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Regional bioeconomies: public finance and sustainable policy narratives

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ABSTRACT

Regional bioeconomies promote sustainable, regional economies under the auspices of EU green growth policies. Combining prospects of rural rejuvenation, sustainability and innovation, they are employed to address climate change, societal challenges, and often benefit from substantial public funds. Yet, despite public finance's key role for bio-based transitions and (regional) bioeconomies, it has received little academic attention. Framed by conceptualisations on greening finance and (sustainable) policy narratives, this paper evaluates the public finance processes of three spatially variegated regional bioeconomy developments in Europe (Finland, Sweden, Spain). It provides empirical accounts from the case study sites and contrasts their public finance narratives with sustainable bioeconomy policy trajectories employed in EU policy promotion and benchmarking. This critical questioning of the current representations of regional bioeconomies in public finance narratives portrays a problematic mismatch between the dominant selective economic features and wider EU policy aims, particularly in relation to sustainability. Accompanied by the neglect of decisive local features in these benchmarking narratives, they promote a sustainably and spatially unreflective path forward for bioeconomy policy learning and development.

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Introduction

The bioeconomy has become a primary political approach to promote and sustain regional economies under the auspices of the UN Sustainable Development Goals and green growth policies (e.g. OECD 2010; EC 2018a, 2018b; Fritzsche et al. 2020). Combining the prospects of rural rejuvenation, sustainable growth and innovation, bioeconomy policies are part of a wider transformation deemed politically appropriate to address climate change related societal challenges. Such transformation requires large investments and both, public and private funding agencies are supporting new bio-based solutions. The European Union's green growth-targeted funding for research, business development and SMEs such as Horizon 2020/Europe and the structural funds (ERDF) have become key to fund the bioeconomy (e.g. De Besi and McCormick 2015; EC 2018b). Indeed, the European Commission's (EC) 2018 revised bioeconomy strategy highlights the 'access-to-finance' as a top priority and promotes a mix of public finance tools and private investments as well as the exchange of best practices (EC 2018b). Additionally, loans and guarantee-based

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finance instruments are employed heavily by the EU and national public institutions to enable the bioeconomy and attract private investment. To summarize, many regional bioeconomies and regional green policies in general benefit from substantial public funds (Bylund 2006; While, Jonas, and Gibbs 2010; Spatial Foresight et al. 2017; Albrecht 2019).

We approach the bioeconomy as a policy arena pushing the use of biomass to replace fossil materials and energy sources through innovation and technological development. In the EU, the bioeconomy is a core policy backed by the EC that has led to the mobilization of policy activities and industrial developments on national and regional levels. With supporters prone to claim the bioeconomy's key role within the EU New Green Deal (EC 2019a), and the calls to exchange good (finance) practices, we argue that projects/developments with access to extended public funding instruments delineate bioeconomy policy's direction and consequently its capacity as a sustainable transformation instrument. Hence, public funding influences networks of policy learning and the mobilization of policy ideas (e.g. Wood 2016) as it provides receiving projects with credibility, portraying them as policies worth promoting (Dörny and Schulz 2018). The bioeconomy has raised criticism for its narrow approach to sustainability and use of natural resources (Bugge, Hansen, and Klitkou 2016; D'Amato et al. 2017); normative focus on economic growth, innovation networks and the marginalization of societal effects in places of materialization (e.g. Albrecht and Kortelainen 2020). Hence, public funding support may establish benchmarks or 'successful' policy narratives (McCann 2013) that are not, or are only partially aligned, with a sustainable economic transformation.

Despite the key role played by public funding in regional bioeconomy developments and their sustainable trajectories, they have received rather limited attention (e.g. Bugge, Hansen, and Klitkou 2016; Birch 2017; Albrecht 2019; Albrecht and Lukkarinen 2020). There is little said regarding the links between public funding, its affiliated narratives and regional bioeconomy trajectories, and the wider narratives with which bioeconomy policies are mobilized. This paper aims to fill in some aspects of this gap by answering the following questions: (1) *What are the narratives that dominate public funding of green/bio economic developments on different scales*, (2) *How do funding trajectories match the publicly promoted sustainable bioeconomy policy narratives*, and (3) *What are the potential consequences of the narratives on policy mobilization and learning processes in relation to bioeconomy policy implementation?*

To address those questions, the paper examines the narratives linked to bioeconomy developments (co-)financed with public funds using the case studies of three widely acknowledged regional forest-based bioeconomies in Europe (Äänekoski in Finland, Värmland in Sweden, and Catalonia in Spain). The cases illustrate how the forest-based bioeconomy is represented through narratives that justify public investments for its development and suggests that the resulting policy mobilisations do not necessarily match the overall aims of sustainable development. This allows us to compare alignments and mismatches between policy narratives promoted as investment benchmarks with grounded perspectives on sustainable and social challenges, as well as to critically assess the employment of these 'best practices' as thresholds for financing sustainable developments. This paper questions the current representations of regional bioeconomy developments in the (public) financial sector, and particularly their role as sustainability benchmarks.

Conceptualizing bioeconomy and public finance

Strategies for green growth, including the bioeconomy, are presented as an answer to environmental and economic crises (e.g. EC 2018a, 2019a). Together with other greening policies in the EU, the aim is to transform the current economic system's dependence on fossil materials primarily by supporting technological development and innovation in old and new sectors (Davies and Mullan 2011). One criticism of the development of a European bioeconomy is its technocratic approaches to sustainability and 'continuous greening of the economy' (e.g. Kleinschmit et al. 2014; Pülzl, Kleinschmit, and Arts 2014; Ramcilovic-Suominen and Pülzl 2018). From this

perspective, bioeconomy policies continue to promote technical fixes to capitalist production instead of contributing to a wider societal transformation including green production and changes in behavioural and consumption patterns (e.g. While, Jonas, and Gibbs 2010; Jacobs 2012). In Europe, policies on green growth, including a forest-based bioeconomy, are backed by networks of practitioners, national and supranational research agencies, universities and regional authorities, including lobby activities at the EU-level (Andersson and Cook 2019).

