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Role of Local Governments in Green Deal Multilevel Governance: The Energy Context

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Abstract: The sustainability of the climate is a global problem that requires the involvement of all levels of public governance and the private sector. Energy issues play a crucial role in the Green Deal (GD), and many of these issues are being addressed at the local government (LG) level. The division of competences within the framework of the GD among the European Union (EU), national governments, LGs, and the private sector has not been sufficiently discussed. Existing studies often neglect the specific role of LGs. The aim of this study was to evaluate the extent to which the role of LGs aligns with the core principles of public governance, namely sustainability, solidarity, subsidiarity, and proportionality. The novelty of this study's methodology lies in the comprehensive and integrated application of all four principles to assess the distribution of competences necessary to achieve global goals. The conclusion of the study demonstrates that, although the functionality and competences of LGs generally comply with these principles, the role of LGs as consultants to and co-legislators with national and EU authorities should be further discussed and expanded. Overall, this study highlights the importance of strengthening the role of LGs as valuable contributors to the governance process.

Keywords: local governments; climate change; sustainability; solidarity; subsidiarity; proportionality

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1. Introduction

Addressing climate warming is an immense challenge that requires urgent action. The issue is intricately linked to the energy sector, which is responsible for a dominant portion (77%) of greenhouse gas emissions in the EU [1]. In the ongoing discussions, energy transformation is not pursued as an end goal but is regarded as the central solution and primary means to achieve the established climate goals. That this strong link has been understood at a high political level is clearly demonstrated by the development of complex national climate and energy plans in EU member states; in several countries, the creation of a unified governance has also been initiated (for example, the Ministry of Climate and Energy has been established in Latvia).

One notable characteristic that sets climate warming apart from other global problems is its wide-ranging impact on all levels of governance, encompassing participants from the United Nations (UN) down to individual households. The EU Green Deal (GD) is poised to demonstrate the concept of multilevel governance in action with the potential to influence and involve stakeholders at various levels [2].

Climate goal No. 13 is a significant component of the 17 Sustainable Development Goals outlined by the United Nations. The Paris Agreement [3], a legally binding international treaty on climate change, places high priority on goal No. 13. This agreement

is rooted in the understanding that global warming is predominantly caused by human activities. It was adopted by 196 countries at the UN Climate Change Conference in Paris on 12 December 2015 and officially came into effect on 4 November 2016.

The European Commission's Green Deal serves as a proposition to assume a leading role and serve as a model for other countries when implementing the goals of the Paris Agreement. Through its initiatives and actions, the EU aims to demonstrate effective strategies for achieving the objectives of the agreement.

A study conducted in 22 EU27 countries [4] revealed that the majority of respondents, particularly in countries within the Mediterranean region, believe that gradual climate change will have a worsening personal impact on them. This belief was reflected by the perception that climate change should be given high priority by the government, a sentiment shared by the majority of respondents from all 22 countries. Notably, there was a strong positive correlation (r = 0.85) between these two beliefs, indicating persuasive causality. In other words, a heightened concern about personal harm resulting from climate change leads to increased confidence in the government's duty to address the issue as a priority (Figure 1). This highlights the significance of personal experiences and perceptions in shaping public attitudes towards climate change mitigation efforts.

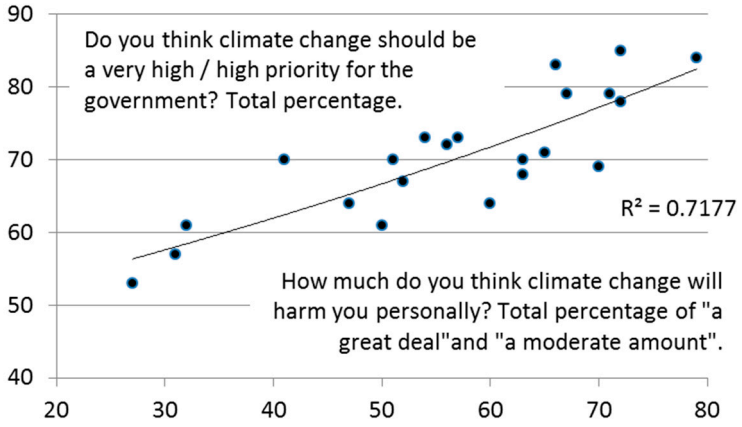

Figure 1. Opinions of EU countries about the worsening personal effects of climate changes and government priority. Developed by the authors on the basis of data from [4].

Since the global summit in Rio de Janeiro in 1992, efforts to combat climate change have gained institutional intergovernmental support [5]. There is now a growing certainty regarding the action plan required to reverse the negative impacts of human activities on the environment.

In 2008, the Covenant of Mayors [6] was introduced as an initiative by the European Commission to endorse and assist local authorities in implementing sustainable energy policies. Signatories of the Covenant commit to the development of a Sustainable Energy and Climate Action Plan (SECAP) within two years of joining and must outline the key actions they will take. They are also required to report on the progress of their implementation every two years.

Participation in the Covenant of Mayors is indeed voluntary, allowing each participant to approach the common global goals in their own way. As members of the Covenant [6], local governments (LGs) undertake three main actions: (1) reducing greenhouse gas emissions within their territories, (2) increasing resilience against and preparedness for the adverse impacts of climate change, and (3) addressing energy poverty to ensure an appropriate transition.

The Covenant has garnered over 12,000 signatures, highlighting its widespread adoption. The initiative has also expanded beyond Europe to other continents, emphasizing the importance of LGs and their collaboration in the advancement of sustainable energy practices. This expansion is reflected by the Global Covenant of Mayors for Climate & En-

ergy [7]. The Covenant exemplifies the proactive and innovative approach of participating LGs, who often strive to go above and beyond what is required by national governments. Furthermore, the activation of LG initiatives is a continuous process, as seen with the European Commission's launch of an initiative for 100 climate-neutral and smart cities in 2022 [8].

The division of rights and responsibilities between EU member states and their subnational governments falls under the national competence of each country. However, the Climate Law [9], which is part of the "Fit for 55" legislative package, emphasizes the need for an inclusive and accessible process at all levels of multilevel governance. This includes the involvement of national, regional, and local governments, as well as social partners, academia, the business community, citizens, and civil society. The aim is to foster collaboration and cooperation between different levels of governance utilizing both top-down and bottom-up approaches [10].

The GD and the Fit for 55 package can be viewed as the European Union's contributions to the implementation of the Paris Agreement, a global initiative led by the United Nations (UN). The UN Environment Programme (UNEP) is responsible for monitoring the implementation of the Paris Agreement. The UNEP has recommended a division of actions and competences among stakeholders from various energy sectors, as outlined in their proposals [11] (see, e.g., the buildings case presented in Table 1). This proposal provides a detailed framework for accelerating the transformation of the energy sector towards zero greenhouse gas (GHG) emissions in a way that involves different actors. Further aspects of this division of actions can be found in related studies [12,13].

Table 1. The UNEP: important actions to accelerate transformation in buildings by different stakeholders [11].

