incorporate dynamic relations between actors across space and time as resources are mobilised and norms, values, practices, and institutions are negotiated in the implementation of sustainable alternatives (Kemp et al., 2013; Loorbach, 2010). In the context of energy transition, attention to the relationships across scales highlights the way energy systems are subject to path-dependence, but also how existing

norms, practices, and values might be unsettled in pursuit of low-carbon alternatives (also Wallace & Batel, Chapter 5). Attention to the relations between and across scales highlights how transitions are not linear, but rather messy, conflictual, and contradictory (Meadowcroft, 2009; Shove, 2010).

The Case Study Areas

Just Transition has been on the agenda for several years in NZ and while global climate and related commitments require a national effort, Government signalled out two rural and resource-dependent regions, Taranaki and Southland, for special attention (see Fig. 8.1). The NZ government launched the 'Just Transitions' programme as a "strategy to move a region toward a low carbon future" (MBIE, 2023a) in 2018. In the strategy, the role of central government is to support regional stakeholders to manage the social, economic, and environmental impacts of their transition and to ensure that impacts and opportunities are more evenly distributed. The programme was developed first in the Taranaki region in 2019 in response to the decision to ban new off-shore oil and gas exploration and subsequently was rolled out in Southland in 2020 in response to the threatened closure of the Tiwai Point Aluminium Smelter.

The Taranaki region is located on the West coast of the North Island. The region consists of fertile agricultural land on the coastal plains that form the lower ring from the coast to slopes of the volcanic cone of Mt. Taranaki. It has a population of 117,561 people (2018), with most people residing in the City of New Plymouth. The regional economy is dominated by the oil and gas sector and agriculture. Oil and gas, dairy farming and processing and energy generation and distribution account for roughly 40% of regional GDP, while contributing only 14% of jobs in the region (Tapuae Roa, 2017).

Southland is located at the South of the South Island. The landscape of the region is dominated by Fiordland National Park to the West and rolling farmland to the East. Over half of the region's population of 102,400 (2020) are concentrated in the City of Invercargill. The regional economy is dominated by agriculture and aluminium manufacturing. Dairy farming boomed in the 1990s and the region now accounts for over 12% of the national dairy herd. Aluminium has been produced at the Tiwai Point Smelter since the 1970s and is reliant on hydropower

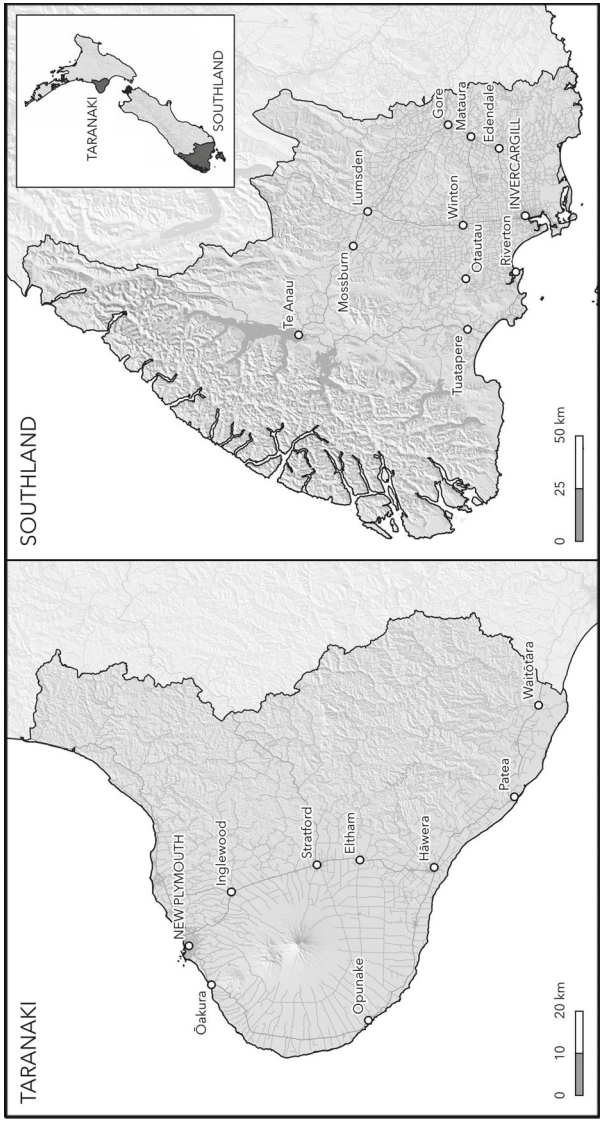

Fig. 8.1 Map of case study regions (Map credit: Chris Garden)

provided from within the region at favourable prices. These two sectors account for nearly 40% of regional GDP.

The concentration in these two commodity-producing sectors in both Taranaki and Southland makes their regional economies vulnerable to global market fluctuations and subsequent boom-bust cycles. Both regions are physically large in character, having extensive farmlands and only modestly sized urban centres, with nearly half of the population in each region living on farms or in small service centres. Each region is isolated from major metropolitan areas in the country, is dominated by a single urban centre with populations of roughly 50,000 people, and is surrounded by a broader hinterland with smaller communities that reflect significant unevenness in terms of economic development. In addition, moves to decarbonise and decrease dependency on the oil and gas sector (in Taranaki) and threats that the aluminium smelter will close (in Southland) make these regions and localities within them vulnerable to the effects of transition. In our analysis, we draw on a three-fold spatial layering of transition processes, beginning with the national context, followed by regional and local level process in the two study regions.

A Multi-Scalar Perspective on New Zealand's Sustainability and Just Transition

The National Level

Sustainability and energy transitions in NZ are being framed and rolled out in a multi-scalar fashion which sees overall policy formulation being set by the central state, while regional and then local authorities and other local agents are responsible for strategy identification and implementation. In accordance with the state's commitment to COP-21 and associated climate-change protocols, it has developed national policies for emission reductions, and equitable just transitions. The most important single measure is the Zero Carbon Act which commits to net zero greenhouse gas emissions (except for methane) by 2050 and a reduction between 24 and 47% of biogenic methane over the same period. It has also established funding mechanisms and provided institutional support to assist regions identify and support energy alternatives and to develop regional strategies to engage in sustainability transitions.

The Zero Carbon Act sets out NZ's commitment to the terms of the Paris Accord. In addition to emission reduction efforts which set

nationally defined emission budgets, government has adopted a 'Just Transitions' framing to ensure that the costs and benefits of emission reductions are distributed equitably. The Equitable Transitions Strategy (2023) acknowledges that national emission reduction targets require regional specificity in policies and approaches:

> Our transition to a low-emission economy will create challenges and opportunities. Changes will play out in different ways for different regions, industries, and groups in society. A well-signalled and inclusive transition can ensure that we achieve our climate goals while helping our economy and communities prosper, leading to higher wages, improved wellbeing, and more productive and resilient businesses. (MBIE, 2023b)

Within this framing, a just transition is seen as critical. The government's Just Transition efforts recognise the uneven impacts of transition to a low-carbon future and that certain groups may be disadvantaged, particularly for resource-dependent rural regions such as Taranaki and Southland. In NZ, the concept of Just Transitions is embedded both within principles of social justice as well as recognition that transitions in energy use and other activity will play out at a regional level. A just transition is "acknowledged and incorporated into planning to make the transition more fair, equitable and inclusive" (MBIE, 2023a). While the acknowledgement of the importance of regional difference is sound in principle, this does assume that all regions are on an equal level in terms of capacity and resources to respond.

As noted above, Taranaki has traditionally depended on the oil and gas industry, while Southland's aluminium smelter has dominated the regional economy. These two regions, largely through their respective Regional Development Agencies, have been at the forefront nationally of identifying regional sustainability and transitions strategies, providing support for research into renewable energy options, and encouraging investment in these activities while seeking to help achieve broader aspects of a 'just' transition in their regions. At a national level, the focus in largely centred on the transition of particular industries and supporting the search for economic diversification, with little attention paid to the community implications. At the local level, while the role of agency is less apparent, these are the places which are at the receiving end of new investment and project plans, and which also face the potential costs of

job loss and closure of traditional activities, and are seeking to embed transition into efforts to address broader community wellbeing.

The Regional Level

Taranaki

In 2018, in line with the ruling government's policy commitment to reduce NZ's emissions and its dependence on carbon, the suspension of all new off-shore oil and gas exploration permits was announced. The Taranaki regional economy is dominated by the oil and gas industry—both on- and off-shore and was a logical target for NZ's sustainability transitions interventions. The announcement was met with dismay in Taranaki, which is the only region on the country with a dependence on oil and gas. The mayor of New Plymouth described it as a 'kick in the guts' (RNZ, 2019) for the Taranaki region. Subsequent media reports focused on doubts and fears of the community for what would happen once the oil and gas industry closed down (1News, 2022), highlighting the local view that the government was too quick to announce the exploration ban.

With the suspension of new exploration, the government also announced that funds were being set aside to help the region reduce its economic dependence on oil and gas and engage in a transition to alternate economic activities, including a shift to a reliance on renewable energy generation and support to ensure that any transition was socially just. This announcement was preceded by the establishment of a Just Transitions Unit in government whose first task was to assist Taranaki initiate a Just Transition and switch from a dependence on carbon generated energy to a reliance on renewables, with a particular focus on hydrogen. To facilitate this transition, state support was provided to assist the pre-existing Regional Development Agency, Venture Taranaki, to lead the transition.

A 'Just Transitions' summit was held in 2019 to outline and discuss the government's intentions, to explore emerging local development options, and to announce a package of targeted support measures. Key in this regard was the announcement of funds to support the establishment of Ara Ake, a clean energy research centre to play a lead role in identifying and supporting the development of new energy sources, with a particular focus on green hydrogen production. The Summit and the promised

government support were seen as essential by the local community as compensation for the anticipated costs of decarbonisation and the need for the government to identify concrete alternatives for its policy decisions (Martin, 2019; Persico, 2019). That said, local concerns were expressed about the efficacy of 'green' hydrogen and the need to also focus attention on other key sectors in the region, such as agriculture (Martin, 2019). In addition, concern was expressed that the approach to transition was being framed too narrowly on the oil and gas sector and energy alternatives rather than addressing broader regional benefits from economic diversification.

In response to these concerns, broader community engagement occurred through the 'Taranaki, 2050 Roadmap Project'. It was built on the 2017 regional development strategy 'Tapuae Roa: Make Way for Taranaki' that was based on consultation with iwi (Māori tribes) in the region, business, and local government. That strategy identified Energy, Food, Tourism, and the Māori Economy as core sectors for the region's future economy (Tapuae Roa, 2017). The Taranaki, 2050 Roadmap used this as a starting point and it identified the need to attract investment and sustain a high quality of life for residents and a high value economy. Innovation based on the region's competitive advantages in terms of energy, engineering, and agriculture was also seen as critical to the region's future. The Roadmap spelt a regional vision for Taranaki to become, by 2050, "a low-emissions economy like no other" grounded on sustainability, inclusivity, enterprise, and common opportunities (Taranaki 2050, 2023). Partnership formation between government, unions, Māori, communities, education, and business is identified in the Roadmap as being a critical for the attainment of sustainability and resilience. The Transition roadmap and action plans are ambitious and aspirational, and note many of the generic just transition concerns, such as resilience, inclusivity, low-emissions, and meaningful work. The plan acknowledges the challenges of resourcing, and the degree of uncertainty around new technology, the economy, and the skills and capacities in the region.

The multi-scalar nature of transition in Taranaki illustrates the tensions and opportunities of the dual focus on direct economic support for economic sectors impacted by transition and a desire for broader community engagement to address local community concerns about justice and equity more broadly. There was an initial focus on support to offset the impacts on the oil and gas sector and its workers. Over time, this shifted to broader questions and engagement about the future of the

region more broadly, including a range of concerns beyond impacts on affected workers. New priorities included a high quality of life for all, attracting highly skilled people to the region, issues around recognition of the impacts of colonialisation, and to address the long-standing inequalities that exist across the region (Groensestein, 2023). Since the hosting of the summit and the launch of the two regional strategies, funding for new initiatives and more deliberate community engagement ensured that local communities and iwi have acquired a greater voice in the process and shaping subsequent outcomes.

Key local outcomes include the establishment of Ara Ake, the National Energy Centre and the H2 Taranaki network in the region. In addition to energy research, plans are in place and investor funds are being sought to develop two 30Mw solar farms, a 1Gw off-shore wind farm, and a second on-shore windfarm to generate electricity for green hydrogen production. These initiatives, together with research into the production of green ammonia, carbon capture, battery storage, and distributed energy, seek to reduce the region's dependence on carbon-based energy sources (Tapuae Roa, 2021). They represent a capital-intensive and technology-focused approach to transition that does not challenge the underlying fundamentals of a resource-dependent region upon which the original oil and gas industry was based on. However, support for economic diversification as part of the broader Just Transition process has taken the form of the promotion of agriculture, tourism, vocational training, and broader well-being activities. Key outcomes in this regard include the establishment of a Food and Fibre network to promote new value-chain opportunities in avocado, gin, botanicals, grains, hemp fibre for construction panels/hempcrete, hops, kiwi fruit, medicinal plants, sheep/dairy, trees (wood processing), and growing Māori businesses and jobs in the primary sector. These efforts have provided for increased employment opportunities that are more accessible across the region. In terms of tourism promotion, collaboration and support from government has seen the development of the Taranaki Crossing—a mountain trail, redevelopment of the Cathedral Square area in the New Plymouth CBD, the development of a Visitor Centre, and the launch of an Events Strategy and promotional activity. Other activities include developing an Investment Prospectus for the region, a lifestyle campaign, a Creative Taranaki plan, support for Māori futures and for tertiary training (Tapuae Roa, 2021).

As these examples demonstrate, the initial focus on addressing the specific impacts of changes to the oil and gas energy sector and to its

workers has shifted beyond the initial goals to include a broader focus on economic diversification and community wellbeing, in response to public concerns and engagement. Public consultation on draft plans for the future of Taranaki included over 40 public events, with volunteer leadership from business and community groups. The commitment to emerging efforts to diversify the economy, to develop energy alternatives, and to promote social outcomes demonstrates aspects of a just transition. However, in practice, the power of path dependence and continued reliance on sectorally-driven economic development raises questions about the diverse ways that both the justice and the transition components of 'just transition' are interpreted. These tensions are evident in comments from the South Taranaki District Mayor, Phil Nixon, regarding the proposed solar energy projects: "I would like to see Taranaki remain NZ's energy centre, and through renewable energy, we can. It's important for NZ to transition to a low emissions economy. It's exciting to see it here in our district as long as it is complementary to our current industries" (Groenestein, 2023).

In the aftermath of the Just Transition Summit, the pace of change has been critiqued based on the locally held view that the government announced the oil and gas ban before alternative industries were ready to fill the gap. However, the ban applied exclusively to new off-shore exploration, and existing productive reserves are estimated to last another 12 years supply (PCE, 2020). This lag time between the urgency to address climate change and reduce emissions and the speed at which industries and sectors can transition and at which job training and capacity building can be generated is identified as a significant hurdle. Locals characterise it more like an 'intervention' than a just transition process. As a result, the process in Taranaki was not considered 'best practice' and "a more concrete plan from government was needed" (Daalder, 2020a) and it is felt that there are not enough protections for workers (Wagstaff, 2020). Rather what we see is that after the shock of the initial announcement, local and regional groups have gradually started to have a greater say in subsequent planning processes.

There is a notable shift in the framing of just transition in Taranaki beyond decarbonisation to also include social and lifestyle factors, and take an 'ecosystems' view (Daalder, 2020b). Transition is more than simply retraining workers, it also should account for broader social and historical injustice (Logan-Reily, 2021) and the need to take a more comprehensive focus, beyond just economics and workers in order to

achieve a just transition. The Taranaki transition roadmap and action plans are ambitious and aspirational and note many of the just transition concerns, such as resilience, inclusivity, low-emissions, and meaningful work. They are also aware of the challenges of resourcing their plans and the degree of uncertainty around new technology, the economy, and the skills and capacities they have. They also encompass a range of concerns far beyond the traditional transition concerns for workers to include wanting a high quality of life for all, and to attract highly skilled people to the region.

Southland

Southland has become a priority region in the country's pursuit of energy transition following the announcement in 2020 by multi-national RioTinto that they would close the NZ Aluminium Smelter (NZAS) at Tiwai Point, impacting the employment of 1000 direct workers and a further 2200 jobs indirectly (Andrew, 2020). The decision by RioTinto is largely an economic business decision linked to the global price of aluminium and rising costs, including local renewable energy contracts. The focus of transition in Southland is to diversify the economy and build resilience beyond the planned closure and to maximise local benefits from the resulting surplus hydro-generated electricity—such as for a data centre or production of green hydrogen. In parallel, the local Regional Development Agency, Great South, and the iwi-led Murihuku Regeneration have actively promoted reductions in emissions, the pursuit of renewable energy options, and new economic development opportunities. Since 2022, there has been a coming together of these interests and with state support from the Just Transitions Unit, a defined regional Just Transitions strategy has been put in place and an oversight group has been set up. In parallel, the region is engaged in a range of renewable energy projects that support the private sector to reduce its carbon dependence through decommissioning of coal-fired boilers and their conversion into either biofuel (carbon neutral) or clean electricity electrodes and to use hydrogen as a fuel source in some of the region's trucking operations (Southland Just Transition, 2022). Other regional agents include the regional level local government authority, Environment Southland, and regional level business interests in the food processing and transport sectors. At a local level, the city council of Invercargill, the largest

centre in Southland, has put in place a 'Stronger Communities' strategy to support a just transition.

In terms of the broader context, the possible closure of the aluminium refinery has been threatened for several years and never actually been realised. As a result, there is some local scepticism that if the plant does not close, current jobs will be retained but exploration of other options for the region—such as hydrogen production or other high-energy intensity requirements, may well be constrained. This uncertainty is reflected in the local media and can be characterised as either boosterism, rallying messages and attention on 'win–win' solutions regarding the transition (Horrell, 2020), or resistance to the idea of closure and demanding action to keep the smelter running for longer (Steyl, 2020). The transition planning process is seen positively, particularly with regard to the $100 m funding which the government has allocated to Southland to support hydrogen development and through the formation of the just transitions oversight group in the region (Girao, 2021a). The mood is optimistic around the just transition planning and the options available to them, framing it as building 'resilience' and "region leading for the region" (Girao, 2021b). In contrast to what happened in Taranaki, it is seen as a process that is not imposed on the region, but rather the region is in control of the transition process.

The region has developed a Just Transition Draft Work Plan to build its economic, environmental, and social resilience through and beyond the planned closure of the aluminium smelter in December 2024. The justification is to respond to the multi-scalar challenges of "local, national and global changes in regulation, technology, the climate and environment, geopolitics and the economy all of which have an impact on people's lives and livelihoods" (MBIE, 2023c). However, the uncertainty over the future of the smelter has limited the level of engagement amid debates concerning the advantage of the smelter staying open versus the development of alternative energy-intensive industries that have been mooted (Daalder, 2023).