We link our study on regional bioeconomies, public funding instruments and their effects on sustainable policies to two fields of geographical inquiry. First, research on policy narratives rooted in conceptualizations of policy mobility literature, where the bioeconomy is approached as spatial processes of policymaking and materialization (e.g. Grundel 2018; Albrecht 2019; Albrecht and Lukkarinen 2020). Second, research on the greening of finance systems, an area of growing interest in economic geography (e.g. Pike and Pollard 2010; Dörny and Schulz 2018; Esposito, Mastromatteo, and Gatti 2019). In addition, the paper draws on valuable input from bioeconomy assessments rooted in political economy, particularly its focus on bioeconomy concepts and values in a capitalist system (Birch 2017). Yet, our own approach is positioned largely with the two former areas, as many of their approaches are framed by the common denominator of the bioeconomy as a key political vehicle for a sustainable transformation rather than its underlying ontological conceptualisations.

Policy narratives and green finance

Policy narratives and their processes of creation, translation and dissemination are a key aspect that shape the (trans)national and mobile design of EU bioeconomy policy (Albrecht 2019). Often tied to the mobilization of policy knowledge or the assembling of policy learning processes they are a crucial element of policy mobility literature (e.g. McCann 2013; Wood 2016; Honeck 2018; Andersson and Cook 2019).

While policy mobility research enables the evaluation of policy mobilization and mutation processes through space, our more confined focus on policy narratives allows dissecting the (potential) divergence between policy aims and materialisations. Recent geographical accounts link research on policy mobility and their narratives with an assessment of assemblages, to display the continuous (re-)production of spatial processes that either maintain or alter their composition (e.g. Prince 2017). With the aims of EU bioeconomy policy often linked to sustainability or regional development a focus on the heterogenous composition of policy narratives allow to critically scrutinize what is actually mobilized in networks of policy learning and boosting (e.g. Albrecht 2019). Hence, assemblage thinking allows integrating processes and multiplicity into the analysis of policy narratives, alongside the effects, materialization practices and potentials when employed in policy mobilization (e.g. Baker and McGuirk 2017).

To investigate the bioeconomy as a mobile policy, its public financing and its development as a sustainable transformation, we acknowledge that public investment and financial support programmes are closely linked to the political trajectories of the funding institutions at various scales (e.g. Pike and Pollard 2010; Barca, McCann, and Rodríguez-Pose 2012). Often, green or environmental financing and investments are used as synonyms, and are approached with a focus on private investment and market-based instruments (Dörny and Schulz 2018), overlooking public investments. Nevertheless, public finance instruments for sustainable transformations are considered as a promising, yet challenging avenue to overcome the predominant short-termism of the financial sector that hinders a sustainable transformation (Esposito, Mastromatteo, and Gatti 2019). Indeed, Sheppard (2018) highlights the role of the state, politics and the integration of multiplicity, while Clark (2017) regards short-term opportunism as a key failure of the current financial system to provide stable and just development. In the following, we treat public funding as a key political instrument for policies as technologies of power including their vested interests (e.g. Kuus 2015), which therefore play a key role in the processes of policy mobility and translation.

Public finance and policy narratives

Policy narratives take a rather prominent role in policy mobility literature as they provide the substance for policy ideas to be mobilized among policy learning communities and beyond (McCann 2013; Wood 2016; Honeck 2018). Concerning the cross-section of policy mobility and finance, some research highlights related (policy) narratives. Baker et al. (2016) and Ward (2017), provide a detailed account of the narratives, mobilization and implementation of tax increment financing as a policy instrument for urban regeneration. Elsewhere, McCann (2013) provides detailed accounts about the boosting of urban policy ideas through ‘success narratives’. In relation to bioeconomy narratives, Albrecht (2019) exemplifies the use of policy narratives in the Äänekoski bioproduct mill (Finland), highlighting their assumptive and selective features in assemblage creation (see also Woods 2015). While narrative perspective is less common in research on finance systems, the study by Hall (2006) about the impact of quantitative financial narratives in London’s corporate banking sector clearly highlights their role in shaping spatial processes and (re-)formulating socio-economic trajectories. Policy narratives, if employed in documents, through branding activities or at expert meetings (e.g. Wood 2015; Albrecht and Lukkarinen 2020), carry certain interpretations about the process or idea they aim to promote or contest. Hence, a focus on narratives entrenched in the financing of (regional) bioeconomies enables scrutiny of certain aspects of the social agency of the actors involved, such as political bodies or financial institutions (e.g. Pike and Pollard 2010; Miller 2012).

With public funding and financing considered as a power tool to promote or attain certain political trajectories, such as a sustainable transformation, the policy narratives that underpin these investments become an instrument for boosting certain policy ideas, consequently steering societal transformation dynamics (e.g. McCann 2003; Barca, McCann, and Rodríguez-Pose 2012; McCann and Ward 2012; McCann 2013). The distribution of success stories, for instance a large European Investment Bank funded project, can create a benchmark for policy learning processes and their communities. This occurs because a successful story is portrayed as suited to achieve the policy narrative (Honeck 2018; Albrecht 2019). Additionally, public finance through regional institutions can take the form of regional branding, comparable to the financialisation of company brands aimed at delivering returns on their investment for the company (e.g. Pike 2009; Pike and Pollard 2010); yet in this case it aims at adding value (including private investments) to the wider region of the (bioeconomy) development. Hence, often policy narratives used in benchmarking are based on success stories, selective (largely optimistic) or even assumptive accounts of the development at hand (McCann 2013; Albrecht and Lukkarinen 2020).