Levels/Stakeholders	Actions/Competences
International actors	Provide access and favorable conditions to finance data Support skills and knowledge growth
National governments	Regulate towards the achievement of zero-carbon building stock Incentivize zero-carbon building stock Facilitate zero-carbon building stock
Local governments	Implement zero-emission building stock plans Integrate low-emissions requirements in urban planning Add requirements that go beyond the national level
Financial institutions	Adjust strategy and investment criteria for zero-carbon building stock Support building renovations
Businesses	Construction and building material companies should review their business models Achieve zero-carbon owned or rented building stock
Citizens	Retrofit for an improved carbon footprint Tenants challenge landlords Adopt energy-saving behaviors

The division of responsibilities among different stakeholders is essential, not only for democratic purposes, but also due to the limitations of budgets. While the EU budget can support and facilitate climate action initiatives, it alone cannot finance the entire process. The same applies to national budgets.

The success of climate actions will greatly depend on the involvement of resources from the private sector. This includes not only entrepreneurs but also the participation of each household. However, it is important to note that the willingness of individuals to actively engage in climate actions is often lower compared to their support for government activities [4]. This highlights the need for effective communication, awareness campaigns, and incentives to encourage greater participation from the general population to address climate change.

The division of competences between the government and LGs varies among EU countries. However, regardless of the specific division, the roles of municipalities in each territory are important. LGs occupy an intermediate position between higher levels of government and private stakeholders, making their role crucial in the context of the GD.

Effective organization of the process relies on the optimal division of rights and responsibilities. The principle of subsidiarity, which delegates decision-making to the most appropriate level of governance, is commonly recognized in all EU member states. This principle ensures that decisions are made at the most local level possible, taking into account the specific needs and characteristics of each region or municipality.

In addition to subsidiarity, principles such as sustainability, solidarity, and proportionality are directly connected to the proposed GD strategy. Sustainability emphasizes the need to address climate change and promote environmentally friendly practices. Solidarity encourages cooperation and support among different stakeholders to achieve common goals. Proportionality ensures that the actions and measures taken are proportionate to the objectives and do not impose unnecessary burdens.

By considering these principles and involving LGs in the decision-making process, the GD aims to foster effective and inclusive governance to address climate change and achieve sustainable development.

Several studies have dealt with the application of the aforementioned principles for competence analysis in the field of energetics (e.g., [14,15]). However, the functionality of LGs has not been discussed sufficiently, with only a few studies focusing on certain aspects of the LGs' roles in the multilevel governance of the innovative process towards green energetics (e.g., [16–18]). LGs, being the closest public authorities to citizens and entrepreneurs, who will be the main investors in the GD, hold an important position. Consequently, there are opinions about the need to increase the role of LGs and the importance of consulting with all stakeholders. Such opinions have been expressed by key consultative institutions of the EU, including the Committee of Regions [19] and the Economic and Social Committee [20]. Objections have been raised regarding the unsatisfactory involvement of social partners and subnational governments in both cases.

All of these factors combined necessitate a systematic analysis of the role of LGs, taking into account the unique situation of the multilevel governance model of the GD. The aim of this study is to evaluate whether and to what extent the role of LGs in this model aligns with the generally accepted principles of public governance, namely sustainability, solidarity, subsidiarity, and proportionality.

The novelty of this research lies in the innovative and integrated application of the aforementioned principles of public sector administration. This application allows for the evaluation of the division of competences among different levels of governance and the involvement of lower-level authorities and stakeholders in achieving global goals. Furthermore, this research aims to identify the specific role of LGs in this context.

Thus far, separate applications of the four principles have been found. The principle of subsidiarity became a European instrument in the latter part of the 20th century, aiming to distribute responsibilities and competences between national and local authorities. This principle is recognized in the treaties of the European Council [21] and the European Union [22]. The application of the subsidiarity principle in EU documents is closely linked to the principle of proportionality [22]. The inclusion of two other widely recognized principles of political philosophy, namely sustainability and solidarity, is necessary due to the scale and nature of the analyzed global problem.

The evaluation of the role of LGs cannot be achieved solely through tests of economy and efficiency or by exploring societal beliefs, as is often included in discussions regarding centralization and decentralization between governance levels (such as between the EU and its member states or between a national state and its LGs). In the case of the GD, an approach that integrates all levels of governance is necessary for a comprehensive assessment.

The authors are not aware of any existing scientific literature or public policy documents that reflect an analysis combining these four principles for the evaluation of compe-

tence division in the case of multilevel governance. The current proposals put forward by UN and EU policymakers are based on the traditional division of competences, where LGs are seen as the agents responsible for implementing global and EU policies. However, a systematic analysis of the scope of activities related to GD suggests that a departure from the traditional division of competences among governance levels is desirable.

2. Materials and Methods

Global and EU policy documents, as well as binding agreements, provide general guidelines regarding the involvement of LGs. However, it is important to note that constitutions, normative systems of states, and the division of the main competences between national and local authorities vary greatly among the 192 member states of the Paris Agreement. The authors have previously utilized benchmarking modeling for economic [23] and digital [24] issues on an EU scale. However, the content and scale of GD tasks are not suitable for analyses that use data mining tools to draw general conclusions about the role of LGs.

Therefore, the application of the principles of public governance organization forms the basis of the research methodology, as it provides a suitable approach for evaluating the role of LGs in the context of the GD.

The EU model of multilevel governance is based on the principle of subsidiarity. This principle, before being applied to the division of political powers and administrative competences between different levels of government, originated from Catholic social teaching [25,26]. In his encyclical Quadragesimo Anno [26], Pius XI articulated this principle and emphasized the crucial aspect "to furnish help to the body social." This highlights the importance of providing support and assistance to broader society:

"79. As history abundantly proves, it is true that on account of changed conditions many things which were done by small associations in former times cannot be done now save by large associations. Still, that most weighty principle, which cannot be set aside or changed, remains fixed and unshaken in social philosophy: Just as it is gravely wrong to take from individuals what they can accomplish by their own initiative and industry and give it to the community, so also it is an injustice and at the same time a grave evil and disturbance of right order to assign to a greater and higher association what lesser and subordinate organizations can do. For every social activity ought of its very nature to furnish help to the members of the body social, and never destroy and absorb them."

Assisting at "lower" levels can be justified through the principle of proportionality. This is precisely why the principles of both subsidiarity and proportionality are included in Article 5 of the Treaty Establishing the European Union [22], as well as in Protocol No. 2. Even in situations where other arguments may lean towards centralization, the test of proportionality is necessary to evaluate and compare the positive effects on the beneficiaries with the potential negative effects on those who may incur losses.

Article 4.3 of the European Charter of Local Self Government [21] establishes three reasons for the legitimacy of centralization. Before decisions about the centralization of a public entity, one "should weigh up the extent and nature of the task and requirements of efficiency and economy".

The nature of any task proposed by the European Commission in its GD package critically depends on the requirements of sustainability. For sustainability, one needs to demonstrate that activities aimed at climate goal No. 13 do not undermine the achievement of the 16 other UN Sustainable Development Goals.

The successful implementation of any action proposed by the European Commission in its GD package heavily relies on the willingness of beneficiaries to demonstrate long-term solidarity with all stakeholders, including non-beneficiaries. This solidarity should extend from households, NGOs, and entrepreneurs to LGs and subnational and national governments to macro-regions and the UN. However, it is important to acknowledge that the short-term and mid-term interests of these stakeholders may sometimes conflict with the proposed strategic activities.

The activities encompassed within the GD are typically shared among various levels of governance. LGs play diverse roles in this regard, including the consultation, co-decision, coordination, and execution of these activities. To ensure the overall effectiveness and efficiency of the GD, significant involvement of local authorities is crucial.

LG competences concerning GD issues can be analyzed from several points of view:

1. By the characteristics of corresponding LG functions;
2. By activities included by the European Commission in the "Fit for 55" package;
3. By relations of the LG with other government levels.

The four aforementioned principles have been utilized separately to analyze the organization of public administration, including issues related to the GD.

Although the term "subsidiarity" is not explicitly mentioned in the European Charter of Local Self-Government [15], the principle itself is explained. It has been at the forefront of discussions between central and local governments in Europe since the 1990s. The principle of subsidiarity was also incorporated in the Maastricht Treaty [27]. Together with the application of the principle of proportionality, it serves to balance tendencies toward centralization and decentralization within the EU. Previous analyses have been conducted on the application of the European core principle of competence division (subsidiarity) in the relationship between the EU and its member states [14,15].

The principle of solidarity serves as a cornerstone for both global and EU climate policies. Prominent political figures at the highest level, such as the Secretary General of the UN [28] and the Executive Vice-President of the European Commission [29], have emphasized the importance of solidarity in their key messages regarding the conditions for GD success. The principle of solidarity is also crucial for the EU Court of Justice [30] when resolving energy conflicts between EU countries.

The principle of sustainability, as interpreted by the UN, encompasses environmental and climate issues. Sustainability is a central topic in discussions on public governance organization worldwide that has been approached from various perspectives.

The novelty of this study's methodology lies in the comprehensive and integrated application of all four principles to assess the distribution of competences necessary for achieving global goals. It recognizes that collaborative efforts from all actors in multi-level government structures are essential prerequisites for success. The algorithm of the methodology consists of several steps, as depicted in Figure 2.

Grouping functions present a landscape of the situation from global, EU, and local points of view. Specifically, the EU's approach to multilevel governance creates distinct features compared to those used by the rest of the world. Testing the correspondence of this landscape to the four aforementioned principles of public governance leads to conclusions about opportunities for improvement and recommendations for EU, national, and local policies. At each step of testing compliance with the four principles, policy analysis methods are employed. The impacts and outcomes of governance design at different levels exhibit similarities. To provide a practical illustration, the effects on national states are examined, leading to conclusions about analogies on a smaller scale.

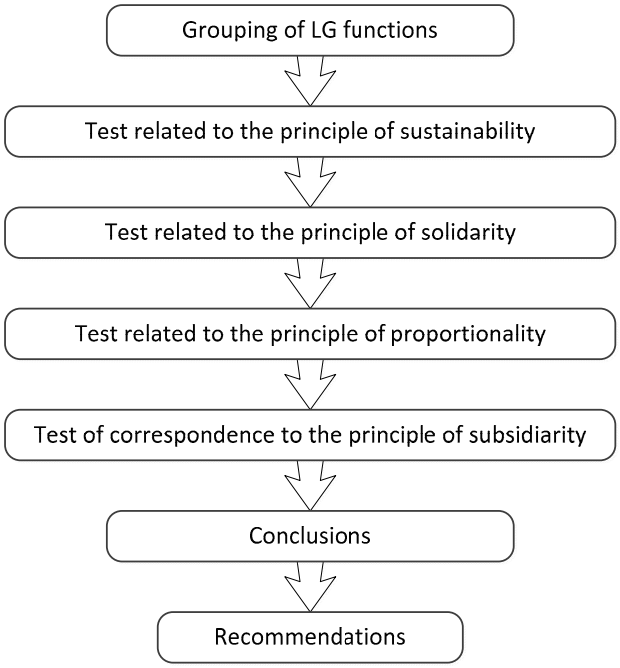

Figure 2. Algorithm of the research methodology. Developed by the authors.

3. Results

3.1. Grouping

There is a large diversity of competence divisions between LGs and national governments in EU countries [31]. In many cases, competences are shared, meaning that some functions are governed by EU legislation, while others are divided among national governments, regions, local governments, and various representatives of the private sector. This is particularly evident in the case of climate and energy policy.

Local governments are responsible for fully or partially carrying out several activities, as shown in Table 2, to fulfill their autonomous competences or tasks delegated by the state.

Table 2. Types of LG activities. Developed by the authors.

Nr.	Type of LG Activity Used to Execute the Autonomous or Delegated Functions
1	Regulation by binding by-laws, adopted by LG councils.
2	Administration of national or local legislative acts.
3	Providing services to physical persons and legal entities.
4	Entrepreneurship by LG-owned companies or by shares in companies.
5	Maintenance and development of public infrastructure.
6	Facilitation of economic and social activities of entrepreneurs and civil society.
7	Coordination, cooperation, consultation, and recommendations to/with other public entities and private initiatives.

In the implementation of the GD, all seven activities listed in Table 2 can be applicable components of the green transition. Therefore, the role of LGs in the GD can be characterized by establishing relationships between GD activities and the seven aforementioned activities (referred to as Nos. in Table 2). The division of competences between countries and their subnational governments is not regulated by the EU. Instead, it depends on the traditions and willingness of EU member states to implement the 30 principles of the Charter [3].

What is common for all EU countries is the signing and ratification of the international treaty of the Council of Europe, which is the European Charter of Local Self-Government [3]. The basic principle guiding the division of competences is the principle of subsidiarity, as

formulated in Article 3.4 of the Charter. The EU has practical experience in applying this principle to the division of competences between the EU and its member states, as outlined in the last paragraphs of Article 5 of the EU Treaty [22]:

"3. Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level. The institutions of the Union shall apply the principle of subsidiarity as laid down in the Protocol on the application of the principles of subsidiarity and proportionality. National Parliaments ensure compliance with the principle of subsidiarity in accordance with the procedure set out in that Protocol.

4. Under the principle of proportionality, the content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties."

Participation in the Covenant of Mayors is a voluntary initiative and is not prescribed by national law. By signing up for this European initiative, each participant commits to doing its part by undertaking the following actions [32]:

"1. COMMIT to setting mid- and long-term targets, consistent with the EU objectives, and at least as ambitious as our national targets. Our goal will be to achieve climate neutrality by 2050. Considering the current climate emergency, we will make climate action our priority and communicate it to our citizens.

2. ENGAGE our citizens, businesses, and governments at all levels in the implementation of this vision and in the transformation of our social and economic systems. We aim to develop a local climate pact with all the players who will help us reach those objectives.

3. ACT, now and together, to get on track and accelerate the necessary transition. We will develop, implement and report, within the established deadlines, an action plan to reach our targets. Our plans will include provisions on how to mitigate and adapt to climate change, while remaining inclusive.

4. NETWORK with fellow Mayors and local leaders, in Europe and beyond, to get inspiration from each other. We will encourage them to join us in the Global Covenant of Mayors movement, wherever they are in the world, would they embrace the objectives and vision described herein."

Each of these four fundamental actions can be performed by one or several of the seven activities listed in Table 2. Specifically, local governments in the EU bring together the positions of national LG associations for discussions with national governments and the positions of the Council of Municipalities and Regions of Europe (CEMR) [17] for discussions with the European Commission and the European Parliament. The collective opinion of self-governments is also represented by the consultative body of the EU, the Committee of the Regions [18].

The European Commission's GD package "Fit for 55" is a component of the UN's global initiative, the Paris Agreement [3], which is monitored by the UN Environment Program (UNEP). The grouping of competences among different actors in multilevel governance, including private-sector activities, can be found in [11]. It is crucial to highlight that the global climate program encompasses both developed and developing countries as well as democracies and authoritarian regimes. It should be noted that the principles of subsidiarity and proportionality are not recognized in many countries. The UNEP report [12] recommends the division of competences into two main dimensions:

(1) According to the sector of economics (electricity supply, industry, transportation, and buildings);
(2) According to the "level" of multilevel governance (national government, international cooperation, subnational government, business, investors and banks, and citizens).

The division of competences by the UNEP is universal and fit for all, including authoritarian regimes.

The role of LGs as part of a subnational authority is often quite limited. This can be attributed to the varying levels of autonomy among the 192 participants of the Paris Agree-

ment. Recommendations for subnational governments are outlined in Table 3. However, the opportunity to implement these recommendations depends on national or subnational legislation regarding the division of competences between national, regional, and local governments.

Table 3. Recommendations of the UNEP to subnational governments regarding the GD in the energy context. Sources: [11,33–44].

Power Supply	Industry	Transportation	Buildings
Set 100 percent renewable targets: Subnational governments can create demand for renewable electricity by setting 100 percent renewable targets.	Regional planning and regulation: Reconsider regional spatial planning and regulations, reform procurement guidelines, explore carbon pricing instruments, engage in labeling, align regulations to facilitate implementation, and ensure accountability for emissions.	Plan infrastructure and supporting policies to reduce travel demand: Initiate or intensify systemic planning and infrastructure changes that reduce transport demand; this includes the development of low- and zero-emission zones to accelerate shifts to zero-emission vehicles in cities.	Implement zero-emission building stock plans: Subnational governments should plan for and implement their arrival at 100 percent zero-emission building stock; particularly important is that the design of any new construction is fossil-fuel-free with the presence of a vision to rapidly reduce embodied emissions.
Plan for appropriate fossil fuel phase-out: Dubnational governments need to plan for fossil fuel phase-out well ahead of time and in a socially acceptable manner.	Cooperate with various stakeholders: Mitigation actions are implemented at subnational levels, so subnational governments must cooperate with national governments, industry, and citizens to implement mitigation actions.	Plan infrastructure and supporting policies for zero-emission vehicles: Invest in smart charging infrastructure and support regulations for the acceleration of deployment.	Integrate low-emission requirements into urban planning: This includes zoning and parks.
		Adjust taxation/pricing schemes: To support transformation, regional and local governments should align regarding public transport as well as local pricing, taxes, and fees on car ownership, parking, and car access to cities (technology changes, mode shift, and avoided travel).	Add requirements in addition to national requirements: Stronger requirements at the subnational level can accelerate the transformation; cities should add renewable subsidies or low/no interest loans for low-income households that are not required at the national level.

The UNEP has high ambitions but cannot provide detailed mechanisms for how to achieve these "higher goals". Such mechanisms should be established at the national level through corresponding national energy and climate plans (NECPs). The challenge for LGs lies in sustainable territorial planning, setting higher standards for buildings and infrastructure within their administrative territories, and engaging with stakeholders of all types.

The EU's strategy for delivering the GD [45] is illustrated in Figure 3. Each of the 14 activities corresponds to a principal action in the "Fit for 55" package, which involves the acceptance of new EU laws or amendments to existing ones. These actions should be financed by the EU, national budgets, LGs, private enterprises, and households.

The proposed UN and EU actions towards the GD can be grouped into three mainstream action lines and three supporting activities. The mainstream lines encompass activities that facilitate alternative fuels and the demand for green energy (three EU activities), as well as actions aimed at phasing out non-renewables through price increases (four EU activities) and administrative restrictions on their use (four EU activities). All of these activities are related to energy, either in whole or in part.

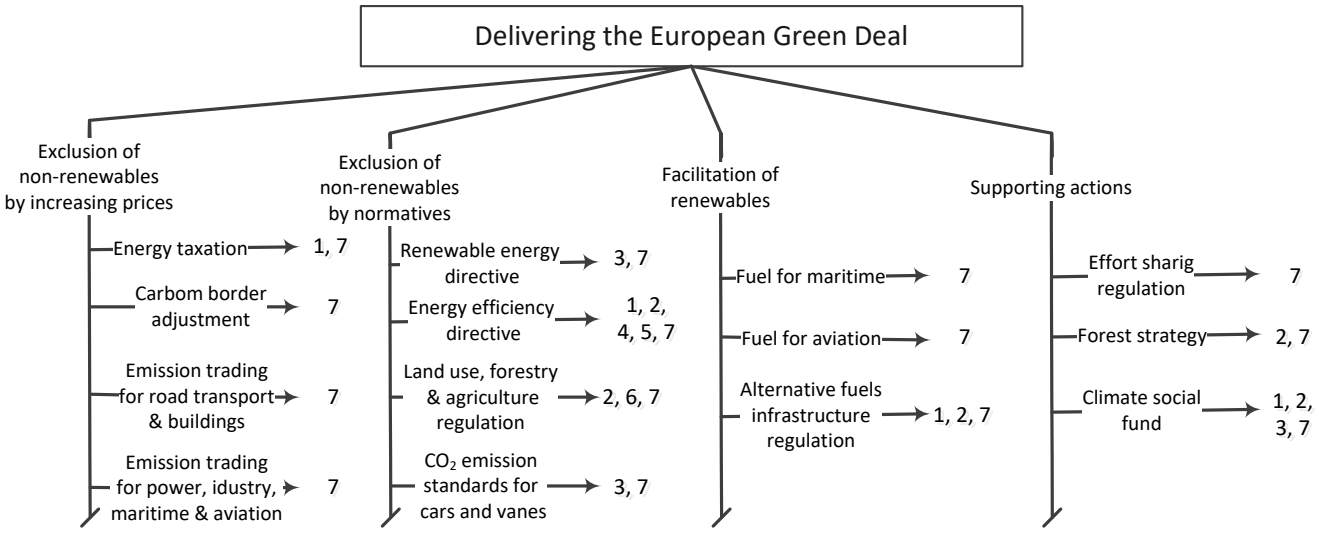

Figure 3. Activities and action lines for delivering the GD; figures indicate the numbers of corresponding LG functions (see Table 1) related to performance activities. Developed by the authors on the basis of data from [45].

The remaining three activities are supporting activities: an effort sharing regulation, the Climate Social Fund, and the EU Forest Strategy. These activities are particularly relevant to LGs. The effort sharing regulation is crucial for the competitiveness of local entrepreneurs and has a significant impact on migration, as territories with higher historic emissions are given preference. The Climate Social Fund, although it may only compensate for a small portion of the actual demands for support among socially vulnerable populations, holds potential for addressing their increasing needs. The EU Forest Strategy aims to strike a balance between greenhouse gas absorption and biodiversity, directly related to land planning, which is a typical competence of LGs in all EU countries.

The involvement of LGs in the mainstream action lines and supporting activities is determined by national legislation or local binding by-laws, depending on the functions assigned to LGs by sectors. The type of activity or function that LGs engage in depends on what is allowed according to national legislation. The numbers of activity types correspond to the set of LG activities outlined in Table 2 for fulfilling their functions.

In EU member states, the classification of LG activities is typically based on either economic classification or classification by the functions of the government [46]. The distribution of responsibilities for LGs in areas such as education, social protection, healthcare, environmental protection, public transport, police, and more varies among countries. That is why, in this research, the types of LG activities (Table 2) are utilized to evaluate the GD activities, as these activity divisions can be applied to any function.

The differences between countries' responsibilities depend on the level of centralization (where a larger share of legislation and administration belongs to the national government and parliament) or decentralization (where a larger share is assigned to LGs or other subnational governments) [45]. For the majority of GD activities, discussions among the European Parliament, European Council (expressing the opinions of member states), and European Commission are still ongoing. As a result, the participation of LGs is voluntary or potential at this stage.

The EU GD activities can be divided into four macro-sectors: power supply, industry, transport, and buildings. This division aligns with the UNEP classification (Table 3) and is particularly relevant for energy-related issues.

Among these sectors, buildings hold the largest share of LG responsibilities in all EU countries (as seen in Table 1). While LGs may only own a small portion of the actual buildings, their roles in regulation and administration are significant. One crucial function of LGs is to facilitate the transition of the private sector towards zero-emission buildings.

This entails the creation of an enabling environment and the provision of support for private-sector initiatives in achieving zero-emission goals.

3.2. Sustainability

The sustainability of the GD can be discussed in terms of two aspects:

- Regarding climate policy as one of the 17 UN Sustainable Development Goals (SDGs), particularly in terms of Goal No. 13, sustainability depends on its interaction with the 16 other goals. It is evident that many activities proposed by the European Commission in the GD may contradict progress in several SDGs, such as No. 1 (no poverty) and No. 8 (decent work and economic growth), among others.
- Regarding the technological, economic, political, and psychological aspects of the action lines included in the GD package, ambitious goals are not supported by planned technological achievements. For example, cheap production and transportation of green hydrogen, affordable production of green fuel for aviation, and cost-effective production of efficient batteries for electricity have not been achieved yet.

The sustainability of the GD depends on addressing these issues and ensuring coherence across the SDGs. It requires advancements in technology, along with consideration of economic, political, and psychological factors. Continued research, development, and innovation are necessary to overcome these limitations and ensure the long-term sustainability of the GD.

The belief that increasing the demand for green energy alone will ensure necessary technological progress can be seen as a mere dream. The advancement of technology relies heavily on collaboration or competition between countries, which is further discussed later.

The Paris Agreement [3] includes a wide spectrum of promises: "Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote, and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity,". Ensuring the rights of local communities in the EU member states means fulfilment of the European Charter of Local Self Government [21].

The Russian invasion of Ukraine that has been ongoing since February 2022 has not been adequately addressed by the leaders of most countries up to the present day. This invasion occurred amidst a compounding post-COVID-19 crisis, encompassing challenges in energy, food, and living costs. The crisis has been further exacerbated by the ongoing conflict in Ukraine, leading to immense human suffering and undermining the global economic recovery from the COVID-19 pandemic [46].

Under a medium-term perspective, there are two choices that can be made:

1. Utilize the crisis as an opportunity to accelerate the transition away from fossil fuels and promote the expansion of renewable energy while also prioritizing energy conservation and efficiency.
2. Divert attention from climate change action and continue investing in fossil fuels, which could lead to a lock-in effect and jeopardize the temperature goal outlined in the Paris Agreement [46,47].

The valuation of national and local climate actions depends on the methodology used to measure and evaluate GHG emissions. The simplest approach is a locally based methodology, where emissions are calculated based on the location of energy generation or the production of carbon-containing products. A more advanced option is a market-based methodology, where emissions are calculated based on the location of energy or product utilization, taking into account emissions associated with their production [32]. The market-based approach considers the export and import of emissions as well as the export and import of absorptions. The GD package aims to consider both approaches.

Some of the short- and medium-term GD activities have negative impacts on the climate. Evaluations based on the market-based approach result in negative assessments on the use of nonrenewable electricity, nonrenewable hydrogen, and nonrenewable building materials.

However, the indirect positive effect in the long-term depends on the achievement of solidarity and/or technological development; e.g., the perspective of using hydrogen as a fuel or electric cars in cities in the short-term can worsen the global balance of GHG emissions, especially in producing countries. It is important for every country and local government to compare the negative effect on prices with the negative effect on GHG emissions, considering the likelihood of potential positive impacts resulting from future technological advancements.

To avoid exacerbating the situation through negative social impacts on local residents and the negative impact of additional EU nonrenewable energy production, the second approach provides more balanced arguments for making local policy decisions. It allows for a comprehensive evaluation that considers both social and environmental aspects, helping to mitigate potential negative consequences.

This does not exclude the application of demonstrative actions as examples, but measuring the real impacts of climate actions is crucial. Cities that are participants in the Covenant of Mayors have been recommended to utilize the second approach, as indicated in Table 4.

Table 4. Urban emission scopes and relations to the Common Reporting Framework (CRF) of the Global Covenant of Mayors' definitions. Source: [47].

Emissions Scope	Definition Related to the CRF	Emissions Type
Scope 1.	GHG emissions from sources located within the city boundary.	Direct emissions.
Scope 2.	GHG emissions occurring because of the use of grid-supplied electricity, heat, steam, and/or cooling within the city boundary.	Indirect emissions from the use of grid-supplied electricity, heat, steam, and/or cooling.
Scope 3.	All other GHG emissions that occur outside the city boundary because of activities taking place within the city boundary.	Emissions occurring outside the jurisdiction boundary because of in-jurisdiction activities.

The plan to decrease global warming by reducing GHG emissions relies on the hope that there will be a substantial increase in the production and supply of green electricity. This electricity will serve as a renewable source for heating, cooling, industrial processes, households, road transport, aviation, and maritime sectors, either directly or indirectly. Such a broad application of green electricity will require a significantly larger amount of electricity than before the implementation of the GD.

Electricity is projected to be the primary source for the production of green hydrogen. This hydrogen, in turn, is expected to be inexpensive and serve as a source for electricity generation during periods when solar and wind energy are not available. Consequently, there will be a need for a substantial reserve of hydrogen for electricity production.

It is a political decision at the national or local levels to determine the extent to which economically non-sustainable actions will be taken to stimulate entrepreneurs and researchers to implement climate policy. However, it is important to note that these actions may have negative social impacts. If the necessary technological progress is not achieved, these actions may be seen as a waste of money and human resources in the long term.

LGs will be involved in various demo experiments, such as the electrification of vehicles, the use of expensive green biofuels, and buses with hydrogen cells. However, it is important to note that these activities mainly serve as demonstrations of possibility and may not lead to positive economic or social effects at present.

At present and in the near future, action lines that increase prices and impose administrative restrictions (as seen in Figure 3) will directly impact LGs and residents negatively.

The proposed GD activities will also decrease the competitiveness of local and national entrepreneurs. The method of sharing competences could have a negative effect on countries with a better balance between GHG absorption and emission. The Committee of Regions serves as the main platform for dialogue between the European Commission and LGs, and their opinion on the EU Climate Law emphasizes this [48]:

"9. points out that a 'one size fits all' approach is not the right way to tackle climate change, . . . , success will depend heavily on local and regional authorities, highlights, likewise, that local and regional authorities as the level of government closest to citizens, play an important part in the management of decentralized energy production through self-consumption, distributed generation and smart networks, promotion of investment and the coupling of energy and climate policies with measures taken in relation to housing, energy poverty and transport."

Similarly, in terms of the opinion on the EU Climate Law from the Economic and Social Committee, which serves as the main platform for dialogue between the European Commission and economic and social partners, specific points are mentioned [20]:

"1.13. The Climate Pact should be focused on empowering people to change systems—through exploration, experimentation and demonstration. Multi-level perspectives, visioning, story-telling and back casting will all be crucial. A wide variety of climate initiatives should be fostered and facilitated . . . ".

"3.9. An enabling environment requires a key shift from consultation and top-down engagement to co-design, co-creation and empowerment."

Consequently, achieving sustainability will greatly depend on the proper organization of dialogue among multilevel authorities and their engagement with civil society. This is essential to create an enabling environment that facilitates quality work for academics, innovators, and designers.

Currently, it is premature to assert the sustainability of GD actions, as there are still numerous unresolved issues. For instance, the promotion of energy efficiency in buildings could mitigate the negative impact on electricity expenses. In this regard, the competence of LGs surpasses that of national governments. The classification of biofuels as renewable or not, as determined by EU political decisions, will also be crucial for LGs in local climate and energy efficiency planning.

It is evident that LGs should not only be involved in consultations and cooperation but also in the co-decision-making process. To prevent a rapid departure from various UN SDGs, the management of GD actions needs to be territorially flexible and incremental. Co-decisions with national governments could ensure this desired flexibility.

3.3. Solidarity

Solidarity among macro-regions, nations, and local communities, as well as between the public and private sectors, is crucial for the success of GD. Solidarity is necessary to ensure that humanity's long-term goals outweigh the short-term interests of public or private entities. This means that a substantial portion of the 17 UN SDGs may need to be postponed until a global transformation of the energy supply for industry, transport, and buildings has occurred. This postponement period is estimated to be a minimum of 30 years, but it is likely to be even longer.

There are several territories (and the respective governments/LGs), where local interests may contradict the goals of the GD:

1. In many northern territories, residents may prefer a warmer climate than the current weather conditions.
2. The development of territories may prioritize the acceleration of their economic growth to increase welfare.
3. Countries and regions whose comparative advantage lies in fossil fuel production and export to the EU may resist the phase-out of fossil fuels for energy generation, industry, and transport. Due to EU sanctions against Russia following its aggression in Ukraine, the structure of extra-EU imports of fossil fuels has significantly changed [49].

In 2022, Russia's market share gradually decreased, while the shares of the other main suppliers (Norway, USA, Kazakhstan, Saudi Arabia, and Libya) as well as those of others increased (Figure 4 illustrates changes in the shares of suppliers for EU imports of petroleum oil compared to Q1 2022). This indicates a diversification of imports and the potential for increased dissatisfaction among certain territories.

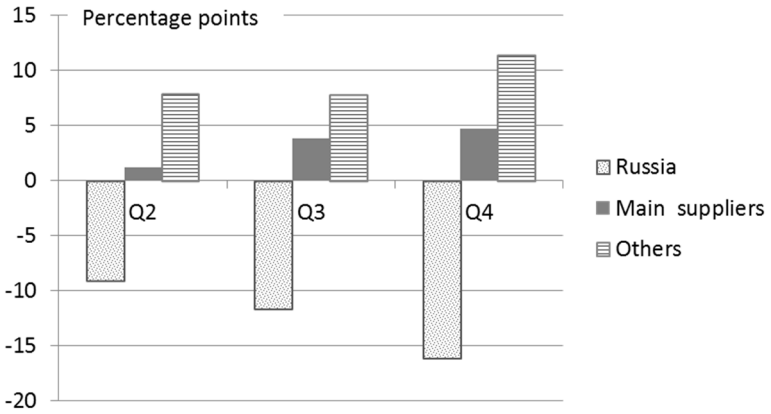

Figure 4. Extra-EU imports of petroleum oil to the EU; changes in suppliers' market shares in 2022 vs. 2022 Q1. Developed by authors on the basis of data from [49].

It is precisely in these territories that a proactive position of LGs is needed to balance local and global interests.

The interests of other countries/companies would align with the EU's activities in the following ways:

1. Countries that lack fuel resources but have opportunities to develop cheaper solar and wind energy sources will benefit from the EU's focus on renewable energetics.
2. Companies involved in the advancement of green energy, green industry, green transport, and green buildings will have business objectives aligned with the EU's emphasis on sustainability.
3. Countries that prioritize the trade of raw materials for solar, wind, hydrogen, and electricity storage technologies may see their interests coincide with the EU's goals. However, it is important to prevent collusion among these countries to artificially inflate prices, which could potentially lead other nations into financial instability. Notably, China and Russia have been the most significant suppliers in this domain over the past decade [33,39].
4. Developers of solar, hydrogen, and electricity battery technologies will find a favorable environment within the EU's efforts to promote and adopt these technologies.

These points highlight the potential for collaboration and mutual benefits between different nations and businesses in alignment with the EU's sustainability agenda.

Contradictory interests have the potential to escalate into conflicts between countries, possibly even resulting in wars. To prevent such conflicts, the Paris Agreement offers significant flexibility, allowing each country to determine its own priorities among the recommended activities and set its own timeline for achieving emission/absorption standards.

Conflicts can emerge among different stakeholders involved in GD implementation. Several conceptual conflicts could arise at the LGs' level in the energy context, including:

1. Conflict between network suppliers (district heating and electricity) and proponents of autonomous heating or electricity generation (communities and individual households). This competition involves a social dimension, as the increased adoption of autonomous generators leads to higher expenses for networked products.

2. Conflict between advocates of transitioning to an electricity-based economy and proponents of GHG-absorption-based economics.
3. Conflict between supporters of heating through "green" biomass incineration and the expansion of electricity and hydrogen utilization.

These conflicts highlight the diverse perspectives and interests within the GD framework and necessitate careful consideration and resolution to ensure effective and sustainable outcomes.

The lobby groups representing the aforementioned interests are currently actively engaged in influencing legislators at the global, EU, and national levels. However, in global and EU contexts, such lobbying efforts are counterbalanced by scientific committees [50,51], which are responsible for demonstrating that political decisions align with scientific advancements and determining what qualifies as "green" and what does not.

These examples illustrate the similar challenges of achieving solidarity within the territories of LGs. On one hand, there are affluent residents who seek a better living environment, while on the other hand, there are marginalized individuals facing survival challenges. There are also conflicting interests between traditional electricity network operators and self-sufficient energy communities as well as between district heating operators and heat pump installers in buildings. Achieving a balanced and cohesive local policy that addresses these diverse concerns is a weighty and critical responsibility for LGs.

To foster solidarity in such a complex situation, it is important to increase the autonomy of LGs in decision-making regarding the implementation of global policies. This responsibility lies within the jurisdiction of national parliaments. Enhanced freedom of LGs would enable them to address social protection issues, as the resources from the Social Climate Fund alone may not be sufficient to provide the necessary support for low-income households. Additionally, the regulation of land use, building issues, and other decisions that balance climate targets with the other 16 UN SDGs at the local administrative level presents a significant challenge.

In order to tackle these challenges, LGs need to engage in local dialogues with entrepreneurs, NGOs, and households. Such dialogues are crucial for achieving solidarity. The majority of the financial and material resources required for the GD should come from the private sector, as investment in GD activities will be a personal decision. The dialogue should focus on facilitating and encouraging investment in GD activities for households, manufacturing buildings, and offices. This includes conducting demo activities, providing education, and offering local subsidies. LGs have traditionally played a significant role in the organization of heating, energy generation, and networks, which aligns with LG activities Nos. 5, 6, and 7.

3.4. Proportionality

The principle of proportionality has been applied to the scope of GD activities planned at any level of multilevel governance. The traditional three tests of proportionality include:

1. The test of legitimacy, which involves verifying that the goal of the activity aligns with the values of a democratic society;
2. The test of correspondence, which involves verifying that the activity is effectively working towards the stated goal;
3. The test of commensurability, which involves verifying that the benefits derived from the activity outweigh the losses.

The intention to protect the environment through GD measures is not up for debate. However, the consequences of the proposed actions can have both positive and negative impacts on countries and LGs.

For many activities, the correspondence to the climate goal is indeed a subject of dispute. There are two main reasons for this. Firstly, the expected technological progress has not been achieved in the 30 years since the Rio de Janeiro summit. The belief that political demand alone will lead to the necessary scientific and technological advancements may turn out to be a utopian notion. Secondly, the balance between the overall impacts of

different GD activities cannot be accurately calculated when the activities of each country and each LG are not properly coordinated.

The negative opinions of the bioenergy association [52] and the hydrogen association [53] highlight these challenges. Both associations have criticized the insufficient support for corresponding activities within the EU territory. The market trend indicates a shift in green fuel production outside of Europe, where production costs are lower and profitability could be higher.

Tests of correspondence raise questions about the increase in electricity production for heating and transportation purposes. The role of electrification of cars and buses in achieving a global balance of GHG emissions and absorption is not clear, especially considering the significant reliance on coal as an energy source and the ongoing conflict in Ukraine, which are hindering the transition to green fuels. Additionally, the expansion of solar and wind energy production requires advancements in energy storage technology, which have not been fully achieved. The same challenges apply to the electrification of heating in buildings.

Without the support of LGs, it would be impossible to organize, design, and maintain initiatives such as Energy Plus neighborhoods, as land planning plays a crucial role in such activities [19]. Involving LGs in community energy initiatives has been proven to be highly beneficial in these cases.

Tests of correspondence could raise also the following issues:

1. It may raise questions about land use and forest policy proposals, as they could potentially lead to social and economic problems through the redistribution of land use proportions.
2. Doubts may arise regarding effort-sharing regulations, particularly in terms of sharing between developed and developing countries. The allocation of efforts is not based on emissions per capita but on revenue per capita.

The global effect regarding GHG emissions is the result of collective efforts. Flexibility is necessary, not only at the global level but also on the national and regional scales. A significant issue that affects any LG is illustrated by the case of China, where the increase in GHG emissions is partially attributed to the production of goods consumed in other countries. The evaluation of territories (countries, regions, and LGs) requires a balanced analysis of emission/absorption and export/import, as outlined in Table 4.

3.5. Subsidiarity

The decision regarding the correspondence on the subsidiarity principle in the context of climate/energy policy is a result of testing three other principles: sustainability, solidarity, and proportionality. The test of proportionality includes assessing whether there is a need for assistance from "lower" levels of multilevel governance at "higher" levels.

According to the principle of subsidiarity, public authorities should only engage in activities that cannot be carried out more efficiently by households, energy communities, and industries. The role of LGs is to make decisions that have a significant local impact on the sustainable development of the territory, particularly in the energy context. This includes decisions related to territory planning for the generation of wind and solar power, the energy efficiency of buildings and district heating systems, the establishment of energy communities, the promotion of green local public transport, the creation of zero-emission cities and zones, and issues related to the Social Climate Fund.

At the same time, a stronger financial burden will primarily fall on the private sector due to increasing prices and the necessary investments required for the transformation of buildings, individual transport, and individual in-house energy generation. It is, therefore, one of the main tasks of LGs to facilitate, consult, and motivate the private sector to transition towards a zero-emission world. The European Commission's proposal to stimulate the private sector through energy and fuel price increases has led to inflation and a global rise in food prices. LGs should serve as models for achieving energy efficiency in their owned buildings by providing advice on optimal heating solutions for private buildings and

helping to reduce energy poverty among vulnerable populations. LGs should also mitigate the impact of rapid shifts away from nonrenewable fuels and the rapid implementation of electric cars, among other initiatives.

The essence of intervention in the aforementioned private tasks is to assist local communities, entrepreneurs, and individual residents. Prior to intervention, it is recommended that possible government failures or market failures should be tested for and conformity with the principles of subsidiarity and proportionality should be ensured [54].

The tasks that traditionally fall under the competence of LGs [47] are often distinct from those of national governments in respective countries. Such tasks are local territory planning for wind and solar power generation, energy efficiency of municipal and private buildings and district heating systems, energy communities, green local public transport, zero-emission zones and cities, and the administration of the social consequences, including Social Climate Fund issues. The extent and nature of these tasks allow for a certain level of decentralization.

Tasks that are identified as the responsibility of EU member states in their NECPs should be subject to consultation with subnational governments, including LGs. The impact of GD actions is not uniform across different territories and economic sectors, highlighting the need for an appropriate platform for discussing the content of national promises and policies.

A national platform that enables balanced discussion among stakeholders representing different short-term, medium-term, and long-term interests is essential. This platform would facilitate the sharing of efforts among countries, sub-regions, and LGs. However, the availability of comprehensive data, following the approach outlined in Table 4, is currently lacking. Existing data mainly consist of the future intentions of G20 countries for the coming decades [11]. This highlights the fact that the Paris Agreement does not ensure that the majority of G20 countries, which are major GHG emitters, are fully prepared to meet internationally agreed targets.

