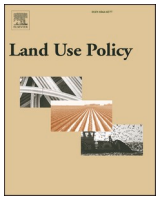
Land Use Policy 129 (2023) 106617

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol



# Clash or concert in European forests? Integration and coherence of forest ecosystem service–related national policies

Karin Beland Lindahl [a,*], Charlotta Söderberg [b], Natalia Lukina [c], Daria Tebenkova [c], Mireia Pecurul [d], Helga Pülzl [e], Metodi Sotirov [f], Camilla Widmark [g]

[a] Department of Social Sciences, Technology and Arts, Luleå University of Technology, Laboratorievägen 14, SE-971 87 Luleå, Sweden
[b] Department of Social Sciences, Technology and Arts, Luleå University of Technology, Sweden
[c] Centre for Forest Ecology and Productivity of the Russian Academy of Sciences, Russia
[d] Forest Science and Technology Centre of Catalonia, Spain
[e] European Forest Institute, Finland
[f] Chair of Forest and Environmental Policy, University of Freiburg, Germany
[g] Department of Forest Economics, Swedish University of Agricultural Sciences, Sweden

ARTICLE INFO

*Keywords:*
Policy integration
Environmental policy integration
Forest governance
Forest, climate, conservation, energy/ bioeconomy nexus
Europe

ABSTRACT

This paper compares how forest ecosystem service–related policies are integrated in different national European forest governance contexts. Efforts to achieve policy integration at the EU and national levels are often described in terms of limited success. Our analysis of forest, energy/bioeconomy, climate, and conservation policies suggests that notions of progress or failure merit careful assessment. Combining theories of policy integration (PI), environmental policy integration (EPI), and policy coherence, we argue that integration outcomes depend on the combined effects of the degree *and* nature of PI, EPI, and multilevel coherence in the context of the prevailing forest governance system. The nature of the interdependencies, specifically anticipated synergies, and the scope of FES-related climate objectives, are crucial. Realizing the range of FES-related objectives entails safeguarding objectives not synergistically aligned with economic aims. Failures to safeguard biodiversity and regulating and cultural ecosystem services in the process of integration may have far-reaching consequences.

## 1. Introduction

Forests and other wooded land cover over 40% of the European Union's (EU) land space and are essential for the health and wellbeing of all Europeans (EC, 2021). The EU Commission has announced a new EU forest strategy to achieve healthy and resilient forests that contribute to biodiversity, climate goals, secure livelihoods, and a circular bioeconomy (EC, 2021). It states that "A healthy future for people, planet and prosperity…depends on ensuring healthy, biodiversity and resilient forests across Europe and the world" (EC, p. 1). However, the Commission also highlights that European forests are under growing strain, and that increasing, sometimes competing, demands continue to add pressure on the forests (EC, 2021). Research likewise shows that European forests face increasing and partly competing societal demands, a trend which is accelerated by a politically promoted shift towards the bioeconomy (Pülzl et al., 2014; Hurmekoski et al., 2019; Lovrić et al., 2020; Ranacher et al., 2020). As a response to these challenges, the EU Commission concludes that realization of the forest strategy's objectives necessitates governance that promotes policy coordination, coherence, and synergies between the different forest ecosystem services (FES) and functions that the forests are expected to deliver. In other words, realizing the strategy's prospects about synergies across policy sectors requires effective cross-sectoral policy integration (e.g., Hetemäki et al., 2017; Winkel, 2017), not least in member states and European Russia where most of Europe's forests are located (FAO, 2020; Rosleshoz, 2020a).

This paper addresses this critical issue by exploring how FES-related policies are integrated in different European national forest governance contexts. While policy integration might appear as a rather technical matter of designing interdependencies between different sectoral objectives, it is a political process involving the allocation of values (Winkel and Sotirov, 2016; Cejudo and Trein, 2022). To understand what values that are gained or lost in the process of integration, we explore the outcomes as expressed in national/federal forest,

* Corresponding author.
*E-mail address:* Karin.beland.lindahl@ltu.se (K. Beland Lindahl).

https://doi.org/10.1016/j.landusepol.2023.106617
Received 13 October 2021; Received in revised form 20 February 2023; Accepted 26 February 2023
Available online 13 March 2023

energy/bioeconomy, climate, and nature conservation policies in different European forest governance contexts.

There is abundant research on policy integration and coordination in different environmental and land-use policy sectors (see e.g., Tosun and Lang, 2017; Trein et al., 2019, 2022; Cejudo and Trein, 2022), and several studies address integration in the FES and bioeconomy contexts (Hogl et al., 2016; Wolfslehner et al., 2020; Baulenas and Sotirov, 2020). FES refer to *provisioning*, *regulating*, *supporting*, and *cultural services* from forests (MEA, 2005; Baral et al., 2016; Seidl et al., 2016) and are understood as producing tangible and intangible benefits for society (Ninan and Inoue, 2013). Previous FES-related studies suggest that integrating relevant policy sectors and objectives has failed despite efforts to achieve co-ordination and synergy at the national and European EU levels (Edwards and Kleinschmit, 2013; Winkel and Sotirov, 2016; Kleinschmit et al., 2017; Pülzl et al., 2018). They note goal and value conflicts within the EU policy framework which hamper integration (e.g., Winkel and Sotirov, 2016; Johansson, 2018; Pülzl et al., 2018; Venghaus et al., 2019; Wolfslehner et al., 2020), describe EU forest policy as fragmented (e.g., Vogelpohl and Aggestam, 2011; Pülzl et al., 2013; Winkel and Sotirov, 2016; Aggestam et al., 2017; Aggestam and Pülzl, 2018; Johansson, 2018; Elomina and Pülzl, 2021), and argue that mechanisms to steer and implement EU forest-related policy are largely lacking (Lazdinis et al., 2019) or partly ineffective (Winkel and Sotirov, 2016; Wolfslehner et al., 2019, 2020; Aggestam and Pülzl, 2020). Venghaus et al. (2019) highlight a gap in the EPI literature regarding integration between more than two sectors or policy areas (Venghaus et al., 2019), and Trein et al. (2022) call for more research related to policy evaluation, i.e. outcomes of policy integration on policy- and system levels.

Less is known about FES-related policy integration in different national and forest management contexts (Kleinschmit et al., 2017; Sotirov and Arts, 2018; Lazdinis et al., 2019). Research on non-EU Member States is generally sparse, particularly including Russia. However, several studies at the EU and member state levels (Huttunen, 2014; Sotirov and Arts, 2018; Sotirov and Storch, 2018) suggest that it cannot be taken for granted that the outcomes of integration of climate, bioenergy and forest policies will meet societal demands for the variety of FES. Rather, these studies show how traditional coalition and sectoral politics have shaped efforts to integrate different FES-related policies in selected EU countries and policy contexts.

In sum, literature calls for more research on how the integration of FES-related policies plays out in different national forest governance contexts, particularly in relation to issues of prioritization of values (Winkel and Sotirov, 2016; Sotirov and Arts, 2018; Sotirov and Storch, 2018). More research evaluating the outcomes of integration processes involving different policy subsystems are also needed (Trein et al., 2022). Reflecting the above needs and knowledge gaps, the aim of this paper is to use a comparative approach to explore how FES-related policies are integrated and coordinated at the national level in different European forest governance contexts. We investigate integration outcomes on the policy level by assessing the degree of integration between FES-related policy objectives and the extent to which environmental concerns are privileged or subordinated. In this context, policy objectives and implementation strategies, as stated in agreed policy documents, are understood as an expression of value allocation which can be empirically analysed without simultaneously investigating the preceding policy formulation and decision-making process. We use theories of policy integration (PI; How are FES-related climate and energy policy objectives integrated with one another, existing nature conservation policy, and existing forest-sector policy?) *and* environmental policy integration (EPI; What is prioritized and how are environmental concerns weighted?). Vertical integration, i.e., policy implementation strategies, are investigated by analysing policy coherence. We focus on the national level and apply a cross-country comparative approach, including case studies in Sweden, Austria, Germany, Spain, and Russia. While empirical analysis of the direct influence of national forest politics and other contextual factors is beyond the scope of this study, the results are discussed in the light of documented similarities and differences between the selected national contexts.

## 2. Theory

To help navigate our multi-sectoral analysis (horizontal integration), we use theories of *policy integration* (PI) and *environmental policy integration* (EPI) and consider policy objectives. To explore how different policy objectives are to be achieved (vertical integration), we analyse the implementation process design in light of the *policy coherence* concept.

Much scholarly discussion of PI goes back to Underdal (1980), who argued that "a policy is integrated to the extent that it recognizes its consequences as decision premises, aggregates them into an overall evaluation, and penetrates all policy levels and all government agencies involved in its execution" (p. 162). He suggested that to qualify as integrated, a policy must meet three basic requirements regarding comprehensiveness, aggregation, and consistency. These requirements refer to different stages in the policy process, and it is primarily comprehensiveness that is relevant to the input stage, i.e., the goal-formulating stage that is subject to our horizontal analysis. Comprehensiveness, according to Underdal (1980), can be assessed along four dimensions: time, space, actors, and issues. The actor and issue dimensions are the most relevant to this study. While "actor" relates to the range of perspectives considered policy options and being evaluated, "issue" refers to the recognition of issue interdependencies, or interactions, within the policy framework. In short, an integrated policy is one in which all significant consequences and implications of policy decisions are recognized as premises in making those decisions (Underdal, 1980). Hence, a policy can be integrated at the goal formulation stage even if the identified interdependences are conflictual, i.e., goal conflicts are identified. Consequently, comprehensiveness in our analysis refers to the recognition of issue interdependences between the objectives (many/few, strong/weak, and synergetic/conflictual/neutral) and the range of perspectives (perceptions of challenges, opportunities, justifications, options, etc.) addressed as premises in the policy documents. High PI reflects many interdependences and a broad range of perspectives addressed as premises in the studied policy document.

Whereas Underdal's (1980) definition of policy integration is recognized and well developed in practice, its application in an environmental context has been debated as it lacks a value hierarchy and tools to deal with the trade-offs common in environmental politics (Lafferty and Hovden, 2003; Kleinschmit et al., 2017). EPI addresses this weakness and is characterized as the "incorporation of environmental objectives into all stages of policy-making in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of policy" (Lafferty and Hovden, 2003, p. 9). Thus, Lafferty and Hovden (2003) argued that the purpose of EPI is not to reach consensus in discussions of trade-offs between the economic and environmental objectives of sector policies, but rather to prioritize environmental objectives from a normative viewpoint. Lenschow (2002, p. 6) defined EPI as "a first-order operational principle to implement and institutionalize the idea of sustainable development", and Persson (2007) stressed that the "weighting" issue is central to EPI. Consequently, EPI helps address the significance of prioritization, i.e., how allocation of values impacts integration outcomes, an issue previously identified as meriting further analysis in the forest policy context (Winkel and Sotirov, 2016; Sotirov and Storch, 2018).