Finally, as most proponents of a narrative approach argue, policy narratives are treated as a spatially constructed and selective rhetoric of the processes or instruments they aim to represent like, for example, the structure, instruments and political trajectories of regional bioeconomy development (e.g. Hall 2006; McCann 2013; Albrecht and Kortelainen 2020). While they are only one, although significant piece in the constantly reshaping jigsaw puzzle of locally embedded assembling processes, it is important to question the mismatches between widely promoted policy narratives and locally embedded bioeconomy developments (Albrecht and Lukkarinen 2020) because the policy narratives affect the outcome and trajectories of policy implementation and design, as pointed out by Albrecht (2019). Additionally, Peck and Theodore (2015, 24) point out the diffusion of policy ideas through ‘power-soaked epistemic networks’, which define success and failure in policy belief systems while Miller (2012) stresses the influence of policy narratives on policy legitimization through alliances. Finally, contrasting a set of financial trajectories with the wider spatial assembling processes and their heterogeneous narratives enables the assessment of the ‘assumptive worlds’ of policy makers (Peck and Theodore 2015), in this case public finance entities, and to unravel how regional benchmarks or best practices meet their denominated credentials, in this case sustainable transition and just regional development.

Methods

This paper employs a set of case studies based on three regional forest-based bioeconomy developments, their key public finance instruments and narratives: Äänekoski bioproduct mill (Finland), Värmland Region with its Paper Province 2.0 strategy (Sweden), and the Forest Science and Technology Centre of Catalonia CTFC (Spain). Our analysis focuses on their key public finance instruments and trajectories, in reconnection with the dominant policy narratives of the case studies and in the EU bioeconomy.

Following methodological commitments stressed in policy mobility assessments (e.g. Baker et al. 2016; Baker and McGuirk 2017), we use qualitative data originating from semi-structured interviews, participant observation, and an extensive analysis of secondary, largely document based data (e.g. funding reports, ERDF project summaries, local and regional strategies) (for more details see Grundel 2018; Albrecht 2019; Morales 2020). It is not our intention to present a methodological case comparison but to highlight the role of variegated public funding narratives present in the three case studies and their potential effects on policy learning and trajectories. Hence, the cases have been selected because of their heterogeneous features as bioeconomy developments of different size, institutional ownership and (territorial) foci, which also results in a variegated level of detail in the case descriptions. Additionally, these forest-based bioeconomies have received a wide array of international attention and are closely linked to the forest-based bioeconomy policy learning communities in Europe. While such communities serve as important nodes of policy sharing and learning (Clark 2017), they also connect the diversity of regional bioeconomy policies and are relevant to illustrate how policies are mobilized, materialized, shaped and translated by various policy actors. Nevertheless, to grasp the processes of policy mobilization here, rather than ‘follow the policy’ (McCann and Ward 2012), this paper evaluates the role of public finance instruments and their trajectories as influential components in wider bioeconomy policy assembling processes. Below, we present the case studies and their key public finance instruments in relation to the public funding related narratives.

Three regional bioeconomies and public finance narratives

Äänekoski bioproduct mill (BPM)

The BPM is located in Äänekoski, a small mill town of 18 770 residents in Central Finland. The town of Äänekoski is a forest industry community and aside from the short presence of Nokia during the late 90s and early 2000s it was a rather typical mill town in the Finnish context until recently. Following the decline and restructuring processes in the Finnish and global forest industry, Äänekoski has been displayed as a positive policy narrative in the transition from an outdated forest industry towards a sustainable bioeconomy (Albrecht 2019; Albrecht and Kortelainen 2020). The key part of this ongoing transformation is the BPM owned by Metsä Group and the production units that use some or several of the BPM’s products or side streams in their own operation. Advertised as a ‘... unique bio ecosystem’, it portrays a new type of integrated forest industry development in Finland and assumes a benchmarking role for bioeconomy investments in Finland and abroad (e.g. Albrecht 2019). Parallel to the BPM investment, the municipality of Äänekoski has invested heavily in re-branding and restructuring the town to reverse its negative industrial image and to halt depopulation trends. Thereby, the town has engaged in a variety of policy narratives and their mobilisations, including the BPM branding stories, European and Finnish bioeconomy policy narratives as a driver for rural growth, and the narrative of Äänekoski as a future hub of B2B bioeconomy expertise (Vision Hunters 2018).

The Finnish multinational company Metsä Group announced its 1.2 B€ investment for the BPM in 2014, making it the largest single bioeconomy framed investment in forest industries in Europe at the time. For finances, the company relied on a mixed finance scheme of 40% equity financing and

60% of debt financing (Hämälä 2017). The equity share was covered by Metsä Fibre's own capital, an increase in shareholder capital and a special shareholder loan by the Itochu cooperation from Japan.¹ The 60% debt financing of approximately 720 M€ was covered by a mix of public and private loans which were partially secured through public export credit guarantees. The public investment share in the construction costs of the BPM consists of four key financing instruments: (1) a 275 M€ loan from the European Investment Bank (EIB), (2) a 75 M€ guarantee by the European Fund for Strategic Investment (EFSI) to secure parts of the EIB loan; (3) joint public export credit guarantees worth 400 M€ by the export credit agencies of Finland (Finnvera) and Sweden (EKN) and, (4) a 32.1 M€ infrastructure investment grant from the Finnish state fund for renewable energy (Finnvera 2015; EC 2016; EIB 2015). The three former instruments are loan based and were aimed at securing and attracting the private debt financing covered by six commercial banks (Nordea, Pohjola Bank, Danske Bank, DNB Bank, SEB, Swedbank). Receiving one of the first EIB loans backed by an EFSI guarantee and 'warehoused' by EIB prior to final ratification of the EFSI (see EIB 2015; EC 2015), the BPM was widely promoted as a bioeconomy narrative and a benchmark for public investment support under the first pillar of the Investment Plan for the Europe/Juncker Plan (EC 2019b) with its focus on private investment generation, SME support and job creation. The only larger direct state aid in the BPM site was the 32.1 M€ grant to finance a share of Metsä Group's investments in state-of-the-art renewable energy measures.