In 2022, the government announced a NZ$108 mn package to support Southland's Just Transition. $100 mn is allocated to support Regional Hydrogen Transition and $8 mn to support new industries, planning, worker transitions, and job matching. The recognition of the need to lay the ground for a response to the potential closure of the aluminium smelter clearly underlies government thinking as does the need

to engage in energy transitions (Jacobs, 2023). The new regional development strategy for Southland was released in 2023, 'Beyond 2025', which integrates just transition within the broader development needs of the region and focuses on the key enablers of housing, workforce, data, energy, and regulation, and planning (Beyond 2025, 2023a). In parallel, iwi interests shape regional transition through Muhrihuku Regeneration which seeks to ground changes within the cultural values and resource management ethics of Māori. The organisation supports energy transitions, renewable energy projects, and decarbonisation, including the potential development of a Regional Energy and Industrial Zone (Murihiku Regeneration, 2023).

However, significant funding for hydrogen innovation and technology makes up the bulk of central government support, with reports suggesting that the greatest uptake could be in exporting green hydrogen to global markets (Daalder, 2022). This potential is reliant on access to low-cost renewable energy sources (such as that currently provided to the smelter). Government funding provides a rebate paid to earlier adopters of hydrogen as a fuel source and supports the development of a hydrogen value chain with scope to develop global linkages. In her announcement of the support, Energy Minister Woods stated that the purpose was to help "local firms and workers to capture new opportunities to reduce the region's reliance on NZAS and build regional resilience. By investing in new industries and employment opportunities, transitioning existing workers and businesses, and developing long-term planning for the region's future, we are creating a more sustainable, equitable, and prosperous future for everyone in the region" (Woods, 2023). Other projects under development include a Southland Engineering and Manufacturing Cluster to support businesses transition away from their reliance on the aluminium smelter, support for aquaculture, small business start-ups, a food and fibre programme to identify and promote new agricultural activities. A Worker Transitions programme and community capacity building, 'Stronger Communities Murihuku', led by the local council reflects a more community-based focus to explore future opportunities if the smelter were to close (Strong Communities Murihiku, 2023). These efforts are focused on diversifying the region's economy and building resilience and providing decent work (Southland Just Transition, 2023b). Unlike the investments in hydrogen, these efforts primarily consist of support, coordination, and partnership development to prepare and build capacity for transition and to support local businesses that provide 44% of

the smelter's supply chain and engineering support, which will be hard hit by closure and for which alternatives are required. This approach prioritises local business interests, rather than energy, and social considerations (Southland Just Transition, 2023a), although a planned skills hub could provide people the "social and wellbeing support they may need" (Steyl, 2022) to retrain or shift careers.

Regional government is active in planning the transition through the 'Net Zero Southland' report, which seeks to align regional, national, and international policies and interventions with respect to emission reductions (Environment Southland, 2023). That report examined the costs and opportunities for the region to achieve zero emissions by 2050 including available mitigation and investment options, and engagement with all local role-players (Beyond 2025, 2023b). The Southland Regional Energy Transition Accelerator (RETA) programme kick-started decarbonisation initiatives. Under the programme, the largest coal fired boilers used in food and wood processing in the region will switch to electric or biofuel energy sources. Significant conversions include repurposing the energy supply at the large Mataura Valley Milk plant and the start of the transition at the Lorneville meat-processing facility (EECA, 2023). The net result has been the reduction of carbon emissions in Southland by an estimated 500,000 tons (Kelly, 2022; McCulloch, 2022; Savory, 2020).

Most of the projects detailed above have a clear focus on energy transitions, but it would be difficult to argue that there is a specific focus on the 'just' side of just transition. The transition process is framed in aspirational tones and focused on the technical capacities that Southland has in its existing industries and hydro-power infrastructure. While the need to reduce emissions is acknowledged, it is framed around low-emissions energy production, industry, and technology, not daily life. The idea of a just transition appears to have been adopted by many of the stakeholders who were already working in the region and mobilised to create a better, greener version of business as usual. Like Taranaki, the farming sector is acknowledged as a major asset to the region and there are opportunities for it to diversify, but it does not occupy a significant place in the discourse of transition planning.

Discussion and Conclusion

This study of sustainability transitions and path dependence in NZ has indicated not only the challenges incurred when trying to drive a Just Transition process from central government but also the need to recognise the agency which regional communities and key stakeholders have in terms of helping to determine and mediate outcomes compatible with local needs and interests. Translating sustainability and just transition efforts from international agreements and national commitments requires a sensitivity to the need to fully engage in an iterative process with regional and a place-based interests. While central states may provide funds to support just transition, as evidence from both NZ regions indicates, it is not simply a case of the 'trickle-down' of policy and planning. Rather, given the vested interests which communities have in their social networks, cultures, resources, and environments, a 'just' transition must also be locally appropriate, not only for decarbonisation challenges but also to address employment and wellbeing concerns related to economic diversification. Engagement with iwi in both Taranaki and Southland, efforts to put in place small business support and retraining programmes, and the pursuit of economic diversification opportunities in both regions—including farming, aquaculture, and tourism—show the degree to which just transition has moved beyond a purely technical focus of replacing one industry with another, to consider the broader regional, community, and social implications of change. Daalder's (2020b) above-mentioned argument that just transition in Taranaki may take a holistic and an 'ecosystems' approach illustrates the validity of such a strategy.

The experience of the two case study regions suggests that while the 'justice' consideration receives a high-level of attention in the Taranaki plans, in Southland, while there is concern to retrain workers, the focus seems to be more on the technical sides of transition and the ability to repurpose the economy. The role of the national state is also interesting to reflect on. In Taranaki, the government's action was top-down and it caught the region off guard. This meant that the region needed time to respond and ultimately developed a comprehensive, multi-sectoral plan which goes beyond purely a focus on energy transitions, to something which is more integrative, multi-sectoral, and community-based in its focus. In Southland, by contrast, government support followed local action and, as such, contributed to up-and-coming regional and local processes. In both regions, possibly because of the limited capacity

and resources of the neoliberal state, the requirement to change was imposed from the top, but has, ultimately, been mediated, and adapted at the regional and local scale to develop more appropriate responses. Such actions show the importance of local agency, and the degree which processes can flow up and down the spatial decision-making hierarchy. Hence, seeing how just and sustainability transitions can be rolled out inevitably requires a multi-scalar understanding which recognises both the role of the central state and the agency of local places and regions (Coenen et al., 2012).

In terms of the 'rural', it would be difficult to argue that rural areas and their communities have featured that prominently in the transition's discussions. While agricultural diversification is embedded in the plans of both regions, ultimately the voices of rural communities are not obvious. Plans tend to focus on key industries, the larger centres, and techno-fix solutions, such as hydrogen production, rather than the rural realities of a large portion of the two region's populations. There is a need for greater attention to be paid to community transitions that go beyond technological innovation and industry support to consider the implications of how rural communities are impacted. Otherwise, there is the risk of marginalising rural communities in processes of change (Furmankiewicz et al., 2021, Golubchikov & O'Sullivan, 2020). Linked to these concerns is the need to recognise that just transitions at a regional scale need to reflect the unequal levels of capacity and resources to respond to transition challenges.

The Taranaki and Southland regions both demonstrate the potential beginnings of a multi-scalar effort to transition regional economies. However, there remains a disconnect between central government policy efforts to reduce emissions in line with the Paris accord and how to engage with resource-dependent regions. The bulk of just transition efforts in both regions still reflects a focus on key economic development production activities and new technological investments. However, the engagement of local and regional actors has reframed the dynamics of just transition as inherently embedded within place. While rural voices tend to be rather marginalised, regional voices can mediate outcomes, diversify plans to make them more holistic and, in the case of Southland, to also receive state support which aligns with regional plans. These dynamics are indicative of a shift away from a just transition imposed by 'distant elsewheres' to locally engaged just transitions responsive to community aspirations.

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CHAPTER 9

Disaggregating Sustainable Transitions Through Power and Governance Arrangements in Municipal Enterprises: A Case Study of the Canmore Community Housing Corporation

Laura Ryser, Sean Markey, Greg Halseth, Martin Mateus, and Lars Hallstrom

Introduction

Housing is a key part of the sustainability discourse of any community. From a social perspective, housing can affect the recruitment and retention of workers and their families that, in turn, support the resilience of rural communities, businesses, and economies. For rapidly growing high-amenity communities, this sustainability can be negatively impacted

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by a housing crisis centred around affordability and availability. This stems from a growth governance model that fails to provide a diversified housing stock that addresses the needs and incomes of residents. This governance model, often defined as a growth-first ideology, is driven by elite decision-makers, such as local and non-local developers, with the goal of supporting growth and profitable development with limited attention to the negative impacts of growth or the need for a more sustainable growth management approach (Gill & Williams, 2014; for elites in tourism, see Sariego-Kluge & Morales, Chapter 3).

The Town of Canmore developed the Canmore Community Housing (CCH) enterprise as an alternative way to build and secure affordable rental and ownership-based housing. Their target was the housing market segment not served by the Bow Valley Housing Authority, a provincially-funded agency that provides social housing for low-income households, and not served by private sector builders focused on expensive housing. The goal was to strengthen the recruitment and retention of workers that support local economic development. This endeavour, however, is unfolding within a complex statutory environment within the Province of Alberta. Drawing upon the case study, this chapter explores the multi-scalar power and governance dynamics that have unfolded in one municipal social enterprise that has been seeking to bring sustainability to its housing market, community, and economy.

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Housing and Sustainability

Housing investment pressure in Canada's high-amenity tourism communities has reduced the supply of affordable housing and exacerbated challenges for the social, economic, and environmental sustainability of these communities. Affordable housing is defined as "housing for low- and moderate-income households where the cost does not exceed 30% of household income" (Tsenkova & Witwer, 2011, 56). In this context, sustainability transitions provide a conceptual and theoretical foundation that brings together the complex processes, regulations, institutions, and capacities of public, private, and civil sector stakeholders to address a range of social, economic, and environmental sustainability questions in small communities through the provision of affordable housing (Avelino & Wittmayer, 2016; Gill & Williams, 2011). Attention to sustainability transition also directly links housing affordability with attention to housing governance. We explore the governance transition to municipal social enterprises that is influenced by the policy and power dynamics among the provincial government, private sector interests, elected municipal officials, and the municipal enterprise. As such, this chapter contributes to the broader literature on sustainability transitions by examining how policy and politics unfold at the local scale and impact capacities for action (Sengers et al., 2019; Traill & Cumbers, 2022; also Connelly et al., Chapter 8). These dynamics are important as limited attention has been given to the jurisdictional, legislative, and fiscal supports needed for community-led sustainability transitions in small communities (Avelino & Wittmayer, 2016; Celata & Coletti, 2018; Forrest & Wiek, 2015).

Insufficient affordable housing can undermine the *social sustainability* of communities by affecting the security, health, and stability of households. As a greater proportion of household income is consumed by housing costs, residents have fewer resources to support social networking, routine interaction, and social inclusion—all undermining a broader sense of community (Hansson, 2020; McNicol & Glorioso, 2014). It also impacts a household's ability to access food and services, all while impeding their ability to acquire savings (Schwartz, 2016). Such pressures may also shape the childhood development and school performance of youth (Wardrip et al., 2011).

Housing is a key contributor to economic growth through construction and related multiplier effects (Harris & Arku, 2006). Affordable

housing, however, is also critical to supporting *economic sustainability* through the development and retention of a local workforce and to foster social stability in the community (Schwartz, 2016). The availability of a broad range of rental market and home ownership that reflects a range of household incomes is critical to sustainable development. Housing markets in high growth, amenity communities, however, can be driven by "amenity migrants" who purchase second homes or investment properties, all while increasing housing prices beyond the capacity of many low- or middle-income households (Dodds, 2012; Gill & Williams, 2014). This undermines the resiliency and sustainability of the community and economy as retail, hospitality, healthcare, emergency services, banking, social services, and government sectors can experience challenges due to labour shortages (Hallström et al., 2013; Schwartz, 2016; Wardrip et al., 2011).

Housing pressures also exacerbate pressures with *environmental sustainability*. The lack of affordable housing can result in overcrowded housing conditions, the use of illegal suites, unsuitable land use, and physical infrastructure pressures on water and sewage treatment capacity (Dodds, 2012; Schwartz, 2016). It can also result in the consumption of more fuel and traffic congestion as low- and middle-income households are forced into long distance labour commuting from other places with affordable housing (Gober et al., 1993; Schwartz, 2016), all of which can further exacerbate income inequities and other social determinants of health (Raphael, 2016). The construction of expensive luxury housing also stresses environmental sustainability through the excessive consumption of land and building materials, and the carbon costs of importing exotic materials and finishings.

Shifting Multi-Scalar Governance Dynamics for Affordable Housing

In Canada, researchers and government reports document the rapid decline in the affordable housing supply (Ryser et al., 2021; Tsenkova & Witwer, 2011). This reflects a shift towards neoliberal policies and practices that resulted in reduced federal and provincial government-civil society collaborations to manage social housing for low-income households, while private sector developers pursued opportunities to maximize profits with market-based housing projects. In addition to degradation of the affordable housing supply, this has left a significant gap in the provision of housing for middle-income households. More recently, provincial

governments in Canada have downloaded new responsibilities for housing onto local governments (Ryser et al., 2023b). This has ranged from completing housing needs assessments to managing long-term care facilities. While senior governments have encouraged municipalities to pursue public–private partnerships for affordable housing, there is little interest by the private sector to invest in affordable housing projects due to rising construction and development costs, and limited profits (Batra, 2020; Tsenkova & Witwer, 2011).

The current housing situation in Canada raises an important question about how small municipalities with limited staff and smaller tax bases can obtain the fiscal resources needed to develop affordable housing in order to nurture a more stable, resilient, and sustainable community. In Canada, provincial governments have the authority to regulate the revenue sources that can be collected by local governments—and these are largely limited to property taxes and senior government transfers (Cooper et al., 2019; Sancton, 2010). Property taxes consist of levies to recover costs for services to residential, commercial, and industrial properties based on a rate applied to the assessed value of that property (McMillan, 2004). However, property taxes have been an insufficient source of revenue to address the pressures of rapid growth in smaller municipalities (Johal, 2019). As a result, some municipalities have negotiated agreements or contributions for affordable housing (Gill & Williams, 2014). Municipal regulations, such as inclusionary zoning or density bonusing, and fiscal tools, such as tax incentives or grants and waiving municipal fees, have been mobilized (with limited success) to expand the supply of affordable housing (Osinubi et al., 2022; Tsenkova & Witwer, 2011). In response, some municipalities are becoming more entrepreneurial in order to obtain the needed financial resources. In Canmore, the municipality developed a social enterprise for affordable housing to strengthen the sustainability and resiliency of the community. For the purpose of our research, municipal entrepreneurialism refers to:

> investments in innovative processes, regulatory actions, and / or actual enterprise development to provide services or leverage economic conditions to generate new revenues or establish new streams of income to the local government. These actions only become entrepreneurial when there is a level of 'risk-taking' and 'leveraging' that requires a change or shift in how municipalities operate, with a greater emphasis on research,

> strategic hiring, deployment of entrepreneurial or business skills, and risk management. (Ryser et al., 2023a)

Despite the growth of municipal enterprises in small Canadian municipalities across Canada, there is a research gap associated with their operations and governance. As described in the adaptive capacity literature, municipal enterprises are affected by complex institutional environments, including outdated provincial legislation and fiscal frameworks that are not designed to support transition or sustainability (Beckie & Connelly, 2016; Hallström et al., 2016; Van Assche et al., 2020).

Canmore, Alberta, Canada

Canmore is a former coal-mining town that has transitioned into a tourism-based economy, with significant activity in construction and services due to its close proximity to Banff National Park. With a 2021 census population of 15,990, the town is located roughly 25 km from Banff and just over 100 km from Calgary, Alberta (see Fig. 9.1). Canmore has been one of the fastest growing communities in Canada. The real estate market, however, has been driven by retirement properties and second home growth. In fact, by 2011, second homes represented 37% of the housing stock—some of which were occupied for an average 42 days per year (McNicol & Glorioso, 2014). Over the past decade, the housing costs have rapidly increased. In particular, the median value of owned dwellings increased by 41% from $602,080 in 2011 to $850,000 in 2021 (Statistics Canada 2011, 2021). By comparison, median monthly shelter costs for rented dwellings increased by 45% from $1,211 in 2011 to $1,760 in 2021 (CDN) (Statistics Canada 2011, 2021). However, changes in median household income were not able to keep pace as it increased by just under 24% over this same ten-year period from $85,579 in 2011 to $106,000 in 2021 (Statistics Canada 2011, 2021).

These trends have pushed housing beyond the affordable limits for many. Based on the most recent 2021 census, 19% of owner households (vs. 26.5% in 2001) and 36.5% of tenant households (vs. 37.7% in 2001) were spending 30% or more of their income on shelter costs (Statistics Canada2001, 2021). The recent improvements in housing affordability for the home ownership and rental markets have largely been due to the efforts of the Canmore Community Housing Corporation (CCHC).

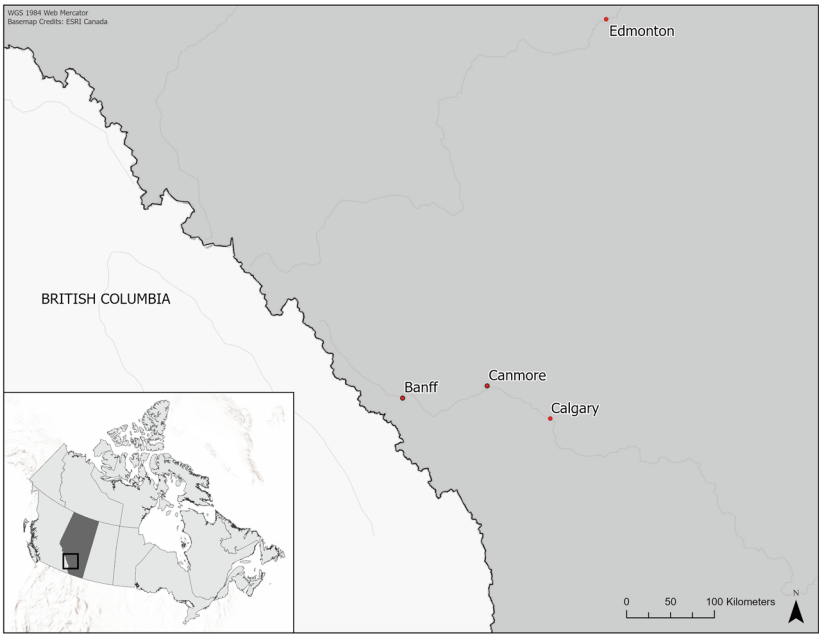

Fig. 9.1 Location of Canmore, Alberta (Credit: Mariah Kashmark, UNBC GIS Lab. Copyright owned by authors)

The Canmore Community Housing Corporation

The Town of Canmore has tried several strategies and policies to encourage private sector investments in affordable housing through zoning bylaws, manufactured housing zones, small lot sizes, zero setbacks, higher density development, etc. Each time, however, housing costs would quickly escalate and again become unaffordable. In response, the Town developed the Canmore Community Housing Corporation (CCHC) (canmorehousing.ca) in 2000 to directly build affordable rental and ownership-based housing. Their goal was to strengthen the recruitment and retention of workers that support economic development.

