

Europe's Just Green Transition beyond the SDGs: towards a preliminary governance typology

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Research Article



# Europe's Just Green Transition beyond the SDGs: towards a preliminary governance typology

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## ABSTRACT

The European Green Deal outlines the European Union's strategy to achieve a carbon-neutral society, aligning with the UN Agenda 2030. The Just Transition Mechanism extends the Green Deal to the social dimension of sustainability. Together, they compose the Just Green Transition (JGT) framework, conceived to go beyond the Sustainable Development Goals by introducing a value-driven approach supported by specific resources and governance models. Yet, its implementation is uneven due to Europe's institutional and territorial heterogeneity. Drawing on evidence from the ESPON NoStaGeo project, the contribution explores how JGT is governed across 40 European institutional contexts, with particular attention to institutional instruments and spatial arrangements. On this basis, the authors propose a preliminary typology of JGT governance, suggesting that, while no one-size-fits-all model exists, effective JGT governance requires combining strong multi-level and multisector coordination with territorial flexibility and stakeholder inclusion.

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## KEYWORDS

Just Green Transitions; SDGs; governance; European Green Deal; European Union

## 1. Introduction

The global commitment to sustainable development, consolidated in 2015 through the adoption of the 2030 Agenda for Sustainable Development and the Paris Agreement, has placed unprecedented pressure on governments to steer profound socio-ecological transformations. In response to these challenging goals, in 2019, the European Union (EU) launched the European Green Deal (EGD), an ambitious roadmap to achieve a 55% reduction in emissions by 2030 and to become the world's first climate-neutral continent by 2050.

To provide targeted support to regions and sectors most affected by the transition towards the green economy (European Commission 2019, 2021), the European Commission developed the Just Transition Mechanism (JTM), a turning-point investment framework articulated in three pillars: (i) a Just Transition Fund (JTF) to provide grants; (ii) a

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private-investment mobilization scheme, through InvestEU; and (iii) a new public sector loan facility for additional investments to be leveraged by the European Investment Bank (Berisha et al. 2026). The JTM also provided a strong governance framework centred on Territorial Just Transition Plans (TJTTPs), designed to support the transition of European territories at various scales. Beyond the EU perimeter, other European countries were launching similar initiatives to anticipate and address the challenges arising from meeting sustainable development targets (Berisha 2026).

Overall, the JTM aims to complement and, to some extent, go beyond the SDGs by integrating a value-driven framework aimed at Just Green Transition (JGT) with dedicated resources and a governance model. Yet, its implementation across Europe varies widely, reflecting path-dependencies and the continent's institutional and territorial diversity. Existing evidence has examined JGT from economic, social, or environmental perspectives; there remains a research gap on how different territorial contexts translate JGT principles into governance approaches, and how institutional and spatial specificities shape transition paths. The current literature still lacks a comparative, pan-European understanding of the governance architectures underpinning JGT, and no framework exists to systematically classify the diverse approaches emerging across the continent.

Drawing on the empirical evidence collected in the framework of the ESPON NoSta-Geo (Territorial Governance of Non-Standard Geographies) project, this contribution addresses the gap by examining how JGT governance is organized across European territorial contexts, assessing the transition paths and developing a preliminary typology of JGT governance. Unlike existing governance frameworks, which typically focus on single dimensions, the proposed typology offers a multidimensional and territorially sensitive framework specifically tailored to JGT, providing a novel lens to navigate the multiple approaches emerging across European territories and to identify patterns, divergences and potential pathways for improvement.

After this introduction, Section 2 outlines the European approach to JGT in line with the UN SDGs and its main implementation challenges. The ESPON NoStaGeo project is presented in Section 3, together with the methodological steps that guided the analysis. In Section 4, evidence of JGT in Europe is presented, highlighting commonalities and differences in legal and territorial governance frameworks, the principal spatial configurations of JGT strategies, and the key features of the TJTTP instruments. Section 5 proposes a pan-European comparative assessment of JGT governance across six dimensions. Finally, a preliminary typology of JGT governance is presented in Section 6.

## 2. Europe's Just Green Transition – towards the SDGs and beyond

Conceived both as a climate policy and a growth strategy, the EGD seeks to place Europe on a trajectory consistent with the SDGs and to extend beyond the 2030 horizon (European Commission 2019). Achieving these ambitious goals requires deep industrial transformation supported by a coherent governance framework. Under the motto 'New Approaches to Persistent Problems' (OECD 2023), the OECD emphasizes the need for place-based approaches and argues for an 'experimental path in governance arrangements and policy initiatives' to achieve industrial transition objectives. In this respect, although the JGT concept is still under discussion (Shaker and Berisha 2025), literature has begun to explore its theoretical foundations and its connection to broader

sustainability frameworks, highlighting, for instance, the strategic role of the EGD in bridging the just transition agenda with the SDGs (Filipović, Lior, and Radovanović 2022).

Despite growing attention on how European territories operationalize the shift from a carbon-based to a carbon-free economy while ensuring that *no one is left behind* (Di Rosa et al. 2025; European Commission 2019), a significant challenge lies in the territorial heterogeneity across Europe with respect to the issues at stake (e.g. carbon emissions). Indeed, while certain regions remain heavily dependent on coal and carbon-intensive industries, others have already diversified towards renewable energy and low-carbon economic models. Based on past experience, some EU member states will likely pursue more ambitious goals than those set at the EU level. In contrast, others will be less ambitious, with potential variation across member states depending on the contingent political priorities (Siddi 2020). Another significant challenge is the heterogeneity that characterizes the European continent in relation to territorial governance traditions, administrative capacities and policy preferences (Berisha et al. 2021; ESPON 2018).

As a consequence, implementing a consistent transition model entails ongoing negotiation between the objectives and governance framework set at the supranational level and the various domestic institutional contexts, a process that is hampered by the EU's relatively weak capacity to impose binding spatial development frameworks (Cotella and Janin Rivolin 2025). Consequently, while the EU provides overarching guidelines and financial instruments, national and regional authorities have substantial room for manoeuvre in designing transition pathways, making it challenging to implement a consistent JGT framework. Whether the EU can leverage the EGD and the JGT to transcend the SDGs will depend on its capacity to reconcile these heterogeneities without sacrificing coherence or inclusivity, adopting an overarching strategy for the Agenda 2030, which integrates the Green Deal, national recovery processes, and enhanced collaboration between EU and UN institutions (Shulla and Leal Filho 2023).

### 3. Materials and methodology

As outlined in the ESPON 2030 Thematic Action Plan on *Governance of new geographies*, there is a strong policy demand for a better understanding of how policies may facilitate functional relationships across space and deliver a territorial governance model that fosters multi-level cooperation beyond administrative boundaries. Aiming at shedding light on this matter, the ESPON NoStaGeo project focuses on emerging non-standard geographies, defined as functional areas characterized by technical, environmental, natural, or social interrelationships that do not conform to traditional geographic forms and are difficult to address within existing territorial administrations and governance models. The project, which adopted a comparative and qualitative approach grounded in place-sensitive territorial analysis, identified several drivers that may shape new functional geographies requiring governance. The authors of this contribution were responsible for coordinating a pan-European comparative analysis of how dedicated governance arrangements have emerged across Europe in relation to four themes: water provision in metropolitan regions; ecological connectivity of protected areas; energy transition and energy saving; and the brown-to-just-green transition.

The adopted approach is particularly suited to the JGT territorial analysis, as it allows the investigation of how governance frameworks emerge and interact with different institutional and territorial specificities.