Public finance instruments for BPM construction were supplemented by a set of public funded projects with a focus on providing infrastructure fit for purpose. The key investment was the 'Äänekoski bioproduct mill traffic connections' project to improve regional transportation infrastructure for the requirements of the BPM worth 173 M€ (Väylä 2020). It included renovations and new constructions in the road and rail transportation systems, such as the renewal of the nearby State Road 4 and the electrification of the railway line between Jyväskylä and Äänekoski (for details see Albrecht 2019). Other institutions and companies in Äänekoski have been granted bioeconomy related European Regional Development Funds (ERDF) worth 3.5 M€ related to product development and construction of production facilities, green town development projects (e.g. Albrecht and Kortelainen 2020), and equipment for a local R&D facilities' bioeconomy knowledge platform (ERDF 2020).

Värmland and Paper Province 2.0

Värmland is a Swedish region located in the southwestern part of the country, bordering with Norway. It has a population of approximately 281,000 inhabitants and consists of 16 municipalities. The forest industry has a long history in the region, dating back to the seventeenth century, with the pulp and paper industry developing in the nineteenth century. Today there are more than 200 firms and industries directly related to the forest industry, employing over 12,000 workers within the sector (Berlina et al. 2016).

There are three main actors pushing for a transformation towards a forest-based bioeconomy in Värmland: the regional authorities (Region Värmland), the regional university (Karlstad University) and the cluster organization Paper Province. The cluster organization was founded in 1999 to support its member firms and industries mainly within the regional pulp and paper industry. Today, the organization has more than 200 members, including a wide range of actors from the whole value chain. Still, one of its tasks is to support its member firms, especially focusing on creating platforms for building partnerships and collaborations with other industries, research institutions and authorities. Since the beginning of the 2000s another task is to benchmark and brand the cluster and the regional forest industry nationally and internationally, also closely related to the name of the cluster itself (Grundel 2018). The establishment of the cluster organization was part of a strategic work to strengthen already existing clusters. This process was co-financed with funds from the regional authorities to support network activities including innovation platforms, meeting places and regional partnerships (Bjurulf and Olsson 2010; Region Värmland 2013).

In 2013, Värmland and Paper Province 2.0 was awarded Vinnväxt² funding. Consequently, the initiative received about 13 M€, jointly financed by Vinnova (Swedish Innovation Agency) (50%) and a triple helix partnership (public-private partnership) (50%) in the region consisting of: Paper Province, regional and local authorities, Karlstad University, SP Technical Research Institute and the Swedish Forest Agency. In line with the aim of Vinnväxt, that is to promote sustainable growth in Swedish regions focusing on strengthening the regional innovation system (RIS), the goal of the Paper Province 2.0 project was to support the RIS in the transformation of the pulp and paper industry into a forestry-based bioeconomy by funding research, development and the commercialization of new bio-based products. However, the funding was also secured because of the overall aim to transform ‘all of society’ in the region, meaning that it should include citizens, authorities, and industries. In addition, receiving the national funding also had a profound effect on the development of the regional smart specialization strategy ‘Värmland’s research and innovation strategy for smart specialisation 2015–2020’ (VRIS3) where the forest-based bioeconomy became the specialization of the highest priority (Region Värmland 2015; Grundel and Dahlström 2016). Another, concrete result was the development of the ‘Academy for Smart Specialisation 2016–2020’, an agreement between the regional authorities and the university on research funding.

Taking the decision towards developing a regional bioeconomy also affected the directionality of other public funding, like ERDF, serving as another major public financial support for the transition towards a bioeconomy in Värmland. One such example is the development of *The Bioeconomy Region* (Interreg Sweden-Norway) stretching the geographical area of Värmland and Dalarna on the Swedish side and Viken and Innlandet Fylkeskommune on the Norwegian side of the border (total funding: 4.4 M€, EU:1.2 M€). The main aim was to support SMEs to stimulate wood-based innovations and international business expansion. This work also included direct support measures to SMEs throughout the whole value chain from an idea to finished product, such as access to regional testbeds and enabling platforms and meeting places for businesses and firms within the sector to network. In this project, the regional authorities took on a lead role and were the driving agency for developing the project.

The Forest Science and Technology Centre of Catalonia

Catalonia is an autonomous region located in Northeast Spain, a strategic location to reach European and international markets. It consists of four provinces, and has around 7.5 million inhabitants, most of them living in Barcelona’s metropolitan area. It is an economic powerhouse in Spain and Southern Europe, and an attractive destination for investment; it has a diversified economy with a strong tertiary sector and a significant industrial tradition and development path. However, the primary sector only represents 1.1% of the regional gross value added in 2019 (Generalitat de Catalunya 2017). Contrary to the cases in Äänekoski and Värmland, Catalonia’s forest-based bioeconomy policy does not aim to modernize the region’s long-standing industrial dependences, but to create new industrial development and economic growth in rural areas by utilizing forests as an underexploited, yet abundant, natural resource. Rural Catalonia, the locus of the envisioned bioeconomy development, faces problems of land abandonment, depopulation and geographical remoteness with limited industrial infrastructure.