Consultation and discussions alone are insufficient to ensure the active and proactive engagement of LGs. Given the significant intermediary role played by local authorities, their participation in the co-decision process is warranted. The responsibility for the socioeconomic impact is shared, and decision-making should be shared as well. This will lead to more balanced actions, as relying solely on UN and EU decisions does not guarantee that "nobody will be left behind." The specific form of co-decision-making may vary depending on the traditions and legal systems of the EU member states, but it is strongly recommended.

Similar considerations apply to the sharing of efforts and other EU legislations. Currently, representatives of LGs are included in consultative bodies such as the Committee of the Regions [55] and the Council of European Municipalities and Regions (CEMR) [56]. While consultations are important (although the opinions of the Committee of the Regions are included in the preambles of "fit for 55" documents), there is a need for elements of future co-decision-making to be established.

4. Discussion

In order to achieve the established goals and fulfill the related tasks, the authors conducted an analysis of the existing global and EU normative environments. The examination of the institutional framework led the authors to be optimistic about the general adequacy of the proposed instruments and the real solidarity among countries and regions regarding the implementation of the GD. Nevertheless, shortages and problems have been recognized.

While the authors hold the opinion that the overall sustainability perspective of the GD is unclear, this viewpoint is currently shared by the minority. Optimism and belief in progress are more prevalent among researchers [11,14,15,46], etc. This study aimed to identify additional resources that can expedite the necessary achievements.

One key resource identified was the active involvement of LGs in the process to serve as models and mediators. The proactive engagement of LGs can alleviate the social and economic burdens of green initiatives on citizens and entrepreneurs. By testing compliance with sustainability and solidarity principles, gaps in global and national climate and energy policies can be identified, and proactive LGs can work towards closing these gaps. This leads to the conclusion that global and national resources are insufficient, and it also presents proposals on how LGs can mobilize the efforts of private-sector stakeholders.

Testing the proposed climate/energy actions for compliance with the four principles of multilevel governance can help to achieve a more balanced policy. The obtained results confirm the significant scientific novelty achieved in the field of management science and governance of climate policy implementation as well as the development of new knowledge and innovative methods for policy analysis.

The aim of the study was to stimulate a broad discussion among experts and politicians regarding the regulatory and management tools required to achieve the set goals of the GD while balancing them with the permissible economic and social burdens on citizens and entrepreneurs, thereby maintaining Europe's global competitiveness. Further discussions will revolve around the competition among climate policy stakeholders with different interests during the implementation of the European Commission's proposed activities. Several topics (but not limited to) are proposed for discussion experts and politicians:

1. Discussion about the optimal alignment of GD activities within the overall scope of LG functions. LG responsibilities are determined by national regulations, as shown in Table 2; GD activities are increasingly guided by EU-wide legally binding regulations. Figure 3 illustrates the authors' analysis of the current potential alignment. In further discussions, all parties involved should participate to find the best approach and clarify the normative environment.
2. Discussion about the proposed methodology for the GD, as outlined in Section 2. This methodology is based on an integrated analysis of governance compliance issues related to the four principles (sustainability, proportionality, subsidiarity, and solidarity) for complex global problems that require the involvement of all actors in multilevel governance (global, EU, national, regional, local, and private). This discussion would aim to evaluate the involvement of lower-level authorities and stakeholders in the achievement of global goals, including other UN Sustainable Development Goals.
3. Discussion about increasing LGs' involvement in the decision-making process at higher levels. LGs are central stakeholders in the power structure. The upper levels consist of EU settings that are binding for member states or national governments, aligning with European and global interests. LGs have a legal role in implementing these interests. The lower levels consist of local residents and businesses with interests in sustainable development, reasonable energy prices, and social issues. LGs, as in the narrow middle part of a sandglass, must connect both levels and balance benefits as much as possible. In order to effectively perform this function, LGs' involvement in decision-making at higher levels is highly desirable.

The main limitation of this research lies in the testing of the adequacy of UN and EU recommendations regarding LGs' involvement in the execution of global policies. The issues related to LGs' interactions with the private sector were only briefly mentioned and require further research. For instance, LGs will face the dilemma of choosing between centralized energy supplies and supporting local initiatives to establish self-sufficient communities. This decision encompasses various energy-related economic and social considerations that should be prioritized.

5. Conclusions

The requirements of the global, EU, national, and municipal level normative acts, as well as the competencies, management features, and tasks of government institutions and LGs related to climate/energy issues, have been analyzed. Regarding the conclusion

about the role of LGs, namely in terms of energy aspects, the authors developed this after grouping the scope of tools proposed by EU and UN policymakers and legislators. For the transition to green energy, measures such as increasing prices and strengthening administrative rules are natural tasks of global and EU governments. The facilitation of green energy demand and production, as well as zero-energy housing (including energy efficiency), could be better achieved by LGs.

The main conclusions about the roles of LGs are as follows:

1. In general, the current functionality of an LG and its potential competences (Figure 3) complies with the principles of sustainability, solidarity, proportionality, and subsidiarity.
2. The autonomous role of LGs in dealing with their own financial and property resources is mainly connected with the transformation to green buildings and green transport infrastructure. This role may be widened by the management of local industry related to power generation for district heating and electricity.
3. The autonomous role of LGs in the administration of spatial planning and land use is mainly to facilitate the expanding production of solar and wind energy sources as well as to facilitate the introduction of cheap green energy-saving technologies.
4. The role of LGs as mediators and facilitators is mainly to spread knowledge about the GD and to provide advice and stimulate green decisions by the private sector. Facilitation includes direct participation in the activities of local energy communities.
5. The role of LGs as consultants of national and EU authorities has to be spread.
6. The role of LGs as co-legislators at the national and EU levels has to be discussed in detail.

In general, it should be noted that local and regional authorities are involved in consultation and cooperation. Nevertheless, taking into account the huge intermediate role of local authorities, it is clear that the participation of LGs in the co-decision process is also reasonable and necessary. It will lead to more balanced actions. UN and EU decisions alone do not ensure that "nobody will leave behind".

6. Recommendations

EU member states should prioritize the development of an institutional and normative platform that facilitates coordination, consultation, and co-decision-making with local and regional authorities (LGs) and private-sector stakeholders for the planning, implementation, measurement, and evaluation of Green Deal initiatives. This platform will ensure effective collaboration and alignment of efforts towards the achievement of the goals of the Green Deal.

LGs should enhance their support to private-sector stakeholders by providing guidance and advice on energy efficiency measures and making informed economic decisions related to green energy and green products. LGs can play a crucial role in the promotion of sustainable practices and can facilitate the transition to a greener economy by actively engaging with and assisting private-sector actors.

It is recommended that the proposed methodology of complex testing, which encompasses the four principles of multilevel governance, should be applied to address complex global problems that require the involvement of all actors in multilevel governance. This approach can also be extended, e.g., to tackle other UN Sustainable Development Goals, promoting a holistic and integrated approach to sustainable development.

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