This paper elaborates on the evidence collected on the governance of the brown-to-green transition across the 40 institutional contexts that comprised the investigation's geographical scope. These include the 27 EU Member States (in the case of Belgium, Flanders and Wallonia-Brussels were subjected to distinct analyses), Iceland, Norway, Liechtenstein, and Switzerland (ESPON partner States, with Liechtenstein and Switzerland analyzed as a single case), non-EU Western Balkan countries (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia) and the United Kingdom (subjected to dedicated analyses for England, Scotland, and Wales). The analysis was conducted through four methodological steps:

- (i) Elaboration of the cases template based on the literature review on JGT and governance models.
- (ii) The compilation of the 40 reports concerning the governance of JGT in the institutional contexts under investigation was conducted by as many context experts selected based on their demonstrated experience on the subject matter.
- (iii) Comparison of the 40 reports with reference to the legal and territorial governance framework, the spatial configuration and the characteristics of the TJTPs.
- (iv) Conceptualization of a preliminary JGT governance typology.

Each report was structured similarly to ensure consistent analysis, comparability and assessment (Table 1). The set of questions was developed following an iterative process by a panel of thematic experts, in consultation with the NoStaGeo research team, who conducted a literature review consolidation. Each context expert was then expected to complete the report with the required information, drawing on their own knowledge and desk research results. The main goals and challenges considered relevant in the institutional contexts under investigation were discussed in a synoptic manner. Various good practices and pitfalls that challenge the establishment of effective territorial governance models and mechanisms were highlighted.

Notably, a comparative assessment of the performance of the identified territorial governance models was also proposed, organized around six dimensions inspired by the ESPON TANGO project (Table 2). Context experts were asked to grade each dimension on a scale from 1 (very low) to 4 (very high), with a corresponding qualitative description to aid assessment, and to provide concrete examples drawn from stakeholder observations, national studies, policy evaluation reports, and relevant academic literature. To prevent cultural biases, the authors then conducted a second layer of analysis, systematically reviewing all country reports to ensure consistency and comparability. Each score was cross-checked against the qualitative evidence provided by the context experts. When discrepancies or ambiguities emerged, the authors revisited the underlying examples and, where necessary, sought clarification from the experts. While the risk of misinterpretation has been minimized through desk analyses, this iterative process allowed the research team to harmonize the assessments and ensure that similar types of evidence were evaluated consistently. The results of the analysis

**Table 1.** Structure of the country report.

| Paragraph                                | Section                                                                | Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.2 <i>Territorial governance of JGT</i> | <b>Topic 1</b> – Organizational framework(s) for industrial transition | <p><b>Question 1</b> – Are there any strategic documents/policies aiming at addressing industrial policy? Which administrative levels are responsible for developing and implementing industrial transition policies?</p> <p><b>Question 2</b> – How is the national regulatory/legal framework for the territorial governance of industrial transition structured and organized?</p> <p><b>Question 3</b> – What system of competencies and instruments organizes industrial transition, and what are the main interlinkages?</p>                                                                                                                                                                  |
|                                          | <b>Topic 2</b> – Territorial Governance of JGT                         | <p><b>Question 4</b> – How is JGT conceptualized in your country? What are its main objectives? What geospatial delineations have been applied to TJTPs? Please indicate which are the spatial units equipped with a TJTPs in your country, and the reason behind this choice.</p> <p><b>Question 5</b> – What organizations/institutions have been involved in developing the TJTP? Which actors are involved in their implementation?</p> <p><b>Question 6</b> – Are any relevant stakeholders missing from the process so far?</p> <p><b>Question 7</b> – How do TJTPs relates to and coordinate with other relevant industrial transition policies and funding instruments in your country?</p> |
| 4.3 <i>Good practices and pitfalls</i>   | Good practices and pitfalls                                            | <p><b>Question 8</b> – Highlight good practices in relation to the territorial governance of JGT in your country. This could, for example, involve joint initiatives of different stakeholders in industrial regions, the involvement of labour unions in the development of place-based measures, mechanisms to strengthen local value chains, etc.</p> <p><b>Question 9</b> – Drawing on the information presented above, please highlight the main pitfalls characterizing the territorial governance of JGT in your country.</p>                                                                                                                                                                |

Source: authors' own elaboration.

for each of the four themes were then summarized by developing a tentative typology of JGT governance.

## 4. Evidence of JGT in Europe

### 4.1. Legal and territorial governance framework

The governance of JGT in Europe is characterized by a multifaceted and multilevel landscape. The analysis shows that each territorial context under investigation addresses the transition through context- and path-dependent approaches. In the following paragraphs, the results of the data collected from *Section 1 – Organisational framework(s) for industrial transition* (Question 1, 2 and 3) of the country reports are discussed.

#### 4.1.1. National policies and strategies

National policies and strategies addressing industrial transition in the contexts under investigation display a broad spectrum of approaches and challenges. While addressing climate change and the urgency of transitioning industrial sectors is a widespread topic, the main focus and goals pursued by national policy documents and strategies might shift. The

**Table 2.** Assessment scoring system for each dimension.

| Dimension/Score                                                                                     | 1 (very low)                                                                          | 2 (low)                                                                                              | 3 (high)                                                                                            | 4 (very high)                                                                                                              |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <i>Coordinating actions of actors and institutions</i>                                              | hierarchical structures according to institutionalized arrangements                   | Open for other structures of coordination                                                            | Establishing structures of coordination and consensus-finding with relevant actors and institutions | multi-level coordination and cooperation between relevant actors and levels                                                |
| <i>Integrating policy sectors</i>                                                                   | One-sector orientation (industry)                                                     | Focus on one sector, while acknowledging the relevance of and interdependencies with other policies. | Addressing the industrial and adjacent sectors                                                      | Multi-sectoral coordination and coherence with other relevant policies                                                     |
| <i>Mobilizing stakeholder participation in the design and implementation of the just transition</i> | One stakeholder group (public) is dominant, other relevant stakeholders are informed. | One group is dominant; others are sometimes involved                                                 | More than one stakeholder group actively participating                                              | Participation of broad public and private actors (incl. employees, local citizens, companies along the supply chain, etc.) |
| <i>Being adaptable to changing contexts</i>                                                         | Fixed and stable organization/ institutionalization                                   | institutionalized with easy options for amendments                                                   | Certain degree of flexibility and institutionalized forms of reflection                             | Dynamic forms of organization, oriented towards learning and experimenting                                                 |
| <i>Realizing place-based/territorial specificities and impacts</i>                                  | Based on jurisdictional criteria / administrative boundaries                          | Open for further spatial considerations based on institutional agreements                            | integrating functional and case-based criteria                                                      | Defined by functional criteria and considering specific hard and soft spaces                                               |
| <i>Mobilizing resources</i>                                                                         | limited to one type of public resource                                                | One instrument is dominant, but others (mainly public) are sometimes combined.                       | several instruments are combined (private investments included)                                     | A vast variety of resources (public and private)                                                                           |

Source: authors' own elaboration.

results of the analysis have led to the identification of five main topics of interest (decarbonization, energy transition, circular economy, digitalization, workforce transition) (Table 3).