Residents must meet an income threshold test to access CCHC programs. For homeownership, the household income threshold recently increased from $147,000 in 2022 to $250,000 effective January 1st, 2023. Applicants must also demonstrate their status as a permanent

employee working 20 + hours per week and as a resident in Canmore for the previous six months. These homeownership units are purchased under a leasehold tenure that binds any future sale of the property to 110% of the Consumer Price Index (Canmore Community Housing Corporation, 2022a). Rental thresholds are determined by bedroom type: $74,503 (studio unit), $94,822 (1-bedroom), $115,141 (2-bedroom), and $135,460 (3-bedroom). The CCHC also provides a matching downpayment program to assist approved CCHC program owners to purchase property in Canmore. The amount is repayable over a 5-year term; however, applicants can extend this period for an additional five years with 1% interest (Canmore Community Housing Corporation, 2021).

The CCHC is a solely owned subsidiary of the Town. As CCHC's primary shareholder, however, the Town does not receive a dividend. Instead, profits are reinvested back into the CCHC mandate. The municipality provides financial contributions to the CCHC's operations and staff; however, these municipal contributions to operating costs have been reduced over time from $750,000 in the early 2000s to $450,000 annually today. This financial support is instrumental in covering operating expenses until CCHC becomes self-sustaining. A portion of revenues are put in replacement reserve funds, reserve funds for matching downpayments, operating reserve funds, reserves to purchase land, or revenues to support developments (Canmore Community Housing Corporation, 2021).

The Town has also created a specific mill rate[1] to support affordable housing. This mill rate is referred to as the Vital Homes Program. The CCHC requests financial support through their budgeting process that is drawn from this mill rate. The Town will also guarantee loans for homeownership developments. This guarantee makes it easier for the CCHC to obtain capital from private lenders and banks. This is critically important as banks tend to assess affordable housing projects as high-risk, and thus tend to provide loans at higher interest rates (Tsenkova & Witwer, 2011). Despite the significant annual contributions provided by the Town, financial statements show that CCHC loans have consistently carried higher interest rates than local banks. For example, loans provided

[1] The mill rate is the property tax rate that is applied to the assessed property value in order to generate property tax revenue. It is based on the tax payable per dollar of the assessed property's value. It is determined by multiplying the assessed property value and the mill rate, divided by 1000 (Government of Alberta 2017).

by the Bank of Montreal and the Bow Valley Credit Union have carried interest rates ranging from 2.21 to 3.9% (Canmore Community Housing Corporation, 2019, 2020, 2021). By comparison, the interest rate for loans provided by the Town to the CCHC has been 4.98% (Canmore Community Housing Corporation, 2019, 2020, 2021). Over time, the CCHC has focused its housing portfolio on the affordable home ownership market (Table 9.1). This strategy allows the municipal enterprise to develop housing equity quickly that middle-income residents could purchase. The Perpetually Affordable Housing (PAH) policy requires new homeowners to sign an agreement that restricts the resale of these assets (Town of Canmore 2015). A resale price formula is indexed to inflation and used to calculate the increase in home values each year. With the purchase of these properties, the CCHC holds agreements registered on the title that provide CCHC with the option to purchase the property when the owner wishes to sell (CCHC, 2023). The CCHC has strategically reduced, but not eliminated, its investments in rental assets due to the long-term hold and debt that affects their financial statements. In total, the capital assets of the CCHC reached $16,887,031 (Canmore Community Housing Corporation, 2021).

Table 9.1 Inventory of Canmore Community Housing Corporation's Housing Assets

Homeownership Assets		*Rental Assets*	
Property	*# of Units*	*Property*	*# of Units*
7th Street 5 plex	3	The Hector	60
Coyote Ridge	12	McArthur Place	48
Hawks Bend	49	Wolf Willow	9
Lookout Ridge	3	1850 Palliser	1
Mineside Court	17		
7th and 7th	4		
Riverdale Centre	1		
Spring Creek Mountain Village	21		
Versant	2		
Wolf Willow	35		
Ravens Ridge	10		
Total	157	Total	118

Source Adapted from Canmore Community Housing Corporation (2022b)

The CCHC has been involved, especially during the Pandemic, with emergency responses such as rent assistance and food aid. Reserves were set aside to respond to the pressures of tenants whose jobs were impacted by the collapse of tourism during the COVID-19 pandemic. These reserves helped the CCHC to reduce the rent of tenants by 25% in April 2020, by 20% in May 2020, and by 15% in June 2020 (Canmore Community Housing Corporation, 2020). Rental rates were restored in July 2020. This demonstrated the value of local governance to be nimble and flexible to local needs. By comparison, the Bow Valley Regional Housing facility in Canmore is a provincially operated facility that did not have the option to temporarily reduce rent costs for low-income social housing units (Patterson, 2020). Furthermore, based on an agreement between the CCHC and the bank, homeowners of CCHC units were able to defer mortgage payments for three months. The CCHC was also engaged in a large development that generated more revenue than anticipated. The revenue surplus was reinvested to match down payments for people in need (https://www.canmorehousing.ca/housing-programs/#matchingdown).

Power Dynamics and Transition Governance at the Local Scale

The Town of Canmore, as the primary shareholder, appoints members to the CCHC Board of Directors. Once the Board is established, it has full autonomy over their decisions without influence by the Town. This has not always been the case. At times, there has been political interference and control from town council and staff with CCHC's operations and strategic directions. This control was exerted in a number of ways. First, the managing director was formerly required to report to both the CCHC Board and to the Town's Chief Administrative Officer (CAO). During shareholder meetings, the Council would provide strategic directions for the CCHC that would not always coincide with the strategic directions of the board. The Town would commit CCHC to actions in public documents, such as the comprehensive action plan, without consulting with the CCHC. These actions would have fiscal and operational implications. As explained by one participant:

> The Town really wanted to exert control in various ways. So it's like they almost wanted us to be Town staff and administration and operate like that, but they wanted to protect themselves and so they had this relationship

> that they couldn't get right. First of all, they had the managing director reporting….. to the CAO and to the Chair which doesn't work very well. In the contract, that's what they originally had. It's like okay well if the board's not telling them what to do properly, then we can get the CAO to step in on our behalf. The other way was that they just made decisions and committed us to doing things… that Council meetings or staff would commit us to in public documents without even consulting with us. That happened a lot, and I would stand behind the scenes and think this doesn't work for us. There's an issue that they need to learn how to effectively work and collaborate with a corporation. But they have this idea that while you're wholly owned by us, we can make Council decisions and it's binding on you and I know that if it's not a properly convened members meeting, you can't do that. There were a lot of times I was armed with all my corporate documents to go do presentations and then they kept putting it off because they knew I'd say, well, actually, you can't do that. (Participant #4)

These pressures stemmed from an unclear understanding of how to collaborate with an arm's length municipal enterprise; pressures exacerbated by turnover among municipal staff and elected officials, leading to a loss of institutional memory, which would also be accompanied by changes in personalities and priorities. There have been times when Board members have not been re-appointed to the CCHC as they did not share the same political or social views of the council. To resolve these issues, new orientation procedures have been put in place that include a review of the ownership of the CCHC, its mandate, the limits of municipality authority as the sole shareholder, and Council's responsibility to appoint board members. Formal funding and land contribution agreements are now used to negotiate the terms and conditions of some of the support provided by the local government. Despite these changes, there are elected municipal councillors who do not accept those limitations. Recently, the Town moved to increase its influence on the 9-member board by increasing the number of council members from two to four representatives. The decision was described as a strategic move to ensure the CCHC better aligned with the Town's goals (Colgan, 2023c). The CCHC experienced political tension, for example, due to concerns it is competing against private sector interests. Some elected municipal councillors have expressed a wish to see homeownership projects left to the private sector. Private sector developers have also induced political pressure on municipal election candidates to dissolve the CCHC.

These political pressures have dissipated as market housing costs increased throughout the region and as the town staff provided data that demonstrates private sector developers are not selling units at affordable prices for middle-income residents working in the community. However, the Town has restructured the board and management leadership in order to use the CCHC as a lead agency to build more partnerships with industry to implement their affordable housing strategy (Colgan, 2023b).

Power Dynamics and Transition Governance at the Provincial and Federal Scale

Community economic and environmental sustainability are closely tied to the ability of all residents to access affordable housing. This reduces commuting, excessive materials use, and other key matters. Sustainability transitions for affordable housing in Canmore are directly tied to the management of housing construction and marketing. For the CCHC, governance dynamics around affordable housing are limited by disjointed and outdated legislative, regulatory, fiscal, and strategic frameworks at the federal and provincial levels of government. A significant challenge for Canmore is that Canada's national housing strategy (and related funding programs) does not address non-market, affordable home ownership for middle-income households (Employment and Social Development Canada 2018; Infrastructure Canada 2023). This has limited the CCHC's access to capital funding for strategic priorities. These affordable housing priorities are directly designed to strengthen the social and economic sustainability of the community. As one participant reflected on the community's housing needs, they explained:

> I think, from a municipality point of view, there has been frustrations over the decades that the burden of responsibility to provide housing solutions has fallen down onto the municipality and it's not a municipal responsibility. Like they don't feel that they're getting assistance from other levels of government. And the national housing strategy is a $20 billion investment over 10 years and so forth, and. But it's not really for our community. It's not producing what we need. There's funding available, but it's for purpose built rental buildings. And Council wants us to focus on homeownership right now because they want to keep families in the community to support your school system, your churches, your service clubs. (Participant #3)

People we spoke with were concerned about the broader social impacts on the community if there was a failure to provide affordable housing options. Some argued that the social fabric and cohesion of the community was undermined by high housing costs that made it difficult to attract and retain families and permanent residents. High turnover rates result in a limited capacity for small businesses and community organizations alike.

As the Town sought to address deficiencies with affordable housing, provincial borrowing limits and restrictions have constrained opportunities to deepen local capacity to address urgent housing pressures through its municipal enterprise. Access to capital at competitive rates is critical for pursuing non-market housing projects. Historically, municipal enterprises were able to access the same low financing rates as municipalities through the Alberta Capital Finance Authority (ACFA). In fact, one of CCHC's purpose-built rental buildings was financed through the ACFA for 35 years at a low interest rate. However, the ability of municipal enterprises to access these low financing rates was eliminated by the provincial government. The Town of Canmore worked with the Town of Banff, the City of Grand Prairie, and the Alberta Urban Municipalities Association (now Alberta Municipalities Association or AMA) to advocate, and develop a motion, for municipal enterprises to have access to the same financing rates as municipalities (see: https://www.abmunis.ca/resolution/alberta-capital-finance-authority-access-housing-authorities). The motion was declined. As one participant explained:

> We did as a municipality co-sponsor with the Town of Banff and the City of Grand Prairie to take a resolution to the Alberta Municipalities Association to try to have what was the Municipal Finance Corporation (MFC) or the Alberta Municipal Finance Corporation fund housing bodies directly, not through municipalities. And that resolution passed at the AMA. And there were some meetings with the Minister of Finance, the Treasury Board as well. But then the Province just recently in the last year or so restructured or dissolved the Municipal Finance Corporation. And so that resolution sort of died. And nobody's advancing it. (Participant #6)

There are mounting concerns about the future of municipal financing structures in Alberta. In 2020, the Province of Alberta dissolved the Alberta Capital Finance Authority (Alberta Capital Finance Authority, 2019). The Alberta Capital Finance Authority provided municipalities

with below market financing for capital projects (Government of Alberta, 2022). Loans for local governments are still available through an office located within the provincial treasury board, but the designated financing authority no longer exists. Furthermore, in 2021, the Province of Alberta also removed access to low interest loans for municipalities without any consultation about the potential impacts such a decision would have on municipalities (Alberta Municipalities, 2022).

As the CCHC has pursued private sector sources of capital to finance affordable housing projects, there have been contradictory and ambiguous provincial regulations and statements about the impacts of the municipal enterprise on the Town's debt limits. In Alberta, municipalities have debt and debt service limits that impact their borrowing capacity. Since the CCHC is owned by the municipality, their financial statements are part of the Town's financial statements. As a result, the CCHC's debt is part of the Town's debt and needs to be factored into future debt servicing. However, the impacts of municipal enterprises on provincial regulations around municipal debt have not always been clearly or consistently interpreted by provincial staff. As one participant explained:

> I think one of the biggest hurdles has been debt acquisition. So to build new housing requires capital. And there's quite a bit of gray regulation around who, in a housing body that's wholly owned by a municipality, where does that debt reside? Because we have consolidated financial statements. So municipalities have debt limits and debt limits are tied to revenues. And we haven't been able to move into the level of housing development we wanted to because of the debt limit aspect. So whenever the housing body took that, it impacted the municipality's debt limits. (Participant #6)

The provincial responses and interpretations of the Municipal Government Act and the Local Authorities Capital Financing Act have varied over time. Two participants were told that if the Town and the CCHC had consolidated financial statements, the CCHC's debt would impact the Town's future borrowing capacity (Participant #4; Participant #6). However, another participant was told that if the municipal council appoints the board of directors for the CCHC, the CCHC's debt can be exempt from municipal debt servicing limits (Participant #3).

Furthermore, there are challenges for the CCHC to obtain land for affordable housing projects. Land pressures are particularly difficult in

Canmore, a community that is surrounded by mountains. Most of the land is controlled by the provincial government as Crown land or is designated as environmentally sensitive land. In this rapidly growing amenity community, the CCHC cannot afford to purchase land at market value. Following unsuccessful efforts to obtain a release of Crown land,[2] the CCHC obtained property from the Town's urban land reserves to support an affordable housing development for $1. The actual value of the land was $1,800,000 (CDN) (Canmore Community Housing Corporation, 2020). Once those properties were rezoned, the CCHC was able to leverage the new value of the property to obtain the 20% equity they needed for financing. The Town is now in the process of establishing a land bank for the CCHC by purchasing land back from residents (Foubert, 2019). Land banks can help to strengthen social equity and social sustainability by removing land from speculation and rapid development as the community arranges access to financing for affordable housing to stabilize housing markets and foster a more inclusive community (Lowe et al., 2022; Olauson et al., 2022). This can produce tensions for environmental sustainability as the removal of land intensifies interest and pressures for developers to pursue environmentally sensitive land to support market-based housing developments.

In Canmore, social and environmental sustainability goals were undermined when provincial regulations permitted 169 hectares of land annexed from the adjacent Municipal District of Bighorn in 1992 by the Natural Resources Conservation Board, an arm's length agency of the Government of Alberta, to be sold to the Three Sisters Golf Resorts Inc. for tourism and recreational development, despite Canmore's interests to retain the property for affordable housing and wildlife corridors. This meant the private developers (now Three Sisters Mountain Village Property Limited) were legally positioned to retain the land for private development, of which just 10% will be designated towards affordable housing after a lengthy legal dispute (Colgan, 2023a). As such, the Town's capacity and power towards sustainability transition is undermined by provincial growth machine politics.

[2] In 2004, the Town of Canmore reached a land transfer agreement with the provincial government for a 2-hectare property with the condition that the Town of Canmore sell the land for $1.7 million to a developer chosen by the Province (Ovsey 2004).

Broadening and Upscaling Transition Governance

As the CCHC has developed over the years, it has broadened and scaled-up its own national and transnational networks to share knowledge and expertise (Traill & Cumbers, 2022). Interviewees note that this has not been easy as there are few municipalities with housing corporations in Canada. The CCHC engages in quarterly meetings with the Whistler Housing Authority and the Tofino Housing Corporation in the neighbouring province of British Columbia, as well as the Blue Mountains Housing Corporation in Thornbury, Ontario to compare responses to various issues and experiences with non-market affordable housing projects for middle-income residents. These networks, however, have provided invaluable lessons to strengthen the resiliency and viability of CCHC operations. Most notably, affordable rental housing projects can put long-term municipal enterprise operations in a precarious position if they are carrying long-term debt. As a result, the CCHC has focused a greater proportion of its efforts to develop homeownership assets that can be built and sold relatively quickly to absolve its debts.

Conclusion

In Canada, the rapid decline in affordable housing has coincided with the downloading of new responsibilities for housing onto municipalities by provincial governments. Affordable housing pressures have been particularly difficult to resolve in rapidly growing small amenity tourism towns where the private sector has focused on highly profitable development. This has increased the consumption of resources, added to long distance commuting, increased the vulnerability of middle-income households as well as small businesses and other organizations in the community who struggle to attract and retain workers. In response, small municipalities are becoming more entrepreneurial by mobilizing municipal social enterprises to develop affordable housing to nurture a more resilient and sustainable community and environment.

Drawing upon the experiences of Canmore, Alberta, this research contributes to our understanding of sustainable transitions in small communities by "deepening" learnings about local and provincial governance processes guiding municipal enterprises. The case study also "broadens" our understanding as to the scale and scope of new approaches to sustainable rental and home ownership markets via shared

learnings with other municipalities elsewhere in Canada. As such, this chapter contributes to broader debates about the options for small municipalities to support practical solutions for sustainable housing markets within complex fiscal and political power dynamics.

Our findings draw attention to important social, economic, and environmental sustainability impacts in small rapidly growing amenity towns as a result of housing affordability challenges. In Canmore, Alberta, provincial legislation and policies, for example, restricted the development capacity of a municipal social enterprise through limited access to affordable capital and Crown land to support a more social approach to affordable housing. Instead, provincial policies and decisions remained focused on growth machine politics and support for private sector initiatives instead of a more resilient, socially inclusive approach affordable housing. These issues were further exacerbated by the restructuring of municipal financing that eventually eliminated the Alberta Capital Finance Authority. At the local level, decisions to restructure the board and strategic direction of the municipal enterprise to build private sector partnerships to implement the Town's affordable housing strategy also suggest ongoing tension in this governance transition. Moving forward, debates about affordable housing will continue to guide sustainability transitions. This stems from the instrumental role of diversified and affordable housing portfolios to shape the stability and integrated social, economic, and environmental aspects of sustainable and resilient small communities. These integrated issues span extended commuting patterns and consumption of carbon resources to live in affordable housing, the stability of the local workforce, the stability of local businesses and services, poverty, and so forth. Small municipalities often feel the pressure to lead, pursue, or advocate responses to these issues as housing can disrupt the economic development and well-being of the community. In this context, more longitudinal research is needed to understand how different forms of housing governance can better position municipal enterprises to play their part in sustainability transitions.

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CHAPTER 10

From Lignite Regions to Transition Labs: Rethinking Regional Politics of Lignite from the Perspective of the "Politics of Scale"

Sören Becker and Matthias Naumann

Introduction

The approach of sustainability transitions has been influential both in informing scientific debate and in identifying political priorities with respect to new technologies and sustainable regional development. However, early work on sustainability transitions has been criticised for attaching too much importance to technological innovations (Lawhon & Murphy, 2012). It has not fully identified by whom these innovations are developed, for what reason, and with what aim they are used. Hence, Lawhon and Murphy criticise the "elite focus" of transition research

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(ibid.). This links to an initial lack of consideration of conflicts and power relations (Smith et al., 2005), while the spatial levels of niches, regimes and landscapes, though intuitive to use, remained analytically unclear. Meanwhile, the transition debate has taken up some of these criticisms by introducing new topics into the debate, including the role of social movements and radical positions, the role of consumers, as well as the formation of political coalitions of civil society and other actors (Avelino, 2011; Elzen et al., 2011; Hess, 2018). Importantly, scholars call for a sustained openness and analytical pluralism in studying social and technological transitions (Hopkins et al., 2020). As Schwanen (2018) has argued, core concepts from human geography serve well to broaden the perspective of transition research.

