MULTILEVEL GOVERNANCE OR SCALAR CLASHES: FINDING THE RIGHT SCALE FOR EU ENERGY POLICY

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ABSTRACT

The European energy policy is based on two major pillars: integration (of infrastructure networks, markets, standards, and policies) and transition, as set out by European climate policies and by the upcoming Green Deal. The governance model for this common EU policy and the shared energy system it supports is mostly based on multilevel governance (MLG) theories, grounded in the principle of subsidiarity. This paper questions the possibility of MLG in the field of energy, in compliance with the European subsidiarity principle. The coexistence of diverse energy models promoting different scales of reference and actors may result in 'scalar clashes': this hybrid model creates a chaotic *status quo*, disrupting the EU's transition towards renewable energy sources. Building a common European energy policy that combines the dual objectives of transition and integration does not just require upscaling energy systems, but also setting the adequate scale(s) to implement this transition.

Key words: energy transition; energy integration; European Union; multilevel governance; subsidiarity

INTRODUCTION

The current European energy policy is based on two major pillars: integration and transition. On the one hand, the integration of energy markets, networked infrastructures, norms and policies at a European level initiated in the 1990s has so far culminated in the project of an 'Energy Union', adopted by the European Commission in 2015 with the aim of 'fundamentally transforming' the European energy system and of 'speaking with one voice' in global affairs.[1] On the other hand, the rise of climate change awareness in the 2000s has led the European Union (EU) to progressively integrate environmental concerns into energy policies. The target was set of achieving 'climate neutrality' by 2050 and a strategy was designed to reach this target: the European Green Deal,[2] for which legislation is being drafted at the time of writing. If energy is not the sole concern of this Green Deal, it ranks among its main preoccupations as one of the main sources of greenhouse gases (GHG) emissions.

While pursuing these two targets – the Energy Union and the energy transition included in the Green Deal – the European Commission, the European Parliament and the European Council implicitly postulate that they are compatible. This paper aims to investigate this assumption, through a geographic approach to the governance of the Energy Union and energy transition policies.

The energy sector in the EU is characterized by a multiplicity of actors operating at

different scales. These actors do not necessarily consider the EU as the optimal scale of reference for their activities, and they contribute to the construction of different potential regimes of energy provision. We will explore these different models for the European energy system and question the scales of reference they promote. We thus show that for the time being, these different energy systems are somehow coexisting, contributing to create a hybrid energy system that challenges the Energy Union's governance model.

The first part of this paper focuses on the construction of the Energy Union and on Green Deal policies, explaining how these policies are linked to long-term strategies around a common energy policy for the EU. It demonstrates how the combination of these two objectives has resulted in the construction of a European energy system that mostly relies on a European level of governance, which is increasingly being questioned by actors at other levels. The second part explores alternative energy models operating at different levels (supra-national, infra-European, regional, and local), and shows how these compete technically and politically with the European model. The third part questions the compatibility of these competing models for European energy governance, in the context of a common energy policy that aims to achieve both EU-wide energy integration and the energy transition. Considering the competition between actors and models within the framework of the European principle of subsidiarity, we postulate the existence of 'scalar clashes' that threaten the very existence of multilevel governance for European energy systems.

RESEARCH DESIGN, METHODOLOGY AND SOURCES

The methodology is based on a scalar approach of European governance and energy system design. The issue is approached through the literature on European integration, European governance, and the social and political construction of scale. We then set out to define the different existing projects for energy integrated systems within the EU, and to map the positions of the actors that support each model over the other existing ones. Our aim was to: (i) understand the discourses and processes of legitimation at stake; (ii) analyse rivalries between competing actors and projects; (iii) understand the compatibilities and incompatibilities between these diverse dynamics and projects at different scales.

This approach from the perspective of the actors' positioning is based on a qualitative analysis relying on:

- Institutional literature from EU actors (European Commission, European Council, European Parliament); European legislation; communications and official discourses from other actors such as the European Committee of Regions, the European Covenant of Mayors, multilateral organizations involving EU Member States (Pentalateral Forum, Visegrád Group, etc.), the European Network of Transmission System Operators for Gas and Electricity, and specific industrial actors or network operators at a national level in France and the UK.
- A six-month field study led through participatory observation within the European Network for Transmission System Operators of Electricity in 2014. This body is an association appointed by the European Commission to build the European power system and propose associated regulations. One of the authors joined the team drafting the Ten-Year Network Development Plan and participated in the team's work, which was the opportunity to interact with most of the actors taking part in the construction of the European energy system (European and national regulators, system operators, European Commission and Parliament staff, third parties such as NGOs acting at different levels, from local to European). This also allowed us to gain access to internal documents and ongoing projects (drafting of regulations for gas and electricity networks and markets).
- A three-month field study led through participatory observation in 2020–2021 within the European Committee of Regions (CoR), as an expert collaborating with the rapporteur on the drafting of the CoR's opinion on the European Commission's communication *Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit*

of our people.[3] Interviews were conducted with several local and regional EU representatives.

- Finally, interviews with additional actors took place between 2013 and 2017 (European Joint Research Center – IET, Petten; French utility company ENGIE; Coreso, a regional initiative for the reinforcement of the secure operation of power networks).

The analysis and findings mostly concern European power and gas systems and models. Other types of fuels and energy (e.g., for transportation) follow different dynamics.