The most common focus, addressed by 25 of 40 territorial contexts, concerns energy transition and efforts to transform energy systems to include more sustainable and renewable sources. *Decarbonization*, which implies a reduction in carbon emissions

**Table 3.** Main thematic focus and goals of JGT.

| Main focus and goal         | Territorial contexts                                                                                                                                                                                                                                                                |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Decarbonization</i>      | Austria, Belgium (Wallonia + Brussels), Bosnia and Herzegovina, Bulgaria, Cyprus, Czech Republic, Estonia, France, Germany, Iceland, Italy, Kosovo, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Sweden, Switzerland and Liechtenstein, UK – Scotland, UK – England |
| <i>Energy Transition</i>    | Albania, Austria, Belgium (Flanders), Croatia, Cyprus, Denmark, Finland, Greece, Hungary, Ireland, Iceland, Italy, Latvia, Malta, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Switzerland and Liechtenstein.              |
| <i>Circular economy</i>     | Belgium (Wallonia + Brussels), Bulgaria, Greece, Kosovo, Lithuania, Luxembourg, Serbia, Slovakia                                                                                                                                                                                    |
| <i>Digitalization</i>       | Belgium (Flanders), Montenegro, Sweden, and UK – England                                                                                                                                                                                                                            |
| <i>Workforce transition</i> | Bulgaria, Malta, Slovenia, Spain, and UK – Wales                                                                                                                                                                                                                                    |

Source: authors' own elaboration.

and a transition to more sustainable practices, emerged in 22 contexts, encompassing commitments to carbon neutrality and reduced greenhouse gas emissions, industrial modernization and R&D investments, and coal phase-out. Beyond, a minor group (8 territorial contexts) dedicated particular attention to the *circular economy*, including efforts to minimize waste, improve resource efficiency, and promote sustainable consumption and production patterns. *Workforce transition* and *digitalization* appear less frequently (5 and 4 territorial contexts, respectively), despite the former being widely recognized as a major challenge, as will be seen later.

Regarding the challenges hindering an equitable transition across territorial contexts, eight distinct challenges were identified (Table 4). The most widespread, reported in 25 territorial contexts, is the need for *workforce reskilling and for addressing skill gaps driven by technological advancements, changing industry requirements, and the green transition, which, in some cases, has led to the implementation of specific strategies*. *Limited access to adequate funding* is another major challenge (22 territorial contexts), particularly hindering infrastructure development, social programmes, and technological advancements. *Stakeholders' involvement and coordination* challenges are also recurrent (19), underscoring a widespread need for more inclusive policy-making processes that engage multiple actors, including citizens, businesses, NGOs, to ensure broad-based support and effective implementation. Additional concerns include *regional disparities* (13), highlighting the need to implement targeted policies to promote regional equity; *institutional and multi-level coordination* (11), reflecting the difficulties in achieving seamless collaboration across levels; *balancing competitiveness with sustainability, attractiveness and economic diversification* (11), lamenting the difficulties of remaining competitive in the global market while transitioning to sustainable practices; ensuring *policy coherence and*

**Table 4.** Main challenges to JGT.

| Main challenges                                                                                    | Territorial contexts                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Limited funding</i>                                                                             | Albania, Belgium (Wallonia + Brussels), Belgium (Flanders), Bosnia and Herzegovina, Croatia, Cyprus, Czech Republic, Denmark, Estonia, France, Hungary, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, Portugal, Romania, Spain, Switzerland and Liechtenstein, UK – Scotland, UK – England |
| <i>Workforce reskilling and skills gap</i>                                                         | Albania, Belgium (Flanders), Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, Poland, Slovenia, Spain, Switzerland and Liechtenstein, UK – Scotland, UK – England, UK – Wales          |
| <i>Stakeholders' involvement and coordination</i>                                                  | Albania, Belgium (Wallonia + Brussels), Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Germany, Hungary, Iceland, Italy, Luxembourg, Malta, Netherlands, North Macedonia, Portugal, Slovenia, UK – Scotland, UK – England                                                                      |
| <i>Institutional and multilevel coordination</i>                                                   | Albania, Belgium (Wallonia + Brussels), Bosnia and Herzegovina, Croatia, Czech Republic, Germany, Malta, Netherlands, Portugal, Spain, UK – Scotland                                                                                                                                                |
| <i>Policy coherence and integration, regulatory gap</i>                                            | Albania, Belgium (Flanders), Croatia, Germany, Hungary, Montenegro, Portugal, Slovakia, Spain, UK – Scotland                                                                                                                                                                                        |
| <i>Regional disparities</i>                                                                        | Croatia, Czech Republic, Estonia, Finland, Germany, Greece, Italy, Latvia, Netherlands, Poland, Romania, Slovakia, Slovenia                                                                                                                                                                         |
| <i>Balancing competitiveness with sustainability, attractiveness, and economic diversification</i> | Austria, France, Germany, Ireland, Kosovo, Malta, Norway, Romania, Serbia, Spain, Sweden                                                                                                                                                                                                            |
| <i>Energy poverty</i>                                                                              | Belgium (Flanders), Finland, Greece, Italy, Montenegro                                                                                                                                                                                                                                              |

Source: authors' own elaboration

*integration* and the presence of *regulatory gaps* (10), stemming from inconsistent or outdated regulations in crucial sectors such as energy, technology, and public health. Finally, concerns about energy poverty, mentioned in 5 contexts, highlight the social dimension of the transition and underscore the need for affordable, sustainable access to clean technologies.

#### 4.1.2. Legal and regulatory frameworks

The comparative analysis of the legal and regulatory frameworks recognizes equity as a key component of sustainable development, although the pathways to achieve this goal remain context-specific, spanning from EU-aligned to decentralized approaches (Table 5). Most territorial contexts updated or adapted their regulatory systems to manage industrial transition, but key differences arise particularly in integrating industrial goals, addressing socioeconomic challenges, and adapting to emerging trends.

The four identified framework types reveal that there is not a dominant model, although the *comprehensive and integrated framework* is the most common (18 territorial contexts). This is typically found in highly industrialized contexts that combine legally binding climate targets with sector-specific plans, innovation-driven policies, and measures to mitigate socio-economic impacts. Some territorial contexts (7), instead, opted for a more *decentralized and localized approach* (as in smaller contexts that rely significantly on municipal or regional initiatives to implement national goals). While this approach supports place-sensitive action, it frequently faces constraints related to limited resources and administrative capacity. *Hybrid frameworks*, observed across 6 territorial contexts, aim to balance national strategic direction with regional flexibility, often relying on recent legislative amendments or specialized plans, yet still struggle to fully coordinate centralized strategies and regional priorities. Finally, *EU-aligned frameworks* (6 territorial contexts) primarily rely on EU directives and regulations to align their domestic policies with the EU climate goals and financial mechanisms; however, they often face challenges in institutional capacity, resource mobilization, and policy implementation.

#### 4.1.3. Organization of competencies and instruments

The organization of competencies and instruments for JGT governance ranges from strongly centralised to highly decentralized systems, with several hybrid approaches in between. In many contexts, priorities and strategies are defined at the national level, binding subnational and local authorities. This might reflect limited governance structures for effectively managing the industrial transition, which is often intertwined with

**Table 5.** Legal and regulatory frameworks organizing JGT.

| Type of framework                           | Territorial contexts                                                                                                                                                                                             |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>EU-aligned framework</i>                 | Bulgaria, Croatia, Hungary, North Macedonia, Poland, Romania                                                                                                                                                     |
| <i>Comprehensive integrated framework</i>   | Albania, Austria, Belgium (Flanders), Cyprus, Czech Republic, Denmark, Finland, Germany, Ireland, Iceland, Netherlands, Norway, Portugal, Serbia, Sweden, Switzerland (Liechtenstein), UK – Scotland and England |
| <i>Decentralized and localized approach</i> | Belgium (Wallonia + Brussels), Estonia, Latvia, Lithuania, Luxembourg, Malta, Spain                                                                                                                              |
| <i>Hybrid framework</i>                     | France, Greece, Italy, Montenegro, Slovenia, UK – Wales                                                                                                                                                          |

Note: Bosnia and Herzegovina, Kosovo and Slovakia were not possible to classify due to the limited information provided in the respective country reports.