A recent approach is the concept of just transitions, calling for greater participation of workers, socially disadvantaged groups and the consideration of uneven development in political discussions about transitions (Newell & Mulvaney, 2013). While the academic debate on just transitions is largely rooted in work on participation and justice in energy transitions, the term is now widely used as a discursive framing for regional change policy and change management (Wang & Lo, 2022). The idea of just transitions found its way into becoming a policy instrument by the establishment of the "Just Transition Fund" (JTF) by the European Union (Dupont et al., 2024). Serving as one corner-stone in the current European Green Deal Agenda, its main target is to battle social imbalances in transitioning the European member states, among these cushioning the economic impacts in European coal-mining regions.

The idea of just transitions as well as the JTF depend on decisions made on various geographical scales—including international calls for greenhouse gas mitigation, national (energy) transition policies, regional and local development. This chapter discusses the case of two German lignite coal regions as current examples of just transitions and their interconnection with different scales as a point of departure for linking the debate on scale in sustainability transitions with the "politics of scale" as discussed in critical human geography. While "scale" and "level" are often used synonymously, the debate on the "Politics of Scale" in critical human geography foregrounds scale as a social construction reflecting uneven relations of power, political strategies and contestations. In that sense, the conceptual approach of the "Politics of Scale" fits with the contested scalar reality of German energy transformation as well as their impact in lignite regions. As we will argue, energy transitions are not only linked

with various forms of uneven development but entail as well changes of the scales of regional governance.

For this argument, we introduce the lignite coal regions of Lusatia (*Lausitzer Revier*) and Rhineland (*Rheinisches Revier*). Both regions have a long history of using lignite for the purpose of energy provision and as an industrial raw material. This history is to end with the political decision of the German federal government to phase out the use of lignite in Germany. In consequence, the former lignite regions are not only becoming sites of the transformation of energy infrastructure but of also expanded economic structural change. Drawing on our own empirical work as well as selected literature (e.g. Furnaro, 2023; Oei et al., 2020; Zeissig et al., 2023), we discuss the transformation of both regions from a scalar perspective. In this argument, we adopt the following three analytical prisms:

- The impact of national policy as a shifting context for regional policy and as an example of the *rescaling* of regional development;
- the emergence of new scales of regional development strategies as a *new scalar fix* of regional governance;
- the contestations of the phasing out of lignite on different geographical scales and as an example for *jumping scales* of various actors in the regions.

This chapter proceeds as follows: first we provide a brief introduction into the debate on the "Politics of Scale". Second, we discuss the phasing of the use of coal in Germany as a compromise package between state, industry and labour unions. We then present selected empirical illustrations from the two lignite regions of Lusatia and Rhineland to highlight the contested scalar dimension of this current transformation. Finally, we conclude with an examination of the question of what do debates on the politics of scale contribute to understandings of sustainability transitions.

The Debate on the Politics of Scale—A Brief Overview

While the debate on the "Politics of Scale" is well established within critical human geography, to date only little connections have been made to debates on sustainability transitions or energy transitions in particular (Becker & Naumann, 2017; Raven et al., 2012; Späth & Rohracher, 2014). In this section we summarise key contributions of the debate and discuss possible connections to the field of just transitions. Therefore, we highlight first, how this literature understands scale as induced spatial structures, state rescaling as a change in state organisation and the political strategies of different actors as scalar strategies. Second, we introduce scale as a perspective on environmental and natural resource governance.

The Production of Space as the Production of Scale

For more than three decades, the concept of scale has played a prominent role in Anglo-American critical human geography (Brenner, 2004; Jonas, 2006; MacKinnon, 2011). Starting point of the scale debate is that the production of space, and therefore spatial scales, is inextricably linked to social relations. The scale debate, thus, stands in line with critical traditions of spatial theory from Henri Lefebvre, David Harvey and Edward W. Soja. While multi-level governance in political science (e.g. Fuhr et al., 2018; Hooghe & Marks, 2003) focusses on the interaction and complex governance between different spatial levels, the scale debate in human geography targets how spatial scales emerge and are linked to social power relations as well as processes of uneven development.

The debate on scale originates in an early "spatial turn" in political economy dating back to the 1980s. Authors such as Immanuel Wallerstein interpret uneven spatial patterns as the outcome of economic power relations, such as the international dependencies of developing and newly industrialising countries (Wallerstein, 2004). The emergence of these patterns is attributed to an increasingly globalised capitalism that continually produces new inequalities. In his book "Uneven Development", Neil Smith (2008 [1984]) theorised the relationship between processes of capital accumulation and the production of space in general, and of spatial scale in particular. The latter arise, above all, from capital dynamics, and capital's character as being both locally anchored and mobile between different locations. The resulting structures—corporate

networks, markets, different levels of state organisations and regulation—are described as a "scalar fix". In the classical interpretation, this is derived from the interests of capital, but is continuously contested and influenced by social struggles (Antentas, 2015).

Strongly rooted in a Marxist tradition, this classical interpretation of scale became subject to post-structuralist critique in the further course of debate (Marston et al., 2005). This criticism took issue with an essentialist understanding within previous scale theory, assuming scales as pre-existing structures. Building on this criticism, Marxist scholars thereafter highlight that scale as a category cannot be recognised independently of the social processes in which it is embedded. Scale should hence be analysed as a product of social conflicts and scalar practices of different actors (MacKinnon, 2011). One field in which the scalar changes have been extensively analysed is the shift in state powers in the course of the neoliberal reforms from the 1980s to the early 2000s. The observed interplay between processes of internationalisation, the disempowerment of existing political scales and the emergence of new, often competitive forms of governance at sub-national level is referred to as state rescaling (Brenner, 2004). The restructuring of the state is conceived as a "profoundly authoritarian process" (Wissen, 2008, p. 9), which in turn shifts the conditions for future action. This is also reflected in the promotion of metropolitan regions as a tool for economic development and spatial planning (Pütz, 2005) and the allocation of political decision-making to the level of the European Union (Jessop, 2009). State rescaling thus changes both the distribution of responsibility between different levels of state organisation and access to these institutions (MacKinnon, 2011). These changes are not an end in themselves, but cater to the realisation of political interests.

Scales and scalar fixes are the product of social conflicts between powerful actors and their political practices. When looking at these disputes, various scalar strategies are considered: attempts to consciously influence the construction and relevance of scales, but also attempts to "leapfrog" certain scales in order to better assert one's own interests. The concept of scale jumping was famously introduced by Neil Smith (1993), who shows in his work on the "homeless vehicle" how a non-motorised vehicle developed by artists helps homeless people to extend the spatial radius or scale of their activities in New York. Scale jumping is therefore a strategy for expanding the spatial frame of one's own actions. This potentially reshuffles existing relationships of power and domination (Smith,

2000, p. 726) and may open up room for manoeuvre for actors previously excluded. Scalar strategies are applied by companies (Chapura, 2009) as well as by trade unions (Heeg, 2014) and social movements (Antentas, 2015). The ability to change the scope of one's own political action thus itself becomes a power resource that is unevenly distributed due to mobility, institutional framework conditions and access to networks or knowledge (Adger et al., 2005).

Rescaling: From Environmental Governance to Just Transitions

With the further diversification of the debate, the concept of scale was as well discussed in application to the field of environmental and natural resource governance (Bulkeley, 2005; Cohen & Bakker, 2014; Reed & Bruynell, 2010). Here, work focusses on the lack of correspondence between the scales of political-administrative processes and ecosystem dynamics, for example in the case of watersheds or national parks (Cohen & McCarthy, 2015). As Swyngedouw (2007) cautions in his analysis of the introduction of river catchment areas in Spanish water regulation, the delineation of seemingly "natural" spaces may as well be a result of political interests. Social power relations are inscribed in the perception and valorisation of nature, for example in form of unequal access to resources (Harvey, 1996). Cohen and Bakker introduce the concept of the "eco-scalar fix", which interprets the scalar regulation of natural resource use as an expression of social power relations (2014, p. 132). More recently, Argent (2019) has made a strong point on how climate adaptation in rural areas is shaped by scalar dynamics.

The endeavour to control or valorise natural resources often results in disputes over scalar orders (Swyngedouw & Heynen, 2003, p. 913). This can be seen, for example, in processes of securing land for the cultivation of agrofuels in South America (Dietz et al., 2015) or palm oil in Indonesia (Brad, 2016). In these cases, various actors (smallholders, international companies, NGOs, government agencies) seek to assert their interests for a favourable regulation of land use accessing different levels of political institutions. In discussions on rescaling the governance of the environment and natural resources, reference is made to new spatial scales as well as to fundamental shifts in the respective role of the state. Reed and Bruynell (2010), for example, identify processes of "scaling up" and "scaling down", in which responsibility for the regulation of natural resources is transferred to higher and lower scales, respectively.

Other examples of scalar strategies refer to city administrations acting at local and international level in city networks for climate adaptation and mitigation (Bulkeley, 2005), movements for climate justice, which are represented both at international summits and with local decentralised actions (Chatterton et al., 2013). For Cohen and McCarthy (2015), these processes of rescaling are an expression of neoliberal restructuring. Decisions are often shifted to levels of scale that are not democratically legitimised (ibid., p. 19). There is also a danger of reproducing structural inequalities between places and regions by localising responsibilities and resources (ibid., p. 6). For example, the development of a forest-based bioeconomy can lead to new regional disparities (Halonen et al., 2022). In sum, the rescaling of the governance of natural resources produces winners and losers (see also Albrecht & Klein, Chapter 2; Kuhmonen et al., Chapter 6).

This links back to the just transitions debate that is often targeting the ignition of new regional dynamics (see also Nel & Marais, Chapter 11). Linking the above insights to the emerging debate on just transitions, we distinguish three dimensions for approaching processes of rescaling: firstly, the material dimension, including changes regarding resource value chains and existing infrastructure networks; secondly, the institutional dimension, pertaining to the question of how regional transition processes are devised and which groups can claim legitimate access to decision-making, and, thirdly, the discursive dimension, highlighting how future visions are being constructed and how a transition process is viewed by different interest groups locally and on other scales. As we have argued elsewhere (Becker & Naumann, 2017), these dimensions are merely analytical distinctions that mutually influence and feedback on each other.

Our perspective corresponds with some strands in the broader sustainability transitions debate, above all, work that stresses the materiality of political and economic relations (Svensson & Nikoleris, 2018), work on institutionalisation processes (Fünfschilling & Truffer, 2014) and work targeting the relation between discourses and socio-technical change (Elzen et al., 2011; Genus, 2016). Moving on from these approaches to different structural dynamics in sustainability transitions, we uphold that a critical perspective on rescaling enables us to follow the various, often conflictive processes through which regions are merely constructed as a new site and a new reference—as a new spatial scale—in sustainability transitions processes. Based on this conceptualisation and connecting to current work on the scalar dimensions of energy transformations (Fu,

2023; Furnaro, 2023), we will now follow major recent developments in rescaling Germany's energy landscapes, that is the politics of the German coal exit and intertwined scalar dynamics in two lignite regions.

The "Coal Exit" in Germany: A Compromise Package Between State, Industry and Labour Unions

Despite the German orientation towards renewable energy, lignite is still an important source of energy for the country. Extractable lignite resources are available in a belt across the centre of country, and are still being mined and combusted in three major mining areas (see Map 1). According to the "German Coal Phase-out Act" of 2020, however, the last coal-fired power station in Germany is to close down no later than 2038. This date was decreed after a deliberation process, mainly taking place in an expert commission consisting of politicians, from different political parties and levels, as well as business and trade-union representatives. Additionally, some scientists and two representatives from local initiatives from the mining areas were members of the commission. Gürtler et al. (2021) argue that thereby, positions and interests from different spatial scales were represented, even though the German commission was less open to citizen and community concerns than its counterpart that devised a phase-out strategy for coal in Canada.

The commission decided on a pathway for reducing both hard coal and lignite capacities in subsequent steps, figuring the years 2022–24, 2029/2030 and 2038 as major milestones. This decision was thereafter confirmed by act of law, and a detailed roadmap for phasing out different plants was agreed upon between the federal state and those major energy corporations operating mines and power plants. The plans for phasing out coal will clearly affect the lignite industry in three German regions—Lusatia, Rhineland and Central Germany (see Fig. 10.1). Thus, the law on the coal exit was accompanied by the "Structural Development Act" an instrument for dealing with the impact of structural change in the affected lignite regions. This includes a financial compensation of the workers affected by the phase-out as well as funding for research and education, efforts for climate protection, investments in transport infrastructures and the location of federal research institutions in lignite regions. Noteworthy, the three regions are distinct in terms of their location, administrative

design, relative importance of the lignite industry, number of inhabitants and settlement structure (Ribbeck-Lampel et al., 2023, p. 30). For example, the Rhineland is economically much less dependent on employment in the lignite sector compared to the Central German and the Lusatia region.

The German coal exit is not only an example for an energy transformation roadmap that aims to change the existing mode of electricity and heat production. It also provides some examples for scalar transformations. Before all, the aforementioned "Structural Development Act" enforced the scale of "Mining Areas" (*Reviere*) as a new *scalar fix* for regional governance and structural policy, entitling the appendant counties (*Landkreise*) to apply for funding of in total 14 billion Euro (ibid., p. 11). The Central German and the Lusatian Mining Area do entail counties in different federal states. Governments of federal states with mining areas appointed "Representatives for Structural Change" (*Strukturwandelbeauftragte*), who are responsible for the political coordination of the future development of mining areas. Within the mining areas, there are debates on the criterion of areas "being directly affected" (*Kernbetroffenheit*) in terms of infrastructure, employment and income, discursively creating another scale of municipalities which should have priority for funding and compensation. Furthermore, there are events creating new scales temporarily, such as festivals, temporal universities, etc. These few examples illustrate how phasing out coal is producing new scalar constellations. We elaborate this in the following subsections on the lignite regions of Rhineland and Lusatia (see Fig. 10.2). The following subsections are based on the analysis of policy documents as well as relevant literature on the transformation of both regions. This includes reports from state institutions on the future development of the respective regions. Previously, a round of expert interviews with actors from the Rhenish mining district was conducted. In this analysis, our focus rests on the scalar dimensions of the ongoing transformation. However, we do not intend to present empirical case studies here, but illustrations of the contested scalar character of just transitions.

Rhineland: Technological Innovation, Participation and Protest

At the beginning of 2024, three large open-pit mines and three major lignite-fired power plants were in operation in the Rhineland mining area, located in the west of the state North Rhine-Westphalia. In this region,

Fig. 10.1 Lignite coal regions in Germany (*Source* Own compilation)

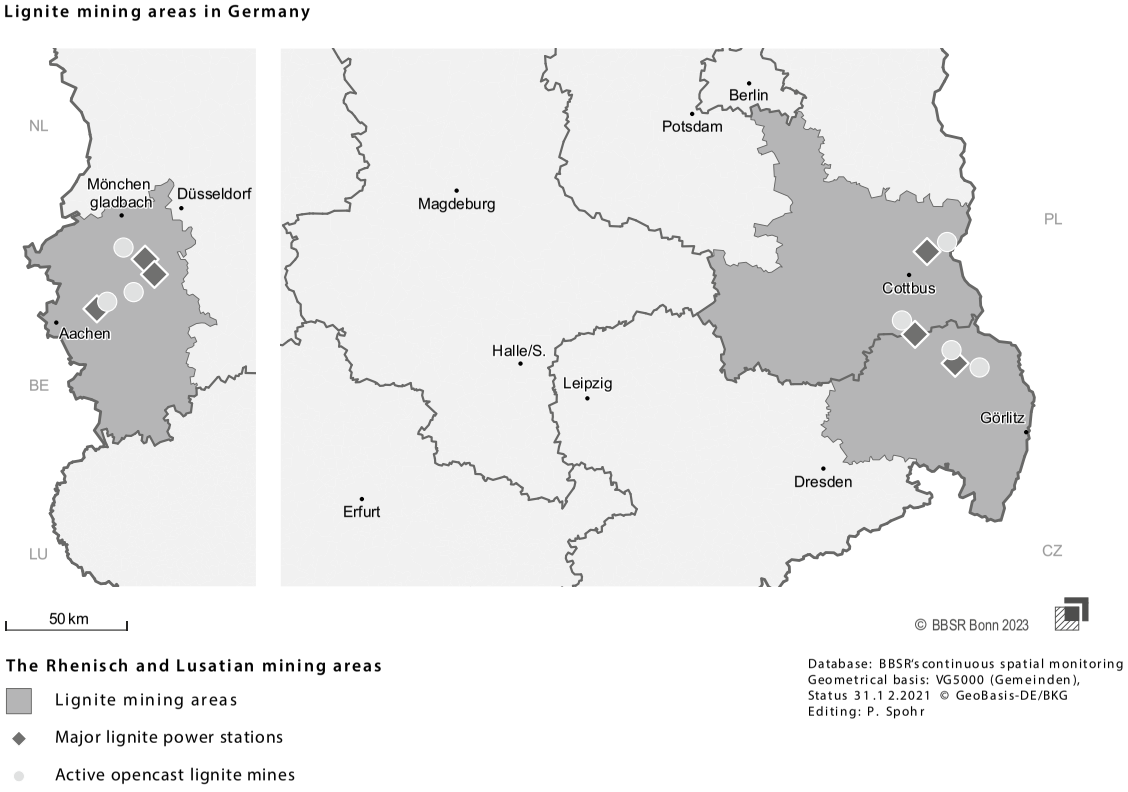

Fig. 10.2 The lignite coal regions Lusatia and Rhineland (*Source* Own compilation)

lignite serves the energy needs of the surrounding agglomerations of Cologne, Aachen and Mönchengladbach and its energy-intense economy such as chemical industries, metallurgy and machine production as well as ceramics. As part of the nationwide negotiations on phasing out coal plants and opencast mining, it was decided that the majority of capacities in the Rhineland mining area should be shut down even earlier than in the other lignite mining areas (in the original plan a few plants would run until 2038, but after re-negotiation with the new federal government of Social Democrats, Liberals and Green Party this was moved to 2030). This decision for a somewhat earlier phase-out was came out as a compromise to pacify the fierce conflict evolving around the Hambach Forest adjacent to the open-pit mine with the same name. In public debate on regional development, this decision was also linked to the comparably diverse economic structure in the region, both reflecting the material conditions and forecasting major material shifts in the region's energy provision. More than that, the Rhenish Mining area stands as an example for how institutional rescaling and a multi-scalar discourse on socio-ecological transformation are embedded in social conflicts about the future of the region (for an overview, see Sander et al., 2020).

Planning for mining was originally divided between the spatial planning units at level of the federal state and the regional authorities below the state level (*Regierungsbezirk*). In the regional lignite planning committee (*Braunkohleausschuss*) personal collaboration over time has produced established patterns for exchanging information and regional coordination between actors. Now, plans for phasing out lignite imply the starting signal for a shift of both the goals of regional development and the institutional landscape of regional governance. A central element in this process was the establishment of the "Future Agency Rhenish Mining Area" (*Zukunftsagentur Rheinisches Revier, ZRR*) which was founded as a limited company with predominantly public owners and is largely financed by the federal state government. As an arms-length agency commissioned by the Ministry of Economy, it serves two main functions: first, the agency provides a platform for bringing together various stakeholders and developing projects for the future of the region; second the agency is also responsible for rating concepts and projects to support the ministry's funding decisions (Zukunftsagentur Rheinisches Revier, 2021).