Catalonia does not have a regional bioeconomy strategy, instead it is guided by a collection of plans dispersed amongst different agencies from the regional government and influenced by the European bioeconomy and circular economy strategies, the Catalanian Industrial National Pact, and to a lesser extend the Spanish bioeconomy strategy. It rests on a rather heterogeneous set of policy translations, as a regional expert pointed out: ‘[within the regional government] there are different groups pushing similar ideas, pushing a discourse that fits their own interests. The territory department, for example, may believe the green economy is a concept that suits them better, for us it is the bioeconomy; at the end what you have is diverse interests contained in the different discourses’ (Interviewee I). The forest-based bioeconomy is just one component of the Catalanian

green policies portfolio, that includes circular economy, green urbanism, and urban landscape among others.

The forest-based bioeconomy is led by the Forest Science and Technology Centre of Catalonia (CTFC), based in the municipality of Solsona. The CTFC is a public consortium integrated by a research centre, local universities and local governments. Their aim is to ‘contribute to the modernization and competitiveness of forest sector, to promote rural development and to foster the sustainable management of the environment’ (Centro Tecnológico Forestal de Catalunya 2020). It promotes a bioeconomy based on using and transforming forest biomass, intending to boost an underdeveloped economic sector that, when combined with state-of-the-art technology and growing domestic and international markets, has the potential to activate rural economies and solve the issue of forest management and fire risk.

Apart from the investments of private firms in their own development and modernization, public funding is the main source to push the development of the Catalan forest-based bioeconomy. While the bioeconomy benefits from funds raised through environmental legislation and the ‘environmental economy’, i.e. environmental taxes, carbon sequestration bonds and payments for environmental services, this is subject to political institutions beyond the CTFC’s control. Currently, its main sources of funding are from the public member institutions of the consortium, research grants, Horizon 2020 and other European funding programmes, and other alliances established by the CTFC directly. The public regional funding, canalized through the CTFC, aims to expand a new area of economic growth utilizing the underexploited forest biomass, while the investment and fundraising made by the CTFC directly targets innovation, forest governance and value chains. The CTFC is a research centre; therefore, it invests in research and innovation within its own structure, rather than providing incentives and grants to other actors outside the organization. A key action area is networking and collaboration, the objective is both to transfer and exchange knowledge, and apply for grants and other funds provided by the European Union (mainly). The CTFC also collaborates with other agencies from the regional government, but especially with other forest-based research centres at the European level, many of them in Northern Europe, and other European organizations, whether public or private. Hence, in this case we are looking predominantly at the narratives the CTFC uses for fundraising or justifying public investment instead of the narratives provided by its funding bodies.

To summarize, the funding narratives displayed below in each of the cases originate from the variegated perspectives of the funding actors and the spatial scale of its developments. For the BPM, a private, industrial development, the public funders role is to secure private investment and provide material support to improve the operating environment mainly; in Värmland, the collaboration between private and public actors to attract national and supranational funding for innovation is key, and, in the case of the CTFC, the construction of its own narratives to attract external funding and justify public investments. Despite their differences, they are all part of wider EU bioeconomy policy assembling processes and their overall policy trajectories to foster a sustainable economic transformation. Yet, while these regional developments are employed as success narratives and benchmarks in communities of bioeconomy and green policy learning, the remainder of the paper will discuss the distortion and reconnections between their public finance narratives and these overall aims.

Discussing public finance narratives

... the bioeconomy is popular because it’s sold as the future of rural development and it’s linked to European policy and EU funding. (Interviewee II)

The mill is a significant driver of growth in Central Finland ... (Finnvera 2018)

The Bioeconomy Region is already one of the leading regions within a forest-based bioeconomy. But our dreams are bigger than that. We want to see our region grow and get bigger. We want more actors to drive development. (The Bioeconomy Region 2020)

The quotes above exemplify the overall narratives that justify public spending in the three cases. In essence, the key alignments between finance narratives and the wider policy narratives, linked to EU, national and regional bioeconomy policy trajectories, are regional development/growth, sector renewal/innovation and local jobs. However, because of the case studies' variegated socio-spatial contexts, these key alignments are nuanced and derive from the continuous policy translation processes (e.g. Albrecht et al. 2017; Ward 2017). While the narrative of regional growth and sector renewal dominates the bioeconomy discourses in the BPM and Paper Province cases, the narrative of rural economic development dominates the discourses in the CTFC. Despite these rather subtle differences in the focus of the narratives, and the marked differences in the socio spatial contexts around such narratives, the three cases are involved in the same policy learning community.

The core component of public finance narratives in the cases are framed around sustainable re-industrialization to enable regional growth, support and showcase innovation, and an export orientation of the forest sector in the Finnish and Swedish cases, and of sector development in the Catalan case. For instance, when announcing the BPM EFSI loan agreement the EIB vice-President stated that 'we are proud to support this next-generation bio-product mill, as it will contribute to safeguarding and creating a significant number of jobs on a traditional industrial site, and bring substantial improvements in terms of energy efficiency and environmental performance ...' (EIB 2015). Similarly, regional reindustrialisation rhetoric is embedded in the Vinnova funding narrative for Värmland, where the forest-based bioeconomy is promoted to generate technological development and innovations in the forest sector in line with Vinnova's tradition of supporting RIS development in the Swedish region. In Catalonia '... the bioeconomy can diversify and increase the primary sector's added value, while improving the region's competitiveness' (Interviewee III); becoming an incubator for new economic development.