THE EUROPEAN ENERGY POLICY AND THE CONSTRUCTION OF A EUROPEAN SCALE OF REFERENCE: COMBINING INTEGRATION WITH TRANSITION OBJECTIVES

This section analyses the construction of the Energy Union and Green Deal policies. It explains how the attempt to combine these two objectives resulted in the creation of a European energy system that mostly relies on a European level of governance.

The European energy integration policy, from the European Community of Coal and Steel to the Energy Union: building regional integration – Energy has been at the heart of the 'integrative mechanism' that characterizes the construction of a common territoriality in Europe (Mamadouh 2001). The Economic Community of Coal and Steel (1951) and the Euratom Treaty (1957) laid the foundations of a regional integration process that really started to take shape in the 1990s, with the first regulations aimed at integrating gas and electricity networks and markets (1996 and 1998).

Several theories of regional integration have been developed since the 1950s, in particular regarding European construction (Rosamond 2000; Saurugger 2014). Neofunctionalism focuses on institutions and on the reorientation of political allegiances (Haas 1958), while the intergovernmental approach emphasizes the rationality of states and the bargaining between them (Hoffmann 1990; Moravcik 1993). New regionalism considers regional integration as the process whereby a portion of space is gradually filled by several actors with enough economic, institutional, political, cultural, substance and identity, to become a separate system in its own right and ultimately be perceived as such (Hettne & Söderbaum 1998). In contrast, the federalist theory of European integration stresses the coexistence of an autonomous and shared governance, and focuses on the complex policy-making process in the EU (Benson & Jordan).

The process of regional integration in the EU has made some headway in the energy sector (Palle 2016): this is apparent in the growth of the energy trade and of exchanges between Member States since the 1950s. Secondly, integration dynamics also affect network infrastructure (power and gas grids) along with the markets it serves. Lastly, European energy integration is a political process built on common regulations and norms drafted between Member States.

European policy has supported these various layers of commercial, infrastructural, market, normative and political integration. The three 'energy packages' of 1996–1998, 2003 and 2009 aimed to liberalize and integrate the energy markets and networks. They did so through (i) the unbundling of network ownership and network management from energy production and distribution; (ii) the creation of independent national regulators; and (iii) the creation of institutional cooperation at a European level between on the one hand national transmission network operators of gas and electricity (European Network for Transmission System Operators of Gas and Electricity), and on the other hand national regulators (Agency for the Cooperation of Energy Regulators). Together, these three packages paved the way for the launch of the 'Energy Union' initiative and strategy in 2015, which aimed to achieve 'a fully integrated internal energy market – enabling the free flow of energy through the EU through adequate infrastructure and without technical or regulatory barriers'.[4]

Until 2009 and the Lisbon Treaty, the EU lacked the legal competence to design a common energy policy, and energy integration was delivered under the umbrella of environmental policy or internal market integration (Petit 2006). Article 194 of the Lisbon Treaty

provided the EU with the shared competence needed for the development of a common energy policy, within the rules of subsidiarity and provided that 'such measures shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply'.

The integration objective has thus played a major part in the construction of a European energy policy. This process progressively targeted (if not fulfilled) all the criteria set by the various theories of regional integration, including institutional cooperation (Haas 1958), intergovernmental cooperation (Hoffmann 1990; Moravcik 1993), economic trade and cultural identity (Hettne & Söderbaum 1998) or shared governance (Benson & Jordan). In the case of energy, this integration process is affecting all aspects of the energy sector (Palle 2016): the infrastructure level that encompasses production units and transport networks; the market level which is dependent on the spatial configuration of the network; the policy level which concerns individual Member States as well as interactions between Member States (intergovernmental cooperation) and interactions between Member States and the EU; and the cultural or representational level, which encompasses the perceptions EU citizens have of the energy sector, of energy policy and of actors' legitimacy in designing and enforcing this policy.

Integrating climate change awareness into energy policy: the European energy transition – Climate change objectives and energy transition targets were integrated into the European energy policy at a later stage, following the rise of climate and environmental awareness in the 2000s. The concept of energy transition is understood by the EU as a transition towards low carbon-emitting energy sources (Bridge *et al.* 2013; Duruisseau 2014; Hansen & Coenen 2015). It is addressed through the EU's climate objectives, aiming for carbon neutrality by 2050. In this sense the energy transition is part of a wider dynamic of transition towards sustainability (Hansen & Coenen 2015) that encompasses most aspects of European societies (Köhler *et al.* 2019).

In the environmental field *per se*, the Treaty of Maastricht (1993) already made the environment an official EU policy area, paving the way for EU regulations on renewable energies[5] or on the integration of energy issues into environmental action programs.[6] In the field of energy, the third energy package (2009) introduced after the 2008 crisis proposed a green growth recovery plan through the development of renewable energies and low-carbon technologies. The 2016 'Winter Package' on the design of the EU's energy market contained measures designed to adapt the design of the European power markets to progressively integrate renewable sources, which brought up issues attached to intermittent and decentralized production (Hache & Palle 2019). With this package, the focus is placed both on the 'completion' of the integration of the energy markets and on climate objectives. The EU thus integrated its climate change mitigation objectives into its common energy policy though energy transition and energy efficiency targets, while ensuring the compatibility, at least from a technical point of view, between the production of renewables and market integration. The introduction of climate and integration objectives into the EU's energy policy continued with the Green Deal, launched by the European Commission in 2019, followed by the stepping up of the EU's climate ambitions by 2030 as requested by the European Council (55% reduction of emissions compared with 1990 levels) in order to reach the target of 'carbon neutrality' by 2050. This initiative is supported by a package of measures that are being drafted by the Commission at the time of writing, under the label 'Fit for 55'. In the Annex to the Communication of the European Commission on the European Green Deal presenting the roadmap for key actions, thirteen targeted actions directly address energy production and use.[7]