Read from a scalar perspective, the national decision to phase out coal has ignited a process of regional networking and a new discourse depicting the Rhenish mining area as both an "innovation region" and a

new scalar fix. Within the ZRR framework, a future-making process was initiated. This, indeed, fostered the creation of new networks between actors on the regional scale: representatives from business, science and business and other associations work together in various working groups under the umbrella of the ZRR. The aim is to develop innovative projects in the sense of creating niches in line with transition studies, which should form the basis of a sustainable economy in the region after a funding phase. Most projects discussed so far are primarily technology-related: under the heading "Hydrogen district", for example, various projects are proposed, including the development of regional fuel cell production and a research cluster for the hydrogen economy. Other activities include the creation of "sustainable" business parks and an accelerator for start-ups in the bioeconomy sector (ibid.). Breul (2022) reads these ongoing efforts for crafting the new regional vision of an innovation region as an expression of the European Union strategy of smart specialisation.

By contrast, two lines of conflict emerged, both regarding the future vision of regional development and the question of who gets involved in the ZRR discussions. Early on, a number of municipality representatives called for a greater involvement into the process of setting priorities and awarding public funding. After protest with the regional planning authorities, regional municipalities were called in to form an "Adjoiners' Conference" (*Anrainerkonferenz*) within the body of the ZRR. Three representatives were admitted to the ZRR Advisory Board, "turning affected into participants" as their webpage states (Zukunftsagentur Rheinisches Revier, 2023).

The second, more prominent conflict line evolved around the Hambach Forest and the village of Lützerath, two places that were to be dismantled for extending the Hambach resp. the Garzweiler mining pit (cf. sander et al., 2020). Several activist groups such as "Ende Gelände", "Ausgeco2hlt", the activists around Hambach Forest and the local branches of Fridays for Future criticised the federal arrangements for a coal phase-out by 2038 and responded with renewed protest actions. Hence, protest, activist camps and civil disobedience actions against power plants and opencast mining form a recurrent strategy. In Hambach Forest, group of activists has even established a permanent occupation; Lützerath acitivists have subverted a nationwide TV programme as an instance of "jumping scales". Localised activism had scalar effects in two directions: first and regionally, various environmental organisations, church groups and citizens' initiatives of those affected

by opencast mining have joined forces in the Civil Society Coordination Group for Structural Change to coordinate their positions (ibid.). Second and important beyond the region, the sites of protest, above all with the village of Lützerath and the Hambach Forest, were framed as focal points in a multi-scalar discourse: locally they ought to be "saved" from the expanding mines, but this local resistance was framed as part of a global struggle, linking the Hambach protest to resistance against climate change in other places (among others in a solidarity visit by Greta Thunberg, see also: Liersch & Stegmaier, 2022). As mentioned above, the disposition to pacify the broiling conflict, federal state and national government, both including the Green Party in the coalition, negotiated a plan for a regional coal phase-out until the year 2030.

Lusatia: Disintegration of Urban and Rural Development

The predominantly rural mining region of Lusatia covers an area from the southern border of Berlin in the north down to the city of Dresden in the south. Unlike the Rhineland region, the Lusatia region has experienced a series of transformations since the German unification in 1990. The region has lost a large part of its industrial employment base and many young people left the region long before the decision for phasing out the use of coal was made. The coal exit here is part of a rescaling, in the sense that the region's energy provision and economy will be strongly affected by this federal decision. This also applies to the Rhineland mining area but this becomes far more relevant for an economically disadvantaged region as Lusatia, where the lignite sector offered well-paid and thus far, secure employment. However, the rescaling of the region's economy by the federal decision to phase out the use of coal has become part of contestations within the region and the city of Cottbus in particular (Bose et al., 2020).

Despite the region's rural structure, first evaluations of decisions for project funding reveal that the city of Cottbus attracts by far most of the funding (Zeissig et al., 2023). Within the next few years a major railway repair workshop, a medical university and a "Science Park" with different research institutions will be established in Cottbus. In that sense, the energy transition of the Lusatia region entails an urban—the city of Cottbus—and a rural—the peripheral, non-urban areas—scale. While in the city of Cottbus there are jobs available to replace the loss of employment in the lignite sector, rural areas offer less job alternatives

for former mining workers. Furthermore, for regional structural policy a new scalar fix has been introduced to the Lusatia mining region. New regional institutions have been established such as the "Wirtschaftsregion Lausitz" (Economic Region Lusatia) which is—similar to the Rhenish Future Agency—responsible for allocating public funding for projects in the part of the Lusatia region belonging to the state of Brandenburg. With the "Wirtschaftsregion Lausitz", the state of Brandenburg tries a more participatory way of funding decisions, while in the state of Saxony all applications for funding are decided by the state ministry (ibid.). Another example of regional institutions is the "Lausitzrunde", a coalition of mayors from all Lusatian municipalities in the state of Brandenburg and Saxony. The "Lausitzrunde" is part of regional structural policy as it articulates the interests of the region's municipalities and conducted a "cluster strategy" for the future economic development in the region (Lausitzrunde, 2023). Therefore, the region's energy transition is characterised by different scalar dialectics: on the one hand, a federal decision leads to a disruption of the region's economy and on the other hand, we witness an ongoing "regionalisation" with newly established regional institutions. These dialectics apply also for "jumping scales" within the region's development.

Contestations around the phasing out of lignite and "jumping scales" become apparent when new social movements for environmental justice, such as "Ende Gelände", mobilised on the national scale for their actions within the region (Müller, 2023; Oßenbrügge, 2021). These campaigns for an immediate end of the use of coal are at times confronted with the harsh resistance from local inhabitants (MDR, 2023). Moreover, right-wing populist are instrumentalising the current debate on the energy transition in the region (Gürtler et al., 2021, p. 12) or within the city of Cottbus (Nettelbladt, 2023). In the Lusatia region, like in other parts of Germany, the electoral support for the far-right party Alternative for Germany (*AfD*) is a phenomenon of left-behind, mostly rural areas and their dissatisfaction with the current process of restructuring (Förtner et al., 2021). Another example for "jumping scales" for regional development are so-called axes of innovation in regional planning, introduced by the states of Berlin and Brandenburg to connect the city of Berlin with the economic development of the Lusatia region (Hauptstadtregion Berlin-Brandenburg, 2023). Therefore, the scale of the region's development does even include regional development strategies of the city of Berlin. Conversely, the scalar dynamics halt at the border to Poland

and the Czech Republic, resulting in a lack of "jumping scales" when it comes to a closer collaboration beyond borders. According to Theuner and Matern (2022), Lusatia's transition from a coal region to a region of renewable energy supply, needs to be understood as a cross-border process, especially when accounting for additional economic activities, such as science and education or touristic use. Such a cross-border perspective involves different scales of collaboration but still needs to be developed and operationalised. In the final section, we draw conclusion from both regions for a further scalar discussion of sustainability transitions.

Conclusion: The "Politics of Scale" of Just Transitions

The scale debate in human geography focusses on the social construction of spatial scales, their constant change and interplay, as well as their strategic handling by various actors. It impressively shows how social relations characterise spatial structures and are equally shaped by them. The German coal exit offers numerous examples of the mutual interrelation of shifts in social and scalar orders. The related material, institutional and discursive changes linked to phasing out coal and lignite go hand in hand with the emergence of lignite regions as new spatial scales, as well as with the changing significance of existing scales and the specific scalar strategies of policy actors. This applies to the materiality of the re-use of former coal infrastructures as well as mining areas, new established institutions for the regional management of structural change as well as dominant discourses about pathways to just transitions in both regions. As we have shown in the previous sections, all of these issues entail a scalar dimension. The materiality, institutions and discourses of just transitions in the Rhineland and the Lusatia regions involve processes of rescaling of energy supply and regional development, the introduction of new scalar fixes of regional governance as well as the contestation of phasing out lignite on different geographical scales and various examples for jumping scales of different actors in the regions (see also Pikner, Chapter 4). Scalar configurations are not only an expression of uneven power relations, but also the result of social conflicts and approaches to enclose these. In terms of just transitions, this perspective enlightens both the creation of regions as an arena for new regional development schemes and issues of which actors are

positioned to influence decision-making and sustainability discourses—on different scales (see also Connelly et al., Chapter 8).

With a view to the emergence of different spatial levels, the scale debate goes beyond the perspective of transition theory and political science work on multi-level governance and provides valuable suggestions for critical energy and transformation research. The question of the different scales of energy supply and their reorganisation addresses the political character of the energy sector, which is inextricably linked to social as well as spatial inequalities. Furthermore, the "Politics of Scale" approach provides an analytical framework for analysing local, regional and global developments and their interactions. In the context of sustainability transitions, a scale perspective can thus focus on social transformations, a broad spectrum of actors and unequal power relations but as well as on future alternatives and utopias. Linking political decisions on different levels without taking for granted the distribution of responsibilities helps us, first, to understand how regions and political responsibilities are reshaped, how new fields or institutions of governance emerge and how these processes correspond with power relations and social conflicts. Second, a perspective on scale can support the search for alternative approaches to sustainable energy futures and the scalar strategies involved. This includes, third, the question if the local, regional, federal, global scale or a combination of these scales are defined as appropriate for materialising sustainability transitions and their contestations. Grasping the energy transition as a scalar transition therefore remains an important perspective for future research in pluralist transformation and sustainability studies.

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CHAPTER 11

South Africa's Sustainability Transition: The Case of the Mpumalanga Province and its Coal-dependent Communities

Etienne Nel and Lochner Marais

Introduction

Global environmental crises and associated efforts to decarbonise energy and production systems have led to a growing academic focus on how society, systems of supply, technology, institutions and the economy can transition to a more sustainable future. In this context, the concept of 'sustainability transitions' has gained in prominence as a framework which can capture moves to embark on "fundamental shifts of entire sectors towards new and sustainable levels of development … (and) shifts (which) encompass technological, material, organizational, institutional, political, economic and socio-cultural dimensions" (Mura et al., 2021,

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p. 1). Related to Sustainability Transitions approaches are sustainable energy transitions (Coenen et al., 2021) which "imply that future energy systems will more strongly rely on renewable energy sources" (Steg et al., 2015, p. 2). As research into how sustainability transitions occur has increased, there has been a recognition that normative understandings of how they are enacted spatially do not simply reflect an information and innovation flow from the global and national scales to the local, but rather issues of multi-scalarity, 'rescaling' and relationality between different spatial scales are occurring which inform and shape the nature of sustainability transitions (Bouzarovski & Haarstad, 2019; Coenen et al., 2012; Dewald & Fromhold-Eisebeth, 2015). In parallel, it is also recognised that sustainability transitions play out differentially across uneven geographical landscapes and that communities which, historically, have relied on resource extraction and carbon-based activity are, and will be, particularly impacted by moves to switch to greater reliance on renewables. This will be especially true for local economies which experience contraction without diversification—areas which Golubchikov and O'Sullivan (2020) refer to as 'energy peripheries'. In weak, undiversified and mono-economies in parts of the Global South such changes will have significant implications for impacted communities. As a direct result, both in the North and the South the concept of 'just transitions' is being engaged with in parallel to the roll-out of sustainability and energy transitions. Just transitions thinking stemmed from labour movements and has since received significant international recognition. It is based on the thinking that "public policy (must) … maximise benefits and minimise hardships for workers (in carbon-based industries) and their communities in this transformation" (Rosenberg, 2010, in Stark et al., 2023).

A rich literature, primarily from Europe, illustrates how sustainability transitions are increasingly playing out as part of "scale transcending innovation systems" (Dewald & Fromhold-Eisebith, 2015, p. 110), through which local actions can help shape higher levels of policy and practice. It is however also clear that writing about sustainability transitions in the Global South is still in an incipient phase. This is a research lacuna, especially in light of the growing economic significance of selected countries in the South and their continued high levels of dependence of carbon-based extraction, processing, power production and associated manufacturing (see also Quimbayo Ruiz, Chapter 7). This reality has led Goldthau et al. (2020, p. 319) to observe that "little scholarly attention has been paid

to the energy transition and the Global South […] Developing countries will be central, as 70% of the future energy demand is expected to come from non-OECD countries in 2040". The situation has been aggravated by the dependent situation much of the South finds itself within the current world economic system, its often-limited agency and the fact that many western nations have off-shored energy and natural resource intensive production to these countries (Roberts & Park, 2009). This is particularly relevant to consider in places and regions in the Global South where mono-economies prevail and communities are locked into a dependence on a single extractive industry. The reality of what has been referred to as the 'resource curse' means that mine and production closure stemming from decarbonisation can have significant long-term negative effects when diversification opportunities are limited and state welfare support for what are 'left behind places' or 'energy peripheries' is often non-existent (Marais et al., 2018; Golubchikov & O'Sullivan, 2020). This justifies research to establish how sustainability and just transitions are playing out in the Global South and the degree to which rescaling is taking place in areas which are sometimes referred to as 'extractive frontiers' (Frederiksen, 2024).

This chapter seeks to partially address this gap regarding the Global South, through its examination of South Africa's current engagement with the concepts and processes of sustainability, energy and just transitions and how these are playing out across various spatial scales in that country. South Africa has the dubious reputation of being the most coal-dependent country in the G20, relying on coal for approximately 80% per cent of its power supply, which is greater than that of countries such as India and China (Nel et al., 2023). Though in volume terms South Africa's use of coal is a fraction of those countries, the sheer level of dependence is a major complicating factor in transition initiatives. The country's commitment to international climate change agreements is slowly taking effect through multi-scalar national, regional and local efforts to gradually reduce dependence on coal, decommission coal-fired power stations, and transition to a greater reliance on renewable energy (PCCC, 2022a). While this is naturally a desirable outcome, such a transition is currently causing significant local-level concern in coal-dependent communities in the Mpumalanga province of the country, where most of South Africa's coal mining and associated power generation takes place. This chapter investigates the commitment to and the challenges encountered in trying to achieve a transition to greater reliance

of renewable energy in that country. Given the historical dependence of the South African economy on a racialised system of labour exploitation under apartheid, which relied on the production of coal and power generation from the mono-economy which was created in part of Mpumalanga (Marais et al., 2018), issues of trying to ensure that a sustainability transition is just in the region are paramount.

The chapter is based on research undertaken over a three-year period in South Africa which involved field research in the Mpumalanga province, interviews with government and corporate leaders and engagement with the country's Presidential Climate Change Commission. This was complemented with desktop research. Following this Introduction, the chapter will overview relevant literature, before discussing the South African context and the sustainability, energy and just transition processes playing out in Mpumalanga. The chapter will also illustrate the complex scalar challenges which exist and conclude with a discussion of the insights gained into how these transitions are playing out in the country.

Literature Review

Climate change and growing resource scarcity have led to calls for the promotion of sustainable development globally and more recently for sustainability transitions linked to the parallel themes of sustainable energy transitions and just transitions (Gerrard & Westoby, 2021; Marais et al., 2022). Growing sustainability challenges caused by pollution and emissions, and associated social concerns are aggravated by historic dependence on embedded and generally carbon–intensive techno-economic and organisational systems. Transitions require fundamental, whole-system and multi-scalar changes to achieve the sustainable management and use of resources and the shift to renewal energy (Kohler et al., 2019). Farla et al. (2012) and Johnstone and Newell (2018) argue that sustainability transitions involve technological and policy shifts and fundamental system changes. Equally important is the social justice element and the need to minimise adverse effects on workers and communities experiencing adverse outcomes (Henry et al., 2020). This chapter is grounded on three interlinked theoretical constructs, namely the spatiality of energy and sustainability transitions, secondly sustainability transitions; and thirdly that of just transitions and the need to adopt a multi-scalar understanding in the case of the latter two considerations.

Processes of sustainability and just transitions play out across geographical space. The spatial dimensions of transitions are important to recognise given the reality that resource extraction and energy production occur at local and regional levels, often creating spatially focussed mono-economies with high levels of dependence on minerals and their processing (Marais et al., 2022). In recent years, there has been a blending of traditional geographical concerns with uneven geographical development and regional disadvantage with new thinking about climate change and energy transitions (Taylor, 2023). Coenen et al., (2021, p. 291) argue that "due to the spatial turn in the socio-technical literature, the geography of energy transitions has recently been taken increasingly seriously". Chlebna and Mattes (2020) go on to state that energy transitions are place-dependent and need a spatial focus. Linked with this, 'path dependence' and 'lock-in', particularly in former resource-dependent localities or regions are important to acknowledge (see also Pikner, Chapter 4). This is because the ability to bring about transformative and just change and to 'transition' a region will depend as much on the adaptability or otherwise of embedded socio-economic systems, local culture and institutions as it will on the ability of a region to transition in technical terms (MacKinnon et al., 2019).

The recognition of interdependent energy systems which link subnational territories has led to the identification of 'regional energy transitions' (Loewen, 2022) which link regional development, local institutions, innovation, natural resources and energy transitions with local labour, skills and governance across geographical scales (Chlebna & Mattes, 2020; Loewen, 2022). Drawing on the 'spatial turn' in Geography Bouzarovski and Haarstad (2019) have explored the relationship between scale and carbon reduction efforts, identifying that decarbonisation processes are not locked into rigid top-down systems of governance and innovation. Rather there is relationality, networking and rescaling through which proactive engagement can take place between different spatial scales i.e. the global/national, the regional and the local. Dewald and Fromhold-Eisebith (2015) argue that innovation needs to be understood as multi-scalar, engaging and productively interacting in the shaping and use of new technologies and their adaption.

Such multi-scalar engagements, Carr and Affolderbach (2014) cautions are not unproblematic and can highlight spatial unevenness in how transitions play out. In addition, as Wieczorek (2018) argues, we cannot ignore 'path dependence' and how transition processes will vary across

time and space, with some places and populations being 'locked-in' to past dependences, which limits the potential for rescaling. This is particularly pertinent to consider in the Global South's 'extractive frontiers' where there are often few livelihood alternatives in areas locked into mono-economies by global production systems and where state welfare systems are often non-existent (Frederiksen, 2024). These realities require further research to establish the degree to which rescaling is playing out in areas subject to such structural disadvantage.

The preceding reality brings to the fore the third theoretical strand underlying the argument in this chapter, namely the consideration of justice and more specifically in the context of this chapter, the notion of 'Just Transitions'. As argued above, this concept has gained traction as processes of decarbonisation play out, potentially negatively impacting the lives and livelihoods of those workers, communities and places which have often had inter-generational dependence on coal mining and coal-fired power generation (see also Becker & Naumann, Chapter 10). While decarbonisation is naturally desirable, it needs to be accompanied by processes which enable local engagement, empowerment and economic and livelihood diversification in the most affected areas, in addition to, if possible, new renewable energy generation in situ. Just transitions thinking seeks to ensure that energy and sustainability transitions lead to fair and empowering or 'just' outcomes for those communities which bear the brunt of changes in technology and resource use (Stark et al., 2023). Recent writing on just transitions argues the need to adopt a multi-dimensional focus on distributional, procedural and recognitional justice (Krawchenko & Gordon, 2021). While all three types of justice are critical to consider in places and regions undergoing sustainability transitions, there is a very real sense in the literature that for places most affected by mine and power station closure (Johnstone & Hielscher, 2017), distributional justice, is particularly critical. This can be achieved "by ensuring the benefits of a transition are concentrated in those regions and communities where the cost (e.g. job loss) is most acutely felt" (Stark et al., 2023, p. 1268). Recognising the importance of interactions and engagements across geographical space and scales and associated processes of rescaling and multi-scalarity, the chapter now moves on to look at how sustainability, energy and just transitions are playing out in South Africa and in the coal-producing region of Mpumalanga specifically.