The literature distinguishes between "weak" and "strong" EPI (Jordan and Schout, 2006; Nilsson and Eckerberg, 2007; Söderberg, 2011; Kleinschmit et al., 2017). "Weak" EPI occurs when the environment is considered in sectoral policymaking on an equal footing with other issues such as economic considerations. "Strong" EPI refers to situations when environmental considerations are prioritized over other issues

(Jordan and Schout, 2006). Strong EPI is typically supported by an "eco-centric worldview", whereas weak EPI is consistent with a more "anthropocentric worldview" and ideas of ecological modernization (Söderberg, 2011). Accordingly, we take EPI to address the value hierarchy of policy objectives and their rationales. We assess prioritization based on two parameters: the prioritization of identified objectives (i.e., prioritized/neutral/subordinated) and the dominant rationale (i.e., privileged justification). Unlike existing EPI research, which usually addresses one environmental issue at a time, we analyse how different environmental policy objectives (e.g., biodiversity protection, climate mitigation, and energy transition) are integrated with one another and into forest-sector policy.

There are multiple approaches to analysing the implementation and vertical integration of policy objectives. One useful concept when analysing multilevel implementation *and* integration is policy coherence. Policy coherence refers to synergetic and systematic support for the achievement of common objectives within and across individual policies and implementation levels (den Hertog and Stross, 2013). Coherence is about eliminating conflicts and promoting synergies, i.e., about how policies interact when implemented. Nilsson et al. (2012) suggested a three-step approach to policy coherence analysis emphasizing the interplay between policy objectives, instruments, and implementation. Our focus is on objective, instrument, and implementation *design*, i.e., implementation conditions based on the arrangement of objectives, allocation of instruments, and definition of responsibilities in relevant policy documents, not on actual practices or outcomes. Here, policy instruments refer to mechanisms meant to achieve policy objectives. Like Steurer (2013), we distinguish hard regulation (with sanctions) from soft regulation (without explicit sanctions). Implementation design addresses the arrangements by authorities and other actors identified as responsible for and/or involved in implementing specific objectives (Steurer, 2013). The responsible authorities and actors sometimes collaborate to achieve shared objectives, but they can also promote different objectives and compete for power and influence. Central to policy's capacity to achieve the desired outcomes is a design that fully considers the multiple levels of policy components and the linkages between policies existing within levels (Howlett, 2009). The means for achieving the goals exist on several levels and can be characterized by the preferred means, or instruments, promoted in the analysed documents (see also Nilsson et al., 2012). Coherence thus refers to the interaction between policies and implementing authorities within and across levels. These interactions may be synergetic (e.g., one instrument helps achieve one or several objectives or supports another instrument), conflictual (e.g., one instrument only partly addresses a goal or negatively affects another goal or instrument), or neutral. Predominantly synergetic interactions reflect high coherence while conflictual or potentially conflictual interactions reflect lower coherence. In line with Nilsson et al.'s (2012) approach, the task is to assess coherence both in one policy area (i.e., coherence across implementation levels) and between policy areas (i.e., coherence between policy areas at the same implementation level).

As outlined above, theories of PI, EPI, and policy coherence offer the theoretical raw material for this study. Table 1 shows how the different components have been combined and operationalized into research questions to guide analysis of the empirical material.

**Table 1**
Analytical framework and research questions.

| Research questions | | Operationalization |
|---|---|---|
| How are national/federal (FES)-related climate and energy policies integrated with one another, existing nature conservation policy, and existing forest-sector policy? | | |
| How is horizontal integration performed? | Which is the most important FES-related **policy objectives**? | FES-related **main and sub-objectives** |
| | Degree of **PI**? How are FES-related climate and energy policy objectives **integrated** with one another, existing nature conservation policy, and existing forest-sector policy? | **Comprehensiveness**: 1) issue interdependences between objectives (many/few, strong/weak, synergetic/ conflictual/ neutral); 2) range of perspectives addressed as premises (i.e., perceptions of challenges, opportunities, justifications, and options) |
| | Strong or weak **EPI**? What is **prioritized** and how are environmental concerns weighted in the process of integration? | **Prioritization**: 1) prioritization of objectives (prioritized/ neutral/ subordinated); 2) dominant rationale (i.e., privileged justification of objectives, challenges, and opportunities) |
| How is vertical integration achieved? | What **policy instruments** are suggested to achieve the objectives? | **Policy instruments**: 1) implementation ideas/strategies (i.e., broader ideas, approaches and/or strategies portrayed as preferred means to achieve objectives); 2) specific policy tools (legal/economic/ informational/hybrids and hard/soft) |
| | What **authorities** and other **actors** are identified as responsible for/ involved in **implementation**? | **Implementation design**: **authorities** and other **actors** identified as responsible for and/or involved in implementation (i.e., division of tasks and responsibilities). |
| | **Coherence?** What is the degree of multi-level interaction within and between the relevant policy areas? | **Interaction** between policy objectives, instruments, and implementation mechanisms across and within different implementation levels (synergetic/conflictual/neutral/ high/low) |

## 3. Design and methods

This study applies a cross-contextual comparative approach to learn from similarities and differences between cases located in five European countries/regions representing different forest governance contexts. The selected cases share some characteristics but were selected to display variation with respect to their geography, forest types, forest ownership, forest sector economy, forest governance systems and forest politics (see Table 2). Four countries are EU member states, and one, Russia (RU), is not. While Sweden is a unitary state, Germany, Austria, Spain, and Russia are different kinds of federal republics, or monarchies, entailing two levels of analysis: the federal and state/regional levels.

Sweden has the highest proportion of, primarily boreal, forest cover and most economically important forest sector. Germany/Baden-Württemberg/Bavaria and Austria illustrate two central European cases in the nemoral forest zone, but they differ in terms of the economic importance of the forest sector. Spain/Catalonia represents a Mediterranean forest type and context. Russia/Nizhegorodsky, finally, represents a case with a governance system that is quite different from the EU cases. While forest governance is a broad concept, the term "forest governance system" here refers to the overall spatial land-use and planning approach shaping the implementation of forest management and nature conservation policy. In principle, there are two main strategies, segregative and integrative, with many intermediary nuances (cf. Sotirov et al., 2013; Fisher et al., 2014; Borras et al., 2017; Sotirov and Arts, 2018). *Segregative* strategies usually refer to spatial differentiation and zoning according to land use, i.e., the landscape is divided into different zones where specific FES are prioritized and optimized. *Integrative* strategies, in contrast, seek to simultaneously provide a wide

**Table 2**
Overview of similarities and differences between the selected case study countries.

| | Sweden | Austria[1] | Germany (Baden- Württemberg and Bavaria) | Spain (Catalonia) | Russia (Nizhegorodsky Oblast) |
|---|---|---|---|---|---|
| EU membership | EU member since 1995 | EU member since 1995 | EU member since 1952 | EU member since 1986 | Non-EU member |
| Government | Unitary state | Federal republic | Federal republic | Federal monarchy | Federal republic |
| Geography and forest type | Northern Europe Boreal | Central Europe Nemoral | Central Europe Nemoral | Southern Europe Mediterranean | Eastern/Northern Europe Boreal |
| Forested area (%) | 67.0 * | 46.4 * | 32.4 * | 41.2 * | 20.1 ** |
| Gross added value, forestry *** | EUR 3523 million (0.74%)*** | EUR 1072 million (0.27%)*** | EUR 3186 million (0.09%)*** | EUR 995 million (0.08%)*** | EUR 2157 million (0.18%)*** |
| Forest ownership | Private, corporate, and state | Private, corporate, and state | Private, corporate, and state | Private and state | State (forest rent system) |
| Forest governance system | Integrated | Integrated | Integrated | Integrated | Segregated |
| Forest politics | Dominating but challenged forest production coalition | Competition between forest production- and nature conservation coalitions | Polarized confrontation between forest production- and nature conservation coalitions | Growing polarization between coalitions | Centralized and hierarchical implementation |

*Share of forest land according to Eurostat (2021) definition (national level).
* * Share of forest land according to 2020a, 2020b definition (national level).
*** Gross added value is defined as output at market price minus intermediate consumption at purchaser price (at basic price), here as a share of gross national product (Eurostat, 2020; Federal State Statistics Service, 2021). For Russia gross added value was calculated based on the euro exchange rate of the Central Bank of Russia as of August 31, 2021 http://www.cbr.ru/.)
[1] Since FES related regional competencies only exist in relation to biodiversity conservation, the Austrian analysis has focused on federal policy and regional biodiversity policies in spite of a federal state structure.

range of FES within each forest management unit or property. While integrative forest governance strategies dominate within the EU cases, the Russian case is included to assess the significance of a predominantly segregative forest governance system and a non-EU trajectory.

The selected cases also vary in terms of actor coalitions and FES-related sector politics (c.f. Wolfslehner et al., 2020), factors that are suggested to affect integration outcomes (Sotirov and Arts, 2018; Sotirov and Storch, 2018). Swedish forest politics is traditionally dominated by strong forest production interests which since the 1980′s is challenged by a coalition of environmental and nature conservation actors (Beland Lindahl et al., 2017a). In Germany and Austria, forest politics is characterized by sectoral competition and a continuous, or in Austria resurgent, polarization between a dominant forest sector coalition and competing nature conservation actor coalitions (Hogl, 2000; Hogl et al., 2009; Quadt et al., 2013). While policy making in Austria, and Sweden, is characterized by a consensus-oriented corporativist policy style, the German approach is traditionally more confrontational and polarized (; Kvarda and Nordbeck, 2012; Beland Lindahl et al. 2017a; Sotirov and Storch, 2018). The Spanish/Catalonian case represents a geographical context with a long tradition of low intensity multi-functional forest management where increasing demands of FES trigger new conflicts between intensified biomass production and biodiversity conservation (Ecologistasenaccion, 2019). Russia, finally, illustrates a highly centralized and hierarchical political context where major tradeoffs between economically important wood production- and conservation objectives are made already at a strategic land use planning stage (Burov, 2021; Min. Nat. Res., 2022). While these contextual differences guided the case selection, our focus is on how policy integration plays out in different forest governance contexts, not on the national contexts per se.

In line with the literature addressing interdependencies between FES-related policies (see above), we explore how climate, energy/bioeconomy, and nature conservation objectives are integrated with one another (horizontal integration); how these objectives are integrated with forest-sector policy (horizontal integration); and how the policy objectives are to be achieved (vertical integration). While specific bioeconomy policies exist in some countries, others address FES-related bioeconomy issues in their energy and/or forest policies. The empirical analysis was conducted in 2019 and 2020. Table 1 shows how the research questions were operationalized to ensure consistency between the Swedish, German, Spanish, Austrian, and Russian, researchers conducting the analysis. Standardized templates (A and B) addressing the operationalized questions in Table 1 (see Appendices 1 and 2 for aggregated versions), and instructions how to apply them, guided the document analysis and the national-level synthesis. Two to five key documents per policy area were selected for analysis and analysed thematically. The analysis was conducted manually in respective national languages. The analysed documents are listed in Templates A and B and met the following selection criteria: 1) important to the policy area in question and to FES delivery; 2) most recent; and 3) possess a certain authority (i.e., bills, laws, or strategies adopted by the government). The results of each case study were translated to English and summarized in Templates A and B, and then analysed comparatively. The comparative analysis was led by the main author but involved all researchers in joint digital meetings, joint writing, and joint development of conclusions for a final project workshop.