The narratives that back public finance in the Catalan forest-based bioeconomy are also based on the (re-)industrialization and regional competitiveness rhetoric from the other cases, but focus on wider rural economic renewal and strengthening the primary economic sector, pinpointing innovation to add value to the Mediterranean forest biomass. The rural is addressed in the BPM and Värmland cases, but regional industrial output and economic growth/performance are far more relevant than an actual focus on rural development. For instance, the BPM framed infrastructure funding is promoted to '... strengthen the entire Central-Finland region's livelihoods and industrial operating conditions' (translation by authors; Väylä 2020). Hence, they align with the EU bioeconomy-strategy components promoting growth in peripheral areas through developing a bioeconomy rather than a distinguished rural development focus. Core features of the public finance narratives related to growth, innovation and renewal in all three cases are tied to the creation of local jobs, business and markets. This, in turn, is also reflected in how the forest-based bioeconomy is presented and the amount of capital invested.

The cases are directly aligned with a selective set of EU bioeconomy policy narratives (EC 2018b) in relation to the potential benefits of bioeconomy development, although the direction and scale of these features in the finance narratives vary in each region. In the Finnish case, due to its singular locality, public finance narratives portray very concrete examples, while the two other cases employ a more general language. For instance, when announcing Finnvera's and the EKN's joint export credit guarantee for the BPM, the regional director of Finnvera publicly announced that '... about half a dozen other companies have already been established around it, and more businesses that use the byflows of the mill will be created over the next 12–18 months, when the production in the mill is ramped up' (Finnvera 2018). On the other hand, the narratives in Catalonia are often generic and focused on rural economic growth and innovation, but a little more place-specific when referring to forest management to prevent fires. Similarly, Värmland's narratives focus on adding value to forest products to speed up innovations and technological development in the forest sector. Especially, national and ERDF-funding have been used to support and benchmark the development of the regional bioeconomy. In this manner, the regional bioeconomy narratives portray a mix of regional bioeconomy production and innovation agendas, and a more general policy agenda

supporting regional growth in European regions. While they tend to fall short of their often very ambitious claims expressed throughout public finance narratives (e.g. employment, SME creation) of bioeconomy development benefits compared to the grounded processes of actual regional development (Albrecht and Kortelainen 2020) these narratives are nonetheless widely employed in (trans)national bioeconomy policy learning communities.

Looking closely at innovation in the different funding narratives, it is more prominent in Värmland and with the CTFC due to their inclusion of and stronger reliance on R&D framed institutions and funding sources. In Värmland, the large impact from Vinnova and the ERDF has led to a strong narrative promoting technological development and innovations in the forest sector, especially supporting the development of the regional innovation system as a supporting infrastructure for innovations in the forest sector. Overall, the ERDF funding to the Bioeconomy Region was especially focused on supporting SMEs in the cross-border area, mainly via support to commercialize new products, widening markets, and developing collaborative platforms both nationally and internationally. Hence, it is also an example of how regional authorities take on a leading role in supporting SMEs in the transformation towards a forest-based bioeconomy and at the same time promoting regional growth and development. One of the most important components of the bioeconomy in Värmland and a key feature when moving beyond the BPM site to Äänekoski's own narratives, is a (triple helix) regional innovation system also portrayed through the vision of the regional authorities for a forest-based bioeconomy. This highlights the areas not only as bioeconomy growth but also as 'learning regions' on how to materialize such growth, and provides financing entities to integrate their social agency (e.g. Pike and Pollard 2010) through success narratives into policy making processes (McCann 2013). Värmland is promoted as '... a large-scale demonstrator, to which people from all over Europe and the rest of the world come to learn about and witness the achievements [...] It shall be possible to come to Värmland to learn how to develop an innovation system based on clusters' (Region Värmland 2015, 24). Despite the marked contextual differences, 'success stories' (backed by public finance) from Finland and Sweden are often used as part of the forest-based bioeconomy narrative in Catalonia and are shared by the CTFC. Hence, they point to the potential effect of these public finance related narratives in networks of policy learning (Wood 2016) and consequently bioeconomy policy translation and design.

A key enabler for the assumptive claims above found in the finance narratives is to attract private investments in the bioeconomy sector. In relation to funding the forest-based bioeconomy and making it attractive for private investment, economically driven narratives dominate and allow a perspective on the social agencies of involved entities (e.g. Pike and Pollard 2010; Miller 2012). First, in relation to place branding/benchmarking and regional competitiveness, the bioeconomy is sold as being capable of moving the region ahead in green production through innovation and knowledge production. For example, the ERDF and municipal co-funded Plänet B project in Äänekoski aims to create '... the world's leading ecosystem for forest-product innovations [...] and the world's largest B2B meeting point for the biotech industry' (Vision Hunters 2018, 3). Second, in relation to an industrial reputational fix, it provides an optimistic outlook for future forest industrial investments as '... the bioeconomy gives [the forestry sector] a stronger identity amongst the multitude of discourses around sustainable development...' (Interviewee I). The third type of economic narrative relates to potentially increasing the profitability of (value-added) forest products and motivating forest owners to invest in forest management and sell forest biomass. This is reflected by narratives on the generation of added value for forest products such as '... the idea behind the bioeconomy is that biomass becomes part of the value chain in other sectors of added value [in Catalonia]' (Interviewee III). The aim to attract private investments and become a frontrunner also leads to a complete marginalization of critical or even cautioning features in all public funding narratives and consequently restrict these aspects to be mobilized into finance and development related policy learning communities (Miller 2012; McCann 2013; Wood 2015). Finally, in the case of the BPM, the export credit guarantees provided by Finnvera and the EKN promote an underlying objective to enable Finnish machine suppliers to take most parts of the

bids, thereby contributing to Finnish economic performance in general (Finnvera 2018) and adding yet another feature of an economy first narrative agenda. Yet, before drawing conclusions on the consequences of these selective economic features in public finance narratives, the role of sustainability requires scrutiny.