Postulating the congruent nature of energy integration and energy transition targets: the legitimization of a European scale of reference for the EU energy system – Initially driven mostly by market integration objectives, the European energy policy progressively

integrated environment and climate concerns. These concerns have gained importance over the past twenty years and are now at the heart of European strategies and goals for the 21st century, both from an internal point of view and on the international stage where the EU is aiming for climate leadership. This progressive integration of energy and climate policies since the Lisbon treaty (Eyl-Mazzega & Mathieu 2020) has led the EU to hold for self-evident the fact that the dual objectives of regional energy integration (at a market, infrastructure, normative and political level) and energy transition are *per se* compatible and congruent. In this sense, transition comes as a leverage for legitimizing integration. It is regarded as contributing to 'territorial cohesion' in the field of energy, which implies a dual and compatible aim of cohesion and efficiency (Evers 2008), and which has become increasingly important in the European policy discourse.

When comparing these measures with other previous emblematic European policies, the question of whether it was optimal or legitimate or not to enforce them from the start at an EU level has been raised. The common Euro currency is the result of a long and prolix theoretical debate on optimal currency areas that started in the 1960s (Mundell 1961, 1969; McKinnon 2000), while the design of the Schengen free movement area and its recent crisis have resulted in heated debates over states' sovereignty (Börzel & Risse 2018). In the energy sector, however, integration has been regarded as a fully EU-wide process, from the first energy package through to today's Green Deal.

This construction of an EU-wide scale of reference for the energy transition in European energy policy raises both political and analytical questions. First, from a political point of view, how is the governance of this transition in the European energy system built in line with the European principle of subsidiarity? Second, from an analytical point of view, how is this governance model and the construction of this European scale of reference for the energy transition policy accepted by the different actors of the European energy system?

FROM SCALE BUILDING TO THE DESIGN OF A GOVERNANCE MODEL FOR THE EU ENERGY POLICY: THE PERSPECTIVES OF RESEARCHERS AND ACTORS

Scale building as a political strategy – Since the 1990s, geographical research has shown that spatial scales are social and political constructs (Staeheli 1994; Swyngedouw 1997). This amounts to taking the opposite view to the conventional conception that perfectly nested scales are arranged in a hierarchical vertical order, ranging from micro to macro (i.e., from the local to the global scale). Classical geographical analyses and policymaking tend to naturalize geographical scales. As a result, these scales are implicitly presented as *a priori* data – such as containers, frames or attributes – that are already spatially defined once and for all and provide a convenient framework for analysing social facts.

Research highlights the limitations of this classic, essentialist and hierarchical conception. Drawing from the work of Henri Lefebvre on the production of space (Lefebvre 1991), and attentive to phenomena such as the redefinition of the role of the State in the context of globalization (Agnew 1994), studies show that spatial scales are not fixed but necessarily dynamic social constructions (Smith 1984; Agnew 1993; Howitt 1993). Scale is less an inert support for the deployment of social practices than a reality produced, possibly reproduced (Marston 2000) and contingent on these practices (Smith 1992; Delaney & Leitner 1997; Swyngedouw 1997, 2010). It is therefore important to determine the actors who build spatial scales and identify the logic that governs their actions. Based on these premises, Sallie Marston considers that showing how geographic scales are constructed and transformed in relation to socio-spatial developments is precisely at the very heart of the work of geographers (Marston 2000). In our case, concerning the energy policy, the EU scale is very explicitly constructed by EU institutions, through a discourse that links the objectives of competitiveness, security of supply and sustainability to the pursuit of both transition and integration dynamics. The process is not just about integrating and upscaling existing

energy systems, but about redesigning these energy systems according to transition objectives while building this new design according to a European scale of reference.

This tendency can be analysed as a political strategy and an instrument of internal power. The construction of the Energy Union, launched in 2015, is based on the growing influence of European institutions (Maltby 2013). By asserting the primacy of integration as a means of implementing the energy transition and by choosing the European scale as its scale of reference, European energy policy legitimizes a transfer of power from Member States to the EU. This corresponds to a neofunctionalist approach (Haas 1958) of regional integration supported by leverage effects.

Subsidiarity and multilevel governance in the energy transition: paving the way for the contestation of the European scale – This transition undergone by European energy systems involves a large variety of actors acting at different scales and levels of administration. As the energy policy is a shared area where the EU does not have exclusive competence, the principle of subsidiarity[8] applies to ensure that power is exercised and policies are enforced 'as closely to the citizen as possible'.[9] However, in official texts, these principles of subsidiarity and proximity only refer to the circumstances in which it is preferable for action to be taken by the Union, rather than the Member States. There is no mention of other possible scales for action besides the EU and national levels. This state of play is currently being challenged by local and regional authorities (LRAs).