## 4. Results

Table 3 summarizes the results for each case study country (see also Templates A and B with references to the analysed documents in Appendices 1 and 2) and illustrates the most important similarities and differences between policy integration in the selected cases. Before presenting the results of the comparative analysis, we briefly summarise the main findings in each case.

### 4.1. Sweden

Since 1993, Swedish national forest regulation includes an environmental/biodiversity goal in parallel with the long-standing goal of maintaining high wood production (SFA, 1979:429, 1§). This amendment reflects a long-standing critique by a growing environmental/nature conservation coalition. However, FES-related climate objectives primarily focus on the capacity of *growing* forests to take up carbon dioxide and mitigate climate change (Sw. Gov. 2017a, 2017b; 2018a, 2018b). The degree of PI is generally high, and strong synergies are constructed between climate mitigation (*growing* forests as carbon sink), increased wood production, substitution of fossil fuels and

**Table 3**
Summary of most important similarities and differences of the selected case studies (based on the results presented in Templates A and B in Appendices 1 and 2).

| | Sweden | Austria | Germany/Baden Württemberg, Bavaria | Spain/Catalonia | Russia/ Nizhegorodsky Oblast |
|---|---|---|---|---|---|
| **Policy objectives** | FES addressed in all policies | FES addressed in all policies | FES addressed in all policies | FES addressed in all policies | FES addressed in all policies |
| **Policy integration (PI)** | **High**<br>**synergies:** growing forests as carbon sink, substitution of fossil fuels/material and economic/rural development; climate mitigation and nature conservation | **High**<br>**synergies:** standing and growing forests as carbon sink and store, substitution of fossil fuels/material, and economic/rural development; forest management/protection, and climate adaptation/ mitigation | **High**<br>**synergies:** standing and growing forests as carbon sink and store, substitution of fossil fuels/material, and economic/ rural development; forest protection and climate adaptation/mitigation | **High**<br>**synergies:** standing and growing forests as carbon sink and store, substitution of fossil fuels/material, and economic/rural development; forest management/ protection and climate adaptation | **Low**<br>**synergies:** standing and growing forests as carbon sink and store, substitution of fossil fuels/material, energy security in remote areas, and socio-economic development; refo-restation/forest management and climate adaptation/ mitigation |
| | **Conflicts:** biodiversity vs. commercial wood/ biomass production. | **Conflicts:** biodiversity vs. commercial wood/biomass production; wood for fuel vs. construction. | **Conflicts:** biodiversity vs. commercial wood/biomass production; wood for fuel vs. construction; climate mitigation by forest use vs. conservation | **Conflicts:** intensification of biomass production vs. biodiversity; rural development vs. urban visions for biomass and biodiversity | **Conflicts:** biodiversity vs. commercial wood production |
| **Environmental policy integration (EPI)** | **Overall weak**<br>**More of everything** | **Weak** in forest and energy/ bioeconomy policies<br>**Relatively strong** in climate policy<br>**Competing objectives** | **Weak** in forest and energy/ bioeconomy policies<br>**Relatively strong** in climate policy<br>**Competing objectives** | **Weak** in forest and energy/ bioeconomy policies<br>**Relatively strong** in climate policy<br>**Competing objectives** | **Overall weak**<br>**Sectoral objectives** |
| **Policy instruments and authorities** | Soft instruments in forest policy<br>Hard and soft in conservation, climate, and energy policies<br>Partly overlapping responsibilities<br>**Sectoral integration** | Hard and soft instruments in forest, climate, and conservation policies<br>Mainly hard (and some soft) in energy and soft in bioeconomy policy<br>Partly overlapping responsibilities<br>**Sectoral competition** | Mainly soft instruments in forest, climate, and energy/ bioeconomy policies<br>Mainly hard in conservation policy<br>Strong sectoral boundaries<br>**Sectoral competition** | Hard and soft instruments in forest, climate, and conservation policies.<br>Soft in energy/bioeconomy policies<br>Strong sectoral boundaries<br>**Sectoral competition** | Hard and soft instruments in forest policy<br>Hard in conservation policy<br>Soft in energy, and under development in climate policy<br>Hierarchical and centralized<br>**Sectoral division** |
| **Policy coherence** | **High** across levels in climate, and energy policies<br>**Low** across levels in forest and conservation policies<br>**Low** and **high** within levels | **High** across levels in forest, climate and energy policies<br>**Low** across levels in conservation policies<br>**Low** and **high** within levels | **High** across levels in forest and conservation policies<br>**Low** across levels in climate and energy/bioeconomy policies<br>**Low and high** within levels | **Relatively low** across levels in climate, energy/bio-economy and conservation policies<br>**Relatively high** across levels in forest policy<br>**Low** and **high** within levels | **High** across levels in forest and conservation policies<br>**Low** across levels in climate and energy policies (under development)<br>**Low** and **high** within levels |

material, and "green" jobs and economic growth (Sw. Gov., 2018a, 2018b). EPI is overall weak. Environmental objectives that are portrayed as synergetic with economic goals and wood/biomass production are prioritized – not *over* but *together with* – the economic objectives. Environmental concerns that are not motivated by an economic rationale, or that involve interdependences of a conflictual nature, are typically not prioritized. The Swedish policy framework is operationalized through a complex system of objectives, subobjectives and monitored targets that cut across traditional sectoral boundaries and guide implementation across administrational levels (see, e.g., SEPA, 2021). While implementation of forest policy is the main responsibility of the Swedish Forest Agency, the responsibility for implementing nature conservation- and climate objectives is for example shared with the Swedish Environmental Protection Agency. Sweden applies a mix of hard (e.g., regulations, taxes, and emission trading) and soft instruments (e.g., information, counselling, deliberation, certification, and subsidies/compensation) in climate, energy, and conservation policies, but primarily soft instruments (e.g., counselling, deliberation, and certification) when implementing forest policy objectives. A central implementation idea is "freedom with responsibility", i.e., an arrangement in which the state authorities and forestry actors share responsibility for policy implementation (Beland Lindahl et al., 2017a). This implies that forest owners are given wide-ranging discretion to manage their forests if they act responsibly in relation to the stipulated objectives.

### 4.2. Austria

Austria is a country characterized by a corporatist and consensual policy style. However, since the establishment of the Austrian forest dialogue in 2003, open competition between the forest production- and environmental/nature conservation coalitions have become more common (Kvarda and Nordbeck, 2012). Competition between these coalitions is increasing and shaping the integration of new cross-sectoral priorities addressing climate change, bioenergy production and bioeconomy development. Synergies between forest production, substitution, and climate benefits, i.e., *growing forests* as carbon sinks, *and* climate and nature conservation benefits associated with *standing, intact, or moderately managed forests* reflect this development. PI is generally high, but EPI remains weak except in climate policy. FES-related climate policy aims at maintaining a broad range of functional FES and displays strong synergies with nature conservation objectives (BMLFUW, 2014, 2017). After a period of reintegrating forest and environmental responsibilities in the Austrian administration, they were recently split up, reinforcing functional competition between forest and environmental competences. Responsibility for bioeconomy policy, in contrast, cuts across the sectoral organization and offers opportunities for all

implementing ministries. While forest policy is administered on the national level, the responsibility for implementing nature conservation policies is shared between the national and provincial level (Hogl, 2000; Quadt et al., 2013). Austria uses hard (i.e., regulations) and soft (e.g., policy strategy, information, counselling, and subsidies/compensation) policy instruments in forest and conservation policy, a mix of hard regulating (e.g., climate law) and soft instruments (e.g., information, deliberation, and economic incentives) in climate policy, and a combination of hard (i.e., regulations) and soft instruments (e.g., information) in energy policy. The sectoral and multi-levelled organization of the administration, in combination with asymmetric power relations between the dominating forest production coalition and a subordinated environmental coalition, explains a high degree of PI in combination with a predominantly weak EPI and a mixture of high and low coherence across and within policy levels.

### 4.3. Germany/Baden-Württemberg/Bavaria

The most defining feature of the German case is a long standing, intense and polarized competition between the traditional forest- and nature conservation sectors which create pressures to integrate conflicting sectoral objectives in ways that are favorable to the sector's interests (Sotirov and Storch, 2018). PI is generally high, but the identified cross-sectoral synergies reflect, and reinforce, sectoral competition. On the one hand, synergies between climate mitigation objectives (*standing forests* as carbon sinks) and biodiversity conservation provide a rationale to reduce timber harvesting or to set forests aside. Likewise, synergies between climate adaptation objectives and forest protection support initiatives to transform intensive forestry based on single-species coniferous monocultures towards close-to-nature forest management and mixed species and broadleaved forests through forest reconstruction so called "Waldumbau". On the other hand, synergies between climate and bioeconomy/bioenergy-related objectives to absorb carbon and substitute fossil with renewable fuels and material, and economic and rural development gains, provide a competing rationale to maintain or increase the production of *growing forests* and timber use. Reflecting strong, and competing, sectoral interests, EPI is weak in forest- and energy/bioeconomy policies, but relatively strong in climate policy. In Germany/Baden Wurttemberg/Bavaria, implementation takes place within a highly sectorized administration with strong sectoral boundaries (Winkel and Sotirov, 2016). There is a mixture of predominantly soft policy instruments (e.g., information, subsidies, counselling, and certification) in forest, climate, and energy/bioeconomy policies, but primarily hard instruments (i.e., regulations) in the nature conservation sector. The combination of generally high PI, weak EPI and predominantly soft instruments in the forest-, climate- and bioenergy/bioeconomy policies, and strong EPI and hard instruments in conservation policy, reflect strong sectoral competition and conflicting actor coalitions.

### 4.4. Spain/Catalonia

The Spanish/Catalonian case illustrates a quite different Mediterranean geographical, climatic and forest political context. There is a long tradition of low intensity integrated forest management favouring multifunctional forest use for ecological, social, and economic benefits in Catalonia. PI is generally high. A prominent objective of FES-related Spanish/Catalonian climate policy is climate adaptation, for example, forest management to reduce forest vulnerability to fire (DOCG, 2017). In addition, synergies between forest management to promote biodiversity conservation, climate benefits and bioeconomy objectives, boosting economic *and* ecological sustainability exist in the Catalonian policy framework (Generalitat de Catalunya, 2014). However, bioeconomy-related objectives to intensify biomass production, i.e., *growing forests*, are potentially in conflict with biodiversity objectives associated with *standing forests* as EPI is weak in forest- and energy/bioeconomy policies. EPI in climate policies is relatively strong. Forest governance in Spain is highly decentralized and Catalonia has its own legislation and administration. The responsibility for implementing FES-related objectives has traditionally been shared between different Ministries leading to fragmentation and sectoral competition. Catalonia applies a mix of hard (e.g., regulations and taxes,) and soft instruments (e.g., information, counselling, subsidies, voluntary agreements, and certification) in forest, climate, and conservation policy, while mainly soft instruments (e.g., information) in energy/bioeconomy policy. Despite sectoral competition and fragmentation affecting policy coherence, a stable subsidy system support implementation of forest policy objectives targeting private owners.

### 4.5. Russia/Nizhegorodsky Oblast

The Russian/ Nizhegorodsky Oblast case differs in several ways: forest land is exclusively state owned; the forest governance system is predominantly segregated; and FES-related policy making is under the total control of the federal Government. Consequently, policy integration directly reflects the Government's goals and priorities (Ru. Gov., 2013; Kharlov, 2014). PI is generally low, EPI is overall weak, and integration is somewhat random (see also Burov, 2021). Interdependences between the Russian forest and nature conservation objectives are high reflecting a traditional close relationship. The energy sector primarily focuses on fossil-fuel production and references to FES are relatively rare in the policy documents (Ru. Gov., 2020). Likewise, FES-related climate policies are under development and not linked to bio- or bioeconomy related objectives (Ministry Nat. Res., 2019). The Russian forest policy framework includes both strategic forest planning documents defining overarching goals and implementation mechanisms, and documents regulating management and the relationship between the state and the forest user (tenants). It displays a mix of hard (e.g., regulations and taxes) and soft (i.e., state–corporate partnerships, subsidies/economic incentives, and certification) policy instruments, while nature conservation policy is primarily implemented with hard instruments (e.g., regulations and taxes), energy so far with soft instruments, and instruments to implement climate policy are under development. Reflecting a highly centralized and hierarchical governance system, coherence across levels is high in forest- and conservation policies. Russia sticks out with a predominantly segregated forest governance approach, i.e., important priorities between FES-related nature conservation- and forest production objectives are already made at an overriding land-use planning stage. In effect, wood provision is, according to state open data, prioritized in 52% of the land area (31% in European Russia), while environment protection and provision of other FES are prioritized in 25% of the forest land area (Rosleshoz, 2020b).

### 4.6. Comparing horizontal integration

#### 4.6.1. Policy objectives and PI

Although FES are addressed in the range of analysed policy areas, the level of policy integration (PI), i.e., the degree to which the FES-related policy objectives inform one another, differs between cases. The level of PI is generally high in EU Member State cases, but lower in the Russian case. In all EU cases, the analysed policies address synergetic and conflictual interdependencies between the identified objectives, not only between forest and nature conservation objectives, but also in relation to FES-related energy/bioeconomy and climate objectives. However, the goal to develop bioeconomies serves an integrating function, linking economic, environmental, and social objectives (see e.g., BMEL, 2014; Sw. Gov., 2018a, 2018b; BMNT, 2019; CTFC, 2019).

As shown in Table 3, the nature of the stipulated synergies and conflicts driving or preventing integration differs across the cases. While conflicts between commercial wood/biomass production and nature conservation, i.e., protection of forest biodiversity, are prominent and

addressed in policies in all cases, the nature of the expected synergies varies. The Swedish case stands out with a rather narrow focus on carbon sequestration capacity and substitution potential of growing forests and wood-based products. Forest, energy, and climate policies are permeated by the dominant idea of strong synergies between intensively managed growing forests, their carbon dioxide uptake, replacement of fossil fuels and materials, and various economic gains. Climate mitigation arguments are used to legitimize more intensive forest management, and exploitation of the carbon-sequestering capacity of growing forests is prioritized with little discussion (Sw. Gov. 2017a, 2017b; Sw. Gov., 2018a, 2018b).

The other cases display a broader range of FES-related synergies. Synergies and arguments like the Swedish ones exist in all cases, not least in Germany, where they figure prominently (BMBF. Federal Ministry of Educaton and Research, 2011; BMEL, 2014). However, in all cases but the Swedish, other synergies targeting climate and nature conservation benefits associated not only with growing forests but also with standing, intact, or moderately managed forests balance or challenge the production-oriented objectives and narratives. For example, in the German cases, climate policy objectives address the importance of forest preservation for maintaining the capacity of forests to act as reservoirs of greenhouse gases, and the justifying text emphasizes the importance of protecting, maintaining, and restoring terrestrial ecosystems, including forests, to combat climate change (BMU, 2016). Even Russian climate policies highlight synergies between climate objectives and efforts to improve forest quality, i.e., they address the carbon sequestering and storing capacities of forests (Ru. Gov., 2011; 2018; 2021).

Consequently, a broad range of strong synergies supplementing (RU, ES, AT) or competing with (DE) the focus on win–win relationships between increased forest production/use of wood/biomass and climate benefits exist in all cases except that of Sweden. In these cases, FES-related climate policies interact synergistically with conservation or forest policy objectives of protecting or enhancing the resilience of forests (DE, AT, ES, RU). In the Swedish case, in contrast, FES-related climate policies primarily focus on the general importance of mitigating climate change as a way to protect forest habitats and their biodiversity (Sw. Gov., 2018a, 2018b).

#### 4.6.2. *Environmental Policy Integration*

The next question concerns EPI: What is prioritized, and how are environmental concerns weighted in the integration process? For obvious reasons, environmental concerns are prioritized in nature conservation policy in all cases. In contrast, no forest or energy/bioeconomy policies clearly prioritize environmental concerns or objectives, i.e., EPI is generally weak in these policy areas. In most cases, environmental concerns are placed on equal footing with objectives about the production of commercial goods, but environmental objectives are often subordinated to rationales of economic growth, effectiveness, and competitiveness. The latter is clearly the case in Sweden, wood production and environmental objectives are placed on equal footing (SFA, 1979:479), but enclosed in a narrative of forests as providing wood, jobs, growth, renewable energy, and climate mitigation – "green gold" (Sw. Gov., 2018a, 2018b). Likewise, the German National Forest Strategy stipulates three equal environmental, social, and economic objectives, but the provisioning services and economic justifications are highlighted in the narratives supporting forest and bioeconomy objectives (BMELV, 2011; BMEL, 2014). Forest and energy/bioeconomy policies in the other cases follow similar patterns (e.g., Ministry Ec. Dev., 2019; Austrian National Council, 2020a, 2020b; BMNT, 2019).

All investigated climate policies include overarching objectives about halting climate change, and in this sense they all prioritize environmental concerns. However, more detailed analysis reveals a more differentiated picture. Climate policies in the Central and Southern European cases (DE, AT, ES) prioritize several FES-related environmental objectives for securing the resilience and functionality of forests and their carbon-regulating functions. Synergies with conservation objectives are developed and acknowledged in a way that makes EPI relatively strong. Swedish FES-related climate policy, in contrast, prioritizes increased wood and biomass production as means to mitigate climate change and boost economic growth (Sw. Gov. 2017a, 2017b; Sw. Gov., 2018a, 2018b). Hence, environmental objectives are prioritized to the extent that they are synergistically aligned with the overarching objectives of maintaining high wood production and promoting economic benefits – a position consistent with weak EPI.

Russian climate policy objectives address efforts to improve forest quality, including environmental functions, but are generally subordinated concerns addressing the vulnerability of the carbon-intensive energy sector and its importance to the Russian economy (Ministry Ec. Dev., 2018). Hence, EPI remains weak.

So, different situations emerge when FES-related climate, energy/bioeconomy, nature conservation, and forest-sector policies are integrated. In the Swedish case, where EPI is generally weak, conflicts with FES-related nature conservation objectives are handled within an optimistic discourse assuming that existing resources can be increased and trade-offs successfully resolved, a "more-of-everything" strategy. In the German, Austrian, and Spanish cases, the EPI of forest and energy/bioeconomy policies is weak, but EPI of climate policies is stronger. As an effect, integrated nature conservation and climate objectives end up standing against integrated energy/bioeconomy and forest policy objectives. While trade-offs between FES-related climate and bioeconomy policies are explicitly acknowledged in the German policy documents (BMUB, 2007; BMEL, 2014), the Austrian bioeconomy narrative emphasizes the opportunity to integrate climate and energy goals without citing trade-offs. In the Russian case, conflicts with FES-related nature conservation objectives typically take the form of limitations imposed primarily on traditional forest-sector objectives (see, e.g., St. D., 2006). Spatial land use planning as applied in the Russian case, represents another way of prioritizing objectives. Since EU Member States predominantly apply integrative forest governance strategies, most synergies and trade-offs must be realized within each forest management unit or each forest property. In Russia, in contrast, important priorities between FES-related nature conservation objectives and economically driven forest production objectives are already made at an overriding land-use planning stage.

### 4.7. *Comparing vertical integration*

#### 4.7.1. *Policy instruments and implementing authorities*

Implementing the identified policy objectives requires adequate policy instruments and arrangements with implementing authorities. First, it is important to acknowledge that different policy sectors have different histories within and across the investigated cases. Whereas forest and nature conservation policies have existed for centuries in all case study countries/regions, bioeconomy and climate policies are relatively new. Hence, the instruments and bureaucracy of the latter are relatively modern or, as in the case of Russia, still developing (Ministry Nat. Res., 2019). Nevertheless, the mix of policy instruments varies between the policy areas and cases, as outlined in Table 3 (and Template B). In the Russian case, land-use planning and zoning serve as an important implementation tool.

In most cases, implementation of forest policy and FES-related nature conservation objectives is governed by separate sectoral organized ministries and authorities (i.e., forest and environment) at different administrative levels. In Russia, forest and FES-related nature conservation objectives are both implemented by the same federal Ministry of Natural Resources and its Federal Forest Agency, which in turn includes different sectoral organized executive authorities implementing wood production and conservation objectives (Ru. Gov., 2010; Ru. Gov., 2015). In many countries (ES, SW, DE), the responsibility for FES-related energy/bioeconomy policies rests with ministries of enterprise and/or forests/agriculture (and research, in the German case). In Austria, it is

also shared with the Ministry of Environment, and in Russia a separate Ministry of Energy has this task (Ru. Gov., 2008). In most cases, climate policies are implemented by the ministries and agencies of environment/sustainability that are also responsible for environmental and FES-related nature conservation policy (SW, ES, DE, AT). In Russia, FES-related climate policy is another responsibility of the federal Ministry of Natural Resources and its Federal Forestry Agency (Ru. Gov., 2010; Ru. Gov., 2015).

However, despite these formal similarities in the arrangement of implementing authorities, the overlapping of responsibilities differs between the cases. Overlapping responsibilities between implementing authorities in Sweden create interdependencies and appear to enhance sectoral integration in this case. In contrast, strong sectoral boundaries between the implementing authorities at the federal, national/regional, and local levels in the German, Spanish, and Austrian cases seem to drive sectoral competition. Sectoral competition between the ministries in charge of agriculture/forestry, on one hand, and ministries in charge of environmental conservation (e.g., biodiversity and climate), on the other, is most evident in Germany and Spain. In Russia, state ownership of forests combined with a traditional state-centred, hierarchical, and centralized policy style promotes sectoral division, despite one ministry and agency coordinating the implementation of both forest and FES-related nature conservation objectives (Petrov et al., 2019).

#### 4.7.2. Policy coherence

Policy coherence, concerning the degree of vertical multilevel interaction within and between the relevant policy areas, displays similarities and differences between the cases. As shown in Table 3, coherence *within* administrative levels is assessed as "low and high" in all cases. This reflects conflicting (i.e., commercial wood/biomass vs. biodiversity) and synergistically aligned (e.g., forests as carbon sinks and climate mitigation) policy objectives as outlined above under PI. In most cases, synergies and conflicts found on federal or national levels are reproduced or even strengthened (DE and RU) at lower administrative levels. Coherence *across* implementation levels within the analysed policy areas varies more across the cases. In the Swedish case, coherence across levels in forest and FES-related nature conservation policies is assessed as low due to unclear division of responsibilities between the involved implementing authorities, high reliance on soft implementation instruments, and a dominant idea of "sectoral responsibility", i.e., each sector is responsible for implementing environmental policy within its mandate and power (Sw. Gov. 1988; 2005). Likewise, coherence across levels in forest and FES-related conservation policy in the Austrian case is low because different administrative responsibilities at national and regional levels partly reinforce traditional conflicts between forest use and protection. In the German and Russian cases, in contrast, coherence across administrative levels in both forest and FES-related conservation policies is relatively high, partly because of strong sectoral boundaries and the absence of cross-cutting responsibilities between the implementing authorities, especially at lower administrative levels. In the Spanish/Catalonian case, overall coherence across levels is assessed as relatively low due to a general fragmentation and lack of resources for implementation within the administration. The multilevel coherence of climate and energy policies varies between the cases as outlined in Table 3.

## 5. Discussion

The aim of this paper is to explore and compare how FES-related policies are integrated and coordinated at the national level in different European forest governance contexts. A point of departure is that realization of the EU forest strategy's objectives requires effective policy integration. So, what constitutes effective policy integration in a European context? While policy integration is a political process reaching from agenda-setting to implementation and evaluation throughout repeated policy cycles, recent studies identify a need to evaluate outcomes (Trien et al., 2022). However, outcomes can be assessed at different policy levels and stages. The FES-related literature calls for more research on how the integration of FES-related policies plays out in different national- and forest management contexts (Kleinschmit et al., 2017; Sotirov and Arts, 2018; Lazdinis et al., 2019). It particularly highlights the importance of prioritization: what values and FES are given priority in the outcomes (e.g., Winkel and Sotirov, 2016; Sotirov and Arts, 2018; Sotirov and Storch, 2018)? In this study, we explore the integration and prioritization of FES-related objectives in nationally adopted policy documents as *outcomes* of bargaining and decision making that took place at preceding policy stages. In the following, the findings are discussed.

### 5.1. PI and the significance of stipulated synergies

Analysed as the degree of PI, i.e., the degree to which different policy objectives "talk to one another" and take different perspectives into account (Underdal, 1980), FES-related policies in the analysed EU Member State cases display relatively high integration. This likely reflects higher-level EU policy promoting a European bioeconomy and calling for integration (Dietz et al., 2018; EC, 2018; Pülzl et al., 2017). The degree of integration is clearly lower in the Russian case, although a similar trend is discernible. Conflicts between commercial wood/-biomass production and nature conservation/biodiversity objectives have long been known (e.g., Winkel and Sotirov, 2016; Kleinschmit et al., 2017) and exist in all investigated policy frameworks. Likewise, anticipated, and desired synergies between climate mitigation (growing forests as carbon sinks and providers of wood/biomass for substitution), a bio-based society (transition to renewable energy and products), increased/intensified industrial wood/biomass production, and various economic gains are prominent in all investigated cases. Similar synergetic interdependencies have been recognized in other studies (e.g., Beland Lindahl et al., 2017a; Sotirov and Arts, 2018), and their emergence is suggested to drive or justify a (re)turn to traditional timber production priorities at the EU level and in selected Member States (Huttunen, 2014; Sotirov and Arts, 2018; Sotirov and Storch, 2018). This trend is also noticeable in several of the cases (SE, DE, AT) investigated here.

More interesting is our finding of stipulated alternative or competing synergies in all cases but the Swedish one. In these cases, FES-related climate policies provide the basis for a broader range of synergies promoting climate and conservation benefits associated with standing, intact, or moderately managed forests. In contrast, Swedish climate policy becomes an additional driver strengthening the already strong bioeconomy and bioenergy-related interdependencies linking energy and forest policies with a traditionally dominant focus on large-scale commercial wood production.

Consequently, we argue that the nature of PI is a more interesting outcome than the degree of integration. Of particular importance are how synergies play out and the scope of FES-related climate policies. Acknowledgment of a broad range of synergetic interdependences between FES-related policy objectives permits choices between alternative pathways to manage forests for the benefit of the climate. Previous studies have already established that different national actor coalitions reflecting the ecological and socio-economic setting of forestry in the respective EU regions, shape EU forest politics (Wolfslehner et al., 2020) and policy integration (Winkel and Sotirov, 2016). This study suggests that also the nature of PI, the scope and interdependencies of climate policies in particular, appears to reflect dominating actor coalitions and the economic importance of the forest sector in different countries and regions. Sweden, with a traditionally large and economically important forest products industry, and a dominating forest production coalition, stands out with high PI rather unilaterally promoting synergies between increased wood/biomass production and FES-related climate and energy benefits. In addition, forest types and geography naturally shape the nature of expected interdependences. More prominent synergies

between forest management and climate adaptation measures in the Mediterranean context for example reflect a stronger focus on fire prevention and water management.

### 5.2. EPI and the importance of FES-related climate policies

Adding the EPI lens highlights a critical aspect of integration outcomes: questions of valuation and prioritization between objectives. This study shows that EPI varies across sectors and cases but generally comes out weak when forest and energy/bioeconomy policies are integrated. This is consistent with the findings of other studies (Kleinschmit et al., 2017; Ramcilovic-Suominen and Pülzl, 2017). However, this study also shows that what is central to discussion of policy integration in a forest governance context is not primarily EPI in the forest or biodiversity sectors. Rather, it is the stipulated interdependencies between integrated bundles of policy areas with varying degrees of EPI. FES-related climate policies with high EPI can help safeguard environmental values that otherwise risk being subordinated traditionally dominating wood production objectives. Such policies can balance, or challenge, strong bioeconomy-related production policies characterized by weak EPI. For example, the Central and Southern European cases (DE, AT, ES) display climate policies with relatively strong EPI that prioritize FES-related environmental objectives aiming at securing the resilience and functionality of forests and their carbon-regulating functions. Climate objectives may thus help justify and boost FES-related conservation objectives, and vice versa. In conflictual forest political settings like Germany and Austria, objectives to protect or enhance forests' regulating or protective services for climate mitigation and adaptation purposes are typically pitted against the dominant bioeconomy discourse focusing on increased or intensified wood and biomass production (cf. Kleinschmit et al., 2017; Sotirov and Storch, 2018). As seen in the highly polarized and sectorized German case, strong EPI in some but not other integrated policy areas are likely reflecting traditional sector politics and may lead to intensified competition between different FES-related climate objectives and actor coalitions.

The Swedish case, on the other hand, illustrates integration outcomes in a context where EPI is generally weak. As a result, FES-related environmental objectives are typically prioritized *if* synergistically aligned with wood/biomass production objectives, and conservation objectives stand alone in the absence of integrated pace-setting climate policy objectives.

Hence, not only PI, how the policy objectives interact, but also EPI, how environmental concerns are valued and prioritized, appear to reflect national actor coalition constellations and the economic importance of the forest- and wood products industry. Previous studies have already concluded that the outcomes of previous efforts to integrate biodiversity conservation into sectoral forest policy in a number of national EU contexts can be explain by ideological cohesion and influence of national actor coalitions (e.g., Sotirov and Storch, 2018). This study shows that the EPI of FES-related climate policies constitutes a particularly important outcome due to the capacity of climate policies to help safeguard conservation values, and/or prioritize wood production - in line with dominating actor coalitions' interests.

As illustrated by the Russian case, the forest governance strategy, i.e., integrative versus segregated, seems to be a factor that fundamentally (re)shapes the meanings and outcomes of PI and EPI. In the Russian case, key trade-offs are made through zoning in a predominantly segregated forest governance and management system, which a priori favours environmental and social objectives in a relatively large part of the forest area. Hence, PI, and particularly EPI, operates in quite different ways in segregated forest management systems, which are common not only in Russia but elsewhere in the non-European world (e.g., Australia, New Zealand, and to some extent Canada and the USA; see e.g., Beland Lindahl et al., 2017b). In these contexts, the most powerful prioritization tools allocating forest values are zoning and landscape-level land-use planning.

### 5.3. Implementation and the significance of coherence

An important aspect of how FES-related policy is integrated is the output side, i.e., implementation and impacts on the ground (Kleinschmit et al., 2017; Sotirov and Arts, 2018; Lazdinis et al., 2019). While exploring management on the ground is beyond the present scope of enquiry, this study does investigate implementation design, i.e., how implementation is stipulated in guiding policies at different administrative levels. Again, implementation design as stipulated in policy can be seen as an outcome of possible efforts to integrate different policy areas and sectors. Conflictual and synergistic interdependencies between objectives at horizontal levels were identified in all cases (see above). How these play out in practice depends on the implementation conditions such as the organisation of the administration, allocation of instruments, and definition of responsibilities.

The organisation of public administration in the investigated cases obviously varies. Nevertheless, the arrangements of implementing authorities and actors display similarities across the cases, suggesting how the cleavages and synergies identified above are institutionalized in more or less sectorized administrations. While the responsibility to implement production-related energy/bioeconomy and forest policy objectives typically rests with ministries and authorities of forestry, agriculture, enterprise, and/or energy, the task of implementing FES-related climate and conservation objectives is usually allocated to environment ministries and their vertically integrated authorities. Hence, seemingly new issues related to climate and energy are subsumed into established sectorized administrations and their traditional interest politics (cf. Wolfslehner, 2020).

By introducing one additional parameter, i.e., the degree of overlapping responsibilities between implementing authorities, this study explains why this institutionalization takes different forms in the various cases. In Sweden, efforts to achieve sectoral integration have resulted in a complex system of implementing authorities with overlapping and unclearly divided responsibilities, i.e., trade-offs are typically expected to be made *within* authorities or integrated settings where traditional forest-sector actors are relatively strong (see also Beland Lindahl, 2008; Beland Lindahl et al., 2017a). Consequently, and in line with Sotirov and Stoch's (2018) hypothesis, bioeconomy-related objectives aligned with the traditionally dominant wood production objectives are likely to take precedence in the process of implementation, hampering transformative change. In the Austrian, German, Spanish, and Russian cases, in contrast, strong sectoral boundaries *between* the different implementing authorities complicate efforts to achieve integration, particularly when new FES-related climate and energy objectives clash with traditional institutional interests (see also Winkel and Sotirov, 2016). Accordingly, efforts to achieve integration in the central- and southern European cases (DE, AT, ES) is likely to spur sectoral competition, or division in the less integrated Russian context. While sectoral competition and division are problematic as they impede transformative change (see Sotirov and Storch, 2018), a sectorized nature conservation administration can also fulfil an important function by safeguarding FES-related objectives unaligned with a production-oriented bioeconomy agenda. Consequently, we argue that sectoral integration does not necessarily broaden FES delivery (see Sweden), and sectoral competition is not always only negative as it may help safeguard objectives and values not synergistically aligned with dominant economic aims (see Germany).

Theory stipulates that policy objectives that are well aligned across administrative implementation levels and interact synergistically within different administrative levels are more likely to be realized than those less aligned or involved in conflict (Nilsson et al., 2012). However, this study shows that the roles of the different policy areas also must be considered. For example, most FES-related objectives, whether originating in nature conservation, forest, climate, or energy/bioeconomy policies, must be realised in forests and usually through forest

management activities guided by forest policy. Therefore, objectives with predominantly synergetic interdependencies with forest policy and a vertically coherent forest policy and administration help realization. Neither of the analysed cases meets these requirements. While predominantly synergetic horizontal interdependencies between climate, energy, and forest policy objectives are observed in the Swedish case, coherence across implementation levels in the Swedish forest sector is weak due to soft implementation tools and unclear division of responsibilities (see also Beland Lindahl et al., 2017a). Several of the other cases (DE, ES, RU) have forest sectors with relatively strong coherence across levels, but synergies between forest/bioeconomy and climate objectives at horizontal levels are weakly developed or challenged.

## 6. Conclusions

Efforts to achieve (environmental) policy integration and coherence within forest policy or between different FES-related policies at the EU and national European levels have so far been described in terms of limited progress or failure (e.g., Winkel and Sotirov, 2016; Kleinschmit et al., 2017; Sotirov and Storch, 2018; Wolfslehner et al., 2020). As stated by Trein et al. (2022) there is a need for systematic assessment of whether policy integration achieves the desired outcomes. This analysis of policy integration outcomes highlights the importance of distinguishing between different policy stages and levels. While this study targeted outcomes at the policy level, the analysed policy documents constitute input to policy implementation and new rounds of policy formulation. Unwanted integration outcomes that can be identified already in the policy documents, are likely to be reinforced during implementation. To understand the reasons for success or failure, it is important to analyse integration outcomes at different stages of the policy cycle. This enables an accurate analysis of the nature and location of possible integration problems. We suggest that our approach to analyse integration outcomes in nationally adopted policy documents offers a relatively quick and easy first step of evaluating integration outcomes. Moreover, we argue that the "success" of policy integration, and whether more integration is desirable (see Hogl et al., 2016; Winkel and Sotirov, 2016; Sotirov and Storch, 2018), depends on several factors. As demonstrated by this study, the *nature* of the interdependencies requires careful consideration, specifically the anticipated synergies and the scope of FES-related climate objectives. Ultimately, integration outcomes depend on the combined effects of the degree *and* nature of PI, EPI, and multilevel coherence in the context of the prevailing forest governance system.

This study shows how the seemingly technical process of wording and designing integrated policies involves important allocation and prioritization of forest values. In the nitty-gritty details of how objectives, interdependencies, synergies, and trade-offs are constructed and represented in the policy documents, are value choices and priorities which will affect what FES future European forests will provide. Realizing the range of FES-related objectives in the process of integration entails policy to safeguard objectives not synergistically aligned with dominant economic aims and instrumental values. Failing to safeguard biodiversity and other regulating and cultural services may have far-reaching and detrimental consequences for forest biodiversity and multifunctionality, i.e. ecological, intrinsic and cultural values. Using a cross-country comparative approach, we argue that this risk is particularly significant in countries/regions with dominating forest production coalitions, economically important forest- and wood products industries, and highly integrative forest governance systems where multiple objectives are expected to be realized within the same forest management unit, property, or landscape. How competing policy objectives are handled and realized depends on the implementation design. Strong sectoral boundaries and sectoral competition between forest and nature conservation authorities may hamper effective integration, but also help safeguarding the provision of FES in conflict with dominant economic/bioeconomy objectives. Realizing bioeconomy-related synergies between forest and FES-related climate and energy objectives requires a horizontally *and* vertically coherent policy framework, not least effective implementation instruments. This study shows that FES-related policy coherence remains low, or partial, in all investigated countries. Realization of anticipated bioeconomy-related cross-sectoral synergies are therefore highly uncertain.

While the focus of this study is on policy integration in a forest related context, it also highlights issues of general theoretical nature. A common question in integration studies is whether to use a lens that explicitly focuses on the prioritization of critical environmental concerns, EPI, at risk of losing sight of other important interdependencies. Or should one look more openly at "what is integrated with what", which in this context allows one to start from the perspective of forest policy (see Hogl et al., 2016). We suggest that analysis of horizontal integration benefit from both perspectives. This study shows that openly combining theories of PI and EPI (see Hogl et al., 2016) is both possible and relevant. It contributes to the existing EPI literature (e.g., Lenschow, 2002; Lafferty and Hovden, 2003; Jordan and Lenschow, 2008, 2010; Venghaus et al., 2019) by illustrating how the concept can be used to explore not only how one environmental issue is weighted relative to other sectoral objectives, but how different environmental concerns are weighted, or even pitted against one another, in the integration process. Moreover, this study supports the argument by Cejudo and Trein (2022) that policy integration does not occur at a single moment, but throughout the policy cycle. More research is therefore needed to explain outcomes on the policy level by exploring the role of actor coalitions and subsystems in policy formulation as well as implementation.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data Availability

Data will be made available on request.

## Acknowledgements

The authors acknowledge the kind comments and recommendations by referees. Funding: This work was conducted as part of the ERA-Net Sumforest Project "POLYFORES" (Grant Agreement 606803). The related research was funded by the Austrian Federal Ministry for Sustainability and Tourism (BMNT) [grant 101201/1], the Ministry of Economy and Business of the Spanish Government (project code PCIN-2017-050), German Federal Ministry of Food and Agriculture (BMEL) via the Federal Office for Agriculture and Food (BLE) [grant number 2816ERA03S], the Swedish Research Council for Sustainable Development (FORMAS, Dnr. 2016-02111). The Russian study was carried out within the framework of CEPF RAS' state assignment (No. 121121600118-8).

## Appendix 1 and 2. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.landusepol.2023.106617.

## References

Aggestam, F., Pülzl, H., 2018. Coordinating the Uncoordinated: the EU Forest Strategy. Forests 9 (3).
Aggestam, F., Pülzl, H., 2020. Downloading Europe: a regional comparison in the uptake of the EU forest action plan. Sustainability 12, 10.
Sw. Gov. (Swedish government), 2017b. Bill 2016/17:146. A climate policy framework for Sweden [in Swedish]. Regeringskansliet, Stockholm.

Aggestam, F., Pülzl, H., Sotirov, M., Winkel, G., 2017. The EU policy framework. In: Winkel, G. (Ed.), Towards a sustainable European forest-based bioeconomy – assessment and the way forward,. What Science Can Tell Us, 8. European Forest Institute, pp. 19–35.
Austrian National Council. 2020a. Energy Efficiency Law. [in German]. Version of 28.05.2020, http://www.ris.bka.gv.at/GeltendeFassung/Bundesnormen/20008914/EEffG%2c%20Fassung%20vom%2028.05.2020.pdf (accessed 28.05.2020).
Austrian National Council. 2020b. Forestry Law. [in German] Version of 28.05.2020, http://www.ris.bka.gv.at/GeltendeFassung/Bundesnormen/10010371/Forstgesetz%201975%2c%20Fassung%20vom%2028.05.2020.pdf (accessed 28.05.2020).
Baral, H., Guariguata, M.R., Keenan, R.J., 2016. A proposed framework for assessing ecosystem goods and services from planted forests. *Ecosyst. Serv.,* 22:B 260–268. https://doi.org/10.1016/j.ecoser.2016.10.002.
Baulenas, E., Sotirov, M., 2020. Cross-sectoral policy integration at the forest and water nexus: national level instrument choices and integration drivers in the European Union. For. Policy Econ. 118 (issue C) https://doi.org/10.1016/j.forpol.2020.102247.
Beland Lindahl, K. 2008. Frame Analysis, Place Perceptions and the Politics of Natural Resource Management: Exploring a forest policy controversy in Sweden. Doctoral Thesis. Acta Universitatis Agriculturae Sueciae No. 2008:60. Swedish University of Agricultural Sciences, Uppsala.
Beland Lindahl, K., Sandström, C., Stens, A., 2017b. Alternative pathways to sustainability: comparing forest governance models. For. Policy Econ. 77, 69–78. https://doi.org/10.1016/j.forpol.2016.10.008.
Sw. Gov. (Swedish government), 1988. Bill 1987/88:85 's Environmental Politics for the 1990's [in Swedish]. Regeringskansliet, Stockholm.
Sw. Gov. (Swedish government), 2005. Bill 2004/05:150. Swedish Environmental Quality Objectives: a common mission [in Swedish]. Regeringskansliet, Stockholm.
Beland Lindahl, K., Sténs, A., Sandström, C., Johansson, J., Lidskog, R., Ranius, T., Roberge, J.-M., 2017a. The Swedish forestry model: more of everything. For. Policy Econ. 77, 44–55. https://doi.org/10.1016/j.forpol.2015.10.012.
BMBF (Federal Ministry of Education and Research). 2019. National Research Strategy BioEconomy 2030. Our pathway towards a biobased economy [in German], Berlin. https://www.bmbf.de (accessed 06.07.2021).
BMEL (Federal Ministry of Food and Agriculture). 2014. National Policy Strategy on Bioeconomy. Renewable resources and biotechnological processes as a basis for food, industry and energy. Berlin. ⟨https://mediathek.fnr.de/national-policy-strategy-on-bioeconomy.html⟩ (accessed 28.05.2020).
BMELV (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz). 2011. Forest Strategy 2020. Sustainable Forest Management –An Opportunity and a Challenge for Society. Federal Ministry of Food, Agriculture and Consumer Protection (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, BMELV): Bonn.
BMLFUW (Federal Ministry of Agriculture, Forestry, Environment and Water Management). 2014. Austrian Biodiversity Strategy 2020+. Vienna. ⟨https://www.bmlrt.gv.at/dam/jcr:7dd9ff6f-1a39–4f77–8c51–6dceaf6b195f/Biodiversit%C3%A4tsstrategie2020_dt.pdf⟩ (accessed 28.05.2020).
BMLFUW (Federal Ministry of Agriculture, Forestry, Environment and Water Management). 2017. Austrian Strategy on Climate Change Adaption, Part 1. Vienna. ⟨https://www.bmk.gv.at/dam/jcr:a97fb5f2–85c5–4027-b377–383f80eee354/NAS_Context_2017_en.pdf⟩ (accessed 28.05.2020).
BMNT (Federal Ministry of Sustainability and Tourism). 2019. Austrian Bioeconomy Strategy. ⟨https://www.bmbwf.gv.at/dam/jcr:d93c5841–45fb-4607-b561-b7bbc2ffb984/190313_Biooekonomie_Strategie.pdf⟩ (accessed 28.05.2020).
BMU (Ministry for the Environment, Nature Conservation and Nuclear Safety). 2016. Climate Action Plan 2050 [in German], Berlin. ⟨https://www.bmu.de/themen/klima-energie/klimaschutz/nationale-klimapolitik/klimaschutzplan-2050/⟩ (accessed 06.07.2021).
BMUB (Ministry for the Environment, Nature Conservation and Nuclear Safety). 2007. National Strategy on Biological Diversity [in German], Berlin. ⟨https://www.bmu.de/themen/natur-biologische-vielfalt-arten/naturschutz-biologische-vielfalt/allgemeines-strategien/nationale-strategie/⟩ (accessed 06.07.2021).
Borras, L., Kleinschmit, D., Winkel, G., 2017. The "German model" of integrative multifunctional forest management. Analysing the emergence and political evolution of a forest management concept. For. Policy Econ. 77, 16–23. https://doi.org/10.1016/j.forpol.2016.06.028.
Burov, M.P. 2021. On the issue of organizing sustainable management of forest fund lands. Actual problems of land management, cadastre, and environmental management. pp. 12–19.) (In Russian. Буров М. П. 2021. К вопросу об организации устойчивого управления земляМи лесного фонда. Актуальные проблеМы землеустройства, кадастра и природообустройства. с. 12–19).
Cejudo, G., Trein, F., 2022. Policy integration as a political process. Policy Sci. https://doi.org/10.1007/s1077-023-09494-6.
CTFC (Centre de Ciència i Tecnologia Forestal de Catalunya). 2019. Circular Bioeconomy and agro-livestock-forestry-fishcheries sector in Catalonia [in Spanish]. Unpublished.
Dietz, T., Börner, J., Förster, J.J., Von Braun, J., 2018. Governance of the bioeconomy: a global comparative study of national bioeconomy strategies. Sustainability 10, 3190. https://doi.org/10.3390/su10093190.
EC (European Commission). 2018. A sustainable bioeconomy for Europe: strengthening the connection between economy, society, and the environment. Updated Bioeconomy Strategy, ⟨https://publications.europa.eu/en/publication-detail/-/publication/edace3e3-e189–11e8-b690–01aa75ed71a1⟩ (accessed 05.07.2021).
EC (European Commission). 2021. New EU forest strategy or 2030. ⟨https://ec.europa.eu/info/files/communication-new-eu-forest-strategy-2030⟩ (accessed 16–.12.2022).
Ecologistasenaccion. 2019. El pla de política forestal de Catalunya tombat per la justícia. Published 4/07/2019. URL: ⟨https://www.ecologistasenaccion.org/123665/el-pla-de-politica-forestal-de-catalunya-tombat-per-la-justicia/⟩ (accessed 13.12.2022).
Edwards, P., Kleinschmit, D., 2013. Towards a European forest policy – conflicting courses. For. Policy Econ. 33, 87–93. https://doi.org/10.1016/j.forpol.2012.06.002.
Elomina, J., Pülzl, H., 2021. How are forests framed? An analysis of EU forest policy'. For. Policy Econ. 127. https://doi.org/10.1016/j.forpol.2021.102448.
Eurostat. 2020. Agriculture, forestry and fishery statistics. Statistical books. 2020 edition. https://ec.europa.eu/eurostat/documents/3217494/12069644/KS-FK-20–001-EN-N.pdf/a7439b01–671b-80ce-85e4–4d803c44340a?t=1608139005821 (accessed 06.07.2021).
Eurostat. 2021. Statistics. Share of forest land. https://ec.europa.eu/eurostat/web/products-datasets/-/sdg_15_10 (accessed 06.07.2021).
FAO (The Food and Agriculture Organization). 2020. The state of the world's forest (SOFO). http://www.fao.org/documents/card/en/c/ca8642en (accessed 06.07.2021).
Federal State Statistics Service. 2021. National accounts of Russia [Electronic resource]: URL: https://rosstat.gov.ru/folder/124102 (accessed: 31.08.2021) (In Russian. Федеральная слуЖба государственной статистики. Национальные счета России [Электронный ресурс]: URL https://rosstat.gov.ru/folder/124102 (дата обращения: 31.08.2021).
Fisher, J., Abson, D.J., Van Butsic, M., Chappell, J., Ekroos, J., Hanspach, J.T., Smith, H. G., von Wehrden, H., 2014. Land Sparring versus land sharing: moving forward. Conserv. Lett. 7 (3), 149–157. https://doi.org/10.1111/conl.12084.
Generalitat de Catalunya. 2014. Estratègia per promoure l'aprofitament energetic de la biomassa forestal i agricola. [in Catalan]. https://govern.cat/govern/docs/2014/02/18/19/16/0d98b16e-1b6f-4bfb-be2b-aecb5b3e4296.pdf (accessed 16–12.2022).
den Hertog, L., Stross, S., 2013. Coherence in EU external relations: concepts and legal rooting of an ambiguous term. Eur. Foreign Aff. Rev. 18 (3), 373–388. https://doi.org/10.54648/eerr2013023.
Hetemäki, L., Hanewinkel, M., Muys, B., Ollikainen, M., Palahí, M., Trasobares, A., 2017. Leading the way to a European circular bioeconomy strategy, 5. From Science to Policy. Joensuu, European Forest Institute.
Hogl, K., 2000. The Austrian domestic forest policy community in change? Impacts of the globalisation and Europeanisation of forest politics. For. Policy Econ. 1, 3–13. https://doi.org/10.1016/S1389-9341(99)00003-9.
Hogl, K., Nordbeck, R., Kvarda, E., 2009. When international impulses hit home: the role of domestic policy subsystem configurations in explaining different types of sustainability strategies. For. Policy Econ. 1, 357–364. https://doi.org/10.1016/j.forpol.2008.07.003.
Hogl, K., Kleinschmit, D., Rayner, J., 2016. Achieving policy integration across fragmented policy domains: forests, agriculture climate and energy. Environ. Plan. C: Gov. Policy 34, 399–414. https://doi.org/10.1177/0263774×16644815.
Howlett, M., 2009. Policy analytical capacity and evidence-based policy-making: lessons from Canada. Can. Public Adm. 52 (2), 399–414. https://doi.org/10.1111/j.1754-7121.2009.00070_1.x.
Hurmekoski, E., Lovrić, M., Lovrić, N., Hetemäki, L., Winkel, G., 2019. Frontiers of the forest-based bioeconomy - a European Delphi study. For. Policy Econ. 102, 86–99. https://doi.org/10.1016/j.forpol.2019.03.008.
Huttunen, S., 2014. Stakeholder frames in the making of forest bioenergy legislation in Finland. Geoforum 53, 63–73. https://doi.org/10.1016/j.geoforum.2014.02.006.
Johansson, J., 2018. Collaborative governance for sustainable forestry in the emerging bio-based economy in Europe. Curr. Opin. Environ. Sustain. 32, 9–16. https://doi.org/10.1016/j.cosust.2018.01.009.
Jordan, A., Schout, A., 2006. The coordination of the European Union: exploring the capacities of networked governance. Oxford University Press.
Jordan, A., Lenschow, A., 2008. Innovation in environmental policy? Integrating the environment for sustainability. Edward Elgar Publishing.
Jordan, A., Lenschow, A., 2010. Environmental Policy Integration: a State of the Art Review. Env. Pol. Gov. 20, 147–158.
Kharlov, I.Y., 2014. Purpose of forests as the basis of forestry. News of higher educational institutions. For. J. 2 (338), 18–29.
Kleinschmit, D., Arts, B., Giurca, A., Mustalahti, I., Sergent, A., Pülzl, H., 2017. Environmental concerns in political bioeconomy discourses. Int. For. Rev. 19 (Suppl. 1), 41–55. https://doi.org/10.1505/146554817822407420.
Kvarda, E., Nordbeck, R., 2012. Legitimacy and policy effectiveness of national strategies for sustainability in Austria. In: Hogl, K., Kvarda, E., Nordbeck, R., Pregernig, M. (Eds.), Environmental Governance: The Challenge of Legitimacy and Effectiveness. Edward Elgar Publishing Ltd, Cheltenham/Northampton, pp. 69–88.
Lafferty, W., Hovden, E., 2003. Environmental policy integration: towards an analytical framework. Environ. Polit. 12 (3), 1–22. https://doi.org/10.1080/0964401041233130825 4.
Lazdinis, M., Angelstam, P., Pülzl, H., 2019. Towards sustainable forest management in the European Union through polycentric forest governance and an integrated landscape approach. Landsc. Ecol. 34, 1739–1749. https://doi.org/10.1007/s10980-019-00864-1.
Lenschow, A., 2002. New regulatory approaches in 'greening' EU policies. Eur. Law J. 8 (1), 19–37. https://doi.org/10.1111/1468-0386.00140.
Lovrić, M., Lovrić, N., Mavsar, R., 2020. Mapping forest-based bioeconomy research in Europe. For. Policy Econ. 110, 101874 https://doi.org/10.1016/j.forpol.2019.01.019.
MEA (Millennium Environmental Assessment). 2005. Ecosystems and human well-being: synthesis. Washington, DC. https://www.millenniumassessment.org/documents/document.356.aspx.pdf (accessed 05.07.2021).
Ministry Ec. Dev. (Ministry of Economic Development of the Russian Federation). 2019. Forecast of the socio-economic development of Russian Federation until 2024 [in

Russian] http://old.economy.gov.ru/minec/activity/sections/macro/prognoz/2019093005 (accessed 20.09.2020).
Ministry Ec. Dev. (Ministry of Economic Development of the Russian Federation). 2018. Forecast of the socio-economic development of Russian Federation until 2036 [in Russian] http://old.economy.gov.ru/minec/about/structure/depmacro/201828113 (accessed 20.09.2020).
Ministry Nat. Res. (Ministry of Natural Resources of the Russian Federation). 2019. Report on the implementation in 2018 of the comprehensive plan for the implementation of the Climate Doctrine of the Russian Federation until 2020 [in Russian] https://www.mnr.gov.ru/docs/o_vypolnenii_kompleksnogo_plana_realizatsii_klimaticheskoy_doktriny/doklad_o_khode_vypolneniya_v_2018_godu_kompleksnogo_plana_realizatsii_klimaticheskoy_doktriny_rossiy/ (accessed 06.07.2021).
Ministry Nat. Res. (Ministry of Natural Resources of the Russian Federation). 2022. Forest management institution [in Russian] http://publication.pravo.gov.ru/Document/View/0001202209300058?ysclid=lbwlzy3px173037686 (Accessed 20.12.2022).
Nilsson, M., Eckerberg, K., 2007. Environmental policy integration in practice: shaping institutions for learning. In: Nilsson, M., Ekerberg, K. (Eds.), Environmental Policy Integration in Practice: Shaping institutions for Learning. Earth Scan, London.
Nilsson, M., Zamparutti, T., Peterson, J.E., Nykvist, B., Rudberg, P., McGuinn, J., 2012. Understanding policy coherence: analytical framework and examples of sector-environment policy interactions in the EU. Environ. Policy Gov. 22 (6), 395–423. https://doi.org/10.1002/eet.1589.
Ninan, K.N., Inoue, M., 2013. Valuing forest ecosystem services: case study of a forest reserve in Japan. Ecosyst. Serv. 5, 78–87. https://doi.org/10.1016/j.ecoser.2013.02.006.
Persson, Å.M. 2007. Choosing Environmental Policy Instruments: Case Studies of Municipal Waste Policy in Sweden and England. Doctoral thesis, Department of Geography and Environment of the London School of Economics and Political Science.
Petrov, V.N., Katkova, T.E., Sari, K. 2019. Trends in the development of the forest economy in Russia and Finland. Economic and social changes: facts, trends, forecast [in Russian]12:3, https://cyberleninka.ru/article/n/tendentsii-razvitiya-lesnoy-ekonomiki-v-rossii-i-finlyandii (accessed 06.07.2021).
Pülzl, H., Kleinschmit, D., Arts, B., 2014. Bioeconomy – an emerging meta-discourse affecting forest discourses? Scand. J. For. Res. 386–393. https://doi.org/10.1080/02827581.2014.920044.
Pülzl, H., Wydra, D., Hogl, K., 2018. Piecemeal Integration: Explaining and Understanding 60 years of European Union Forest Policy-Making. Forests 9 (11), 719. https://doi.org/10.3390/f9110719.
Pülzl, H., Giurca, A., Kleinschmit, D., Arts, B., Mustalahti, I., Sergent, A., Secco, L., Pettenella, D., Brukas, V., Winkel, G., 2013. The role of forests in bioeconomy strategies at the domestic and EU level. In: Towards a sustainable European forest-based bioeconomy – assessment and the way forward. European Forest Institute. *What science can tell us*, 8, pp. 36–52.
Pülzl, H., Giurca, A., Kleinschmit, D., Arts, B., Mustalajhti, I., Sergent, A., Secco, L., Pettenella, D., Brukas, V., Winkel, G., 2017. The role of forests in bioeconomy strategies at the domestic and EU level. In: Towards a sustainable European forest-based bioeconomy – assessment and the way forward. European Forest Institute. *What science can tell us*, 8, pp. 19–35.
Quadt, V., van der Maaten-Theunissen, M., and Frank, G. 2013. Integration of Nature Protection in Austrian Forest Policy. INTEGRATE Country Report for Austria. EFICENT-OEF, Freiburg.
Ramcilovic-Suominen, S., Pülzl, H., 2018. Sustainable development: a selling point for the emerging EU bioeconomy policy framework. J. Clean. Prod. 172, 4170–4180. https://doi.org/10.1016/j.jclepro.2016.12.157.
Ranacher, L., Wallin, I., Valsta, L., Kleinschmit, D., 2020. Social dimensions of a forest-based bioeconomy: a summary and synthesis (12). AMBIO 2020 (49), 1851–1859. https://doi.org/10.1007/s13280-020-01401-0.
Rosleshoz. 2020a. Federal Forestry Agency of the Russian Federation. Open data. Forest land area, 2020. [in Russian], http://rosleshoz.gov.ru/opendata/7705598840-ForestlandArea (accessed 05.07.2021).
Rosleshoz. 2020b. Federal Forestry Agency of the Russian Federation. Open data. Information about forest lands, 2020 [in Russian]. http://rosleshoz.gov.ru/opendata/7705598840-ForestFund (accessed 06.07.2021).
Ru. Gov. (Government of the Russian Federation. 2013. Basics of state policy for using, conservation, protection and reproduction of forests in Russian Federation until 2030 [in Russian], http://government.ru/docs/all/88751/ (accessed 16.12.2022).
Ru. Gov. (Government of the Russian Federation. 2021. Strategy of forestry development in the Russian Federation until 2030 [in Russian], http://static.government.ru/media/files/pFdqtWFH8y9SfQjDE0Xnwd8eXWoJJMYB.pdf (accessed 05.04.2021).
Ru. Gov. (Government of the Russian Federation). 2008. Regulations on the Ministry of energy of the Russian Federation [in Russian], https://minenergo.gov.ru/node/234 (accessed 15.12.2020).
Ru. Gov. (Government of the Russian Federation)2011. Comprehensive plan for the implementation of the Climate Doctrine of the Russian Federation till 2020 [in Russian], http://archive.government.ru/special/gov/results/15045/ (accessed 25.04.2020).
Ru. Gov. (Government of the Russian Federation)2015. Regulation on the Ministry of Natural Resources and Ecology of the Russian Federation [in Russian]. https://www.mnr.gov.ru/about/statute/ (accessed 15.12.2020).
Ru. Gov. (Government of the Russian Federation).2010. Regulations on the Federal Forestry Agency [in Russian], http://rosleshoz.gov.ru/doc/%D0%BF%D1%80%D0%BF_%E2%84%9 (Accessed 15.12.2020).
Ru. Gov. (Government of the Russian Federation).2018. Strategy of forestry development in the Russian Federation until 2030 [in Russian], http://static.government.ru/media/files/cA4eYSe0MObgNpm5hSavTdIxID77KCTL.pdf (accessed 12.07.2020).
Ru. Gov. (Government of the Russian Federation). 2020. Energy strategy of Russia until 2035 [in Russian], https://minenergo.gov.ru/node/1026 (Accessed 13.07.2020).
Seidl, R., Spies, T.A., Peterson, D.L., Stephens, S.L., Hicke, J.A., 2016. Review: Searching for resilience: addressing the impacts of changing disturbance regimes on forest ecosystem services. J. Appl. Ecol. 53, 120–129. https://doi.org/10.1111/1365-2664.12511.
SEPA (Swedish Environmental Protection Agency). 2021. Environmental goals [in Swedish], https://www.sverigesmiljomal.se (accessed 06.07.2021).
SFA (Swedish Forestry Act). 1979:479. https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/skogsvardslag-1979429_sfs-1979–429 (accessed 12.12.2022).
Söderberg, C., 2011. Institutional conditions for multi-sector environmental policy integration in Swedish bioenergy policy. Environ. Polit. 20 (4), 528–546. https://doi.org/10.1080/09644016.2011.589625.
Sotirov, M., Arts, B., 2018. Integrated forest governance in Europe: an introduction to the special issue on forest policy integration and integrated forest management. Land Use Policy 79, 960–967. https://doi.org/10.1016/j.landusepol.2018.03.042.
Sotirov, M., Storch, S., 2018. Resilience through policy integration in Europe? Domestic forest policy changes as response to absorb pressure to integrate biodiversity conservation, bioenergy use and climate protection in France, Germany, the Netherlands and Sweden. Land Use Policy 79, 977–989. https://doi.org/10.1016/j.landusepol.2017.04.034.
Sotirov, M., Cappelmann, L., Riemer, A., Eriksson, L.O., 2013. Implementing the vision of sustainable forestry through integrated forest management? INTEGRAL Policy Brief. 1.
St. D. (The State Duma). 2006. Forest code of Russian Federation [in Russian] http://pravo.gov.ru/proxy/ips/?docbody=&nd=102110364 (accessed 13.07.2020).
Steurer, R., 2013. Disentangling governance: a synoptic view of regulation by government, business and civil society. Policy Sci. 46 (4), 387–410. https://doi.org/10.1007/s11077-013-9177-y.
Sw. Gov. (Swedish government. 2017a. Bill 2016/17:1. Budget proposition [in Swedish] Stockholm, Regeringskansliet.
Sw. Gov. (Swedish government. 2018a. Bill 2017/18:228. Energy policy intentions [in Swedish]. Stockholm, Regeringskansliet.
Sw. Gov. (Swedish government). 2018b. Swedish National Forest Program [in Swedish]. Appendix government decision. N2018.15 (accessed 06.07.2021).
Tosun, J., Lang, A., 2017. Policy integration: mapping the different concepts. J. Policy Stud. 38 (6), 553–570. https://doi.org/10.1080/01442872.2017.1339239.
Trein, P., Meyer, I., Maggetti, M., 2019. The integration and co-ordination of Public Policies: a systematic comparative review. J. Comp. Policy Anal.: Res. Pract. 21 (4), 332–349. https://doi.org/10.1080/13876988.2018.1496667.
Trein, P., Fischer, M., Magetti, M., Sarti, F., 2022. Empirical research on Policy integration: a review and new directions. Policy Sci. 9. https://doi.org/10.1007/s11077-022-09489-.
Underdal, A., 1980. Integrated marine policy: what? Why? How? Mar. Policy 4 (3), 159–169. https://doi.org/10.1016/0308-597X(80)90051-2.
Venghaus, S., Märker, C., Dieken, S., Siekmann, F., 2019. Linking environmental policy integration and the water-energy-land-(Food-) Nexus: a review of the European Union's energy, water, and agricultural policies. Energies 12, 1–16. https://doi.org/10.3390/en12234446.
Vogelpohl, T., Aggestam, F., 2011. Public policies as institutions for sustainability: potentials of the concept and findings from assessing sustainability in the European forest-based sector. Eur. J. Res. 2011 (131), 57–71. https://doi.org/10.1007/s10342-011-0504-6.
European forest-based bioeconomy - assessment and the way forward. In: Winkel, G. (Ed.), 2017, What Science Can Tell Us, 8. European Forest Institute, Joensuu.
Winkel, G., Sotirov, M., 2016. Whose integration is this? European forest policy between the gospel of coordination, institutional competition, and new spirit of integration. Environ. Plan. C: Gov. Policy 34 (3), J K. https://doi.org/10.1068/c1356.
Non-wood forest products in Europe: Seeing the forest around the trees. In: Wolfslehner, B., Prokofieva, I., Mavsar, R. (Eds.), 2019. What Science Can Tell Us, 10. Joensuu. European Forest Institute.
Wolfslehner, B., Pülzl, H., Kleinschmit, D., Aggestam, F., Winkel, G., Candel, J., Eckerberg, K., Feindt, P., McDermott, C., Secco, L., Sotirov, M., Lackner, M., Roux, J.-L., 2020. European forest governance post-2020. From Science to policy, 10. European Forest Institute, Joensuu.