The South African and Mpumalanga Context

South Africa faces significant challenges related to the scale of the sustainable energy transition required to transition from coal to renewable energy production. In parallel, there are the challenges of how to make this transition just for displaced workers (Nel et al., 2023). Achieving a transition will be felt most acutely in the coal rich province of Mpumalanga lying to the east of Johannesburg. Mpumalanga produces the majority of the country's coal used in heavy industry, petro-chemical refining, mineral smelting, and significantly, the majority of the country's domestic electricity, generated primarily by a series of coal-fuelled power stations in that province (see Fig. 11.1). South Africa is the most industrialised country in Africa and from the 1880s developed a spatial concentrated industrial and mining complex dependent on carbon-based activities. Known as the Mineral-Energy-Complex and centred on the greater Johannesburg area in the province of Gauteng and spilling over into the neighbouring provinces of the Free State and Mpumalanga, it was historically anchored on the gold value chain (Fine & Rustomjee, 1996 in PCCC, 2022a). It now hosts some 15 million people and hosts some of the world's largest petro-chemical plants, some 40 metal refineries, car manufacturers and diverse industries and mines (Scholvin, 2014). It should be noted that roughly 18% of South African electricity is for domestic consumption. The balance is for industrial-related use often for product production that is owned by or exported to the wealthier western nations, raising issues of macro-level responsibility for the need and costs to transition (Dewa et al., 2020).

UN Climate Change—Conference of the Parties (COP) commitments will require the decommissioning of 13 coal-fired plants by 2050 (11 are in Mpumalanga) and the closure of the remaining two after that date. Directly impacted will be production from the nearly 200 coal mines in Mpumalanga and associated support activities in rail and road transport and associated service industries and the towns and municipalities which host carbon-based activities (Mpumalanga Green Cluster Agency, 2023). In total, gradual closure will impact more than 150,000 workers in the region who are part of the coal value chain. As coal and energy production is the largest economic sector in many of the region's municipalities, closure runs the risk of significantly exacerbating already high levels of poverty and unemployment, currently standing at 37% and 39%, respectively (Cole et al., 2023). As a direct result, the social implications

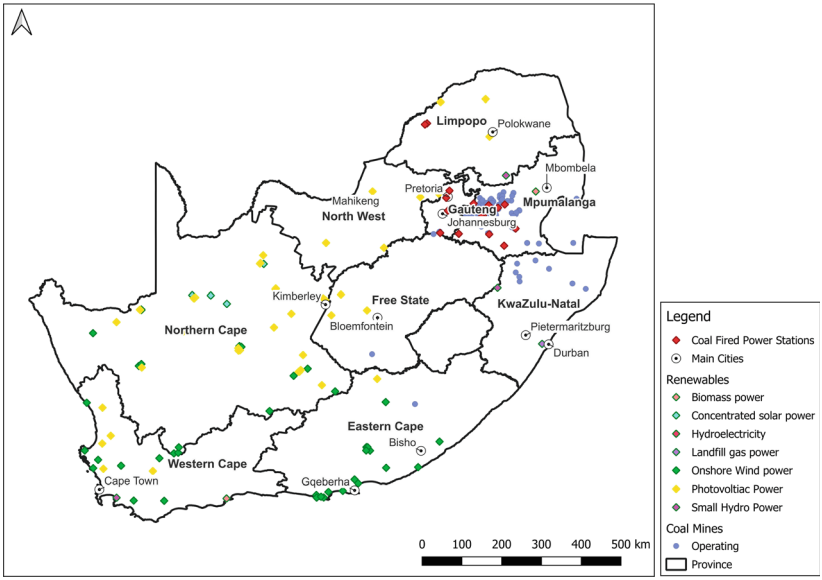

Fig. 11.1 South Africa: Coal-fired power stations, coal mines and renewable energy sites (*Source* Centre for Development Support, University of the Free State)

of energy transitions in South Africa must focus not only on economic and energy issues but also on issues of social justice, reskilling and social upliftment (Fakir, 2023a, 2023b).

Risks to employment and local-level concerns among workers who have been or might be displaced a serious issues for affected workers and trade unions. This discontent feeds through and influences provincial and national level political parties and politicians through processes of rescaling. Recent examples in the country of how the 'resource curse' and mine closure have played out in gold mining areas over the last 30 years, leaving miners as the unemployed victims of corporate restructuring is painfully apparent to communities in Mpumalanga, helping to shape local, regional and national level debate (Cole et al., 2023; Marias et al., 2018; Siyongwana & Shabalala, 2019).

In line with Coenen et al.'s (2012) call for a multi-scalar conception of sustainable energy transitions, the situation in South Africa clearly

lends itself to this form of analysis. In terms of adopting a scalar understanding of the coal value chain, it is at the micro or local scale where mining and entrepreneurial activity is clustered, where local municipalities administer services and where considerations of closure and possible renewable energy generation are taking place. The Mpumalanga province and its government exist at the regional scale, having administrative and economic development responsibilities and oversight over the province and the coal belt. At the national scale, the national government determines national policy commitments and development programmes. Here also sit the large national parastatals and international corporates which control coal mining, industrial activity and national power generation. International scale processes also help shape national choices.

Over and above South Africa's commitment to honour the Paris Agreement and transition the country's energy production, there are other contextual challenges in South Africa which impact on the pace of the sustainable energy transition. These include current high levels of debt and mismanagement experienced by the nationally owned and dominant electricity generator and distributor Eskom and its failure to meet national energy demand. These constraints will be discussed more fully below. In addition, there is significant opposition to change from coal communities and unions in Mpumalanga who fear job loss and have little faith that there are 'just' alternatives for them (Fakir, 2023b; Mirzania et al., 2023). An emerging concern is a reality that virtually none of the currently proposed renewable energy projects, which will eventually replace coal-fired power stations, are located in the Mpumalanga region and are instead primarily located in more distant provinces more conducive to wind and solar energy generation (see Figure Fig. 11.1). In the discussion which follows, the focus will be on these challenges and a scalar overview of how international, national, regional and local processes are interacting and affecting each other, in the roll-out of the sustainability and just transition processes in South Africa.

A Multi-Scalar Perspective on South Africa's Sustainable Energy and Just Transition

Drawing on writing on sustainability, energy and just transitions, the section adopts a multi-scalar lens to examine how these processes are playing in South Africa. As the term 'Just Transition' (or JT) is now part of institutionalised language used in South Africa, it will be used

to capture the essence of arguments related to sustainability, energy and just transitions. How the term is understood in the country will be explained below. The term macro-scale reflects the international and national context and commitments, and the meso-scales are the provinces such as Mpumalanga; while the micro-scale is the local places where energy and just transitions are playing out.

The Macro Scale Perspective—National and Global

National Policy

National policy with respect to sustainability and just transitions following the signing of the COP agreement has been anchored on two key policy foci—the Integrated Resource Plan of 2019 which put in the place plans for the phasing out of the use of coal and the switch to renewable energy; and the Framework for a Just Transition of 2022 (Mpumalanga Green Cluster Agency, 2023; PCCC, 2022b). National oversight is provided from the Office of the President where the Presidential Climate Change Commission (PCCC) operates from, whilst the key government ministries of Mineral Resource and Energy; and Electricity also play key roles. The PCCC commenced work in 2021 and focuses on policy formulation, public consultation and technical work to meet emissions reduction targets and to achieve a just transition (Fakir, 2023b). As noted above, the overall framing of the sustainability and energy transition is embedded within the commitment to the principle of a 'just transition' in South Africa, which the PCCC defines as interventions "to achieve a quality life for all South Africans, in the context of increasing the ability to adapt to the adverse impacts of climate, fostering climate resilience, and reaching net-zero greenhouse gas emissions by 2050" (PCCC, 2022b, p. 7). Given the government's long-term commitment to enhance quality of life and address the devastating legacies of apartheid for all South Africans, the notion of justice is a fundamental cornerstone of all government policy. To support a just transition nationally, the PCCC oversees the above-mentioned Framework for a Just Transition and the associated 'Just Energy Investment Plan' (PCCC 2022b). The former acknowledges that the transition will lead to job losses in the coal sector (and related industries) and will adversely affect Mpumalanga. Consequently, proposals include responses to increase economic diversification, local governance, social protection, diversify skills and promote human resource development. Green jobs and a climate-proofing infrastructure are seen as key.

The latter document outlines timeframes for decommissioning coal-fired stations, the envisaged risks and cost requirements.

Electricity Provision

The other key national level role player is the para-statal Eskom which, till recently, had the exclusive mandate to generate all of the country's electricity. This historic monopoly coupled with significant challenges which the organisation faces has led to the dual challenge of trying to achieve an energy transition while also still trying to meet national electricity demand from ageing power plants which experience repeated maintenance challenges. Power shortages are now a daily reality in the country and many plants only operated at just over 60% of capacity (Eskom, 2023). This has led to the situation where Eskom and the Minister of Electricity arguing that closing coal-fired power stations is not an option at this stage (Patel, 2023). Challenges which Eskom is experiencing include loss of staff, ageing infrastructure, corruption and even sabotage (De Ruyter, 2023; Nel et al., 2023). On the positive side, since 2012, the government ended Eskom's power generating monopoly and initiated a Renewable Energy Independent Power Producers Programme (REIPPP) which is seeing slow progress in the growth of the private renewable electricity supply market now providing 10% of national electricity supply (Evans & Ngcuka, 2023; Mahlaka, 2022). On the downside, the majority of the electricity grid remains owned by Eskom and is currently concentrated on linking Mpumalanga to the country's main centres, having a low-capacity presence in the remoter, underpopulated western provinces which are the most suitable areas for wind and solar power generation (see Fig. 11.1). The net result is that, though approved and under construction, many new plants cannot be fully connected to the national grid at present.

The Just Energy Transition Partnership and the Costs of Transition

Given South Africa's position as the most industrialised economy in Africa and reality that it is one of the world's largest polluters—the petro-chemical facility at Secunda is the largest single point source of greenhouse gases in the world and it has some of the most polluting coal-fired power stations (Hakkarainen et al., 2023)—there are international concerns that the country needs to be encouraged and supported in its energy transition. In 2022, in the first move of its kind globally, the EU, USA and UK signed the 'Just Energy Transition Partnership' (JETP) with South Africa to help support an energy transition in that country. Worth

US$8.5 bn (later increased to $10bn) the associated grants and loans will help South Africa in the transition (Burton, 2022; European Commission, 2022). While this move is naturally to be welcomed, it is apparent that the actual costs of the proposed transition will be significantly higher. It is currently estimated that the total cost will come to $US 250 billion over 30 years (Nel et al., 2023). At most Eskom will be able to match the JETP funds, leaving a current shortfall of some $220bn. The JETP has itself become a source of contestation with South African politicians such as the Minister of Mineral Resources and Energy wanting to slow down the transition while the country grapples with energy shortfalls and the risks posed to carbon-dependent communities. This has upset the JETP international partners, especially Germany, which has questioned national commitment to the JETP process (Nel et al., 2023). The international funding made available shows the degree to which the multi-scalar influences of external role-players are influencing strategic choices in South Africa. It however also reveals the reverse flow of concerns from South Africa as to how the JETP should be rolled out. The potential closing of coal facilities in terms of COP and the JETP has led to hostility from the unions and some established politicians who, in a contradictory fashion, either argue that the West should be doing more to assist countries in the Global South (Bridge et al., 2015) or, alternatively, they argue that the JETP is a new form of colonialism forcing them to act, but not necessarily in South Africa's best interest (Archibong & Afolabi, 2023). These sentiments indicate that global commitments and the flow of support down to the national level in South Africa are not uncontested and are causing tension between external transition goals and local priorities and concerns. National foci, particularly on distributional justice will slow down the energy transition process and this indicates that mediation between the international-national and local scales is needed to achieve international goals, but simultaneously to alleviate national and local concerns.

Rescaling Pressures within Government

There are currently tensions within national government with respect to the envisaged just transition. While the Presidency and the PCCC wish to honour and effect national commitments, many national level politicians and the key Minister of Mineral Resources and Energy are opposed to the speed of the envisaged change and its implications for workers. The latter is directly linked to the reality that politicians are attuned to the concerns of their supporters in Mpumalanga, and the fact that the ruling African

National Congress has an alliance with the key national workers unions to protect their interests (Omarjee, 2023). The latter are opposed to the risk of job loss on the part of their members, a not unreasonable view based on the poor outcomes for their members in other areas where mines are closed (Siyongwana & Shabalala, 2019). What is playing out are two counter-flows, at one level international pressures and funds are seeking to effect national and local change in the country with the support of part of government. However, as part of rescaling a reverse flow of opposition and concern from the local to the national is also shaping national action and dialogue with international partners.

Meso-scale—The Provincial Perspective

The energy transition will impact the Mpumalanga province more than others in the country and attention in this section focuses on this province and how it is currently engaging with other scales—macro and local. South Africa is a unitary state and not a federation, and the nine provincial governments have responsibility for a range of state functions, including education, health care, administration of key social welfare responsibilities and economic development. In terms of the latter, the potential loss of some of the provinces key economic mainstays is a cause of significant provincial concern.

Despite the various nationally led plans and proposed support for the province, provincial-level responses and engagement have been limited, which is impacting on the transition process. Provincial action is constrained by resourcing and capacity issues and limited new private sector investment (Madumo, 2015). It is also apparent that the province and key actors within it, have to date, been the recipients of national, top-down decisions and have had little say in how those decisions have been arrived at. On the positive side, the provincial government has recently taken a lead in the hosting of provincial workshops to encourage the diversification of the economy (Mpumalanga Government, 2023). It has also established a Climate Change Adaptation and Mitigation Plan for the province which seeks to improve the energy mix and reduce emissions. A Green Economy Development Plan to address challenges of unemployment and poverty, which the anticipated loss of 50 000 jobs by 2030 will cause has also been drawn up (Mpumalanga Provincial Government, n.d.). While these moves are to be welcomed, the limited new private sector investment in the province, the fact that most renewable

energy projects are being developed in other provinces, the existence of a narrow coal-based mono-economy in much of the province and the reality that 'path dependence' prevails limits the opportunities for provincial authorities to help drive a process of change (PCCC, 2022a).

A recent positive move was the establishment of the Mpumalanga Green Cluster Agency in 2022 (Greencape, 2022). The agency was established "to identify and remove barriers to an economically viable green economy catalysing their uptake to enable the region and its citizens to prosper" (Mpumalanga Green Cluster Agency, 2023). It seeks to work with existing enterprises and attract enterprises in the green economy value chain and develop renewable energy generating plants. It is currently too early to evaluate this endeavour.

In summary, the provincial authorities sit in an uncomfortable middle-level position as the transition process rolls out. They lack the power to challenge national and international commitments and the resources, capacity and finances to adequately respond to growing regional and local-level needs. These parallel processes place them in an invidious position. Despite this, they are legally required to address the social welfare and development needs of the province's population, but given slow action on their part, limited resources and the minimal uptake of opportunities offered to the private sector, real risks exist going forward.

Micro Scale—Local Perspectives

Local residents in the mining areas of Mpumalanga are dependent on coal for employment and business opportunities in the value chain and broader support economy (Denoon Stevens & Du Toit, 2022). Blaauw and Pretorius (2022) have pointed out that there is deep-rooted suspicion (and with reason) that renewables will result in local job losses. Through a process of rescaling, local concerns reach up through the unions and politicians to national level decision-makers, directly impacting on the way in which change is playing out and being negotiated in the country.

Local municipal strategic planning in Mpumalanga has been slow in considering the potential reality of decarbonization of the economy and the transition to sustainable energy sources. Botes et al. (2024) note that the required Integrated Development Plan (IDP) of the Emalahleni municipality, which is one of the three most coal-dependent municipalities, hardly mentions the reality and consequences of closing coal-fired stations and mines. This lack of acknowledgement of coal closure in IDPs

is common in all of the municipalities. The lacklustre history of the failure of local economic development initiatives to respond adequately to mine closure elsewhere in the province is well documented (Siyongwana & Shabalala, 2019). A rapid decline in employment will affect the ability of residents to pay local taxes which helps fund local municipalities which are required to provide basic services such as wastewater, water, refuse collection, local roads and local economic development. Worryingly, this loss of local employment and a reduction in income is not considered in local documents, nor is the need for economic diversification to any significant degree. In parallel, unemployed workers and the families may leave the area and municipalities face the risk of becoming shrinking towns with major service delivery challenges. These underfunded and under-resourced local municipalities are currently struggling to supply the basics such as water and are not in a position to prioritise economic diversification facilitation (Koma, 2010).

Interviews undertaken with the local business sector, community leaders and politicians in 2021–2023 suggested that climate change and its economic implications were not high on the local agenda. We often heard phrases like "there is enough coal for 300 years" or "these green plans will not work". These coal-energy 'lock-ins' are economic and cognitive. As the local economies are highly dependent on the mining and energy sectors, business closures across the value chain will lead to significant unemployment. Despite these inevitable problems, needed cooperation between businesses and local governments, which is essential for future transitions and prosperity in the region is clearly limited. One economically positive example (though not environmentally beneficial) is that of partnership between the local business community and the Steve Tshwete municipality, which plans to buy and operate the Hendrina Power Station when it is decommissioned (Benoni City News, 2023). This reflects on the lock-in and path dependence associated with coal energy.

In 2022 local capacity and national level commitment from Eskom to achieve a just transition was put to the test when the first coal-fired power station, at Komati, was closed in line with COP commitments. In parallel a smaller solar power station is being developed on the site to use the existing transmission lines and land. However, what happened here reflects how the actions of a macro-level actor, namely Eskom the power station owner, have negatively impacted on the local level in terms of job losses and failure to engage in the principles of a just transition

and distributive justice. In this case, there was a top-down process with minimal local-level engagement or practical local assistance. The PCCC (2023) established that the community had not been properly consulted and was caught off-guard by the decommissioning of the plant. There were no efforts to reskill workers or diversify the local economy and facilities and buildings associated with the plant were sold off without offering them to the community. As part of decommissioning Eskom undertook a socio-economic impact study and obtained an US$500million loan agreement with the World Bank to develop solar facilities on the site (Ebrahim, 2023). In 2020, Eskom's impact assessment report estimated that 791 direct jobs and more than 4000 indirect jobs would be lost at closure, while repurposing will only contribute 400 new jobs (Eskom, 2020).

What happened here provoked the ire of the Minister of Mineral Resources and Energy, Gwede Mantashe, who identified the major error of not considering justice issues prior to enacting change, or of working with local people to reduce negative outcomes (Omarjee, 2023). A recent report by the PCCC about this closure has highlighted potential risks to a just transition elsewhere, the lack of a long-term approach to closure, insufficient local participation in the decommissioning process and the absence of reskilling initiatives (Ebrahim, 2023). This negative experience must be learnt from, to avoid similar outcomes when further power stations close.