In the last few years, the European Committee of the Regions, a consultative body representing European cities, municipalities, and rural territories, has repeatedly asked for the LRAs to be included in climate and energy policy design, invoking the subsidiarity principle[10] and pointing out that 'more than 70 per cent of climate change mitigation and up to 90 per cent of climate change adaptation measures are undertaken by local and regional authorities',[11] considering that energy transition measures are included under the umbrella of climate change mitigation and adaptation measures. A participative observation led by the authors between December 2020 and March 2021 within the European Committee of the Regions has allowed us to conduct interviews with representatives from the European Commission's Directorates-General for Energy (DG ENER), Climate (DG CLIMA) and the Environment (DG ENVE), from the Young European Politicians, from the European Committee of the Regions, and from various networks of local and regional authorities involved in climate initiatives such as the Covenant of Mayors, ICLEI, Fedarene and the Climate Action Network. The opposition between discourses appeared very clearly: on the one hand, representatives of the different DGs of the European Commission understood the subsidiarity principle as a dialogue between the EU institutions and the Member States only; on the other hand, all the other actors with interests at a local and regional level asked for an extension of this subsidiarity principle to the local and regional levels, along with specific demands such as the recognition of locally and regionally determined contributions (to carbon emission reductions) in national and European plans, as well as administrative and financial freedom for LRAs to choose their technological and policy path to decarbonization and to innovate and experiment at a local level. All these local and regional actors mentioned the need for real 'multi-level governance' in energy and climate policymaking, as opposed to the subsidiarity principle whose scope is limited to Member States and EU institutions.

A wide field of research on multilevel governance (MLG) echoes this call for a better integration of LRAs into climate-related policymaking and policy enforcement (Stephenson 2013), especially focused on urban issues (Betsill & Bulkeley 2006; Emelianoff 2013; Jaglin 2014). It is mostly advocated that multilevel governance as a theory and a normative praxis, along with subsidiarity as a political principle, have favoured the European Union's integration process (Pazos-Vidal 2019). Literature suggests that by bringing actors to work with each other in a non-hierarchical way, MLG is expected to smooth over conflict by accommodating diversity (Hooghe & Marks 2003), with actors on all levels working together in more or less formal and fluid networks (Mamadouh

& van der Wusten 2008, 2009; Jessop 2013). However, literature on MLG also suggests that in many cases concerning energy and climate policies, networks of actors at local and regional levels have been more keen and more efficient than states in adopting energy transition measures, taken within a more global approach to climate change mitigation and adaptation (Betsill & Rabe 2009).

Sections "The European Energy Policy and the Construction of a European Scale of Reference: Combining Integration With Transition Objectives" and "From Scale Building to the Design of a Governance Model for the EU Energy Policy: The Perspectives of Researchers and Actors" have shown how the dual objectives of regional integration and transition towards low carbon-emitting energy sources have been integrated into the European energy policy and are considered as fully compatible, making transition a political leverage for integration. This explains why, when targeting the transition of European energy systems, European institutions only consider a European scale of reference without questioning or considering any alternative options (macro-regional scale, infra-European groups of states, full decentralization of the energy production, etc.). However, other actors are promoting other scales of action for the energy transition, arguing that there are discrepancies between on the one hand the subsidiarity principle, which is only relevant to the national and European levels, and on the other hand the practice of multi-level governance, which facilitates links between local and regional actors while leaving them out of effective policymaking. The following section explores existing alternatives to the European model for a transitioning energy system.

COEXISTING AND COMPETING MODELS? ALTERNATIVES TO THE EUROPEAN SCALE OF REFERENCE FOR A COMMON ENERGY POLICY

Presentation of empirical materials – This section is based on an empirical study of the different possible models for the European energy system, supported by the different actors of the European energy sector. This study draws from two main types of sources, as described in Section "Research Design, Methodology and Sources". First an analysis of the institutional literature produced by the different actors of the European energy sector, and secondly a six-month participative observation in the drafting team of the Ten-Year Network Development Plan of the European Network for Transmission System Operators for Electricity (ENTSO-E). The ENTSO-E and its counterpart the ENTSO-G (for gas) have been created as associations for national transmission system operators (TSOs), with the aim of integrating gas and electricity transport networks in the EU. They have also been tasked with drafting common 'Network Codes' under the supervision of the European energy regulator (ACER).[12] These sets of rules encompass technical requirements to connect to the EU power grid and gas systems, but also market rules and emergency guidelines. As such, they address network and market integration, but also the security of supply, common assistance, and solidarity. Most of the actors of the European energy system thus interact with the ENTSO-E and ENTSO-G (which share the same building in Brussels), and it has been possible to observe their relations and positioning regarding the EU scale for the European energy system. These observations have then been discussed with the Joint Research Center's Institute for Energy and Transport during a one-day visit to the team (21/07/2013) – whom the authors thank for their insightful comments, while taking full responsibility for the analysis proposed below.

The models presented below have been analysed from the perspective of electricity for two main reasons: first because the power sector has up until now been much more impacted and changed by the integration of renewable sources than the gas sector; secondly because the immediate nature of electricity exchanges compared to gas makes the choice of the scale at which the system is designed more critical than it is for the gas system. The focus of this section is therefore on electricity, while gas-related dynamics are described as a comparison.

Scaling up the initial national model: what an EU-scale energy system would look like under the current dynamics – The dynamics of European energy integration observed since the 1990s have developed from an initial national model (Lagendjik 2008) in which infrastructure, operation, standards, markets, and energy policies were designed by states. Relations (exchanges, regulatory arrangements, or political consultations) existed between neighbouring countries, but they were considered mainly on a bilateral basis and as means of relief or local optimization of the production of energy. Figure 1 shows a schematic view of this initial national model before European energy integration. It is based on the history of power networks in Europe (Hugues 1993; Barrère; Bouneau, 2004, 2010; Lagendijk 2008).