Sustainability

The weak integration of sustainability features in bioeconomy strategies is frequently criticized (e.g. Bugge, Hansen, and Klitkou 2016; D'Amato et al. 2017), yet it has a central role in public bioeconomy narratives as a sustainable transformation instrument (EC 2018b; Patermann and Aguilar 2018). Generally, profound sustainable features are less visible in the Finnish and Swedish case studies' public finance narratives compared to EU bioeconomy policy trajectories. For instance, direct sustainability credentials in the narratives for public BPM financing are predominantly related to efficiency and energetic performance. The Finnish energy subsidy related narrative (TEM 2015) employs a more concrete sustainability rhetoric of the BPM as an enabler of sustainable growth from Finnish forests for growing global demands. This sustainability feature, rooted in a replacement of fossil-fuel based products with green, forest-based products, frequently appears in narratives for public finance in the other cases. In Värmland the sustainability narrative is presented as part of the transformation to the forest-based bioeconomy by promoting the bioeconomy region project as 'The leading region in the forest-based bioeconomy – for a more sustainable future' (The Bioeconomy Region 2020), for example. This use of the forest industry to contribute to sustainable development is also present in the narratives portrayed in the Paper Province 2.0 initiative. The outtake of biomass from forests is supposed to support the development of new 'sustainable products' and at the same time stimulate regional economic growth. This narrative on sustainable development is striking since the forest industry has a long history in the region, and on a more general level the forest industry in Sweden and Finland has reputation as a 'dirty sector' (Martin, Grundel, and Dahlström forthcoming). Indeed, more sustainable production lines and value-added products from forests, support the transformation of the industry becoming more sustainable. Yet, the risk that an increased outtake from forests will affect biodiversity and ecosystem-services easily counteracts such assumptive gains (Pedersen et al. 2020) and is completely omitted from the public finance narratives contrary to its growing rhetoric in EU policy documentation (e.g. Fritsche et al. 2020). Even though sustainability terminology is addressed in the Värmland projects, especially in terms of the possibilities for a forest-based bioeconomy to support the transformation to a fossil-free society, economic growth and technological development prevail.

While wider policy narratives of the transformation to a bioeconomy include the need to meet the challenges of climate change, loss of biodiversity and natural resources, these aspects are practically absent in the public finance narratives of our cases. Considering the role policy narratives play in forming policy alliances (Miller 2012) and their employment to mobilize policy ideas (McCann 2013; Wood 2016) they carry the risk that a transformation based on these narratives towards a sustainable forest-based bioeconomy becomes no more than another project of ecological modernization meeting the needs of technological and economic development. This is also owed to the weak indicators for sustainability employed which, for instance, in the case of the EIB is fulfilled by the BPM's environmental impact assessment. This reduces sustainability in the EIB finance narrative to the mill site and its direct influence on the surrounding environment such as water runoff, energy use and production but neglects any features such a wood potentials or environmentally problematic one-use products related to the wider sustainability of the development. The final verdict of 'No significant environment and social issues were noted' (EIB 2019) in relation to the BPM environmental and social assessment is not very convincing considering critique and discourses appearing in reality (e.g. Albrecht and Kortelainen 2020). Nonetheless, EIB and the EU taxonomy (TEG 2020) are considered the most suitable near term funding instruments to express sustainability of EU bioeconomy development to market actors (Fritsche et al. 2020). Hence, public finance narratives that are just

selectively aligned with overall trajectories and spatial processes of implementation become a key component in bioeconomy policy learning and boosting (McCann 2013).

The Catalanian case has subtle differences in how sustainability is incorporated in the CTFC bioeconomy narrative. As mentioned earlier, the forest-based bioeconomy in Catalonia is one of several green policies implemented in the region. It does not occupy a privileged position within the government's green policy priorities, and has been delegated to a research centre, leaving room to account for other areas of the bioeconomy that may not be profitable, such as conservation and sustainable use of resources, civil society participation, forest governance, and forest management. Despite those areas being core activities in the CTFC's work, these deeper sustainability credentials are glossed over by economic narratives when it comes to fundraising and making the bioeconomy an attractive sector for private investment. This is intensified when Sweden and Finland are often used as examples of successful implementation of a forest-based bioeconomy. Being part of narrative competition for policy relevance (Miller 2012) this tendency again points to a problematic selectiveness of promoting policy ideas through the 'power-soaked epistemic networks' (e.g. Peck and Theodore 2015, 24) or learning communities involved.

Finally, a striking feature that combines sustainable features in most public finance narratives is their direct interlinkage with economic parameters. A good example is the numeric display of an abundant forest resource (e.g. annual growth vs. cutting rates) to generate and supply green markets present in all case studies despite massive scientific critique on the envisioned cutting potentials and resulting effects on biodiversity, for instance in Finland or elsewhere (Nordström et al. 2016; Blicharska et al. 2019; Pedersen et al. 2020; Zhang et al. 2020). Particularly in Catalonia and Värmland, and to a lesser degree in the BPM case, this is linked to the need for innovation in order to enable the forest sector to deliver on these 'sustainable' potentials. Hence, as the cases show, public finance narratives portray a rather superficial integration of sustainability aspects which actually marginalises any critical voices related to the impact of a growing resource use and bioeconomy industrial development.