In summary, what is taking place at the local level reveals several contradictory processes. Local municipalities are not yet adequately prepared or empowered to respond to the challenges which plant closure will bring and there is actual and cognitive 'lock in' to historic path dependencies. Eskom's failure to adequately engage with the community and workers in Komati as it imposed a top-down closure process was a clear failing in terms of what just transition means. There is a parallel and vocal protest against what is taking place, which is scaling up to national level politicians and causing the PCCC to start drawing up guidelines to prevent a repetition of the errors which played out at Komati (PCCC, 2023).

Discussion and Conclusion

This chapter has confirmed the degree to which sustainable energy and just transitions in South Africa and in Mpumalanga in particular can be understood as part of a multi-scalar process. This perspective helps interrogate how transitions at the local and regional levels are mediated and

shaped by higher-level commitments, decisions and investment choices, and it illustrates how local realities and reactions, through rescaling processes, influence national level unions and politicians. The process is clearly not a smooth one and reflects the outplaying of oppositional forces in a context of limited capacity and resources.

Rescaling is fractious and exemplifies the absence of a unified voice in the national government which, in a contradictory fashion, is trying drive an energy and just transitions, while other branches of government see coal and the communities which depend on it, as needing to be protected in the long term. The voices of workers and unions have influenced national thinking and in 2023 the country's President stated: "abandoning coal as a fuel source is an idea that must be dispelled" (Businesstech, 2023). Such an approach coupled with the stark reality of the country's electricity shortfalls and the sheer dependence on coal suggests that achieving an energy transition will be long delayed. This will naturally upset the JETP partners, continue to harm the environment and postpone inevitable closure of coal mines and power plants which will still take place eventually, because of delayed honouring of COP commitments or the gradual obsolescence of older facilities.

The slow processes of decommissioning power stations and the development of renewal energy capacity in other provinces run the real risk of exacerbating uneven geographical development and the negative effects of 'lock-in' and 'path dependence' in Mpumalanga, which is effectively an 'extractive' and an 'energy periphery' (Golubchikov & O'Sullivan, 2020). Weak provincial and local government leadership and capacity, the 'anti-model' of the Komati closure and the narrow vision of local leaders who are still trying to motivate the continued mining do not bode well for the future. Limited attempts to date to diversify the region's mono-economy and reskill workers run the real risk, that when inevitable closure happens, the region, as was the case of the former Free State Goldfields in the country in the 1990s, will be left as a shadow of its former self, characterised by abandoned facilities and unemployment (Marais et al., 2018).

The failure to achieve a 'just' transition in Komati will require a radical rethink on how to manage future plant closures to reduce social impact and job loss and, where possible, to start new enterprises, not least in the renewable energy sector. It also shows what can go wrong when top-down decision-makers fail to listen to and engage with local actors to achieve mutually agreed outcomes. The concern and discontent among displaced

or vulnerable workers is feeding into the narrative among unions and some politicians who are speaking against the objective of changing from coal to sustainable energies (see also Becker & Naumann, Chapter 10; Pikner, Chapter 4 in a European context). This is unfortunate as it is leading to opposition rather than to the collaborative development of agreed on options to implement a just transition.

What is happening in South Africa can be considered representational of many other countries in the Global South where the transitions to sustainable energy sources and just transitions for the displaced workers are critical, but may be hampered by capacity and financial constraints, limited information flows and the path dependence which prevails, in what are often 'peripheral' regions and 'extractive frontiers' (Frederiksen, 2024). In mono-economies, energy transitions could potentially exacerbate uneven geographical development over time, particularly if they are imposed and not negotiated. As shown by this case, progress can be slow and can be hindered by political and local tensions. This in turn raises wider questions regarding the degree to which countries in the Global North should be assisting those in the South to meet the costs of transitioning, given that much of the carbon-dependent energy in countries like South Africa has been used for and will continue to be used for the production of goods owned by or exported to the wealthier Global North.

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CHAPTER 12

Sustainability Transition in Peripheral Small-Scale Forest Industries: Case Studies from Finland and Sweden

Maija Halonen and Linda Lundmark

Introduction

The development of northern resource regions is influenced by the global sustainability transition agenda, which has heightened interest in natural resources within peripheral locations (Hansen & Coenen, 2015; Munro, 2019). This transition is reshaping the operational landscape of forest industries and their societal roles. In forest-rich countries like Finland and Sweden, the spotlight has primarily focused on major forest companies (such as Stora Enso, UPM, and Holmen) and their facilities, while smaller forest industries in remote areas have received less attention. Similarly, discussions around sustainability and related transitions or transformations

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in the forest sector tend to emphasise large-scale companies rather than smaller-scale ones (e.g. Kleinschmit et al., 2014; Näyhä, 2019).

To address this knowledge gap, this chapter delves into forest manufacturing companies and units located in the regional inland peripheries of northeast Finland and northern Sweden. These entities represent forest industries situated far from major transportation routes and economic centres. Despite their relatively small scale compared to major players in the forest sector, they are part of the global sector through which these peripheral industries are intricately connected to market dynamics across different scales and are influenced by political agendas related to sustainable forest use (see also Halonen et al., 2022). Moreover, they contribute to regional development processes and hold importance for local communities, particularly in terms of economic growth and livelihoods.

The forest manufacturing companies in these peripheral communities position nationally and globally important forest resources at the forefront of the sustainability transition, localising a portion of this transition within areas rich in natural resources. This chapter explores how local policymakers and representatives of the forest industries interpret sustainability transition agendas and their influence on the forest-related socio-economic environment. Additionally, it examines how local forest industries adapt to ever-changing agendas, markets, and crises. These questions are approached from the developmental perspectives of local policymakers and the practical economic viewpoints of actors in the forest industries.

Industrial Forest Bioeconomy in the Sustainability Transition

In recent decades, forest industries have undergone several transformative periods, most of which have arisen from shifts in production demand or innovations. Rather than being explicitly driven by global societal agendas, these transformations have often emerged organically due to changing market dynamics within the economic environment. In this context, the concept of sustainability transition plays a pivotal role.

The sustainability transition represents a globally set agenda aimed at reshaping societies to be less environmentally damaging and more equitable for communities (see Avelino et al., 2016; Gibbs & O'Neill, 2017; McCauley & Heffron, 2018). It seeks to alter how we perceive and

utilise forests as economic resources. For example, the United Nations (UN, 2015) emphasises that forest loss has adverse effects on carbon emissions, biodiversity, and land quality. Consequently, efforts to protect forests and develop long-term management plans are crucial to mitigating these impacts. However, the call for environmental stewardship does not imply a complete cessation of industrial forest use. On the contrary, forests are increasingly recognised as part of the solution in transitioning towards a green economy (see Halonen et al., 2022; Kröger & Raitio, 2017; Skarbøvik et al., 2020). The green economy, as defined by the UN (2011), is characterised by being low-carbon, resource-efficient, and socially inclusive.

These principles align with the European Union's (EU's) strategic vision, as outlined in its Green Deal (European Commission [EC], 2019). The Green Deal serves as a guiding framework not only for environmental policies but also for the Bioeconomy Strategy (EC, 2018) and the Forest Strategy (EC, 2021) within the EU. The transformation could be described as emerging due to changing market flows in the economic environment rather than directed through global societal agendas. In that sense, considering the sustainability transition as a socio-technological transition (instead of only a techno-economic transition) makes a difference to this pattern.

Two objectives of the Bioeconomy Strategy (EC, 2018)—namely, "managing natural resources sustainably" and "mitigating and adapting to climate change"—underscore the imperative to re-evaluate the perpetual use of natural resources. In the Forest Strategy (EC, 2021), these objectives are expressed in principles that advocate for maintaining wood utilisation within sustainable limits, aligning with criteria for carbon stocks as defined by The Land Use, Land Use Change, and Forestry (LULUCF) Regulation. Notably, the cascading use of forests and resource practices typical of a circular economy are highlighted as beneficial production approaches.

The objective of "reducing dependence on non-renewable, unsustainable resources," as outlined in the Bioeconomy Strategy, is seamlessly integrated into the Forest Strategy. The latter proposes "measures for innovation and promotion of new materials and products to replace fossil-based counterparts." In optimal scenarios, forest-based products result from efficient resource utilisation, exhibit longevity, and excel in carbon storage. However, even short-lived wood-based products are deemed

acceptable if they are substitutes for fossil-based counterparts and are produced in ways unsuitable for long-lived materials.

Despite the constraints on forest use, the forest bioeconomy plays a pivotal role in bolstering European competitiveness (EC, 2021). Both strategies underscore the potential of the bioeconomy and forest-based sectors to serve multiple socio-economic functions and yield benefits such as job creation, investments, innovations, and growth opportunities, particularly in remote or peripheral rural areas. Although they contain sustainable ideals and aims in many ways, they may also be in contradiction with each other and with the different understandings of sustainability; therefore, the policies have also been subject to criticism (e.g. Halonen et al., 2022; Ramcilovic-Suominen & Pülzl, 2018; also Albrecht & Klein, Chapter 2).

Forest Industries in Finland and Sweden

Finland and Sweden are key players in the European forest sector (excluding the Russian Federation). While Germany boasts the largest forest resources, Finland ranks second and Sweden third in terms of forest reserves (Sauvula-Seppälä, 2023). Germany has the largest amount of forest industry exports, followed by Sweden in second place and Finland in third (calculated from FAOstat data, as cited in Sauvula-Seppälä, 2023). Forestry plays a central role in both the Finnish and Swedish economies, and the forest sector has become a pivotal arena for the development of a bioeconomy (Fischer et al., 2020; Uotila & Sauvula-Seppälä, 2023). Approximately half of the forests in both countries are privately owned, with around 25% in Sweden and 7% in Finland owned by companies. Additionally, approximately 14% of forests in Sweden and 35% in Finland are under state control (Luke, 2023a; Statistics Sweden, 2023; Swedish Forest Industries, 2023). The forest industry in Finland and Sweden is characterised by a few major players alongside numerous smaller actors. In the media, these dominant industry players are often portrayed as having a guiding role in the sustainability transition related to forest resources (e.g. Näyhä & Wallius, 2024). Notable examples of large forest industries and related operators include Stora Enso (Finland and Sweden), UPM-Kymmene (Finland), Metsä Group (Finland), Tornator (Finland), Holmen (Sweden), Sveaskog (Sweden), and SCA (Sweden). In addition to private forest industries, the national forest authorities—Metsähallitus (Finland) and Skogsstyrelsen (Sweden)—play a major role, particularly in

managing forest use and sales on state-owned lands, as well as addressing governance-related issues.

Forest mills were once scattered across both countries, including in smaller rural and remote inland areas. Particularly during the early 1900s, resource towns experienced a boom as various types of forest mills and related manufacturing companies flourished. However, subsequent market fluctuations and societal changes led to the closure of mills, particularly in inland regions where units were relatively small and distant from markets and efficient transportation connections. Consequently, the forest industries became concentrated closer to coastal areas, especially in the southern and northern parts of both countries (Lindgren et al., 2017; Swedish Forest Industries, 2023; Tykkyläinen et al., 2017). The most remote and sparsely populated inland areas—situated within the vast forest resources on the eastern side of Finland and the western side of Sweden—now appear to be relatively empty regions, housing only a handful of forest-related industrial companies. These companies are examples of forest enterprises that have diverged from the more typical centralised and agglomerated patterns seen in the forest sector. A common thread in these cases is their specific embeddedness within the regional context and their linkages to trade and other industry actors (Lindgren et al., 2017; Tykkyläinen et al., 2017). While some of these companies may have once been units of major players in the field, ownership restructuring has resulted in them being typically owned by other entities. Overall, these companies tend to be relatively small industrial units compared to the major players in their sub-sector.

Small Scaling as Rescaling Sustainability Transition

In this chapter, the concept of rescaling the sustainability transition encompasses rescaling through small scaling. Rather than focusing solely on rescaling sustainability transition policies from one scale to another (as discussed by Madsen, 2022), we approach rescaling as a framing mechanism for understanding the sustainability transition. Our specific focus lies on two themes presented in sustainability transition agendas: the role of the forest bioeconomy in sustainability transition and expectations related to peripheral and rural development.

Firstly, small-scale transition refers to a shift in scalar context—from one geographical scale to another. Given that the sustainability transition is often framed as a global agenda, this chapter aims to rescale

that agenda to a smaller, localised context and practices of local development and economic actors. By adopting this perspective, we emphasise practical implementation, concrete actions, and the actual practices associated with sustainability, moving away from abstract policymaking and agenda-setting. Consequently, the sustainability transition becomes geographically localised, and the potential abstractions put forth by local actors are grounded in specific places. Our approach to rescaling sustainability within the local context aligns with Carr and Affolderbach's (2014) framework, albeit with slight modifications. Through multiscalar relations, local contexts become embedded, supported, and defined by external factors. Moreover, we view the sustainability transition as interconnected with relations across different scales and local contexts. Additionally, we consider places as dynamic loci of change, where ideas related to the transition undergo transformation and adoption within spatial arrangements tied to specific localities.

In this chapter, our focus turns to peripheral rural areas, allowing us to juxtapose broader agendas with the perspectives of actors from regions highlighted in those agendas. Specifically, we explore the interplay between the green economy, sustainability transition, and the context of rural regions and natural resources (also Kuhmonen et al., Chapter 6). One of our primary objectives is to address the knowledge gap concerning the development of (resource) peripheries within advanced economies—a phenomenon that remains understudied within the sustainability transition framework (Munro, 2019; Vale et al., 2023).

Secondly, our attention shifts to a focus on a smaller scale, signifying a departure from the prevailing emphasis on large-scale economic actors. While forest industries often feature prominently in related research (e.g. Kotilainen & Rytteri, 2011; Kröger & Raitio, 2017; Näyhä & Wallius, 2024) as drivers of bioeconomy development (Holmgren et al., 2022), we redirect our focus towards relatively small-scale actors within their respective fields (see also Albrecht & Klein, Chapter 2). It is important to recognise that statistical definitions do not always neatly apply to the companies under examination. Instead, the meaningful definition of small-scale emerges from the operational context of each company. While most of the examined companies fall within the small- to medium-sized range based on staff headcount (as per the SME definition, see EC, 2023), a few included companies qualify as large by that same definition. Nevertheless, these actors perceive themselves as small-scale within their operational context relative to the major players.

Regional Inland Peripheries in Finland and Sweden

The case study areas (Fig. 12.1) in Finland belong to the regions of North Karelia (regional centre Joensuu), North Savo (regional centre Kuopio), and Kainuu (regional centre Kajaani). In Sweden, the case study area is located in Västerbotten (regional centre Umeå). These areas were selected and classified as regional peripheries to highlight their rurality and physical remoteness on the edge of the region and their distance from the regional centre. In most cases, the descriptive characteristics of the local communities align with those typical of rural regions: shrinking and ageing populations, limited education and research opportunities, and relatively long distances to logistics centres, terminals, and even further to the main markets.

Across all cases, there are common features, such as extensive forest resources and industrial forest-related companies, that still operate in these locations. The industrial history is quite similar, with a boom period dating back to the first half of the twentieth century, followed by turbulent times. The primary strategies for adaptation have included rationalisation, production renewal, changes in ownership, and, over the years, both closures and new establishment of industrial units (e.g. Lindgren et al., 2017; Tykkyläinen et al., 2017). While many of the largest forest companies previously had a presence in the case study areas, they have since been sold and are currently operating under different ownership.

Interview Data and Analysis

The data consists of interviews with local industrial and public representatives conducted between 2021 and 2023. Among the interviewees, 16 were local industrial representatives holding leadership positions in companies, while 10 were local public representatives in similar roles within municipal authorities or development companies. Of the total 26 interviewees, 20 were from Finland, and 6 were from Sweden. To maintain confidentiality, we agreed with the interviewees that their participation or the companies or authorities they represented could be inferred, but we refrained from using direct company names or providing detailed information about them.

The interviews covered all four regions, ensuring a minimum of four interviewees from each region. At least one interviewee represented the

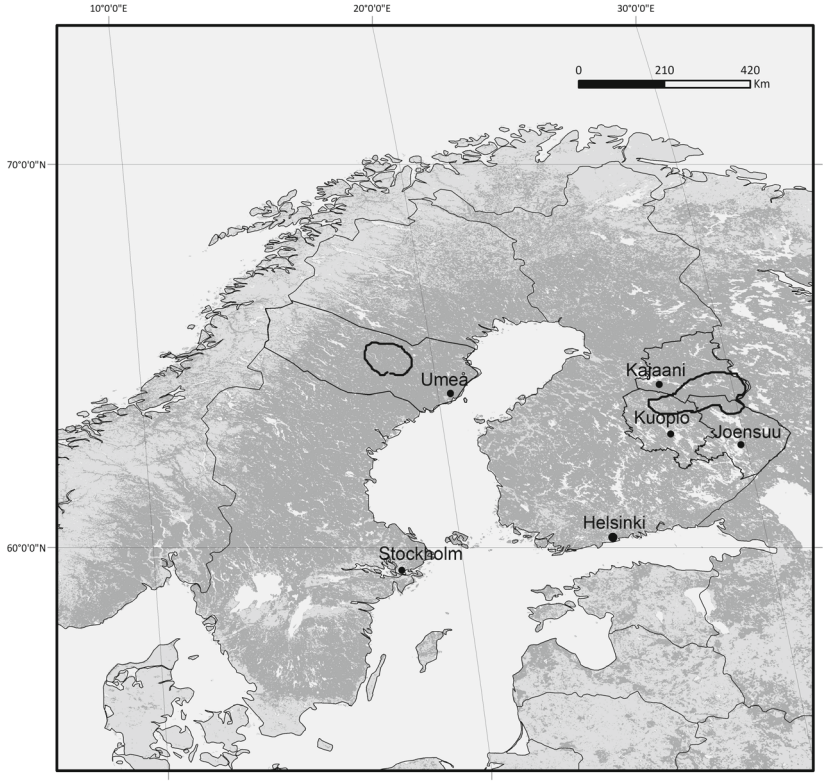

Fig. 12.1 The case study areas in Finland and Sweden (*Source* ArcGIS Hub [2015], European Commission Joint Research Centre [ECJRC] [2003], Eurostat [2021])

public organisation, while the remaining participants were affiliated with various companies. These companies span a diverse range of forest industries, including sawn and cardboard production, wooden houses, building materials, biorefining production, and forestry-related components and machines. The industrial units under study were established between 1903 and 2011, reflecting a broad spectrum of historical layers within the forest industry.

Our interviews allowed us to delve into the experiences, perceptions, and opinions related to sustainability transition and contextualised scales.

We treated these interviews as expert insights, enabling us to construct knowledge about specific phenomena from the perspectives of practices and processes occurring in selected locations and organisations. While the interviews followed a semi-structured format, with overarching themes shaping the discussions, specific questions were tailored based on each expert's individual perceptions. The main themes were: (1) background, structure and operations (e.g. SWOT, main drivers and actors, natural resources), (2) green economy and sustainability transition, (3) external factors and (un)predictability (e.g. inflation, energy crises, war, covid), (4) distances, (5) growth, and (6) alternative scenarios. For our analysis, we employed a qualitative content analysis approach. The interviews were organised into thematic categories, with phrases, sentences, or paragraphs serving as the units of analysis (following Krippendorff, 2004). These interviews were supported by excerpts translated from Finnish or Swedish by the authors. Each interview is labelled as SweCompX, SwePublicY, FinCompX, or FinPublicY.