The integrated European model, promoted by EU institutions, is derived from this national model which was then scaled up. Ultimately, it aims to put in place:

- a homogeneous space organized according to a network of integrated infrastructure, which the European network operators are responsible for setting up (EU regulations 714/2009, and 715/2009) – this applies to both gas and electricity;
- a common normative architecture, allowing for the functioning of a single market and possibly for a single European energy price (EU regulations 714/2009; 715/2009; 2009/72/CE and 2009/73/CE) this concerns both gas and electricity;
- a common market based on the gradual coupling of the European energy markets supported by the European Commission, whose main targets are day-ahead markets but intra-day is also considered (Meeus *et al.* 2009; Füss, Mahringer & Prokopczuk 2017);
- a common energy policy based on the Lisbon Treaty and on the action of the Commission, the Parliament, and the Council, as developed in Section "The European Energy Policy and the Construction of a European Scale of Reference: Combining Integration With Transition Objectives". It is built on an increasingly concerted energy mix (renewables production targets, debates on the European position concerning the exploitation of shale gas and oil, or the conditions of use of civilian nuclear power).

This fully integrated model is presented schematically in the Figure 2. It is an absolute and a theoretical case, which forms the logical outcome of the current dynamics of integration supported by European institutions.

This model is currently predominant, but it is being explicitly or implicitly challenged by various actors who are operating within and promoting different scales of reference. They do so for various political, technical, or financial reasons.

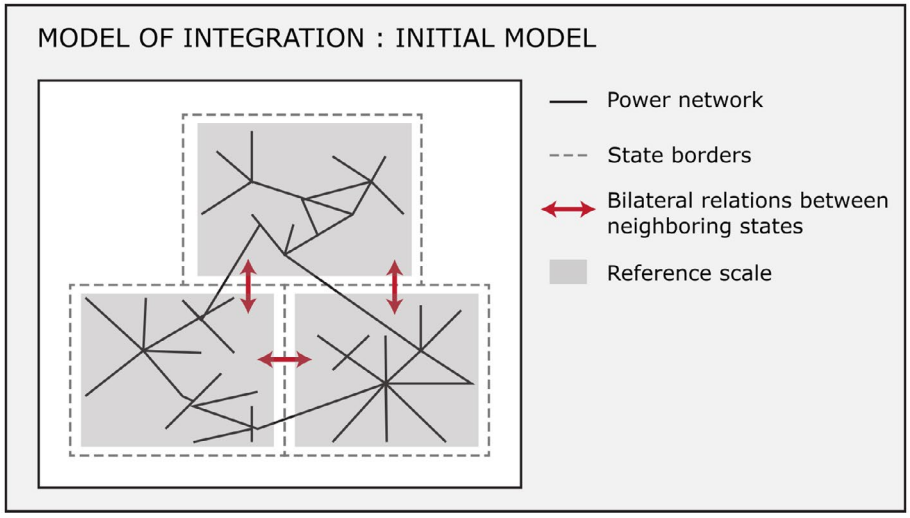

Figure 1. *Model of integration: initial Model.*

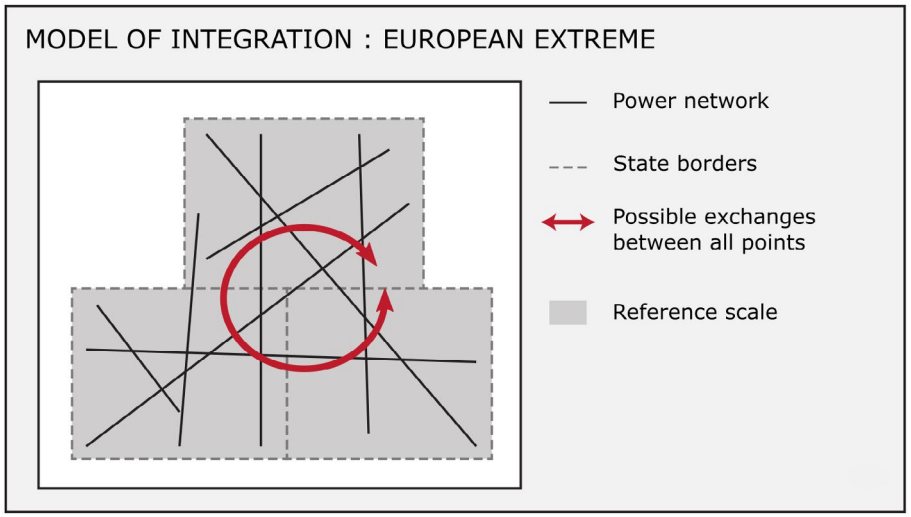

Figure 2. *Model of integration: European extreme.*

The local extreme: a utopian dream of total decentralization? – At the other end of the spectrum of possible scales of reference for a European energy model stands a model based on the predominance of the local scale. Production and consumption are fully decentralized, leading to a multiplicity of small interconnected and interdependent local energy systems. This model is promoted by local actors (associations, some local and regional authorities[13]) and by some environmental NGOs. Greenpeace, for example, advocates for a reduction of the network and for the decentralization of part of the production (Teske 2014). These actors share a common position: they do not wish to associate the energy transition with capitalistic liberalization and with the development of heavy infrastructure, and they call for a local transition that takes grassroots initiatives into account (Blanchet 2015; van der Schoor & Scholtens 2015).