Source: authors' own elaboration.

political and administrative complexity, such as in the cases of Bosnia and Herzegovina or Kosovo. In other cases, generally in smaller territorial entities such as Luxembourg or Malta, central governments retain primary responsibility for policy design, sometimes in collaboration with strategic partners, with very limited involvement of other administrative levels. Other systems strive to balance centralized policy direction with significant regional and local involvement, requiring strong coordination mechanisms and administrative capacity to prevent fragmentation or inefficiencies. For instance, Germany exemplifies this model, in which federal initiatives provide strategic and financial guidance, while the Länder implement tailored plans, particularly in coal-transition regions such as Lusatia and the Rhineland. Finally, a smaller group adopts more decentralized approaches, granting subnational autonomy in planning and implementing industrial transition policies. Similar considerations emerge in the distribution of instruments across administrative levels. Table 6 summarizes data collected on the instruments organizing JGT at different administrative levels, grouping them into three distinct categories: Strategic/Guidance (S/G), Programming/Incentives (P/I), and Regulative (R).

At the national level, strategic/guidance instruments are the most common, serving as overarching frameworks to set long-term visions and define pathways for the transition, guiding subsequent action at regional and local levels. Also, in Eastern European contexts, national strategies are predominantly aligned with EU directives, underscoring the influence of supranational strategic frameworks. Regulatory instruments, while less prevalent, are mainly found in contexts characterized by robust governance systems, which provide the legal accountability necessary to enforce transition policies, whereas they remain limited in contexts with weaker regulatory development, such as Kosovo or Montenegro, reflecting gaps in governance capacity and political commitment. At the sub-national level, the type of instrument used largely reflects governance structures. Decentralized systems grant regional governments a prominent role in adapting national strategies to the region-specific socio-economic and environmental conditions. Also, there is a prominence of programming and incentive tools, which provide regional authorities with the capacity of managing funding schemes that align with both national goals and local needs. In contrast, centralized systems bound subnational entities to implementation roles, limiting the scope for developing their own instruments. Finally, hybrid systems fall between these two, with sub-national actors being more active in shaping and managing programming and incentive tools, though often struggling with coordination challenges.

At the local level, programming and incentives tools are the most common, particularly where municipalities directly implement projects funded by national or EU mechanisms. In these cases, local governments typically focus on operational measures such as promoting renewable energy, managing local development plans, or supporting community-level green initiatives (e.g. Bulgaria's municipal-level incentives on green technologies). Strategic guidance tools at the local level, instead, are less common compared to the other levels, particularly in Southeastern Europe, due to constraints in resources and technical expertise. Finally, regulatory instruments are rare at the local level, with only few exceptions granting local authorities the power to enforce climate and industrial policies aligned with higher-level frameworks.

**Table 6.** Instruments organizing JGT.

| Territorial contexts            | National    | Sub-national 1 | Sub-national 2 | Local 1     | Local 2  |
|---------------------------------|-------------|----------------|----------------|-------------|----------|
| Albania                         | S/G         | S/G            |                | P/I         | n.a.     |
| Austria                         | S/G         | P/I            | n.a.           | P/I; R      |          |
| Belgium (Wallonia + Brussels)   | n.a.        | S/G            | n.a.           | n.a.        | n.a.     |
| Belgium (Flanders)              | P/I         |                | n.a.           | P/I         |          |
| Bosnia and Herzegovina          | S/G         | n.a.           |                | n.a.        | n.a.     |
| Bulgaria                        | R; S/G; P/I | P/I            | P/I            | P/I         | n.a.     |
| Croatia                         | S/G         | S/G            |                | S/G         | n.a.     |
| Cyprus                          | S/G         | n.a.           |                | n.a.        |          |
| Czech Republic                  | S/G; P/I    | P/I; S/G       | n.a.           | P/I; S/G; R | n.a.     |
| Denmark                         | S/G; P/I    | S/G; P/I       | n.a.           | S/G; R      |          |
| Estonia                         | S/G; P/I    | S/G            | S/G            | R           |          |
| Finland                         | R; S/G; P/I | S/G; P/I       |                | S/G         |          |
| France                          | P/I         | P/I            | P/I            | P/I         | n.a.     |
| Germany                         | P/I; S/G    | S/G            | P/I            | S/G; P/I    | n.a.     |
| Greece                          | n.a.        | P/I            | P/I            | n.a.        | n.a.     |
| Hungary                         | S/G; P/I; R | n.a.           | P/I; S/G       | n.a.        | S/G      |
| Ireland                         | S/G         | S/G; P/I       |                | S/G         |          |
| Iceland                         | S/G; P/I    | n.a.           | n.a.           | R           |          |
| Italy                           | S/G         | S/G            | P/I            | n.a.        |          |
| Kosovo                          | S/G         | n.a.           | n.a.           | n.a.        |          |
| Latvia                          | S/G; R      | P/I            |                | P/I         |          |
| Lithuania                       | S/G; P/I    | n.a.           | P/I            | P/I         | S/G; P/I |
| Luxembourg                      | S/G; P/I; R |                |                | n.a.        | n.a.     |
| Malta                           | S/G         | n.a.           | n.a.           | R           |          |
| Montenegro                      | S/G         | n.a.           | n.a.           | n.a.        | n.a.     |
| Netherlands                     | R; P/I      | n.a.           | n.a.           | n.a.        |          |
| North Macedonia                 | S/G; P/I    | n.a.           | P/I            | P/I         | n.a.     |
| Norway                          | R; P/I; S/G | S/G            | S/G            | n.a.        | S/G; P/I |
| Poland                          | S/G         | S/G; P/I       | n.a.           | n.a.        | n.a.     |
| Portugal                        | S/G; P/I    | S/G; R; P/I    | P/I            | R           | n.a.     |
| Romania                         | S/G; P/I    | P/I; S/G       | S/G            | S/G         | P/I      |
| Serbia                          | S/G         | n.a.           | n.a.           | n.a.        | n.a.     |
| Slovakia                        | S/G; R      |                | S/G            | n.a.        | R        |
| Slovenia                        | S/G; P/I; R | n.a.           | P/I; S/G       | n.a.        | S/G; P/I |
| Spain                           | S/G         | S/G            | n.a.           | S/G         | S/G      |
| Sweden                          | R; P/I      | S/G            | n.a.           | n.a.        |          |
| Switzerland (and Liechtenstein) | S/G; P/I    | S/G            | S/G; R         | S/G; P/I    | S/G; P/I |
| UK – Scotland                   | S/G; R      | S/G; P/I       | P/I            | R; P/I      | P/I      |
| UK – England                    | S/G; R      | P/I            | P/I            | P/I         |          |
| UK – Wales                      | n.a.        | S/G; P/I       | P/I            | P/I         |          |

S/G: Strategic/Guidance; P/I: Programming/Incentives; R: Regulative.

The grey cell indicates that a specific institutional level in a territorial context is not provided with any administrative authority. The indication n.a. (i.e. not available) is used for levels where the existing administrative authority is not responsible for the preparation of any instrument.

Source: authors' own elaboration

## 4.2. Spatial configuration of JGT

Whereas the concept of JGT is widely embraced across Europe, its interpretation and implementation reflect, on the one hand, the socioeconomic, environmental, and geographical characteristics of each territorial context, and on the other hand, the diverse governance structures and distribution of power and competencies across levels. Therefore, its spatialization varies from context to context (Table 7).

