



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

M. Halonen (✉)

Department of Geographical and Historical Studies, University of Eastern
Finland, Joensuu, Finland

e-mail: majja.halonen@uef.fi

L. Lundmark

Department of Geography, Umeå University, Umeå, Sweden

e-mail: linda.lundmark@umu.se

© The Author(s) 2025

M. Halonen et al. (eds.), *Rescaling Sustainability Transitions*,

https://doi.org/10.1007/978-3-031-69918-4_12

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 multiscale 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

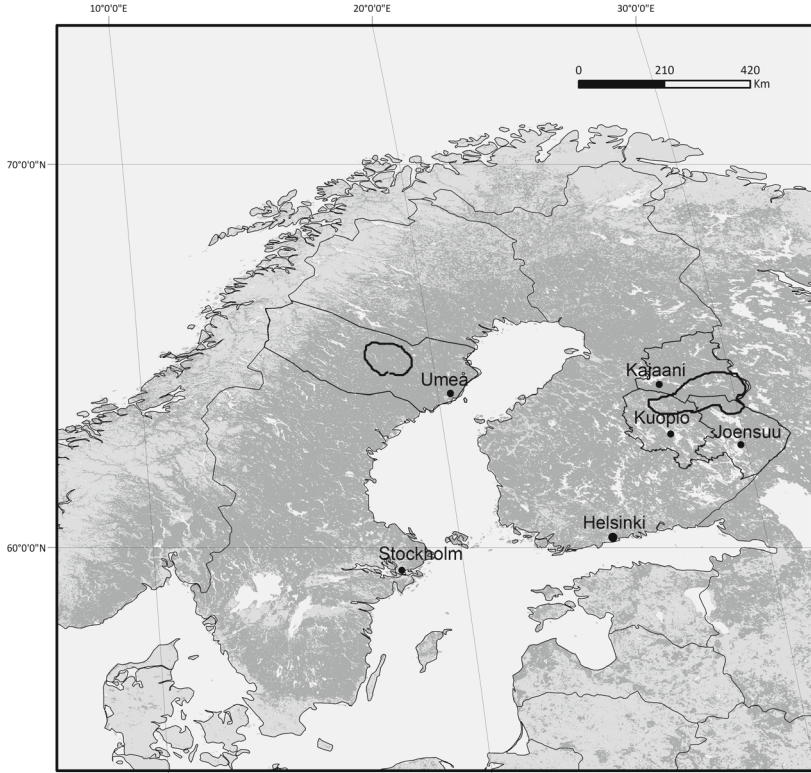


Fig. 12.1 The case study areas in Finland and Sweden (*Source* ArcGIS Hub [2015], European Commission Joint Research Centre [ECJRC] [2003], Eurostat [2021])

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 m³ of roundwood and wood by-products from Russia in 2020, but this reduced to 1500 m³ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂. 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.

Acknowledgements Maija Halonen acknowledges the financial support from the Kone Foundation [Sixth cycle in the periphery, 29.11.2019], and Linda Lundmark appreciates the support from Formas [Project no. 2011-00072]. We would like to thank the interviewees for their valuable contributions and the reviewers for the constructive input.

REFERENCES

- ArcGIS Hub. (2015). *CountriesWGS8, World Countries*. https://hub.arcgis.com/datasets/a21fdb46d23e4ef896f31475217cbb08_1
- Avelino, F., Grin, J., Pel, B., & Jhagroe, S. (2016). The Politics of Sustainability Transitions. *Journal of Environmental Policy & Planning*, 18(5), 557–567. <https://doi.org/10.1080/1523908X.2016.1216782>
- Carr, C., & Affolderbach, J. (2014). Rescaling Sustainability? Local Opportunities and Scalar Contradictions. *Local Environment*, 19(6), 567–571. <https://doi.org/10.1080/13549839.2014.894281>
- EC, European Commission. (2018). *A Sustainable Bioeconomy for Europe: Strengthening the Connection Between Economy, Society and the Environment*. Updated Bioeconomy Strategy. Publications Office of the European Union.
- European Commission (EC). (2019). *The European Green Deal Sets Out How to Make Europe the First Climate Neutral Continent by 2050, Boosting the Economy, Improving People's Health and Quality of Life, Caring for Nature*,