Our analytical journey begins by examining broader perspectives—the local community (development) and the environment (forests as resources). We then delve deeper, narrowing our focus to the views of forest industries along the production chain—from the locale of raw materials to manufacturing, transportation, and customers.

Results

The Significance of the Forest Industries for the Local Communities

All public interviewees commonly express their appreciation or positive attitude towards local forest industries. They often cite forest manufacturing companies as good examples when evaluating the strengths of local economic development. Opinions vary on whether forest industries are considered a major industrial sector, a sector among other industries, or individually significant companies among other industrial firms. The importance to local communities is primarily related to the job opportunities these companies provide, the investments and capital (both economic and social) they have brought or potentially will bring in the future, and the general business activity they contribute. The largest forest companies (by turnover or staff) are typically flagship companies, but companies of all sizes are valued. Smaller companies are particularly significant due to

their ability to operate in niche markets and their role as relatively newly established companies and/or innovative users of wood.

It was also noted that while many companies can be portrayed as capable of innovative action through their production or products, the communities lack companies that develop more high-tech or novel products related to wooden side-streams. These products, for example, could be related to technological innovations in mechanical wood production or the utilisation of soluble pulp or lignin. The interviewees also highlight the extensive amount of unprocessed wood that is still exported, meaning the economic value is not enhanced through further processing. Some industrial representatives agree that Finnish processing lags behind, for instance, central European wood processing. Part of the explanation lies in the planning history and volume related to wood materials, which are considered superior (e.g. in Germany and Austria).

Another reason is that the demand for Scandinavian wood has been high in the European markets, since the availability of good quality spruce has been better than in Central Europe. Some industrial representatives also criticise the overall sustainability if, for instance, the sawn wood is first transported to Central Europe for further processing and transported back to Finland for wooden construction. However, despite this lack of value-added or further processing, relatively traditional sawmills are often valued for their size, their long history as the backbone of the local forest industry, their provision of tree substance for side-stream production, and sometimes for the energy they provide for local users or wider networks.

The typical characteristic of forest industry companies is their heavy export orientation, through which the communities become linked to national and Nordic markets, but above all, the European and global markets. Although these links make the companies and, thus, communities vulnerable to the fluctuations of these markets, the external connections are more often regarded as a positive characteristic from the perspectives of the communities and as a signal of successful adaptation of the companies. In a way, they exemplify that competitive, internationally operating companies can also be located in small remote towns that are often presented as lagging regions and hinterlands in a broader economic landscape.

Approaches to Sustainable Use of Forests

Multiple Users of Forests

The general impression regarding the green and sustainable transition is that neither public nor industrial interviewees are fully against or supportive of it. To some extent, the explanation relates to the phase in which the transition is proceeding. Especially in the interviews with public actors, the green transition is acknowledged and accepted as a broader framework for development, and sustainability is something that should be considered in all actions. There are some concrete examples of new behaviours or actions taken, but more emphasis is placed on the way it has changed the way of thinking—a process that may still be ongoing and may not have translated into action yet.

For public interviewees, the question of the forest industry's sustainability focuses mainly on wood cuttings. There seems to be little caution in their assessments concerning the meaning of sustainability in the use of the forests in their surroundings. In principle, there seems to be support for other greener options. However, they are framed against the strong belief that most locals approve of the extensive felling, and the explanation emphasises the great importance of the local forest industry.

> That [debate on multiple uses of forests or protection] is very scarce. The background is understandable because the [Local Sawmill] is the backbone of the [Town], many hundreds of workplaces are there. If you consider all the regional impacts the mill has, for the town, it would be a catastrophe if it would end. Culturally thinking, it could almost be said that 100% accepts that the mill is here and cuts the wood. However, some green statements have been presented, and the scenery and the pleasant environment which is a very good thing. (FinPublic1)

The comments are not as directly concerned with the environmental aspects, such as protection, biodiversity, or carbon sinks, as they are usually presented in conflicts arising from sustainability and its impacts on forest use. The examples and reflections are more related to the multiple ways of using the forest and viewing the forest as a tangible living environment. Most often, these tensions are not new, and the changing effects suggest that more tensions will likely arise towards wood cuttings and other forms, and the dominating power of the forest industry might diminish.

> I think we have to be prepared for increasing conflicts because there are more people wanting to use nature for different purposes. (SwePublic1)
>
> The tourism industry wants to preserve beautiful nature and a wide variety of plants and so on. Then we have the forest industry that uses the forest in a very intensive way, cutting, and clearcuts and so on. Most of the time, tourism industry doesn't have so much to say. […] Perhaps in the future that could change, but until now forest industry has been [stronger]. (SwePublic2)

Multiple Users of Wooden Materials

For industrial representatives, wood cuttings appear to be just a part of sustainability and are more related to the accessibility of industrial resources. Sustainability has created a paradox that on one hand increases the demand for wood, but on the other hand attempts to reduce it. The increasing demand is related to the interest in wood-based materials among renewable resources, which are seen as more sustainable than, for example, concrete, plastic, or fossil oil, and thus as replacements for those materials. The attempts to reduce the use of forest resources are largely related to the roles of forests as carbon sinks, occasionally important locations for biodiversity, and the overall need to curb over-cutting and the destruction of nature. The increase in demand affects many existing companies, and planned or recently started large mills, such as the Kemi bioproduct mill in northern Finland. Furthermore, the Russian war in Ukraine has shaken the wood markets due to trade sanctions and import restrictions directed at Russia. For instance, Finland imported nearly 10,000 m^3 of roundwood and wood by-products from Russia in 2020, but this reduced to 1500 m^3 in 2022 and to none from August 2022 onwards (Luke, 2023b). This has increased the demand for wood in domestic markets and in other markets, a situation that concerns not only Finland but also other countries that used to import wood from Russia. The following answer concerning the impacts of sustainability on industrial forest production reveals this complexity well:

> From the investment side, where you get the logs and turn them into sawn timber, there are big investments going on, and some pulp mills may be coming up. The more comes, the more it will affect the raw material we buy. And if all of them go through, and what is presented to this forest conservation, restoration, then, yes, this really does affect. I also wonder what will be enough for all these sawmills, to have enough timber

> in Finland. One thing, which doesn't concern sustainability directly, but a lot of logs have been imported from Russia to Finland. (FinComp1)

There are some variations in how companies have adapted to changes in the wood markets. Those who buy wood from larger companies are more reliant on how these bigger actors succeed in procuring extra wood and what is sold at a reasonable price. In contrast, those who can buy from different sources, usually from various types of owners, have more options if one source fails. However, having good and long-term contracts with a few main wood suppliers has proven to be a reliable strategy to adapt to fluctuations in the wood markets. Therefore, direct assumptions cannot be made about whether having few or many suppliers or which size of suppliers is the best. The biggest challenges seem to be with companies that have been established relatively recently (operating for years rather than several decades) and have not yet formed robust one-to-one partnerships with wood suppliers or may not have established networks that help if substitute wood is needed. In general, a small size is sometimes seen as a factor that causes uncertainty or powerlessness in the wood markets, but it can be turned into something positive since they usually need less wood than larger operators, especially if they manage to be flexible and prepared for changing situations. An example of preparedness is the early disengagement of Finnish companies from Russian wood, which in most cases took place in the early 2000s, especially around 2007 due to Russian wood customs. The Swedish companies interviewed for this research have not imported from Russia, but their assessment was also that due to Russia's previous influence on the global wood market, imports would impact the wood markets throughout Europe and also in Sweden.

Three common claims were made by the interviewees. First, despite many uncertainties, the interviewees were confident that the wood supply was secured for their needs and that they would be able to acquire it. Second, most of the companies have extended their wood acquisition area, for example, from a radius of 100 km to 200 km, and/or the number of wood suppliers, which is regarded here as a form of rescaling of the wood procurement management. Third, the approach to the accessibility of wood appeared to be a practical question that would be handled and solved by the rules in the competitive markets. For example, not many are against the reduction of wood cuttings, nor is there any anxiety about growing competition in the wood markets. They clearly believe in the market and that those who are competitive will be successful in supplying

wood for their operations. Limitations to extraction are part of the market constraints, and companies and society must adapt to that reality:

> I think that we [people in general] want to get rid of fossil-based materials, and we will benefit from more wood-based solutions, but within those boundaries what we can get out of the woods, that the forests really grow in the future. I imagine that both will happen and has happened. The fact is that there will not be enough [wood], and then you just have to manage. (FinComp7)

Sustainably from the Forest to the Customers

The location in the vicinity of forest resources is considered part of sustainability since the wooden material is transported relatively short distances to the mills. However, the original business-related reasons for the location have been related to the cost and time efficiency of wood transportation, in addition to possible personal reasons, such as in the case of local family businesses. Only more recently has it become positive from a sustainability point of view. The exception is the pulp that is needed in special production processes, which now needs to be imported from much further away due to the increased demand and the end of imports from Russia. This is acknowledged as a limitation to sustainable production, and other solutions are being investigated. In addition, most of the industrial interviewees referred to compliance with laws and main certificates (PEFC or FSC) as ways to ensure that wood is harvested sustainably, reflecting their trust in formal laws and certain certificates as acceptable indicators of sustainability in their field. In general, there seems to be quite a strong reliance on forestry in "Scandinavia" as referring to Finland, Sweden, and Norway, with the belief that the management of forests is sustainable, and industrial representatives can trust that the wood they buy is harvested sustainably.

On the other hand, distances to processing or to buyers are a problem. The most sustainable distances to further processing are described as situations when transportation from one mill to another can simply cross the street. These cases are usually related to the further processing of wood or side-streams from the local sawmill. However, most sawmill products and further processed products are transported elsewhere. A small percentage of products travel to bigger cities in the southern parts of Finland or Sweden, but most are exported to other countries. Typically, the freight

is first transported to the main seaports and then further from there. Only a few industries have reasonable access to rail transportation, meaning that most of the transportation is handled by trucks. Rail transportation is more cost-efficient and sustainable (in terms of CO_2 emissions) than trucks, but even those using rail transportation argue that it could be improved. The bottlenecks of railways concern the poor conditions or congestion of railways and unelectrified railways, for which reason the diesel used in railway transportation still keeps the CO_2 emissions high. Those using trucks also critique truck transportation in terms of sustainability. However, because there are no other options for transportation, it is just something to live with and to try to find other ways to improve sustainability. It is also a point of criticism towards transportation networks in peripheral areas that are not expected to be improved by the interviewees.

Wood material is regarded as sustainable because it is a renewable natural resource. As simply presented: "We are producing an environmentally friendly product. It's not concrete or metal or something." (SweComp1) Especially when contrasting wood as a substitute material for fossil-based or non-renewable materials, wood is seen as a sustainable alternative. Most industrial representatives have positively received the atmosphere created by the policies or adopted by the consumers that have raised its value as a sustainable material. It is often related to the reduction of CO_2 emissions and the potential to use wood materials as carbon stocks: "After all, our product is [sustainable] in such a way that there is a lot of carbon tied to our products, that is what they say how it is calculated." (FinComp1).

The paradox, however, is that understanding wood as a sustainable material and as a carbon stock also boosts the overall growth of the use of wood materials. From the boundary perspective, this is a contradiction, but it is mainly regarded as a positive development for the industry itself: "This awareness increases all the time, related to CO_2. And the more the awareness increases, the more it promotes the use of wood as a building material." (FinComp4) From this perspective, being a small-scale unit cannot really be regarded as the most favourable size or a value that might not change in the future.

Customers buying wood materials or products are generally described as catalysts for improvements in sustainable production. However, there is a wide range of customer types, which has also impacted the phase and the ways sustainability has become noted in companies. For example,

in some cases, customers have started to present aspects related to the sustainable use of wood, to which the company has reacted (e.g. typically somehow related to certificates). In contrast, in other cases, the company has been proactive and developed production (e.g. enabling the use of side-streams), products (e.g. including less toxic components), or other parts of the chain (e.g. through alternative ways of transportation) to be more sustainable. The timeline of when sustainability became an issue for customers also varies, from about a decade or more to one to two years. A common factor for almost all customers seems to be the price limit, beyond which sustainability does not matter as much anymore. This message was surprisingly similar and concerned multinational large company customers, regular wholesalers, and retailers, as well as single entrepreneurs and customers. Of course, the price limit is highly subjective and context-specific, but the cost seems to have a significant impact on how meaningful sustainability is in the purchase decision situation.

> That green thing, most of the customers think those issues. […] But when it comes too far, you can see it too much in the price, then those green values pretty much vanish from the people. It is still the money that largely defines the value. (FinComp5)

A Question of Large Scale?

The overall impression from the interviews was that there is no significant need to scale up their business, or at least it was not presented as an intrinsic value for them. Mostly, the slight apprehension about growing and becoming larger is motivated by practical issues. For example, the mill's capacity cannot be increased simply because the property's boundaries cannot be expanded. In some cases, the volume of production could be increased, but this would require substantial investments, which are often assessed as too risky and not worth making. In addition, the reasonable accessibility of wood was mainly assessed to be achievable for the current volumes or for a certain level of growth. Some of the companies also calculated the volumes they have no economic or sustainable reason to exceed. In those calculations, they have tried to consider the wood material they need from a certain area, the estimated needs of the other operators, and the amount of wood that can be harvested from the area. The problem, however, is that it is very difficult to estimate the overall need for wood for industrial purposes and the capacity of the wood

that can be extracted from a certain forest area. On rare occasions, the company may present its small size almost like a strategy it has adopted after years of only thinking about how to grow.

> Before, there were a lot of discussions about growth and we must be big and so on. Now, we are thinking more about how we can make it sustainable and good at this volume. We don't want to be 300 employees and bigger, bigger, bigger. We are already quite big, and I think it's better to make the company that we have even better in this volume. Actually, we have sold out some customers and changed some customers that are more suitable for our production because we can work a lot with our efficiency. And to do that, we don't need more customers. (SweComp1)

The only clear exceptions were the companies which had operated for a short period and were still in their pioneering or early growth phase, as compared to most of the other companies that were in their maturing phase or had already faced a declining phase (usually in terms of staff or production volume, not necessarily in terms of turnover or profit). An example of a small pioneering company could be one that has started to operate in the field of energy production. In the global oil sector, they represented a very small and, thus, not significant actor. In addition, they were operating in a relatively new field of business without long histories of formal education and thus were at risk of not getting enough skilled employees. However, the difficulty of getting enough employees was a shared problem for almost all the companies, a problem that was related to the small-scale of the company and the remote location. The need for new employees was related to retirements, growth of production, or new types of production. The lack of suitable employees was explained by the shrinking generations, the non-existing education (especially vocational and/or upper secondary school) possibilities nearby, and the tough competition for skilled employees, especially with the larger companies. The employment problem appeared almost as a more severe hindrance for future operations than the boundaries of wood resources.

Conclusions

Local policymakers and the actors in the forest industries interpreted the sustainability transition agendas mostly through positive frames, especially when considering the influences on economic development and employment (for sustainability transition and local development, see Connelly et al., Chapter 8) in the communities and the demand for forest-related products. On the other hand, the use of forest resources was seen or believed to be restricted in the future, but there was no clear opposition against that either. The interpretations of the sustainable use of forests appeared to be abstract and trusting on the formal or general understanding of the sector rather than their own experiences and knowledge as experts, which were more present in the interpretation concerning sustainability and how it has influenced the actual business. The local industries have different ways of adapting to shifting agendas, markets, and crises, which are mainly related to individual differences of the companies, the sub-sector, and the age—and to some extent to the size—of the companies. Surprisingly, few differences were related to the national context, which in one sense also emphasises the similarities of the companies that are similarly distant (from markets) and nearby (resources), important for the local communities, and relatively small within their sub-sector.

While results show that there is an awareness of the sustainability transition taking place, the economic structure and spatial organisation of the small-scale forest sector do not allow for quick and costly adjustments to sometimes intangible goals that do not pay off instantly. Current research themes propose that small-scale operators are better embedded in local contexts and, therefore, align better with the sustainability transition as envisioned by non-growth proponents (Vezzoni & Ramcilovic-Suominen, 2023). In fact, as the small-scale operators covered here seem to have no desire to grow, they are well suited to this idea. However, they also adjust their operations to adapt to geographical structures and organisation (global markets, transport, availability of raw material and forest land), national and international regulations, and regional circumstances while aiming to stay relevant for customers worldwide. Thus, these small-scale operators become a part of the networks of the large-scale forest sector and the different phases of the sustainability transition, which is understood in various ways in different parts of the chain.

In terms of responsibility for the sustainability transition to take place in small-scale operations in peripheral locations, there are some indications that to efficiently and effectively steer the transition, finding leverage points and incentives to take certain steps in the favourable direction could be a way for the public to solve some of the issues raised in the interviews. According to Holmgren et al. (2022), the absence of a formal process for bioeconomy development has allowed for a multi-scalar industry-led process where the power of influence of large-scale owners, including the state as an owner and an economic interest, is slowing down the sustainability transition due to them using the imperative of interpretation for their own benefit. This will form the governance of the forest resources and the bioeconomy at large and, in extension, be crucial for the pace and outcome of the sustainability transition. However, from our interviews, it is clear that although the transition is well known and believed to be necessary, the operations are closely linked to daily procedures and much more embedded in local circumstances, which means that visions and strategies adopted elsewhere in the governance structure are subordinate.

Some local problems encountered by the companies are externally generated. For example, the lack of employees is a problem that most likely will not be solved by the industry itself, small or large. It must be addressed from a governmental and regional perspective by, for example, raising the status of those localities and ensuring there is education available in the regions. In addition to a situation that is already problematic, the ongoing sustainability transition in the industrial north of Sweden, with large investments aimed at a few hotspots, will also affect these other industries to a significant extent and, in turn, also affect the nature of the sustainability transition.

Among public actors, the green transition is recognised as a broader development path, which includes the notion that sustainability should be considered in all actions. However, most importantly, it is clear that while the way of thinking has changed, actual behaviours or systems have not changed as much yet. Thus, it could be said that the pace of development is higher in the minds of public agencies and government than what is actually taking place on the ground. This happens for highly local and company-dependent reasons—costs are too high, and the local context does not support change.

In both Sweden and Finland, forestry is central to the bioeconomy, and the reliance on the forest sector of the bioeconomy in the ongoing neo-industrialisation of the North is high (Fischer et al., 2020). According to local stakeholders, the backbone of the sustainability transition in this context is the felling of trees and access to raw materials. The objective of the bioeconomy is to increase all types of forest use while simultaneously preserving forests. According to interviews, the sustainability transition will consume much more wood but remove fewer trees, which does not fully reconcile. However, the interviews support a tendency in policy documents suggesting a higher reliance on forest raw materials for future sustainable development while also stressing the importance of conservation and protection of forests (for deforestation, see Quimbayo Ruiz, Chapter 7). In conclusion, small-scale forest companies may not be interested in growing for practical and managerial reasons, but it is likely that some kind of rescaling will occur alongside the progress of the sustainability transition.

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