**Table 7.** Spatial configuration of JGT.

| Spatial configuration                    | Territorial contexts                                                                                                                                                            |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Functional boundaries</i>             | Austria, France, Ireland, Luxembourg, Netherlands, Romania, Slovenia, UK (Scotland)                                                                                             |
| <i>Administrative boundaries</i>         | Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovakia, Sweden, Switzerland, UK (England) |
| <i>Hybrid/experimental</i>               | Serbia, Spain                                                                                                                                                                   |
| <i>No need for spatial configuration</i> | Cyprus, Malta, Liechtenstein                                                                                                                                                    |
| <i>Absence of spatial configuration</i>  | Albania, Belgium (both Flanders and Wallonia-Brussels), Bosnia and Herzegovina, Iceland, Kosovo, Montenegro, North Macedonia, Norway, UK (Wales)                                |

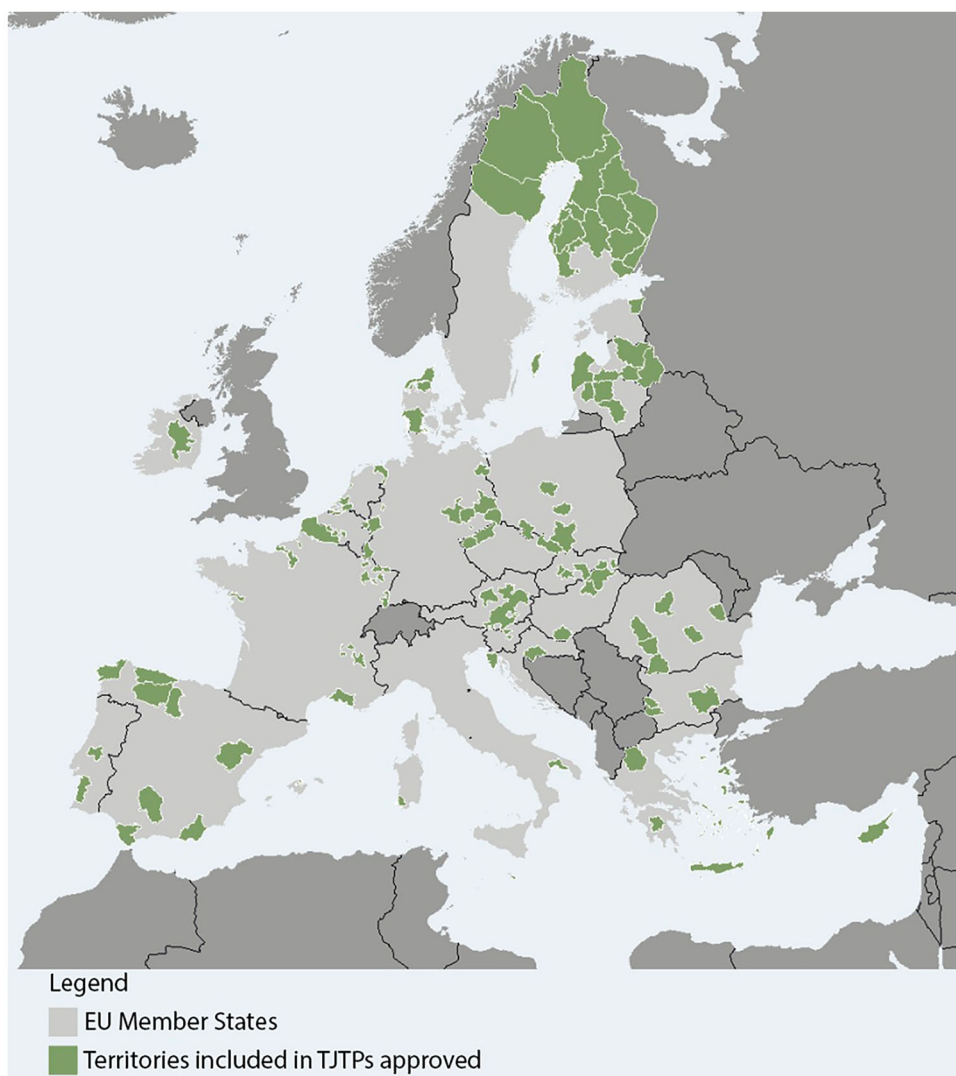
Source: authors' own elaboration.

Most territorial contexts (18 out of 40) use *existing administrative boundaries* to implement the JGT, leveraging political and administrative structures to facilitate coordination and accountability. For instance, Germany's six TJTPs are based on specific geospatial areas across four federal states, while similarly, on a different administrative level, the two Italian TJTPs focus on the urban areas of Taranto (Puglia region) and Sulcis Iglesiente (Sardinia), which correspond to the provincial boundaries. In other cases, administrative boundaries of specific local entities are applied to implement JGT, such as the Local Authority Districts in England, or specific municipalities, such as the Daugavpils Municipality, an industrial centre in Latvia, that are disproportionately impacted by the green transition. Some territorial contexts (8) instead adopt a *functional approach*, aligning their territorial governance with economic activities, value chains, and natural or industrial ecosystems. This approach allows policies to target spatial interdependencies among industries, labour markets, and resource flows. France, for example, targets subregional industrial territories, including intermunicipal cooperation bodies (i.e. 'Chemistry Valley' in Lyon, Seine and Bresle valleys in Normandie, *territoire du Pacte de Cordemais*), one NUTS3 region (Bouches du Rhône), and one NUTS2 region (Nord Pas de Calais). Moreover, Ireland implemented this approach targeting a new spatial delimitation, the Midlands regions, which encompasses the full area of 5 Local Authorities (Offaly, Westmeath, Longford, Roscommon, Laois) and certain districts within 3 other local authorities (North Tipperary, East Galway, Kildare).

Interestingly, Spain and Serbia have introduced a *hybrid or experimental approach*, combining functional and administrative elements, reflecting an attempt to address the limitations of either approach in isolation. In contexts of smaller size (Cyprus, Malta and Liechtenstein), a unified national approach is adopted, without any specific spatial delineations. In these cases, JGT governance is instead organized around thematic or sectoral priorities. Finally, 9 territorial contexts are characterized by embryonic governance efforts regarding JGT, rendering spatial configurations either absent or too inconsistent to classify.

#### 4.3. Territorial just transition plans

TJTPs are EU-funded initiatives (Figure 1) designed not only to mitigate the socio-economic impacts of the transition to climate neutrality, but also to ensure that no region or community is left behind. In particular, the state of play in terms of the development and implementation of TJTPs was analyzed, reflecting the complex interplay of governance



**Figure 1.** Approved TJTPs by the EU (source: Inforegio – Just Transition Fund).

structures, stakeholder engagement, funding mechanisms, and policy coordination across the territorial contexts.

Firstly, different approaches can be observed in governance structures and responsibilities. *Decentralized models*, such as those in Germany and Spain, facilitate multi-level coordination, allowing national ministries to collaborate with regional and local authorities to tailor strategies to specific territorial contexts. Germany's federal ministries provide strategic oversight, while Länder-level institutions adapt implementation to local needs. Spain, although not a federal state, employs a similarly multi-tiered approach, enhanced by the creation of the Spanish Network of Municipalities in Just Transition to foster horizontal cooperation. In contrast, territorial contexts like Bulgaria and Cyprus adopt *centralized models*, concentrate responsibilities within national ministries or contracted entities, limiting regional input and adaptability. Ireland exemplifies a

*hybrid model*, with strong community-level engagement during implementation, though less so in the planning phase. These differences impact the inclusivity, responsiveness, and legitimacy of TJTPs.

*Stakeholder engagement* also varies considerably. Contexts such as Denmark, Italy, Estonia, Croatia, and Spain demonstrate, at least on paper, multi-stakeholder involvement, integrating NGOs, labour unions, industry representatives, and local communities into both the development and implementation phases of TJTPs. For instance, Denmark institutionalizes NGOs' participation through formal monitoring bodies (the Monitoring Committee), while Italy and Estonia rely on energy corporations and regional agencies to align national goals with local realities. In Croatia and Spain, sectoral stakeholders and civil society representatives contribute to both advocacy and implementation, ensuring that socio-economic and environmental concerns are addressed. Conversely, in contexts such as Poland, Ireland and Finland, for instance, Small and Medium-sized Enterprises, particularly in traditional brown sectors, are frequently underrepresented, limiting the adaptability of these contexts to the green transition. Similarly, labour unions are often insufficiently engaged, especially in Hungary and Latvia, raising concerns about the socio-economic resilience of vulnerable labour groups. Finally, academic and research institutions, despite their potential to contribute critical expertise in innovation, sustainability, and policy evaluation, remain underutilized, with Denmark being an exception.