- and Leaving No One Behind*. Press release 11 December 2019. https://ec.europa.eu/commission/presscorner/detail/e%20n/ip_19_6691
- European Commission (EC). (2021). *New EU Forest Strategy for 2030*.
- European Commission (EC). (2023). *Internal Market, Industry, Entrepreneurship and SMEs: SME Definition*. https://single-market-economy.ec.europa.eu/smes/sme-definition_en
- European Commission Joint Research Centre (ECJRC). (2003). *GLC2000, The Global Land Cover Map for the Year 2000*. <http://www-gem.jrc.it/glc2000>.
- Eurostat. (2021). *GISCO: Geographical Information and Maps: Administrative Units/Statistical Units, LAU*. <https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units/laui>
- Fischer, K., Stenius, T., & Holmgren, S. (2020). Swedish Forests in the Bioeconomy: Stories from the National Forest Program. *Society & Natural Resources*, 33(7), 896–913. <https://doi.org/10.1080/08941920.2020.1725202>
- Gibbs, D., & O'Neill, K. (2017). Future Green Economies and Regional Development: A Research Agenda. *Regional Studies*, 51(1), 161–173. <https://doi.org/10.1080/00343404.2016.1255719>
- Halonen, M., Nähkö, A., & Kuhmonen, I. (2022). Regional Sustainability Transition Through Forest-based Bioeconomy? Development Actors' Perspectives on Related Policies, Power, and Justice. *Forest Policy and Economics*, 142, 102775. <https://doi.org/10.1016/j.forpol.2022.102775>
- Hansen, T., & Coenen, L. (2015). The Geography of Sustainability Transitions: Review, Synthesis and Reflections on an Emergent Research Field. *Environmental Innovation and Societal Transitions*, 17, 92–109. <https://doi.org/10.1016/j.eist.2014.11.001>
- Holmgren, S., Giurca, A., Johansson, J., Söderlund Kanarp, C., Stenius, T., & Fischer, K. (2022). Whose Transformation is This? Unpacking the 'Apparatus of Capture' in Sweden's Bioeconomy. *Environmental Innovation and Societal Transitions*, 42, 44–57. <https://doi.org/10.1016/j.eist.2021.11.005>
- Kleinschmit, D., Lindstad, B. H., Thorsen, B. J., Toppinen, A., Roos, A., & Baardsen, S. (2014). Shades of Green: A Social Scientific View on Bioeconomy in the Forest Sector. *Scandinavian Journal of Forest Research*, 29(4), 402–410. <https://doi.org/10.1080/02827581.2014.921722>
- Kotilainen, J., & Rytteri, R. (2011). Transformation of Forest Policy Regime in Finland Since the 19th Century. *Journal of Historical Geography*, 37, 429–439. <https://doi.org/10.1016/j.jhg.2011.04.003>
- Krippendorff, K. (2004). *Content analysis: An introduction to its methodology*. 2nd ed., SAGE Publications.
- Kröger, M., & Raitio, K. (2017). Finnish Forest Policy in the Era of Bioeconomy: A Pathway to Sustainability? *Forest Policy and Economics*, 77, 6–15. <https://doi.org/10.1016/j.forpol.2016.12.003>

- Lindgren, U., Borrgren, J., Karlsson, S., Eriksson, R. H., & Timmermans, B. (2017). Is There an End to the Concentration of Businesses and People? In C. Keskitalo (Ed.), *Globalisation and Change in Forest Ownership and Forest Use: Natural Resource Management in Transition* (pp. 139–181). Palgrave Macmillan. https://doi.org/10.1057/978-1-137-57116-8_5
- Luke, Natural Resource Institute Finland. (2023a). *Ownership of Forestry Land (1000 ha) by Inventory, Region and Ownership Category, 2018–2022*. https://statdb.luke.fi/PxWeb/pxweb/en/LUKE/LUKE__04%20Metsa__06%20Metsavarat/1.06_Metsatalousmaa_omistajaryhmittain.px/
- Luke, Natural Resources Institute Finland. (2023b). *Foreign Trade in Roundwood and Forest Industry Products*. https://statdb.luke.fi/PxWeb/pxweb/en/LUKE/LUKE__04%20Metsa__04%20Talous__06%20Metsateollisuuden%20ulkomaankauppa/?rxid=001bc7da-70f4-47c4-a6c2-c9100d8b50db
- Madsen, S. H. J. (2022). A Constructivist Approach to the Spatial Organization of Transformative Innovation Policy. *Environmental Innovation and Societal Transitions*, 42, 340–351. <https://doi.org/10.1016/j.eist.2022.01.007>
- McCauley, D., & Heffron, R. (2018). Just Transition: Integrating Climate, Energy and Environmental Justice. *Energy Policy*, 119, 1–7. <https://doi.org/10.1016/j.enpol.2018.04.014>
- Munro, F. (2019). Renewable Energy and Transition-periphery Dynamics in Scotland. *Environmental Innovation and Societal Transitions*, 31, 273–281. <https://doi.org/10.1016/j.eist.2018.09.001>
- Näyhä, A. (2019). Transition in the Finnish Forest-based Sector: Company Perspectives on the Bioeconomy, Circular Economy and Sustainability. *Journal of Cleaner Production*, 209, 1294–1306. <https://doi.org/10.1016/j.jclepro.2018.10.260>
- Näyhä, A., & Wallius, V. (2024). Actors, Discourses and Relations in the Finnish Newspapers’ Forest Discussion: Empowering or Disempowering Sustainability Transition? (Preprint). <https://doi.org/10.2139/ssrn.4500285>
- Ramcilovic-Suominen, S., & Pülzl, H. (2018). Sustainable Development—A ‘Selling Point’ of the Emerging EU Bioeconomy Policy Framework? *Journal of Cleaner Production*, 172, 4170–4180. <https://doi.org/10.1016/j.jclepro.2016.12.157>
- Sauvula-Seppälä, T. (2023). Kansainvälisiä metsätilastoja—International Forest Statistics. In E. Vaahtera, T. Niinistö, A. Peltola, M. Rätyn, T. Sauvula-Seppälä, J. Torvelainen, J. & E. Uotila (Eds.), *Metsätalustollinen vuosikirja—Finnish Statistical Yearbook of Forestry 2022* (pp. 187–196). Luonnonvarakeskus.
- Skarbøvik, E., Jordan, P., Lepistö, A., Kronvang, B., Stutter, M. I., & Vermaat, J. E. (2020). Catchment Effects of a Future Nordic Bioeconomy: From Land Use to Water Resources. *Ambio*, 49, 1697–1709. <https://doi.org/10.1007/s13280-020-01391-z>

- Statistics Sweden. (2023). Skogsdata—aktuella uppgifter om de svenska skogarna. <https://www.scb.se/hitta-statistik/statistik-efter-amne/jord-och-skogsbruk-fiske/skogarnas-tillstand-och-forandring/skogsdata--aktuella-uppgifter-om-de-svenska-skogarna/>
- Swedish Forest Industries. (2023). *Insights About Swedish Forests and Forestry*. <https://www.forestindustries.se/>
- Tykkyläinen, M., Vatanen, E., Halonen, M., & Kotilainen, J. (2017). Global-local Links and Industrial Restructuring in a Resource Town in Finland: The Case of Lieksa. In G. Halseth (Ed.) *Transformation of Resource Towns and Peripheries: Political Economy Perspectives* (pp. 85–111). Routledge.
- United Nations (UN). (2011). *UNEP United Nations Environment Programme*. <https://www.unep.org/regions/asia-andpacific/regional-initiatives/supporting-resource-efficiency/green-economy>
- United Nations (UN). (2015). *Sustainable Development Goals*. <https://www.un.org/sustainable-development-goals>
- Uotila, E., & Sauvula-Seppälä, T. (2023). Metsäsektori kansantaloudessa—Forest Sector in Finland's National Economy. In E. Vaahtera, T. Niinistö, A. Peltola, M. Rätty, T. Sauvula-Seppälä, J. Torvelainen, J. & E. Uotila (Eds.) *Metsätalastollinen vuosikirja—Finnish Statistical Yearbook of Forestry 2022* (pp. 175–186). Luonnonvarakeskus, Helsinki.
- Vale, M., Peponi, A., Carvalho, L., Veloso, A. P., Queiros, M., & Morgado, P. (2023). Are Peripheral Regions in Troubled Waters for Sustainability Transitions? A Systematic Analysis of the Literature. *European Urban and Regional Studies*, 0(0). <https://doi.org/10.1177/096977642311943>
- Vezzoni, R., & Ramcilovic-Suominen, S. (2023). *The Finnish Bioeconomy Beyond Growth. Natural Resources and Bioeconomy Studies 104/2023*. Luke, Natural Resource Institute Finland <https://doi.org/10.13140/RG.2.2.11912.39686>

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