These actors stand for a transition based on local dynamics and decentralized production.

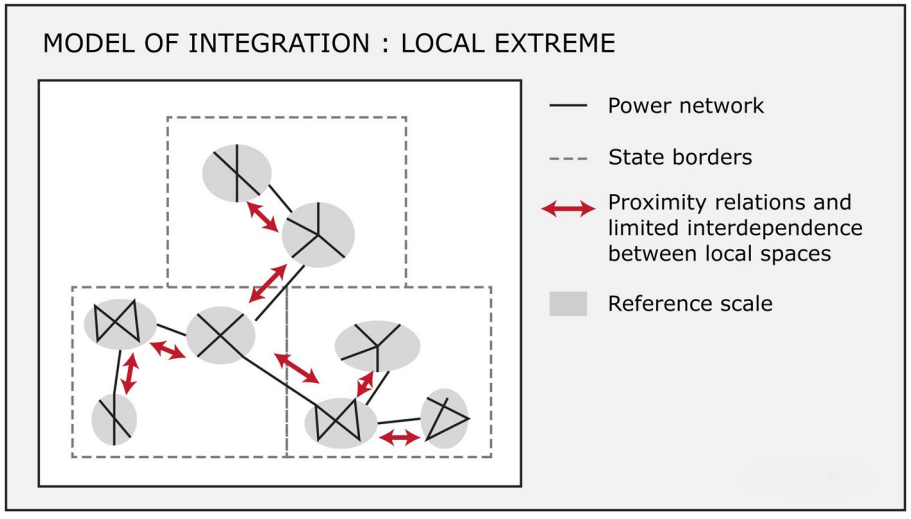

Figure 3. *Model of integration: local extreme.*

The increasing use of renewable energies is also reflected in the growing importance of the local dimension, particularly for individuals who become producers of all or part of the energy they consume. This dynamic facilitates the emergence of 'off-grid' spaces (Coutard & Rutherford 2015), that are independent from collective infrastructure. This is a paradigm shift from the dominant EU model which currently seeks to avoid electrical 'peninsulas' or 'islands' (Figure 3).

These local dynamics were at first regarded as a marginal alternative by traditional energy players (regulators, grid operators, electricity generators, etc.), who do not envisage a 'post-network' model in Europe for the next 30 years. 'This model is being discussed very seriously in the German parliament for example, but it is politically utopian and very expensive: it does not allow for any economies of scale.' (JRC-IET interview, 21/07/2013).

Despite the increasing momentum of these local dynamics, states and the EU do not seem ready to give up control over a centralized network that remains a strategic economic resource. Yet the major European energy industry players are aware of these evolutions and of the proliferation of local energy sources, which goes along with demands for a local governance of these systems. Gérard Mestrallet, then CEO of the ENGIE group, wrote: 'The old world is the world of centralized energy, based primarily on coal and gas, with some nuclear plants. The new world is a world in which the energy structure is decentralized, decarbonized, digitized, and that changes everything. […] We have changed scale' (Mestrallet 2015, p. 9).

The macro-regional alternative: supra-national integration below the European scale – A second dynamic questions the implementation of an energy integration and transition policy at a European scale. It operates on a macro-regional but sub-European scale, bringing together clusters of neighbouring states to form potential 'European sub-regions'. This dynamic touches on many of the domains of the multi-layered cake that is the European energy sector. It includes overlapping actors and initiatives concerning infrastructure, technical standards, regulation, and market structure respectively, but also public policies at the local, national and European scales (Palle 2014).

Concerning infrastructure, macro-regional European divisions are paradoxically designed by institutions and actors who work on a European scale. They can be found in electricity and gas infrastructure development plans, and in the selection of projects of common interest supported by the Commission (Palle 2013). With regards to the standards in place, the Regional Initiatives for Gas and Electricity created in 2006 created another segmentation of the European area. Designed to be the first building blocks of an integrated European market, the 'regions' bring together regulators, the industry and neighbouring Member States, as well as the European Commission and other stakeholders, with the aim of experimenting and developing solutions to improve energy markets. The scale of reference for these initiatives is ambiguous in that they were initially designed on a regional scale, to eventually serve the construction of a European scale.

Target models for the future internal energy market envisage partitioning the market into 'zones' or areas (i.e., entry/exit zones or balancing zones for gas, and separate zones or bidding zones for the power market) according to trade possibilities and to the existing congestion of transmission networks. The geographical boundaries of these areas and their definition criteria are debated (Hunt 2008; Hewicker & Kesting 2009; Bems *et al.*). They come to form another regional division, which can evolve over time, depending on market conditions.

Finally, at the political level, bottom-up initiatives from groups of Member States have led to the establishment of regional policy dialogue forums (de Jong & Egenhofer 2014). Initiatives include the Višegrad Group (Poland, Czech Republic, Slovakia and Hungary), which focuses on infrastructure and security of supply with the political aim of limiting Russian influence in the region (Matúš & Oravcová 2018); the Pentalateral Energy Forum (France, Germany, Belgium, Luxembourg, the Netherlands and Austria, with Switzerland acting as observer), a cooperation arena mainly addressing practical and technical matters and used to settle complex policy issues (Handke 2018); The

Nordic Council (Denmark, Finland, Iceland, Norway, Sweden, Faroe Islands, Greenland and Åland) whose specific focus in terms of energy is renewable policies and market integration. These bodies are all similarly designed to facilitate cooperation, common positions, and common actions in the energy field at a regional level (Figure 4).

As we have seen, three models can be identified in the EU for the reconfiguration of energy systems in the context of the energy transition policy: at a local scale, at a supra-national but sub-EU scale, and at an EU scale. The following section questions the potential for coexistence or competition between these dynamics.

SCALAR CLASHES OR MULTILEVEL GOVERNANCE? HOW TO DEAL WITH A MULTISCALAR ENERGY SYSTEM

A hybrid energy system composed of multiscalar architectures – The current energy transition, along with the changes and challenges it is implying for the energy sector in the EU, raises an issue of scale. Along with the EU institutions' strategy for an energy integration that uses transition as a leverage, other dynamics of integration between Member States are operating at a supra-national but infra-EU level. Local dynamics of decentralization of the production and management of energy are also emerging, along with demands for the decentralization of energy governance. The combination of these three dynamics, along with the enduring legacy of the national scale of reference for energy systems that prevailed before the emergence of the EU policy, have given birth to a hybrid energy system in which none of the models presented above entirely prevails over the others.[14] This section describes the components of this multiscalar system from a network perspective, as the basis for market exchanges, before analysing its implications in terms of governance.

From a network point of view, the electricity grid is becoming more and more integrated at an EU level, with a current target for each state to reach a capacity of physical exchange with its neighbours that must account for at least 15 per cent of its national production.[15] Network management and transmission system operators (TSOs) remain national entities that only control the national grid. Macro-regional entities called regional security coordinators (such as Coreso or TSC[16]) watch over several national networks, to oversee the cooperation between them and test what impacts an action taken by one TSO at a national level might have on interconnected neighbouring networks. Meanwhile, at a local level, some groups of citizens, municipalities or other types of consumers are either producing their own decentralized energy or asking for independence and disconnection from the transport network,

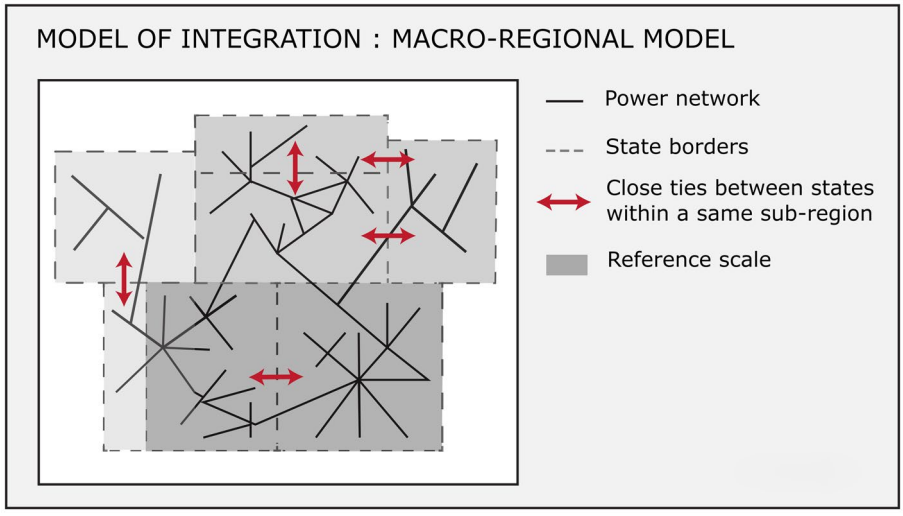

Figure 4. *Model of integration: macro-regional model.*

which increases the complexity of network management for the national TSO (Figure 5).

The coexistence of this plurality of actors, with each managing only a portion of the network while having an impact on the others, raises governance issues for a system that is simultaneously integrating at an EU level and disintegrating at a local level, while being managed at a national level. The next section analyses the challenges posed by this multiscalar system in terms of governance. How can efficient governance mechanisms be designed in such a system? And what is the most appropriate level for taking action?

Governance challenges in a hybrid system: a clash between incompatible spatial arrangements – The hybridization of the energy models presented above implies multiscalar dynamics that lead to several problems. The first is that the actors, who are faced with multiple and interlocked scales of action and decision, may take actions that are harmful to others in a densely meshed system that demands real-time management. The number of actors associated or wishing to be associated with decision-making is increasing. Inconsistencies can occur. They are a threat for security of supply in the real-time management system that is the electrical system, where some decisions must be taken in a timeframe that does not exceed 15 minutes. They are less harmful in the gas system, which has more inertia and allows room for negotiation and management friction. This section explores the challenges that affect the different levels of integration presented in 3.1 in a hybrid energy system as described in 6.1.

At the infrastructure level, the interconnection of transport networks and the growth of renewables generation (which is intermittent and uncontrollable) are a source of instability for the network (Hache & Palle 2019). This is even more the case when the national TSOs do not have any information on the flows inside the networks of neighbouring countries to which they are connected, and they have to deal with a local and decentralized production that they can neither control nor predict. When the coordination between actors is insufficient, this mismatch between the scale at which the network is interconnected and the scale at which it is managed can lead to a lack of optimization, or to disturbances aggravated by the cascading effects enhanced by interconnection.[17]

At the market level, the problem of free competition between states and the sources they use arises. One emblematic case is the complaint by the Netherlands against Germany over renewable energy tariffs. This happened a context where the production of renewable energy has been partially subsidized by many states, in line with EU objectives regarding the energy transition, but without subsidy mechanisms being harmonized. Germany's support for renewable energies, in line with its accelerated energy transition policy, has thus been perceived as energy dumping by certain neighbours such as the Netherlands, who are large importers of German electricity that they deemed artificially cheap. This led to a complaint to the European Commission over the enforcement of the EU energy policy at a state level (Bitterlich 2013).

At the political level, the choice of the national mix – which is still a state prerogative under the Lisbon treaty (art. 194) – leads to oppositions in an EU-wide interconnected network. For example, Germany's phasing out of nuclear power, lawfully carried out without any consultation with its neighbours, has led to the redesign of electricity flows in Germany. The nuclear power plants located in the southern part of Germany to power the industrial basin have been partially replaced by wind plants in the Northern part of the country, thus generating new North-South flows that the German transport network was not dimensioned to accommodate. Because of the integrated nature of the European power network, these flows have taken the shortest route through the neighbouring Czech and Polish power grids which they destabilized, leading to protests from the two countries who in turn installed phase-shifting transformers along their borders with Germany to regain control over energy flows (Palle 2017).

Lastly, from a cultural perspective, while climate awareness is rising among EU citizens, leading most EU governments to support energy transition policies, the perception that each actor has of what the energy transition actually is and should be

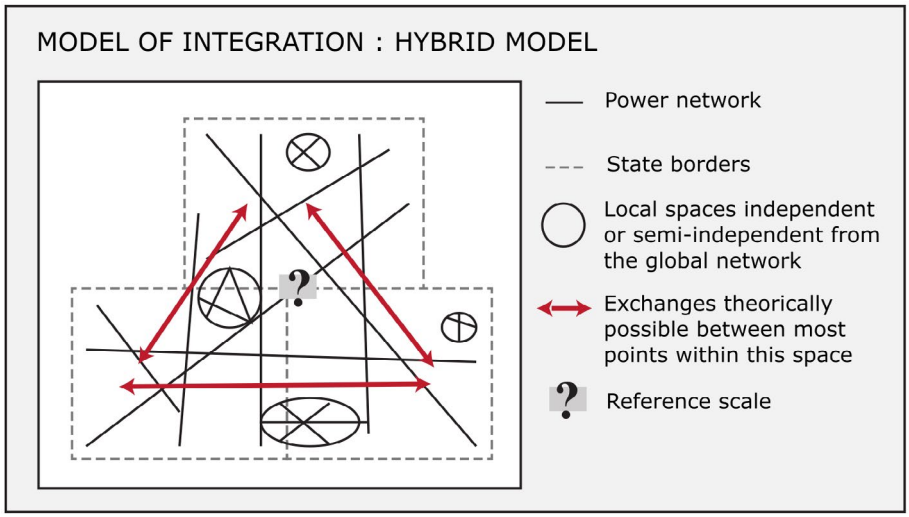

Figure 5. *Model of integration: hybrid model.*

differs and fuels scalar oppositions. If for the European Commission and the European Parliament, energy transition and energy integration are coherent and consubstantial, for many local actors, the energy transition comes with a desire for independence, as well as local energy production and governance (Emelianoff 2013; Blanchet 2015; van der Schoor & Scholtens 2015). These two visions of the transition and the scale at which it should happen, clash over specific territorial projects. For example, on the one hand the EU funds and supports large infrastructure projects, such as new transport lines for the power network to incorporate renewable plants and reinforce the network to face the challenge of production intermittency, while on the other hand these projects are opposed by the local population who consider them exogenous to the territory and incompatible with their vision of a local transition (Cain & Nelson 2013; Oiry 2015; Durand, Oiry & Palle 2018).

At all levels of integration of the hybrid energy system created by the coexistence of European, macro-regional, local, and national dynamics, governance issues arise between actors. This puts into question the possibility for multilevel governance in such a system, while raising an unresolved question: what is the optimal scale for enforcing the European energy transition?

Discussion: from multilevel governance to scalar clashes: building a legitimate and optimal scale for an energy policy – The EU-wide model appears to be strongly supported by the EU institutions for the transition of the European energy system towards renewables. However, when analysing current integration and transition dynamics in the European energy system, it appears that a diversity of architectures and scales for this system are currently developing. Along with the dominant EU-wide model, macro-regional systems (that are supra-national but sub-EU) and local systems are emerging while the former national systems are still very present in the energy sectors' dynamics.

In this context, multilevel governance only has a limited ability to accommodate the diversity of actors and the scales they promote (Hooghe & Marks 2003), and to build governance with actors on all levels working together in more or less formal and fluid networks (Mamadouh & van der Wusten 2008, 2009; Jessop 2013).

• First, because local and regional actors consider that their voice is not sufficiently considered, as shown in 4.2. On the contrary, recent studies show that recent renewable energy policies in the EU have seen stronger involvement and centralization from both the governments and the EU (Ćetković & Buzogány 2016).

Likewise, at the macro-regional level, de Witte (2015) highlights that although the Lisbon treaty has cancelled the provisions that previously invited EU Member States to conclude international conventions among themselves to help advance the EU's integration agenda (former Articles 293 EC and 34(2)(d) EU), recent practice shows that Member States have upheld and expanded their habit of concluding international treaties between themselves – and energy is no exception to this trend.

• Second, because these different actors' visions of what an energy transition is and should be are sometimes incompatible, as shown by the example of opposition movements against power lines (Cain & