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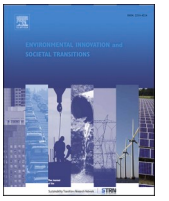

Policy mixes across vertical levels of governance in the EU: The case of the sustainable energy transition in Latvia

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ABSTRACT

The European Green Deal requires policy alignment horizontally across policy areas but also vertically across governance levels. Accordingly, the diversity of actors and their preferences can hinder sociotechnical transitions. We, therefore, ask: How do policy mixes unfold across vertical scales of governance in sociotechnical transitions? We analyse vertical policy mix characteristics, considering consistency, coherence, comprehensiveness, and credibility, and the inherent feedback loops between politics and policy. Drawing on empirical evidence from Latvia, gathered through content analysis and interviews with senior stakeholders, we highlight two key findings: First, friction points in policy coherence between the national-local governance levels feed back into the vertical policy mix, as EU-level policy strategies are not substantiated with corresponding policy instruments. Second, the lack of political commitment to the transition at the national level perpetuates friction points in comprehensiveness and credibility of the vertical policy mix, hindering transition processes.

1. Introduction

Climate change and environmental degradation remain pressing global challenges, also to be addressed in the EU. In response, the European Green Deal aims to accelerate decarbonisation to attain climate neutrality by 2050, particularly focusing on the energy sector (European Commission, 2022b). Catalysing technological innovation, especially technology diffusion for the energy transition, in turn, requires policy alignment across policy areas and levels of governance. However, this alignment is currently lacking, for instance, in advancing renewable energy technologies (Markard and Rosenbloom, 2020).

The sustainability transitions literature has explored policy alignment using the concept of 'policy mixes', referring to the combination of policy instruments and processes through which such instruments emerge and interact (Rogge and Reichardt, 2016). Research has focused on policy mixes spanning various sectors or technologies at one level of governance, most often the state (Capano and Howlett, 2020; Kivimaa and Kern, 2016; Kivimaa and Virkamäki, 2014; Ossenbrink et al., 2019).

However, policy mixes span various governance levels, creating complexity and friction between them. Sustainability transitions research has largely neglected this verticality aspect of policy mixes (Flanagan et al., 2011; Howlett et al., 2017). Political scientists have evoked the concept of 'multi-level governance' to consider various relationships across levels of governance. However, the approach does not account for the complexity of policy mix dynamics in sociotechnical transitions that emerges through feedback mechanisms between politics and policy across governance levels (Edmondson et al., 2019). We aim to fill the gap and unpack vertical

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policy mixes (VPM) spanning supranational, state, and local governance levels for sustainability transitions. Specifically, we ask: How do policy mixes unfold across vertical scales of governance in sociotechnical transitions?

Our analysis is structured by the logic of policy mix characteristics, drawing on the seminal work on policy mixes by Rogge and Reichardt (2016) and Edmondson et al. (2019). For policy mix characteristics, we distinguish the 'consistency' of policy elements (policy strategies and instruments), the 'coherence[1]' of policy processes (policy making and implementation), and the 'comprehensiveness', and 'credibility' of the overall policy mix. We also identify feedback mechanisms between politics and policy across supranational, state, and local governance levels.

We conduct an in-depth analysis of the electricity sector transition in Latvia. Latvia is part of the EU and is mandated to accelerate the sustainable energy transition in line with the European Green Deal (European Commission 2020). Increasing the share of renewables requires diversification into new technologies like wind and solar PV, which are currently negligible in Latvia's energy mix. However, the supporting policies for such technologies in Latvia have been minor, endangering the achievement of the EU's Green Deal ambition. Essentially, friction points emerge in sustainability transition processes across governance levels. The findings of this paper can be extended to other situations where a country that is part of a supranational entity is lagging behind in a particular policy area.

We rely on multiple qualitative methods: semi-structured interviews with senior policymakers and energy sector stakeholders at the three governance levels as well as content analysis. The analysis focuses on the timeline starting with the EU Renewable Energy Directive in 2018 (2018/2001/EU) that sets the first binding renewable energy target for 2030 (later revised upwards in the 'Fit for 55′ package) (European Parliament, 2021).

We primarily aim to make a theoretical contribution to sustainability transition policy and politics research, offering a new perspective on operationalising policy mix characteristics across governance levels. We also make an empirical contribution, exploring vertical policy mixes in a novel geographical context for sustainability transition scholarship. We highlight two findings: First, friction points in policy coherence between the national-local governance levels feed back into the vertical policy mix, as EU-level policy strategies are not substantiated with corresponding policy instruments. Second, the lack of political commitment to the transition at the national level perpetuates friction points in comprehensiveness and credibility of the vertical policy mix, hindering transition processes.

The paper is structured as follows: Section 2 provides a brief literature review and outlines the theoretical framework. Section 3 elaborates on the methodology, and Section 4 gives a background to the case. Section 5 presents the findings, followed by a discussion in Section 6. Section 7 concludes the paper.

2. Theoretical framework

2.1. Vertical policy mixes

Governance plays a crucial role in context-dependant transition processes, given the high uncertainty over future technological, economic, and political developments (Kern et al., 2019; Kuzemko et al., 2016). Single policies are insufficient to achieve the complex sustainability transition goals. The sustainability transitions literature has increasingly engaged with policy mixes, defined as "interactions and interdependencies between different policies as they affect the extent to which intended policy outcomes are achieved" (Flanagan et al., 2011, p. 702). For a comprehensive view of policy mixes, we distinguish 'policy elements' and 'policy processes'. Policy elements include policy strategies and specific policy instruments, which are "concrete tools to achieve overarching objectives" (Rogge and Reichardt, 2016, p. 1623). Policy processes, including policy planning and implementation, refer to the "political problem-solving process among constrained social actors in the search for solutions to societal problems" (Rogge and Reichardt, 2016, p. 1625).

Policy mix research has largely focused on policy elements, although policy processes also form an indispensable part of policy mixes. "Behind policy there is always politics" (Meadowcroft, 2011, p. 73), as policy elements are shaped by policy processes (Howlett and Rayner, 2007; Markard et al., 2012). In other words, policy mixes are rarely free from political challenges caused by diverse preferences of actors with varying degree of power (Flanagan et al., 2011; Rogge et al., 2017). As a result, policy mixes often evolve haphazardly, resulting in incompatible policy layering or insufficient policies to destabilise the incumbent industries (Howlett et al., 2017; Kivimaa and Kern, 2016).

Scholars have explored 'horizontal' policy mixes[2] across policy areas (Del Río, 2014; Flanagan et al., 2011; Grubb et al., 2017; Magro and Wilson, 2019). Example works have assessed policy coherence between emissions trading and renewable electricity support schemes (Del Río, 2007), energy, climate, and security policy (Kivimaa and Sivonen, 2021; Strambo et al., 2015), and R&D policies (Nauwelaers et al., 2009), among others.

We also identified research in 'vertical' policy mixes, primarily in federal country contexts (Huang, 2019; Kuzemko et al., 2020; Magro and Wilson, 2013). Lanahan and Feldman (2015) and Huang (2019) both find that bottom-up as well as top-down factors shape policy mixes across levels of governance in federal countries. Lanahan and Feldman (2015) particularly highlight how state government policy responses complement federal level policies, drawing on the example of the US Small Business Innovation Research

[1] Note that scholars sometimes use the word 'coherence' referring to policy outputs (similar to the way 'consistency' is used in this paper), e.g., Kivimaa and Sivonen (2021); Nilsson et al. (2012)

[2] Early work explores interactions between policies, without explicitly referring to 'policy mixes'

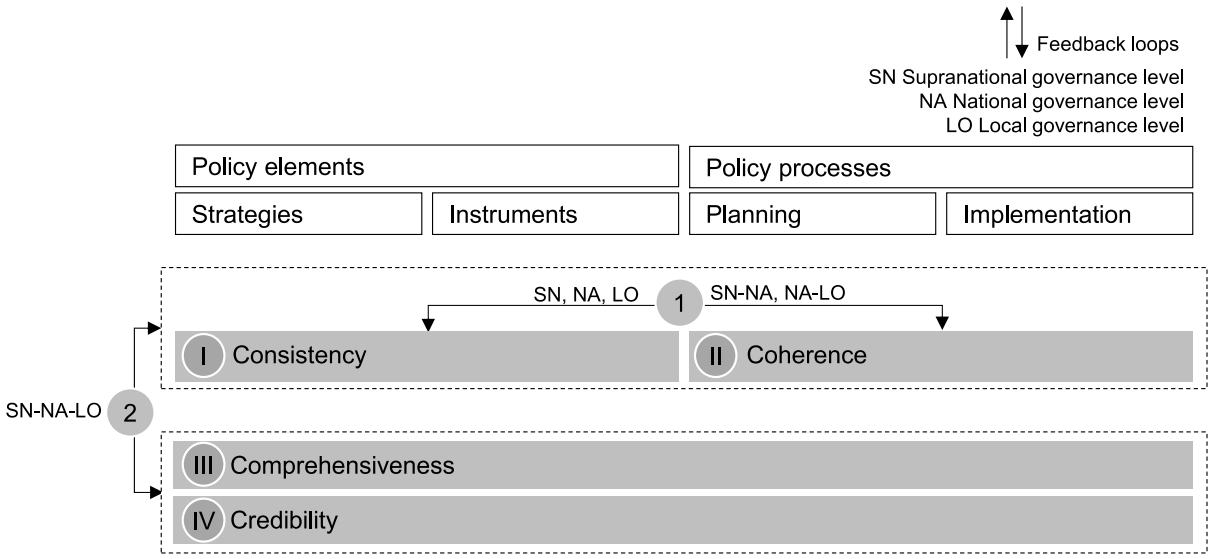

Fig. 1. Policy mix characteristics, adapted from Rogge & Reichardt (2016).

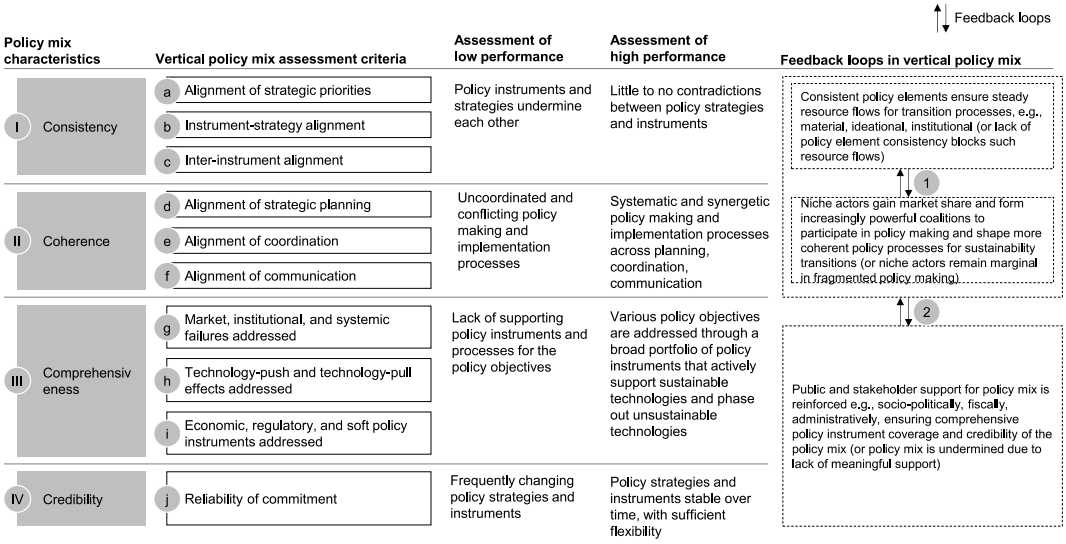

Fig. 2. Operationalising policy mixes, extended from Rogge & Reichardt (2016), Edmondson et al. (2019).

programme. Huang (2019) shows how national priorities can reshape policy mixes at lower governance levels. For instance, urban governments have been more active in mobilising resources than provincial governments for solar water heating technology development in China. However, the existing analyses have not engaged with the supranational governance level in vertical policy mixes. Sustainability transitions research tends to submerge that as a 'landscape' factor. Unpacking the whole verticality of policy mixes can render helpful insights.

Scholars from a different field, political science, have studied 'multi-level governance' to analyse relationships across governance levels, especially in the EU. These approaches explore how state governments develop and implement policies considering the supranational influences in international environmental regimes. For instance, scholars have explored how various domestic factors, such as the quality of democracy, affect member-state compliance with EU policies and laws (Andonova, 2004; Chaisty and Whitefield, 2015; Schimmelfennig and Sedelmeier, 2005). Scholars have also explored the making of supranational strategies in the first place (Ćetković and Buzogány, 2019; Knill and Liefferink, 2021). More recent literature has studied 'transnational' governance, paying closer attention to various actor types in contexts of diffused authority (Andonova and Tuta, 2014; Hale, 2020). Scholars have, for instance, analysed how smaller governance units, such as cities, can counterbalance inaction at higher governance levels (Borgström, 2019; Dale et al., 2020; Ehnert et al., 2018).

However, the approach does not do justice to the complex interaction mechanisms between policy elements and policy processes in

sociotechnical transitions across all governance levels (Cherp et al., 2011; Lindberg et al., 2019; Loorbach, 2010). Various friction points and feedback loops can distort a vertical policy mix, such as discrepancies in transition strategies and instruments across governance levels. Complex policymaking faces the risk of failure when vertical dimensions are not well integrated (Edmondson et al., 2020; Howlett et al., 2017; Howlett and Del Río, 2015). In a nutshell, political science scholars have engaged with verticality across governance levels without explicitly considering policy mixes for particular transition goals (e.g., energy). Sustainability transitions scholars have engaged with policy mixes for particular goals but not yet the full spectrum of governance levels. This paper aims to bridge this gap.

2.2. Operationalising vertical policy mixes

We aim to extend the current work to consider the policy mix dynamics across all governance levels: supranational, national, and local. We conceptualise the vertical policy mix, combining work on policy mix characteristics by Rogge and Reichardt (2016) and feedback mechanisms by Edmondson et al. (2019). The analysis relies on insights from assessing policy mix 'characteristics' (Fig. 1) – 'consistency' of policy elements (I), 'coherence' of policy processes (II), 'comprehensiveness' (III), and 'credibility' (IV) of the policy mix and the inherent feedback loops (1&2) between these across governance levels.

This paper offers an analytical framework for operationalising and assessing the policy mix characteristics across vertical governance levels (Fig. 2). We define assessment criteria for each policy mix characteristic (on a scale from low to high). The policy mix characteristics descriptions are extrapolated from a variety of sources. First, we transformed the definitions of characteristics used in Rogge and Reichardt (2016) into more actionable criteria. Second, we matched these criteria with views from the policy analysis literature. Finally, we triangulated our view on the criteria in discussions with colleagues at several academic conferences.

Regarding policy mix characteristics, consistency of policy elements (I) refers to how policy elements work together to achieve the policy objectives (Lindberg, 2019). We consider consistency in policy strategies (policy objectives with quantified targets and principal plans for achieving them), in policy instruments (as defined before), and between policy strategies and instruments. Policy element consistency requires little or no contradictions in strategic priorities (a), substantiated with fitting (b) and mutually reinforcing (c) policy instruments (considering their goals, type, and design features) (Bach and Hansen, 2021; Rogge and Reichardt, 2016).

Coherence of policy processes (II) refers to policy making, implying "processes that determine the elements of the policy mix" (Rogge and Reichardt, 2016, p. 1625) and policy implementation, namely, executing and enforcing the policy instruments. Policy processes are coherent when policy making and implementation are systematic and synergetic to achieve the policy objectives. The coherence should hold across policy planning (d), policy coordination (e), and also communication (f) (Ashoff, 2005; OECD, 2019b; Tanaka et al., 2020).

The comprehensiveness of the policy mix (III) refers to how extensive and exhaustive the policy elements and policy processes are. Comprehensive policy mixes address market, institutional, and systemic policy failures (g), considering technology-push and demand-pull aspects (h) and leveraging economic, regulatory, and soft instruments (i) (Bach and Hansen, 2021; Costantini et al., 2017; Sovacool, 2009).

The credibility of the policy mix (IV) is also assessed across the entire vertical policy mix, considering policy elements (strategies and instruments with their design features) and processes (Rogge and Dütschke, 2018). Credible policy mixes signal reliability of policy commitment (j) to the transition, enabling a policy framework that is stable but also sufficiently flexible for any changes required (Newell and Goldsmith, 2001; Reichardt et al., 2016; Rogge and Reichardt, 2016).

Moreover, policy elements and processes are interlinked through feedback mechanisms. Friction points in the policy mix can trigger negative feedback loops, as policies are not only products of politics but also influence subsequent politics (Kingdon and Stano, 2011; Wright, 2008). Essentially, "policy mixes stimulate changes in sociotechnical systems through policy effects, and […] these changes can subsequently generate feedback mechanisms influencing the evolution of the policy mix" (Edmondson et al., 2019, p. 2).

For the purposes of this analysis we distinguish two feedback loops. First, consistent policy elements facilitate coherent policy processes that, in turn, reinforce further consistency in policy elements (1 in Figs. 1 and 2) in case of a positive feedback loop. In case of negative feedback loop, low policy element consistency undermines policy process coherence and thus further policy element consistency. In other words, policies facilitating the transition empower niche stakeholders (e.g. through material, ideational, and institutional effects) increasing their political participation that, in turn, contributes to more systematic policies for sustainability transitions (Bolwig et al., 2019; Edmondson et al., 2019; Oberlander and Weaver, 2015). Second, multiple such positive feedback loops between policy elements and processes can contribute to comprehensiveness and credibility of the overall policy mix (e.g. pro-transition actors securing stronger socio-political, fiscal, administrative influence). A more comprehensive and credible policy mix, in turn, reinforces policy process coherence and element consistency (2 in Figs. 1 and 2). In case of a negative feedback loop, lacking political commitment to the transition lowers comprehensiveness and credibility of the vertical policy mix, hindering change. In other words, politics shapes policy, shapes politics.

This paper explores the phenomenon in the context of vertical policy mixes, as policy elements and processes must align across the supranational, national, and local governance levels. Although the state remains the primary energy policy decision-maker, friction points in policy mix consistency and coherence can emerge vertically between supranational and national (friction point highly relevant for policy making) and national and local governance levels (friction point highly relevant for policy implementation), triggering negative feedback loops for the overall comprehensiveness and credibility of the policy mix. Note that the focus of this paper is to assess vertical policy mixes across governance levels, but policy mixes have to be consistent, coherent, comprehensive, and credible at each governance level. This paper speaks to the horizontal policy mixes only where that has direct implications for the vertical policy mix.

Table 1
List of interviewees.

Nr.	Code	VPM level	Organisation	Role
1	EU1	EU	DG Energy	Former Senior Official
2	EU2	EU	European Commission	Economic Advisor
3	EU3	EU	DG Energy	Country Expert
4	N1	State	Ministry of Economics	Director of Department
5	N2	State	Ministry of Economics	Director of Department
6	N3	State	Ministry of Economics	Head of Unit
7	N4	State	Ministry of Economics	Head of Unit
8	N5	State	Ministry of Environmental Protection and Regional Development	Adviser to the Minister
9	N6	State	Bank of Latvia	Senior Official
10	N7	State	Electric utility company	Head of Division
11	L1	Local	Riga City Council	Councillor
12	L2	Local	Riga Energy Agency	Senior Official
13	L3	Local	EU-driven innovation initiative	Managing Director
14	O1	Other	Stockholm School of Economics	Head of Department
15	O2	Other	International energy company	Head of Division

3. Methodology

3.1. Case selection

We adopt a single case study design to analyse the vertical policy mix across three governance levels. Such a single case study approach enables in-depth exploratory, context-specific analysis (George and Bennett, 2005; Yin, 2009).

We draw on empirical evidence from Latvia's electricity sector transition. The energy sector in Latvia necessitates a fundamental energy sector transition towards renewable energy technologies (Ministry of Economics LV 2020). The electricity sector is a fundamental pillar in the NECP, and the greening of other sectors such as transport relies on the supply of clean and affordable electricity. On the one hand, the supranational EU level strongly influences energy sector policy at state level, also unlocking various support mechanisms, including financial (Solorio Sandoval and Jörgens, 2017). On the other hand, support policies for niche technologies in Latvia, particularly wind and solar PV have been minor (as outlined in the National Energy and Climate Plan, NECP) (EBRD 2016). With that, the case of electricity transition in Latvia can be instrumental for also understanding other cases where state and local level policy support for EU level ambition is missing, threatening to derail, here, the European Green Deal.

3.2. Data collection

We rely on multiple qualitative methods to collect data for the analysis of the vertical policy mix: content analysis and semi-structured interviews.

As a first step to outlining the relevant policy elements (policy strategies and instruments) and policy processes (facts on policy planning and implementation), we conducted a content analysis (Newbold et al., 2002; Stemler, 2000). To identify the policy elements, we analysed and evaluated 25 policy documents (considering documents relevant to the current policy mix, starting with the Renewable Energy Directive published in 2009), including policy strategies and plans across all three governance levels (list of sources in the Appendix). In addition, we conducted an extensive press search on the electricity sector transition in Latvia to identify the policy processes and gain additional insight on policy elements. We used the Factiva search tool to identify news articles in English between 2018 and 2021. Relying on the selected criteria, we identified 673 articles on the topic and read 312 articles relevant to the electricity sector transition in Latvia (excluding false positives and articles with repetitive information, criteria are outlined in the Appendix). Moreover, we also read news articles from three widely read news sources in Latvia (in the Latvian language, covering the same period): weekly news periodical 'ir', online news 'delfi.lv', and Latvian TV and radio portal 'lsm.lv'.

In the second step, we conducted 15 semi-structured interviews with senior stakeholders at all three governance levels. (Table 1)[3] lists the interviewees, their organisations and roles. We selected the interviewees based on a systematic scanning of profiles to include both stakeholders that take part in policy processes (e.g., government officials) and stakeholders that benefit (or do not) from the policy elements (e.g., energy producers). The highest number of interviews was with stakeholders at state level, which remains the main governance level in energy policy processes. We also incorporated perspectives from stakeholders at supranational and local levels (the latter focusing on Riga municipality, the largest local administrative unit that offers most data points). We relied on snowball sampling where appropriate and interviewed an independent expert to discuss our first findings. Given the country's small size, the count of interviews was sufficient to cover all necessary angles. The interviews were conducted in 2021 using online conferencing tools. With one exception, we conducted all interviews in the native language (Latvian), which helped build rapport with

[3] Interview identities are presented at a high level of abstraction to protect their confidentiality

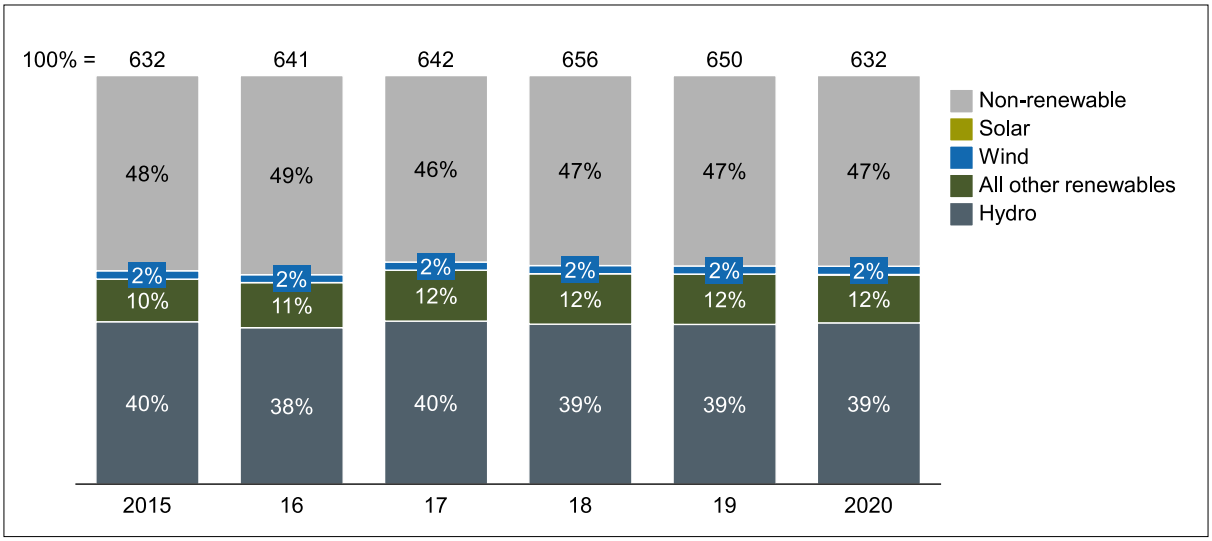

Fig. 3. Electricity production in Latvia, ktoe (Eurostat, 2020b).

the interviewees, increasing clarity and precision. Each interview lasted 45–60 min, and we recorded the interviews upon interviewees' consent.[4] We transcribed all the interviews. Altogether we compiled and worked with 97 pages of notes and transcripts. The interview guidelines and coding frames reflect the analytical framework outlined in Section 2. We adjusted the interview guidelines to fit each interviewee's expertise and reflect prior findings.

3.3. Data analysis

Building upon the insights from content analysis and interviews with senior stakeholders, we looked for evidence on the vertical policy mix assessment criteria introduced in Fig. 2. We assessed the characteristics on a low to high scale, based on the descriptions of the end-points. For instance, for consistency of policy elements (I), we searched for evidence on the alignment of strategic priorities (a), instruments that serve these strategies (b), and alignment among instruments (c). We assessed consistency as rather high if we identified alignment in these criteria across governance levels (or low if we found evidence that policy strategy and elements undermine each other). We repeated the process for all policy mix characteristics across vertical governance levels (illustrative interview guidelines in the Appendix).

In the last step, we triangulated our findings by reviewing reports by international organisations relevant to Latvia's energy sector transition. Latvia is not a member of the International Energy Agency (IEA), so comprehensive external energy sector analyses are not available. However, other organisations, such as the Organization for Economic Co-operation and Development (OECD), offer analyses of various aspects relevant to the electricity sector transition in the country.

4. Case description

Having regained independence from the Soviet Union in 1990, Latvia has undergone significant political and economic changes in the past three decades, including in the energy sector. Nevertheless, the historic energy sector integration with the Soviet Union has shaped energy sector dynamics, for instance, perpetuating the dependence on Russian gas (Grigas, 2013b).

Although the share of renewable energy and particularly electricity in Latvia's energy mix is above the EU average, increasing that share any further (in line with the European Green Deal) necessitates structural changes in the energy sector. Renewable sources constitute 53% (vs 38% EU average) of gross final electricity consumption in 2020 (most of the remaining electricity is generated in two combined heat and power plants (CHPs), powered by natural gas) (Eurostat, 2020a). Latvia's target is to reach over 60% of gross final electricity consumption in 2030 (Ministry of Economics LV 2020). However, nearly 40% of electricity in 2020 is generated in three large hydropower plants on the Daugava river (Eurostat, 2020b). Any further increase in the share of renewables requires diversifying into cost-efficient electricity generating technologies, primarily wind and solar energy. Currently, wind and solar technologies constitute a negligible share of Latvia's energy mix (2% in 2020, growing only at 1% p.a. since 2015, see Fig. 3) (Eurostat, 2020b). Accordingly, energy transition requires a significant change from the status quo. The geographic conditions for the technologies are favourable in Latvia, as confirmed by feasibility studies and installed capacities in neighbouring countries, such as

[4] Privacy and confidentiality questions were covered at the start of each interview, all interview notes and recordings are kept on secure university servers

Table 2
Existing and planned policies in Latvia's electricity transitions[11] (Ministry of Economics LV 2020).

Main policy instruments [a]	Brief description	Timeline
Mandatory procurement mechanism	Compensation mechanism for producers of electricity from renewable sources and in cogeneration plants	Existing[b]
Implement transnational projects for offshore wind parks	One high capacity wind park (at least 800 MW), co-financed by Connecting Europe Facility and Common Interest Projects (3.1)	Planned (2030)
Review territorial construction regulation and land use restrictions for RES technologies	Revise rules (incl. clarifying general construction regulations, issuing building permits), map available to project developers regarding suitable areas (3.2)	Planned (2022)
Develop a conceptual solution for the development of land wind parks	Concept and legislative changes for large capacity wind parks (at least 800MW incl. the offshore wind park), additional 1600 GWh of wind energy per year (3.3)	Planned (2022)
Promote the use of solar electricity generation	Assess possibility for a loan/guarantee programme, e.g., from EU Structural Funds (3.4)	Planned/ approved (2022)
Carry out necessary assessments for further development of RES electricity	Assess possibility of technologically neutral RES auctions for newly installed capacity, evaluate possible incentive measures for municipalities (3.5)	Planned (2023)
Promote marketing of RES electricity	Develop framework for including electricity source information in invoices, RES electricity purchase contracts, trading of RES electricity (3.6)	Planned (2022)
Support development of innovative solutions to increase share of RES in energy system	Develop appropriate legislation, leverage EU Structural Funds (3.7)	Planned (2030)
Develop legal framework for promoting self-generation and self-consumption of energy	Develop appropriate legislation (4.1)	Planned (2023)
Promote development of energy communities	Develop appropriate legislation, carry out a study on viable business model (4.3)	Planned (2026)
Review the rates of the natural resource tax and the conditions for their application	Assess and develop appropriate legislation (11.2)	Planned (2025)
Improve public knowledge, awareness of RES use	Information campaigns, incl. on the role and necessity of the use of RES (12.1)	Planned (2023)
Legislation for system of guarantees of origin of electricity	Develop legislation to improve the system of guarantees of origin of electricity, integrate the system in single European System of Contributions of Energy (H6)	Planned (2022)
Accelerate procedures for RES technology deployment	Single point of contact for authorisation of RES deployment and publicly available instructions for the required authorisation, framework to enable local communities to benefit from RES (H7)	Planned (2022)
Funding to promote use of RES	Assess the possibility of various initiatives e.g. RES Promotion and Energy Efficiency Improvement Fund, selling RES statistics and channelling revenues to the Fund (H8)	Planned (2022)

[a] Planned policy measures according to NECP Appendix IV
[b] Note: by the time of publication, the mandatory procurement mechanism might be abolished

Lithuania (Eurostat, 2021; Lindroos et al., 2018).

Latvia's energy sector is embedded in the EU energy sector strategies, also regarding the transition to sustainable energy sources in the framework of the European Green Deal. The EU single electricity market has contributed to energy diversification in Latvia through facilitating critical infrastructure projects (e.g. electricity connections to Estonia funded by Connecting Europe Facility European Commission, 2021a). In light of EU policies, Latvia has also liberalised the electricity market and Latvia's electricity grids will be synchronised with the EU network by 2025 (away from the grids of the Commonwealth of Independent States) (AST, 2022; Morgan, 2018).

Furthermore, the revised Renewable Energy Directive and 'Fit for 55′ package sets a binding renewable energy target for the EU. As a member state, Latvia also partakes in decision-making processes at EU level through the Council of the EU, the European Parliament, as well as the European Commission (EC). Member states must reflect a sufficient level of ambition in their strategic planning line with this target, considering status quo domestic energy market realities (European Commission 2019). At the time of writing, most planned policy activities in Latvia as outlined in the NECP are pending further assessment and development (summarized in Table 2).

5. Findings

Our findings show the shortcomings in the vertical policy mix for the electricity sector transition in Latvia. The findings are structured by vertical policy mix characteristics, assessing the consistency of policy elements (5.1), coherence of policy processes (5.2), and comprehensiveness (5.3) and credibility (5.4) of the overall policy mix. Each sub-section starts with an overview table with the findings and illustrative quotes from the interviews, including supporting evidence from the Factiva search where helpful. Then, we discuss each assessment criteria separately and include references to the relevant feedback loops

5.1. Consistency of policy elements

We find that contradictions in policy strategies and instruments (and between the two) reduce policy element consistency in the vertical policy mix for Latvia's electricity sector transition (Table 3). The strategic ambition for sustainability transition at the supranational level is only partly reflected in strategies at the state and local levels. Moreover, the strategic ambitions are not substantiated with policy instruments and these at times undermine each other. Such contradictions limit resource (e.g., funding) and institutional (e.g., regulatory) support for niche technologies and relevant actors (with implication for Feedback loop 1 in Fig. 2).

First, alignment of strategic priorities is lacking across governance levels in Latvia's vertical policy mix for electricity transition. In principle, the goals defined in Latvia's NECP for 2030 (50% share of renewable energy and 60% share of renewable electricity in final

Table 3
Consistency of policy elements.

(I) Consistency of policy elements			
Assessment criteria	VPM friction point	Findings	Illustrative interview quotes and evidence
Alignment of strategic priorities	SN—NA	The higher ambition level of strategies at supranational level is insufficiently reflected in strategies at state level	"One can create structures for fundamental change, or pick low hanging fruit – Latvia does the latter […]" (EU1) Latvia has largely implemented the European Commission recommendations in the energy sector, although on renewable energy most policies might not be sufficient to achieve the 2030 target (LETA, 2021)
	NA-LO	Only the largest municipalities have developed specific strategies	"Most municipalities do not have strategic energy policy plans or instruments in place [..]" (N5)
Instrument-strategy alignment	SN—NA	Supranational (and state level) strategic ambition is not sufficiently substantiated with policy instruments	"Interesting situation, where we run [renewable energy] projects in Estonia and Lithuania, but not in Latvia, because there is no support for it" (N7) Out of 800 new contracts for sale of solar panels and parts of solar parks in 2020 by Latvenergo, ¾ of total capacity is installed for customers outside Latvia (LETA, 2021) Latvia lacks long-term strategy for energy and instruments to achieve the plans, according to the Head of Latvian Wind Energy Association (LETA, 2021)
	NA-LO	Existing policy instruments contradict the supranational (and state level) strategic ambition[a]	"The mandatory procurement mechanism was neither a logical nor a fair policy instrument" (L1) The Audit Office released a report on Latvia's renewable energy policy, outlining unjustified support to cogeneration plants, incl. payment of EUR 500′000 to two companies in 2018/19 (LETA, 2021) 27 MPC licenses revoked for 'green' power plants after inspection (LETA, 2019) Government subsidies suspended for 21 green energy producers in 2019, saving EUR 31.5mn (LETA, 2020)
Inter-instrument alignment	SN—NA	Policy instruments curated at supranational level lack reinforcement at state level	"According to the EU, the [money from] the EU Cohesion Fund, should be complemented with other investment. Our reality is such that […] what the EU does not finance, that is left for the state and is usually not happening" (N4)
	NA-LO	Policy instruments at local level contradict policy instruments at state level	"Municipalities have the right, especially in protected areas, to trigger extra environment protection mechanisms (e.g., biodiversity screening) […] Territorial planning policies at municipality level is a key barrier [to wind energy projects]" (N1)

[a] Here consider lack of consistency emanating from policy design (e.g. policy instrument access critera), rather than from policy processes (e.g. implementation)

consumption) satisfy the EU criteria[5] and reach above the EU average in absolute terms (European Commission 2020). Certain goals in the NECP also reverberate across other state-level strategies, e.g. energy sector innovation is also one of five 'smart specialisation' focus areas in Latvia's industrial strategy (in line with the EU Cohesion policy) (Cross-Sectoral Coordination Center 2020; Ministry of Education and Science LV 2018). However, the state level strategy fails to deliver concrete objectives (e.g., quantified trajectories) and the NECP is "picking low hanging fruit" (EU2), e.g., for solar and wind energy development. Moreover, only the largest municipality of the capital city Riga has a substantial local level strategy (Riga City Sustainable Energy and Climate Plan 2030) outlining objectives of reaching climate neutrality by 2050 (Ekodoma 2021).

Second, the supranational and national strategic ambition is not sufficiently substantiated with supporting policy instruments at national and local levels, limiting support for niche technologies and relevant actors. According to the EC assessment of Latvia's NECP, Latvia could miss its 2030 energy transition target without outlining targeted policy measures (European Commission 2020; OECD, 2019a). Stakeholders confirm that specific policy instruments are expected in the updated NECP version, but such have already been introduced in the neighbouring countries, for example, Lithuania (EU2). Moreover, the main policy instrument in Latvia's electricity sector transition, the mandatory procurement component (MPC) has conflicted with the strategic transition goals in practice (SPRK 2016). The MPC instruments speaks to the policy strategy "on paper, not in spirit" (L1). The MPC was designed to support renewable electricity producers but also (efficient) natural CHPs. Although the EC has approved the MPC instrument in theory, in practice (often inefficient) CHPs received the highest support share, an outcome driven by policy instrument design (e.g. access criteria) (Dreblow et al., 2013; Ministry of Economics LV 2018). As a result, wind and solar niche technologies and respective stakeholders didn't meaningfully benefit from this (financially costly) policy (Ministry of Economics LV 2020).

Third, missing inter-instrument alignment further limits support for niche technologies and actors. For instance, Latvia gains

[5] In line with the formula in Annex II to Regulation 2018/1999 on the Governance of Energy Union and Climate Action, the ambition level was increased after the EU's first comments on the NECP draft

Table 4
Coherence of policy processes.

(II) Coherence of policy processes Assessment criteria	VPM friction point	Findings	Illustrative interview quotes and evidence
Alignment of strategic planning	SN—NA	Effective alignment of strategic planning between supranational and state governance levels	"EC controls whether Latvia lives up to the minimal requirements, and in general, these strategic processes are well aligned" (EU2)
	NA-LO	Various political preferences and vested interests hinder policy planning (and implementation) at state and local governance levels	"Latvia has a significant fossil energy lobby that is counteracting renewable energy projects as much as possible. One cannot deny or ignore this. Gas is in a stable position with a large systemic influence. One could trace how the old energy sources are fighting the new." (EU2)
Alignment of coordination	SN—NA	Effective policy coordination at supranational and state governance levels	"[Policy coordination] has always been good, in NECP discussion meetings, in Brussels" (EU3)
	NA-LO	Policy coordination at the state and local governance levels is fragmented	"Currently many small uncoordinated initiatives, that is not logical […] At national level, it is not clear what the goal is […] Cannot accidentally arrive at the required outcome" (N6) Economics Ministry has prepared amendments to the electricity market law, proposing to scrap MPC (LETA, 2019)
Alignment of communication	SN—NA	Policy communication at the supranational-state nexus reinforces policy implementation	85% of Latvia's residents support solar power development in Latvia, 77% wind energy (LETA, 2019)
	NA-LO	Policy communication complicates policy implementation at state and local governance levels	"For 10–15 years, we have not gotten rid of the green oligarch image in Latvia; when people think of a wind generator, they think of oligarchs, although that is no longer the case" (L1) "There are many myths about Latvia as a green country that data-based facts and indicators disprove" (EU2)

significant funding for sustainability transition[6] from the EU Cohesion Fund (CF) and the Recovery and Resilience Facility (RRF) .[7] However, funding for specific projects from the EU is often not complemented with funding options at the state level, reinforced by the generally low propensity to borrow: "Latvia has careful politics […] we try to get by with what we have […] also the capital market is shallow" (N6). Furthermore, institutional barriers at local level can contradict policy instruments at state level. Specifically, territorial planning in municipalities, often shaped by NIMBY effect, affects wind project development (Āboltiņš, 2019; Ministry of Economics LV 2020). For instance, a wind project in Tukums municipality was restricted at a late stage of project development, in a way that was later deemed illegal (N2, EU2). Although some initiatives at the EU level address such barriers, additional policy instruments at state and local levels are required to practically support niche technologies: "we need various mechanisms: upgrade legislation, create benefits for communities […], involve inhabitants" (L1).

5.2. *Coherence of policy processes*

We identify friction points in policy process coherence, especially between national-local governance levels (Table 4). We find that vested interests distort strategic policy planning, policy coordination is fragmented, and policy communication does not reinforce public support for renewable energy technologies. Such policy processes reduce the bottom-up political commitment to the transition (with implication for Feedback loop 1 in Fig. 2).

First, strategic planning activities are not fully aligned across governance levels in Latvia's electricity policy mix, as status quo actors block systematic and synergetic policy support for the transitions. On the one hand, interviewers confirm that strategic planning activities between the EU and the national level function well (Carbon Market Watch 2018; European Parliament, 2021). On the other hand, at the state level the current government is the first to prioritise the energy transition in practice (EU1). Vested business interests have hindered strategic planning towards sustainability at the state and local levels, the topic has been researched by scholars and investigative journalists (Grigas, 2013a; Sprance, 2020). Specifically, there has been a strong gas lobby of Latvijas Gāze (natural gas company, partially owned by Gazprom[8]) in energy policy making, perpetuating support for the gas sector and electricity generation in CHP power plants (L1). For instance, Latvia was the last country in the EU to liberalise the gas market (Brauna et al., 2022). Accordingly, the policy processes are rather reactive to EU directives rather than strategically integrating the energy sector transition with broader economic development objectives (N1). It wasn't until 2021 that Latvenergo pledged to shift to renewable energy in Latvia (Irbe, 2022).

Second, policy coordination suffers from lack of involvement of the local governance level. Stakeholders confirm effective policy

[6] According to the NECP, the transition in Latvia is expected to cost ~3% GDP per year (EUR 8 billion for the period 2021-30) (Kamenders et al., 2020)

[7] 50% of CF funding in Latvia (EUR 468 million) and 42% of RRF (EUR 281 million) is allocated to climate and (primarily) energy efficiency projects (N4)

[8] Latvia has relied on gas from Russia, wherey Gazprom held an exclusive supply contract until 2017 (Āboltiņš & Akule, 2014)

Table 5
Comprehensiveness of policy mix.

(III) Comprehensiveness of the policy mix Assessment criteria	VPM friction point	Findings	Illustrative quotes and evidence
Market, institutional, and systemic failures addressed	SN—NA-LO	Market, institutional, and systemic failures hindering innovation in the energy sector not comprehensively addressed	"We are in the last place in the EU regarding innovation investment for state-owned companies […] There are limitations in the existing legislation" (N7)
Technology-push and market-pull effects addressed	SN—NA-LO	Lagging support measures to encourage market-pull for new technologies	"Need to support not suppliers but consumers" (EU1) One third of Latvia's households would be ready to generate their own electric power, majority through solar panels (according to Enefit survey) (LETA, 2020) 61% of Latvia's households changed electricity supplier in 2018 [accordingly, could be incentivized to think more about energy sources] (LETA, 2019)
Economic, regulatory, and soft instruments addressed	SN—NA-LO	The potential of economic instruments not fulfilled	"There are talks about an additional tax for renewable energy that would disincentivise investors" (O2)

coordination at the supranational-state governance nexus (e.g., incorporating EC recommendations on the NECP draft European Commission, 2021b) (EU2, EU3). However, "municipalities are detached from energy policy making" (N5), leaving important actors that could favour transition policies out of the debate. To illustrate, the coordination with municipalities is the responsibility of the Ministry of Environmental Protection and Regional Development (VARAM), while energy and innovation policy making is the responsibility of the Ministry of Economics (EM) (L1). Stakeholders repeatedly outlined that "there is no dialogue between EM and VARAM" (L1). Although the National Energy and Climate Council, led by the Prime Minister, has been established to make coordinated policy proposals and advance innovation and financing, many stakeholders caution of the marginal benefit of the institution for niche stakeholders (Cabinet of Ministers LV 2019) (N1, N5, N6, EU1).[9]

Finally, policy communication also remains weak due to the low involvement of pro-transition voices. Despite the pro-transition communication from the EU level, e.g. through the EC representation in Latvia communicating the European Green Deal to businesses and the general public, it is essential to engage consumers regarding greener and potentially cheaper electricity options. Nevertheless, effective policy communication at state and local levels is lacking (L1). Additionally, the MPC was communicated as green energy support while de facto supporting natural gas, rendering a negative public image of renewable energy (as intransparent, excessively expensive) (Āboltiņš, 2019; Sprance and Kļava, 2019). "In Latvia, MPC is like swearing" (O2), fuelling consumer distrust in the energy sector.

5.3. Policy mix comprehensiveness

We find that the overall vertical policy mix is not sufficiently comprehensive to satisfy the strategic sustainability transition objectives (Table 5). First, market, institutional, and systematic sustainability transition aspects have not been comprehensively addressed, such as supporting the innovation of new technologies in Latvia's energy sector. Second, the market-pull elements require more support in Latvia's energy sociotechnical system, including targeted support for energy communities. Third, the potential of different kinds of policy instruments, including economic, regulatory, and soft instruments, is not exhausted, such as taxation policy. Essentially, lacking political commitment to the transition fails to ensure comprehensive policy mix (that, in turn, reinforces the low political commitment, with implications for Feedback loop 2 in Fig. 2).

First, market, institutional, and systemic failures hindering innovation in the energy sector are not comprehensively addressed. Namely, although strategically innovation in the energy sector is a policy priority, there is no comprehensive political and financial support for energy innovation at the state and local levels. The EC assessment of Latvia's NECP highlights the missing policy instruments to advance technological innovation in the energy sector,[10] these are in the planning stage at the time of writing (N3) (European Commission 2020). One of the main barriers is that state-owned companies cannot purchase innovative technologies without a complex procurement procedure, which makes the process unviable (N7, N3, EU2). Accordingly, Latvia remains "in the last place in the EU regarding innovation investment for state-owned companies" (in contrast to the state-owned energy company Ignitis in Lithuania or examples from Nordic countries) (N7).

Second, market-pull measures specifically remain weak in Latvia's energy system. Lacking support for energy communities is a key example. According to the revised Renewable Energy Directive (2018/2001/EU), member states should ensure appropriate support schemes for energy communities and various projects at the EU level contribute to that (e.g., Energy Communities Repository

[9] Note: by the time of publication, Latvia has created a new Ministry for Climate and Energy to combine the energy-related questions previously with EM and climate-related questions previously with VARAM (Kincis, 2023). However, the contribution of this institution remains to be seen.
[10] More detailed measures are expected in the 2021-27 national industry policy guidelines
[11] Note: by the time of publication, some advances on the policies planned for 2022 have been made, partly accelerated by the pressures on the energy sector following the Russian invasion of Ukraine. These updates do not change the findings of this paper.

Table 6
Credibility of policy mix.

(IV) Credibility of the policy mix Assessment criteria	VPM friction point	Findings	Illustrative interview quotes and evidence
Reliability of commitment	SN—NA-LO	Lacking political commitment at state and local levels decreases the reliability of the vertical policy mix	"It has always surprised me why [energy transition] comes so late. Energy is expensive, there is energy dependence on Russia. It would be an obvious choice […] it's been 30 years since independence" (O1) "Laws are changed, there are many legal processes, tainted legal framework, which is important for new local and foreign investment […] energy market situation is unattractive to foreign investors […] The gordian knot has not been broken. The past influences the present" (EU2)

providing technical and administrative advice) (European Commission, 2022a). The NECP outlines the objective to increase the self-consumer share and update the enabling framework for energy communities. However, more targeted policies are pending at the state and local levels, especially given the high upfront cost of technologies (L1, EU1, N1).

Finally, the potential of diverse policy instruments is not realized, including economic instruments. A prime example is tax policy. The revised EU Energy Tax Directive defines the rules for electricity and energy products. Namely, tax breaks for fossil fuels should be phased out by 2030 (Latvian Wind Energy Association, 2022). To date, however, the tax system in Latvia provides indirect support for gas and CHPs: "without crippling the market, whereby gas is mysteriously cheaper, renewable energy would have gone up" (L1). Also, the tax is disproportionately high for low-income households (OECD, 2019a). Stakeholders remain sceptical about the usefulness of currently planned taxation in advancing renewable energy technologies (L1).

5.4. Policy mix credibility

Finally, with lacking political commitment to the transition at the state level, the policy mix also lacks credibility (Table 6). Policy elements developed at supranational level can reinforce the reliability of commitment to the transition at state and local governance levels. However, lacking socio-political, fiscal, and administrative feedbacks to steadily support transition policy at the state and local levels counteract the positive effects from the EU policies (Feedback loop 2 in Fig. 2).

On the one hand, the European Green Deal offers the required "push from abroad" (O1) for policy change to enable the sustainable electricity sector transition in Latvia. The EU strategies set clear expectations and timelines and provide financial and other types of policy support. On the other hand, lacking coherence in policy decision-making and vested interests lower the political commitment to the transition at state and local levels. In the context of frequently changing coalition governments and fragmented energy sector governance, predictability and continuity in energy sector policies remain low (O1, EU2). That, in turn, reduces the reliability of policy support for niche stakeholders. The frequent changes to the MPC policy instrument eligibility criteria, funding strategies, and ultimately phasing out trajectories illustrate this point. Overall, there has been no clear state politics: "political will is very important, we lack that" (L1).

6. Discussion

We analysed the consistency of policy mix elements, coherence of policy processes, as well as the comprehensiveness and credibility of the vertical policy mix for the electricity sector transition towards sustainability in Latvia. The policy mix characteristics shape feedback mechanisms between policy and politics, defining the vertical policy mix. In this section, we discuss our central findings, analyse the inherent feedback mechanisms, and deduce policy implications.

First, friction points in policy coherence between the national-local governance levels feed back into the vertical policy mix, as EU-level policy strategies are not substantiated with corresponding policy instruments. We find discrepancies in policy strategies across governance levels, as the ambition for transition processes in supranational strategies does not resonate in strategic objectives and policy instruments that bring them to life at state (and local) governance levels. The relatively low policy element consistency in the vertical policy mix fails to create a supportive environment for niche technologies and with that, restricts the development of niche stakeholders. Accordingly, they do not gain the weight to contribute to policy process coherence at the state governance level. In the case of Latvia, the NECP is picking the 'low hanging fruit' without clear policy objectives and instruments to advance technological innovation to ensure the transition to sustainable electricity in line with the 2030 and ultimately, 2050 net zero goals.

Second, the lack of political commitment to the transition at the national level perpetuates friction points in comprehensiveness and credibility of the vertical policy mix, hindering transition processes. Vested interests, particularly the gas lobby, hinder systematic and synergetic policy making, especially at the state-local governance nexus. Within the broader political context of frequently changing coalition governments in the country, the overall comprehensiveness and credibility of vertical policy mix remains low even with strong EU commitment to the transition. That, in turn, perpetuates low policy process coherence and policy element consistency, triggering a negative feedback loop that results in unfavourable conditions for niche technologies. To illustrate, investors prefer to invest in renewable technology parks in neighbouring Lithuania, where the political conditions are better. Accordingly, the share of

wind and solar PV technologies has grown slowly in Latvia (Ministry of Economics, 2020b). This dynamic further slows the socio-technical change towards the European Green Deal ambition.

Our findings on the feedback loops in the vertical policy mix for Latvia's electricity transition raise the question of what can be done to help generate political momentum in member-states for the required changes towards the European Green Deal. Even more so, given that comparable changes have been made in neighbouring member-states, for instance, Lithuania (Zepa, 2022). We identify two main policy implications. First, initiatives at supranational level can create incentives for political commitment to the transition at state and local levels. We observed that financial support from the EU is frequently a defining factor for energy transition initiatives. Further non-financial initiatives at EU level can also be helpful, such as targeted educational campaigns to shift consumers to green energy sources (e.g., informing on opportunities for energy communities). That, in turn, gives a stronger voice to pro-transition actors domestically, increasing political commitment to the transition. Second, a higher diversity of stakeholders, including from municipalities and regions, require substantial incentives and opportunities to partake in strategic policy planning at the state level. Increasing stakeholder participation in policy planning and following up on implementation can help unlock comprehensive and credible vertical policy mixes.

Our research also indicates that external shocks can affect these feedback loops. Especially the sharp increase in gas prices resulting from the Russian invasion of Ukraine in February 2022 has shaped energy policy in Europe with two-fold effects (Oxford Institute for Energy Studies 2022). On the one hand, shocks can perpetuate negative feedback loops by increasing support for non-sustainable alternatives, for instance, re-opening coal power plants in Germany (Connoly, 2022). On the other hand, external shocks can intensify seeking viable solutions for energy security, independence, and sustainability (IEA, 2022). For instance, Latvia has banned imports of Russian gas as of January 1st 2023 (Klūga, 2022). However, it remains to be seen whether the momentum can increase policy process coherence and ultimately, political commitment, shifting the feedback loops more in favour of sustainable energy transition.

Moreover, this paper renders avenues for future research. First, we made an early attempt to operationalise policy mix characteristics systematically. Further work would be helpful to scrutinise and detail the operationalisation of policy mix characteristics to devise a consistent approach helpful for empirical studies. This conceptual approach also requires broader empirical testing in comparative case studies across geographies and technologies. Second, we engaged with feedback loops at a high level of abstraction, identifying two mechanisms. Further work is required to conceptualise these in more detail across governance levels, also considering policy sequencing aspects (Meckling et al., 2017). Finally, more systematic approach to understanding vertical policy mix implications from external shocks would be insightful. Specifically, offering policy advice on reducing negative fluctuations in a (vertical) policy mix.

7. Conclusions

How do policy mixes unfold across vertical scales of governance in sociotechnical transitions? We explored the policy mix characteristics and the inherent feedback loops, drawing on data and insights from a comprehensive single case study analysis in the EU member state Latvia. We relied on semi-structured interviews and content analysis to gain detailed insights into the vertical policy mix.

Our analysis renders two key insights on policy mixes across vertical scales. First, friction points in policy coherence between the national-local governance levels feed back into the vertical policy mix, as EU-level policy strategies are not substantiated with corresponding policy instruments. Second, the lack of political commitment to the transition at the national level perpetuates friction points in comprehensiveness and credibility of the vertical policy mix, hindering transition processes. Essentially, the frequently changing policy strategies and instruments at state and local levels offset the ambitious sustainability agenda at EU level, reinforcing the status quo over substantial political and economic change.

Our findings suggest policy implications for overcoming friction points in the vertical policy mix and directions for future research. These are important to address for the EU Green Deal ambition.

Declaration of Competing Interest

We have no conflict of interest to disclose.

Data availability

Data will be made available on request.

Appendix

Appendix para (Tables A1-A5).

Table A1
Policy elements: policy documents analysed.

Author EU governance level	Nr	Policy document
European Commission	1	Communication from the Commission: The European Green Deal (COM/2019/640)
	2	A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy (COM/2015/080)
	3	Renewable Energy Directive (2009/28/EC)
	4	Renewable Energy Directive (2018/2021/EU, Clean Energy for all Europeans package)
	5	Baltic Sea Offshore Wind Joint Declaration of Intent
	6	Governance of the Energy Union and Climate Action (EU) Regulation 2018/1999
	7	Publication: Clean Energy for all Europeans
	8	Assessment of the Final National Energy and Climate Plan of Latvia
	9	Country Report Latvia (2020 European Semester)
Other	10	BEMIP Offshore Wind Work-program
	11	Roadmap on Regional Gas Market Integration between Estonia, Finland, Latvia, and Lithuania
	12	Political Roadmap on Implementing the Synchronisation of the Baltic States' Electricity Networks with the Continental European Network via Poland
State governance level		
Ministry of Economics	13	National Energy and Climate Plan 2020 (NECP 2020)
	14	National Energy and Climate Plan 2030 (NECP 2030) Annex I: Detailed information about the connection of the plan with policy planning documents of Latvia Annex II: Detailed information about the consistency of the common result indicators of the ERDF and the CF with the indicators of the Plan Annex III: Information about the main policies included in the baseline scenario of forecasts and their main implementation measures Annex IV: Breakdown of policy measures Annex V: Information on the necessary additional financing for the measures included in Annex 4 to the plan with an identified amount of State budget financing Annex VI: The methods used to analyse and forecast the development of energy systems and GHG emissions
	15	Cabinet Order 04.02.2020 Nr. 46 (about NECP 2021–2030)
	16	Energy Development Guidelines 2016–2020
	17	National Industrial Policy Guidelines 2021–2027
Ministry of Education and Science	18	Research and Innovation Strategy for Smart Specialization (RIS3)
Ministry of Environmental Protection and Regional Development	19	Strategy for Latvia for the Achievement of Climate Neutrality by 2050
Saeima of the Republic of Latvia	20	Sustainable Development Strategy of Latvia until 2030
Cross-Sectoral Coordination centre	21	National Development Plan of Latvia 2021–2027 (NDP2027)
EBRD	22	Strategy for Latvia
Local governance level		
Riga Energy Agency	23	Riga Smart City Sustainable Energy Action Plan 2014–2020
Riga Energy Agency	24	Riga City Energy and Climate Plan 2022–2030
Riga City Development Department	25	Sustainable Development Strategy Riga 2030

Table A2
Factiva search terms.

Category	Criteria used
Search terms	"energy" OR "renewable" OR "renewable energy" OR "wind" OR "solar" AND "electricity" AND "Latvia"
Search period	01.06.2018–31.12.2021
Sources	Latvian News Agency (to limit scope from over 3000 articles to 673)
Region	Latvia
Other restrictions	Headline and Lead paragraph

Table A3
Illustrative interview guidelines/coding frame.

VPM characteristics	VPM assessment criteria	Interview questions
Policy element consistency	(a)	To what extent are the strategic goals for the transition aligned / not aligned between the EU and Latvia? To what extent is the energy transition aligned / not aligned with other strategic economic development goals in Latvia? To what extent is the energy transition strategic goal reflected in local level strategies?

(*continued on next page*)

Table A3 (*continued*)

VPM characteristics	VPM assessment criteria	Interview questions
	(b)	To what extent are the strategic goals substantiated with concrete policies (policy instruments) at the state and local levels? To what extent is the state taking advantage of all support mechanisms available at the EU level, such as funding sources? Can you identify any support mechanisms that would be helpful but currently do not exist at the EU level?
	(c)	Can you identify any contradictions between existing policies (policy instruments)? Consider, for instance, their target, duration, support level, stringency, differentiation. Can you identify any policy instruments that are not used but would be helpful to advance the strategic goals?
Policy process coherence	(d)	How effective is policy planning between the EU and state levels? How effective is policy planning between state and local levels?
	(e)	How effective is policy coordination between the EU and state levels? How effective is policy coordination between state and local levels?
	(f)	How effective is strategic and policy communication between the EU and state levels? Consider all policy planning and implementation stages, including agenda setting, policy formulation, policy adoption. How effective is strategic and policy communication between the state and local levels? Consider all policy planning and implementation stages, including agenda setting, policy formulation, policy adoption.
Policy mix comprehensiveness	(g)	To what extent does the policy mix create a level playing field for renewable energy technologies in the market? Why? To what extent does the policy mix address the relevant regulatory and administrative institutional issues? Why? To what extent does the policy mix enable the inclusion of renewable technologies in the existing energy system (e.g., infrastructure)? Why?
	(h)	To what extent does the policy mix support the supply side (technology-push) of renewable energy technologies? Why? To what extent does the policy mix support the demand side (technology-pull) for renewable energy technologies? Why?
	(i)	How would you assess the diversity of policy instruments employed to advance the transition (economic, regulatory, soft)? Why?
Policy mix credibility	(j)	To what extent is the policy mix stable? Why? To what extent is the policy mix sufficiently flexible to enable change if required? Why? To what extend does the policy mix create an attractive environment to investors and other business stakeholders in renewable energy? Why?

Table A4
Additional illustrative interview quotes.

Assessment criteria	VPM friction point	Further relevant quotes
(I) Consistency of policy elements		
Alignment of strategic priorities	SN—NA	"Latvia's plan goes in the right direction, identifies problems, but the ambition level does not exceed the EU recommendations" (EU2)
	NA-LO	"[Municipalities] would like to be more pro-actively involved in policy planning processes" (L2)
Instrument-strategy alignment	SN—NA	"Specificity and roadmaps for policies is lacking, also the contribution from the key economic sectors […] I am not certain that [the existing policy measures] will be sufficient at the end of the day" (EU2)
	NA-LO	"MPC has been artificial. Instead of creating a stimulus, it has been expensive" (N5) "We don't need any kind of public support. We just need a flat playing field where we can operate" (O2)
Inter-instrument alignment	SN—NA	"Public money does not attract private money. There is a lack of wise financial instruments. If Latvia continues to sleep on EU grant money and does not work with business angels, it will fall behind. That is an important factor – access to risk money." (EU2)
	NA-LO	"The private sector […] having issues with construction boards, that was the end of renewable energy in Latvia" (N6)
(II) Coherence of policy processes		
Alignment of strategic planning	SN—NA	"Latvia positively and loudly supports 'Fit for 55' by EC and also has changed the usual caution in the rhetorics" (EU1)
	NA-LO	"Fossil gas is the largest enemy of a fair transition to clean energy in Latvia […] If there were no crippled market whereby gas is mysteriously cheaper, then renewable energy would long have spiked" (L1) "Why could the largest company, that belongs to the state, not take on an ambitious renewable energy plan? Compared to Ignitis and Enefit Green, we are sitting around, waiting for something" (L1)
Alignment of coordination	SN—NA	"EC controls whether Latvia lives up to the minimal requirements, and in general, these fit the general strategy" (EU2)
	NA-LO	"Need one institution to coordinate the green course […] municipalities are detached from the important topics, such as energy" (N5) "We consult [the municipalities on relevant questions] as much as we are being asked" (N1)
Alignment of communication	SN—NA	"Industries have upheld the cliché that we are green, although that is not the case. We buy brown energy. If we are so green in the formal statistics – then why are we struggling so much?" (N6)

(*continued on next page*)

Table A4 (*continued*)

(II) Coherence of policy processes		
	NA-LO	"The MPC has left the impression on citizens that renewable energy is the most expensive" (EU1) "There are many unused opportunities to make consumers more aware" (EU3)
(III) Comprehensiveness		
Market, institutional, and systemic failures addressed	SN—NA-LO	"Framework for innovation is currently in the planning process" (N3) "Innovation initiatives start with EU funds" (L3)
Technology-push and market-pull effects addressed	SN—NA-LO	"We see solar technologies as complementary to wind technologies, a fantastic solution in the context of decentralisation demands" (N1)
Economic, regulatory, and soft instruments addressed	SN—NA	"Tax policy changes are more important, more efficient, and stronger than CF support" (N4)
(IV) Credibility		
Market, institutional, and systemic failures addressed	SN—NA-LO	"Structural factors come into play, for instance, governments have frequently changed, and decision-making in fragmented coalitions has been difficult […] Problem that cannot be solved – party relations in the government coalition" (EU1) "The energy ministers in Latvia have changed frequently, regulation in the field is not stable. We have made short term decisions […] The energy market situation is unattractive to foreign investors." (L1) "Problem exists because banks are cautious with project development. They do not see state politics. They see risks in how projects, such as wind parks, are implemented, as they remain stuck for ten years. If there were no other obstacles, finance would not be a problem, from bank side there is a big interest for good projects." (N6)

Table A5
Articles from Factiva search used for fact checking or referenced in text.

Article title	Author	News agency	Date
There are parties in government coalition that are against touching VAT on energy - Gerhards	Silvija Reinberga	LETA	20 December 2021
Latvia lacks long-term strategy on energy - Wind Energy Association	n.a.	LETA	15 December 2021
Latvenergo Group's turnover increases 17% in nine months	Marta Kronberga	LETA	30 November 2021
Latvenergo planning to double capacity for generation of energy from renewable resources	Marta Kronberga	LETA	29 November 2021
Economics Ministry proposes cutting MPC in electricity bills by 65% in 2022	n.a.	LETA	5 November 2021
Latvenergo sells by 70% more natural gas last year	Krišs Janis Kairis	LETA	7 March 2021
Audit Office to turn to authorities over EUR 0.5 million paid to two companies in mandatory procurement support	Raivis Spalvens	LETA	7 January 2021
Latvia has largely implemented recommendations in energy sector - European Commission	n.a.	LETA	15 October 2021
Toms Naburgs to be head of Latvian Wind Energy Association	n.a.	LETA	15 September 2021
Two Economics Ministry officials face prosecution for poor MPC oversight	Gatis Kristovskis	LETA	18 May 2021
Latvia has huge potential in wind energy - Levits	Baiba Krastina	LETA	29 April 2021
Elektrum solar energy park opened in Lithuania	Krišs Jānis Kairis	LETA	7 April 2021
Latvian-owned Elektrum Lithuania stepping into remote solar farm market	n.a.	LETA	9 July 2020
One third of Latvia's households ready to generate own power - Enefit	n.a.	LETA	10 April 2019
Karins assumes MPC might not be liquidated in March due to three important risks	n.a.	LETA	20 March 2019
Enefit to start selling electricity to Latvia's households in March	n.a.	LETA	27 February 2019
Ways to promote "green" energy should be found after scrapping MPC – economics minister	n.a.	LETA	19 February 2019
Latvia has third largest share of renewables in gross energy consumption - Eurostat	n.a.	LETA	12 February 2019
Wind power industry's development in Latvia hampered by lack of political vision - association	n.a.	LETA	29 January 2019
Government hears Economics Ministry's plan for phasing out MPC without discussions	n.a.	LETA	29 January 2019
85.2% of Latvia's residents support solar power development - survey	n.a.	LETA	15 January 2019
No need for new support mechanism to substitute MPC - economics minister nominee	n.a.	LETA	14 January 2019
27 "green" power plants lose MPC licenses after snap inspections	n.a.	LETA	3 January 2019
Baltic, Nordic countries sign agreement on cooperation in energy research program	n.a.	LETA	1 October 2018
Baltic, Nordic countries to increase energy-related research cooperation	n.a.	LETA	28 September 2018
Saeima committee in principle supports proposals on restricting MPC	n.a.	LETA	26 September 2018
Nemiro suspends Economics Ministry's state secretary alleging violations in MPC oversight		LETA	5 February 2020

(*continued on next page*)

Table A5 (*continued*)

Article title	Author	News agency	Date
	Raivis Spalvens, Ainars Leijejs		
Climate and energy plan 2030 is step towards climate neutrality - ministers	Raivis Spalvens	LETA	28 January 2020
Government subsidies suspended for 21 green energy producers in 2019, saving EUR 31.5 million	Raivis Spalvens	LETA	23 January 2020
Work on removing MPC from electricity bills to be activated in the future - Nemiro	n.a.	LETA	22 January 2020
Production of wind energy should be based on market principles - Nem	Marta Kronberga	LETA	3 December 2019
Climate-neutral economy does not mean halt to economic growth - Puce	Raivis Spalvens	LETA	21 November 2019
Climate policy is opportunity to improve Latvia's welfare - Karins	Raivis Spalvens	LETA	21 November 2019
Latvia plans to ensure a share of at least 50% renewable energy in its overall final energy consumption by 2030	Ivars Motivans	LETA	8 November 2019
Consumption of renewable energy sources drops 4.5% in 2018	n.a.	LETA	5 September 2019
Saeima investigative commission requests information on each individual MPC license and officials' reasons for issuing licenses	n.a.	LETA	16 August 2019
Government subsidies suspended for 134 green energy producers	n.a.	LETA	1 July 2019
"Green certificates" to be removed from MPC reform plan - PM Kucinskis	n.a.	LETA	13 August 2018
Government to make decision on Economics Ministry's proposal to scrap MPC in three years	n.a.	LETA	13 August 2018
PM Kucinskis to ask prosecutor's office to look into unlawful issue of MPC licenses	n.a.	LETA	8 August 2018
Nelja Energia: Latvian renewable subsidies have failed to develop sector	n.a.	LETA	7 August 2018
MPC liquidation would reduce electricity bills by 10% - Aseradens	n.a.	LETA	2 August 2018
Work group not to agree on liquidation of MPC system but work on renewing sector's reputation - expert	Raivis Spalvens	LETA	27 July 2018
Parliament orders PM to produce report on officials responsible for flawed green energy support system	n.a.	LETA	20 June 2018
Security of energy supply is and will remain priority of Latvia and EU - President Vejonis	n.a.	LETA	1 June 2018

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