Conclusion

This paper analysed a set of regional bioeconomy narratives linked to public finance contributions. It has shown that the promotion of these 'success stories' (e.g. McCann 2013) functions to attract private investment. It also employs a largely quantifiable economic baseline with assumptive benefits related to economic growth and innovation to portray its funding targets/developments as worthy of reproduction in other regions. Generally, these cases illustrate a clear alignment with a limited set of (socio-)economic features employed in wider EU and national bioeconomy policy narratives, such as job creation (EC 2018b). While this is not surprising and is in line with earlier findings, the public finance narratives marginalize the sustainability narratives of bioeconomy development called for by most green EU policies (e.g. EC 2018b, 2019a). Regarding an expected strong increase in bioeconomy funding (despite COVID19 budget cuts) under the Horizon Europe funding (2021–2027) and as part of the EU recovery plan (EC 2020), the bioeconomy strategy clearly points out that 'this unprecedented level of commitment needs an equivalent level of responsibility in ensuring that these investments deliver a sustainable bioeconomy across the EU' (EC 2018b, 54). Similarly, the mainstreaming of integrating sustainability aspects in financing decisions and their risk assessments is highlighted in the EU action plan for financing sustainable growth (EC 2018a), yet these commitments are practically absent from the finance narratives studied here.

The fact that economic growth and profit-related narratives dominate the discourses that local practitioners reproduce to promote or justify public funds has a direct effect on what kind of policies are mobilized, and consequently policy learning and translation as it benchmarks selective success stories. Additionally, the surprisingly strong coherence of public finance narratives in these spatially variegated cases are in stark contrast with the heterogeneous assembling processes that

display a far more nuanced display of ‘localized’ policy translation processes (Peck and Theodore 2015) that could affect the potential impact of these narratives on the wider bioeconomy policy learning community (Albrecht 2019). Yet, while the translation and localization of the actual developments differ based on the socio-spatial components and involvement of different entities in bioeconomy development (Albrecht and Kortelainen 2020), it appears that, similar to sustainability concerns, these spatial peculiarities are glossed over in public finance narratives. This flattening of narratives employed for policy learning highlights regions like Åänekoski and Värmland, where the forest-based bioeconomy dominates not only the green policies discourse, but also the overall regional development agenda and its accompanying large amounts of public and private investment. Despite Catalonia’s role as a marginal forest bioeconomy region and its focus on new path development, as opposed to the other two cases with their historically dominant forest industry, it is subjected to these dominant narratives of reindustrialisation. Consequently, despite activities of the CFTC in the fields of conservation and biodiversity, drawing from these flattened and selective bioeconomy learning communities risks silencing these aspects when promoting their own funding narratives on bioeconomy potentials. Hence, the narrative that dominates and consequently is mobilized through policy learning communities and networks to other regions is that of the ability to attract investment based on largely assumptive claims, as opposed to the commitment to or proven credentials for a sustainable transition pointed out in wider bioeconomy policy narratives in the EU.

Following Pike and Pollard (2010) this clear alignment in finance narratives to promote public investment provides a direct link to the political trajectories of the institutional entities involved. Hence, in this case and considering the assumptive character of most social benefits (e.g. jobs), the bioeconomy is portrayed as a profitable source of income with a rather limited view regarding its sustainable or societal impact. While this dominance affects the trajectories and consistence of policy learning communities (Wood 2016; Honeck 2018), Hall (2006) further points to their direct effects on the governance instruments and monitoring structures of (bio)economy deployment. As the portrayed benefits predominantly include the assumptive creation of jobs, regional growth & innovation, and predictions of larger (export) markets for ‘green’ products, the current narratives promote a non-inclusive and unsustainable as well as spatially unreflective path forward. Although there are concerns around the sustainability of the intensive use of forest biomass, the forest-based bioeconomy is only deemed viable if capable of promising direct and fast returns, whether in forms of profit for private investment or economic growth and job creation for public investment. Thus, they align with private financialisation trajectories contrary to their potential role to promote sustainable long-term solutions (Esposito, Mastromatteo, and Gatti 2019).

Most of the bioeconomy actors interviewed agreed on an inclusive vision for the bioeconomy. However, the privileging of spatially flat and selective economic features in public finance narratives reinforce the risk that (public)finance-oriented policy learning communities engage with the forest bioeconomy as a development sphere, or policy arena with intrinsic sustainability characteristics. This highly problematic prevalence also implies that the mobilization, translation and learning of the bioeconomy policy will privilege aspects of the policy that ‘promise’ fast financial success and marginalize non-profitable, societal relevant aspects considered as the core to achieve the EU bioeconomy policy trajectories (e.g. EC 2018b). Hence, current public funding narratives understandingly lean towards economic parameters due to the entities involved are in direct neglect of key aspects in the wider narratives of EU bioeconomy policy: sustainability and the integration of society through an indifferent treatment of development narratives. Finally, these superficial economic narratives also limit the potentials of bioeconomy policy learning communities as they omit crucial, heterogeneous and complex socio-spatial processes that often delineate failure or success in bioeconomy development and are able to include critical or alternative voices into policy translation and design. There is an urgent need to integrate strong sustainability considerations not only towards private investments as foreseen in the action plan for sustainable growth (EC 2018a),

but to actively reconsider the competitive sales talk, a.k.a. public finance narratives of the public institutions involved in financing the bioeconomy.

To summarize, the rationales employed to finance the bioeconomy are the policy trajectories given by the European Union, regional actors' perceptions of the opportunities that the bioeconomy represents, and the acknowledgement of environmentally unsustainable practices. The dominant narrative that justifies public finance are the potential economic opportunities for industrial and technological development. In other words, the bioeconomy is financed with public funds because of its potential economic benefits predicted for regions, but not because it is a strategy for sustainable transformation.

Notes

1. Japanese Itochu group is also a 50% shareholder in the new cellulose based textile pilot plant development in the site of the BPM.
2. The Vinnväxt programme was established in 2001 where Swedish regions compete for extensive funding over a period of 10 years (Vinnova, 2014). The aim is to promote sustainable growth in Swedish regions by developing competitive research and innovation environments, especially by strengthening regional innovation systems (RIS) with a focus on triple helix collaborations.

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