*Funding mechanisms* further differentiate governance models. Sweden exemplifies a hybrid governance model integrating public and private funding, with major industrial actors actively investing in decarbonization initiatives. In other territorial contexts, such as in Italy, a more decentralized approach is adopted, with regional energy agencies enhancing the effectiveness of policy implementation at the subnational level. Conversely, others, such as Portugal, maintain a centralized funding structure that limits the autonomy granted to regional actors. The analysis also highlights emerging governance trends that point to a growing emphasis on spatially targeted and innovation-driven approaches. France and Czechia prioritize interventions in carbon-intensive regions, while Scotland and Denmark cultivate regional innovation ecosystems, leveraging research institutions and industrial clusters to foster adaptive governance. These developments reflect a growing shift towards place-based strategies and innovation-driven governance approaches to manage complex transitions.

Despite these differences, common challenges persist. Decentralized systems, such as Germany's, struggle with coordination across levels, often leading to fragmented policy implementation. Conversely, centralized systems risk overlooking local specificities, which can undermine the legitimacy and effectiveness of transition policies. Another cross-cutting issue is the need for robust monitoring and accountability mechanisms. Hungary's efforts to institutionalize stakeholder oversight exemplify the broader concern with ensuring transparency and inclusivity in governance processes.

## 5. A comparative assessment of the JGT paths

Building on the analysis of legal and territorial frameworks, this section presents the results of the comparative assessment of JGT paths according to six critical dimensions: (i) coordinating actions of actors and institutions, (ii) integrating policy sectors, (iii)

mobilizing stakeholder participation, (iv) being adaptive to changing contexts, (v) realizing place-based/territorial specificities, and (vi) mobilizing resources. For each dimension, national experts assigned a quantitative score (0 = absent, 1 = very low, 2 = low, 3 = high, 4 = very high), as already described in Table 2, and provided a brief justification for their choice. Table 8 summarizes the results using a colour scale ranging from red (lowest score) to green (highest score).

With respect to *coordination among actors and institutions*, only a limited group of territorial contexts (France, Italy, Luxembourg, and Spain) achieved the highest score (4), due to their well-established multi-level coordination and cooperation mechanisms, in which regional and local authorities play active roles in planning and implementation. A much broader cluster (20) registered high scores (3), reflecting collaborative governance style, but not fully integrated coordination mechanisms. Sixteen territorial contexts are characterized by low (2) or very low (1) levels of coordination, often due to centralized hierarchical models, with limited horizontal cooperation and opportunities for consensus-building across different levels.

When it comes to *integrating sectoral policies*, Austria, Luxembourg, Norway, Slovenia and Spain lead with coherent multi-sectoral strategies (score 4). These territorial contexts have developed governance frameworks that integrate industrial strategies with broader policy domains, reflecting a sophisticated, collaborative approach to policymaking. For instance, Luxembourg's policy documents align industrial transition with broader territorial and environmental goals, while in Austria, the integration of multiple policy sectors within the JGT framework is well advanced, with the NEKP, the Climate Protection Act, and the JTP that align with EU-level goals, ensuring multi-sectoral coherence. Overall, most territorial contexts perform well (score 3), showcasing rather advanced, although not always fully multi-sectoral, governance models, while countries like Albania, Denmark, Germany, and Ireland show limited cross-sectoral coordination (score 2), often focusing on a single sector while recognizing its interdependencies with other policies. Finally, a smaller group of territorial contexts (Belgium-Wallonia and Brussels, North Macedonia, Serbia, and England-Wales) registered the lowest score (1), displaying a one-sector orientation predominantly focused on industry.

*Stakeholder participation* is very high or high in approximately half of the territorial contexts, particularly in Belgium (Wallonia and Brussels), Denmark, Slovenia and Spain, where public, private and civil-society actors are actively engaged in design and implementation. Spain balances centralized oversight with bottom-up initiatives identified by open calls for municipalities and local communities. Conversely, territorial contexts such as Croatia, the Czech Republic, and Hungary exhibit limited stakeholder engagement (2), with governance processes largely dominated by public institutions and limited engagement of civil society or local communities.

*Being adaptive to changing contexts* is crucial; France stands out as the only territorial context with the highest score (4), as country experts highlight the emphasis on experimentation and institutional learning, particularly at local and regional levels. Besides, more than half of the territorial contexts score 3, combining a notable degree of flexibility with institutionalized forms of reflection, like in the cases of Austria, Germany, Sweden and Spain. Nonetheless, 17 territorial contexts exhibit low (2) or very low (1) capacity to adapt to change, where political or structural constraints limit the capacity to experiment and to adjust policies in response to emerging evidence. That is the case in Bulgaria,

**Table 8.** Assessing the territorial governance of JGT.

| Territorial contexts            | <i>Coordinating actions of actors and institutions</i> | <i>Integrating policy sectors</i> | <i>Mobilizing stakeholder participation</i> | <i>Being adaptive to changing contexts</i> | <i>Realizing place-based/territorial specificities and impacts</i> | <i>Mobilizing resources</i> |
|---------------------------------|--------------------------------------------------------|-----------------------------------|---------------------------------------------|--------------------------------------------|--------------------------------------------------------------------|-----------------------------|
| Albania                         | 2                                                      | 2                                 | 2                                           | 2                                          | 2                                                                  | 2                           |
| Austria                         | 3                                                      | 4                                 | 2                                           | 3                                          | 4                                                                  | 3                           |
| Belgium (Wallonia + Brussels)   | 3                                                      | 1                                 | 4                                           | 3                                          | 2                                                                  | 4                           |
| Belgium (Flanders)              | 3                                                      | 3                                 | 3                                           | 3                                          | 3                                                                  | 3                           |
| Bosnia and Herzegovina          | 2                                                      | 3                                 | 2                                           | 1                                          | 1                                                                  | 3                           |
| Bulgaria                        | 2                                                      | 2                                 | 2                                           | 1                                          | 2                                                                  | 2                           |
| Croatia                         | 2                                                      | 2                                 | 2                                           | 3                                          | 3                                                                  | 2                           |
| Cyprus                          | 1                                                      | 2                                 | 1                                           | 1                                          | 1                                                                  | 2                           |
| Czech Republic                  | 3                                                      | 3                                 | 2                                           | 2                                          | 3                                                                  | 3                           |
| Denmark                         | 2                                                      | 2                                 | 4                                           | 3                                          | 3                                                                  | 4                           |
| Estonia                         | 3                                                      | 3                                 | 3                                           | 2                                          | 2                                                                  | 3                           |
| Finland                         | 1                                                      | 3                                 | 2                                           | 1                                          | 1                                                                  | 2                           |
| France                          | 4                                                      | 3                                 | 3                                           | 4                                          | 3                                                                  | 4                           |
| Germany                         | 3                                                      | 2                                 | 2                                           | 3                                          | 4                                                                  | 4                           |
| Greece                          | 2                                                      | 3                                 | 2                                           | 2                                          | 1                                                                  | 2                           |
| Hungary                         | 3                                                      | 3                                 | 2                                           | 1                                          | 1                                                                  | 2                           |
| Ireland                         | 3                                                      | 2                                 | 3                                           | 3                                          | 4                                                                  | 3                           |
| Iceland                         | 2                                                      | 3                                 | 3                                           | 3                                          | 2                                                                  | 1                           |
| Italy                           | 4                                                      | 3                                 | 3                                           | 2                                          | 3                                                                  | 3                           |
| Kosovo                          | 1                                                      | 2                                 | 2                                           | 1                                          | 1                                                                  | 2                           |
| Latvia                          | 2                                                      | 3                                 | 2                                           | 3                                          | 3                                                                  | 2                           |
| Lithuania                       | 3                                                      | 3                                 | 3                                           | 3                                          | 3                                                                  | 3                           |
| Luxembourg                      | 4                                                      | 4                                 | 3                                           | 3                                          | 3                                                                  | 3                           |
| Malta                           | 3                                                      | 3                                 | 3                                           | 3                                          | 3                                                                  | 4                           |
| Montenegro                      | 1                                                      | 2                                 | 2                                           | 1                                          | 1                                                                  | 2                           |
| Netherlands                     | 3                                                      | 3                                 | 3                                           | 3                                          | 3                                                                  | 3                           |
| North Macedonia                 | 2                                                      | 1                                 | 2                                           | 3                                          | 1                                                                  | 3                           |
| Norway                          | 3                                                      | 4                                 | 3                                           | 3                                          | 4                                                                  | 4                           |
| Poland                          | 3                                                      | 3                                 | 2                                           | 2                                          | 4                                                                  | 3                           |
| Portugal                        | 2                                                      | 3                                 | 2                                           | 3                                          | 3                                                                  | 2                           |
| Romania                         | 3                                                      | 2                                 | 3                                           | 3                                          | 3                                                                  | 3                           |
| Serbia                          | 3                                                      | 1                                 | 3                                           | 1                                          | 1                                                                  | 2                           |
| Slovakia                        | 1                                                      | 3                                 | 3                                           | 1                                          | 2                                                                  | 2                           |
| Slovenia                        | 3                                                      | 4                                 | 4                                           | 1                                          | 2                                                                  | 2                           |
| Spain                           | 4                                                      | 4                                 | 4                                           | 3                                          | 4                                                                  | 3                           |
| Sweden                          | 3                                                      | 3                                 | 2                                           | 3                                          | 3                                                                  | 3                           |
| Switzerland (and Liechtenstein) | 2                                                      | 3                                 | 2                                           | 3                                          | 4                                                                  | 3                           |
| UK – Scotland                   | 3                                                      | 3                                 | 3                                           | 2                                          | 3                                                                  | 3                           |
| UK – England                    | 3                                                      | 3                                 | 2                                           | 3                                          | 3                                                                  | 3                           |
| UK – Wales                      | 3                                                      | 1                                 | 2                                           | 3                                          | n.a.                                                               | 1                           |

Source: authors' own elaboration.

where entrenched state-capture networks in the coal sector aim to preserve the status quo, undermining the development of strategic documents for long-term decarbonization.

The dimension concerning the *realization of place-based territorial specificities* records the highest number of territorial contexts – seven – with the highest score (4), adopting functionally oriented approaches that transcend administrative boundaries and incorporate both physical (hard) and intangible (soft) spatial dynamics. Spain exemplifies best practices through participatory spatial delimitation guided by the principle of cumulative impacts. A broader group of 16 territorial contexts scored 3, balancing institutional agreements with some degree of functional flexibility, which allow for tailored spatial considerations. Italy, for example, tailors its TJTPs to regional industrial contexts but still relies on traditional administrative boundaries, limiting the full realization of functional geographies. Other contexts (Albania, Belgium (Wallonia and Brussels), Bulgaria, Estonia, Iceland, Slovakia, and Slovenia) scored 2 due to their reliance on jurisdictional criteria and limited functional considerations, often resulting in uneven territorial coverage and reduced policy effectiveness. Finally, 9 territorial contexts (Bosnia and Herzegovina, Cyprus, Finland, Greece, Hungary, Kosovo, Montenegro, North Macedonia, Serbia) scored 1, reflecting centralized and jurisdictionally bound strategies with limited incorporation of functional geographies into transition policies.

Finally, concerning *resource mobilization*, most territorial contexts appear up to the challenge. Six of them (Belgium – Wallonia and Brussels, Denmark, France, Germany, Malta and Norway) exhibit highly diversified strategies (score 4), involving several private actors alongside EU and national funding, while most of the others (18) demonstrate moderate capacity of combining public and private instruments (score 3), though private investment remains limited. On the other hand, 14 territorial contexts rely predominantly on a single public funding source, occasionally incorporating additional resources (score 2), while two – Iceland and Wales – scored 1 since R&D funding has been primarily identified as a key existing resource in Iceland, while the transition is not targeted by significant dedicated funds in Wales.

### 5.1. Discussion of findings

The comparative assessment of the JGT paths reveals that successful transition strategies rely upon the simultaneous presence of enabling institutional structures (well-established multilevel coordination), inclusive procedural arrangements (stakeholder engagement and cross-sector integration) and diversified financing strategies, resonating with EGD's emphasis on systemic change and integrated policy responses. Where these elements coexist, policy coherence is stronger, implementation is more feasible, and legitimacy is more likely to be secured at the local level. Conversely, one-sector orientations and hierarchical administrative models constrain integration, limit experimentation and reduce legitimacy. These asymmetries, together with the EU's limited capacity to enforce binding spatial development frameworks, help explain the cross-country variation observed in the comparative assessment, as well as the persistent tension between supranational goals and domestic institutional contexts. Indeed, some territorial contexts pursue more ambitious decarbonization paths, while others remain constrained by legacy industries and contingent political priorities. For spatial planning

and territorial governance, these findings underscore the need to move beyond administrative boundaries to embrace functional territorial approaches that integrate sectoral strategies and accommodate differentiated transition paths. At the policy level, strengthening multi-level coordination, institutionalizing participatory territorial delimitation and expanding diversified funding instruments are key to enhancing territorial governance capacity.

## 6. Towards a typology of JGT governance

Drawing on comparative data, a preliminary typology is proposed to categorize national approaches into five distinct governance models based on the authors' interpretation of the governance mechanisms and experiences discussed (Table 9 and Figure 2). These models are not mutually exclusive, as territorial contexts may exhibit characteristics of more than one type, but each is classified according to its predominant features. The effort to identify a typology of JGT governance does not aim to evaluate the effectiveness of each model, but rather to provide a structured framework for understanding the multiple approaches adopted, showcasing a spectrum of potential solutions.

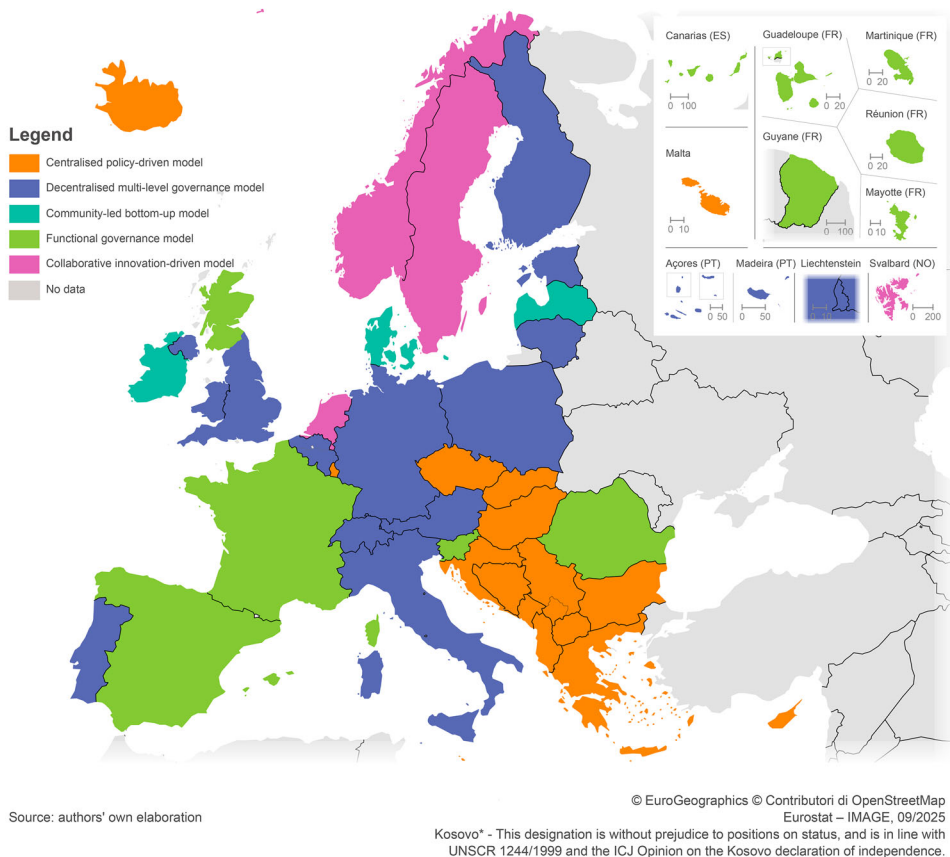
The *centralized policy-driven model*, observed in 16 territorial contexts, is characterized by a strong national control over the definition and implementation of transition strategies, often prevalent in contexts where subnational institutional capacity is limited or international commitments are prioritized. While this model ensures coherence and alignment with broader goals, it can limit local engagement, raising concerns about the inclusiveness of the process. In contrast, the *decentralized multi-level governance model* emphasizes the distribution of responsibilities across levels, fostering collaboration and participatory decision-making. This model, observed in 13 territorial contexts, allows regions to address their unique socio-economic challenges while benefiting from financial support and policy guidance. The German example stands out for its governance of TJTPs, which shows a balance between federal oversight and regional autonomy. In regions like Lusatia and Mittel Deutschland, transition strategies are developed to integrate local perspectives while aligning with national objectives. However,

**Table 9.** Typology of JGT governance.

| Type                                              | Features                                                                                                                                                                                        | Limitations/challenges                                                       |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <i>Centralized policy-driven model</i>            | Strong reliance on national governments to define and implement transition strategies                                                                                                           | Limited participation of local communities in decision-making processes      |
| <i>Decentralized multi-level governance model</i> | Emphasizes the distribution of authorities across national, regional, and local levels, fostering collaboration and participatory decision-making                                               | Challenges in coordination due to regional disparities                       |
| <i>Functional governance model</i>                | Takes a spatially adaptive approach, focusing on regions defined by their industrial, ecological, or economic interdependencies rather than administrative boundaries                           | Difficulties in aligning policies across different sectors and jurisdictions |
| <i>Collaborative innovation-driven model</i>      | The model leverages partnerships between public authorities, private enterprises, and research institutions to drive industrial transition through technological and organizational innovation. | Marginalizing vulnerable groups due to lack of economic interests (power)    |
| <i>Community-led bottom-up model</i>              | Ensure that the voices of affected communities are central to decision-making.                                                                                                                  | Scalability remains limited to local conditions.                             |

Source: authors' own elaboration.

## Typology of JGT governance



**Figure 2.** Typology of JGT governance (source: authors' own elaboration).

coordination challenges persist, as demonstrated in Belgium, where regional disparities complicate national and EU-alignment. The *functional governance model* adopts a spatially adaptive approach, focusing on interdependencies across industries, ecosystems, and the economy rather than on administrative boundaries. France, Romania, Spain, Slovenia and the UK (Scotland) have implemented this model, tailoring transition strategies to the specific characteristics of functional areas, such as industrial zones (like in the Seine Valley in France or in the Jiu Valley in Romania) or cross-border regions (like in the case of Slovenia's collaboration with the North Adriatic Hydrogen Valley). While enabling targeted interventions and resource optimization, this approach also introduces complexity in policy coordination across overlapping jurisdictions and sectors. The *collaborative innovation-driven model* leverages partnerships between public authorities, private enterprises, and research institutions to advance technological and organizational innovation. Norway, Sweden and the Netherlands exemplify this model through initiatives such as HYBRIT in Norrbotten, which integrates industrial

innovation with decarbonization goals by developing fossil-free steel through public-private collaboration, and circular economy projects in the Port of Rotterdam, managed through partnerships involving government bodies and private companies. Furthermore, this approach often aligns industrial competitiveness with decarbonization goals, but may risk overlooking social equity concerns, particularly in territorial contexts with limited capacity to attract investment or where vulnerable groups are insufficiently integrated into innovation processes. The *community-led, bottom-up model prioritizes grassroots participation and local ownership of transition initiatives, ensuring that affected communities' voices* are central to decision-making, as observed in Denmark, Ireland, and Latvia. This approach strengthens legitimacy and social acceptance, but the scalability and the integration of bottom-up initiatives into broader national frameworks, especially in non-EU territorial contexts, remain limited, particularly in early-stage transition contexts where community engagement mechanisms are still emerging.

## 7. Conclusions

This paper sets out to compare the governance models put in place to operationalize the EU JGT, moving beyond the universal and non-binding nature of the UN SDGs (Berisha, Caprioli, and Cotella 2022) through a dedicated funding framework (the JTF) and territorially differentiated instruments (the TJTPs). Drawing on empirical evidence from 40 institutional contexts, the study provides the first systematic, comparative assessments of JGT governance across Europe and advances a preliminary typology grounded in observed institutional, spatial and policy practices. The findings demonstrate that the EU's approach to JGT represents a significant governance innovation, particularly through the introduction of TJTPs as place-based instruments linking climate objectives with social and territorial equity. However, the analysis reveals that the ambition of a 'just' and 'green' transition is unevenly translated into practice. The five models composing the proposed typology of JGT governance (centralized policy-driven, decentralized multi-level, functional, collaborative innovation-driven, and community-led bottom-up) highlight that, while no single model guarantees success, effectiveness depends on the internal coherence of governance arrangements and their attention to potential trade-offs – e.g. strategic coherence Vs responsiveness to local needs, attention to territorial diversity Vs higher administrative complexity and fragmentation, mobilizing private investment and technological change Vs. attention to vulnerable groups etc.

From a theoretical perspective, the findings contribute to the literature on European territorial governance, shedding light on how experimental governance arrangements developed to handle new functional geographies can enhance policy effectiveness (Cotella and Vitale Brovarone 2024), but only when supported by adaptive institutions and robust coordination mechanisms that prevent overly fragmented or ad hoc spatial arrangements. In this light, greater emphasis should be placed on institutional capacity-building at regional and local levels, particularly to support stakeholder engagement, cross-sectoral integration, and learning-oriented governance. At the same time, JGT may benefit from further embedding in the (post-2027) Cohesion Policy, ensuring further coherence and funding continuity between TJTPs and broader regional development strategies and sustained territorial transformation beyond the lifespan of the Just Transition Fund. To shed further light on this issue and guide future policy development,

further comparative research is certainly needed, aiming to identify implementation bottlenecks, institutional enablers, and the role of multi-level governance in facilitating or hindering progress during the implementation phase.

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## Author contributions

CRedit: **Erika Puntillo**: Conceptualization, Resources, Writing – original draft; **Erblin Berisha**: Conceptualization, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing; **Giancarlo Cotella**: Conceptualization, Methodology, Supervision, Writing – review & editing.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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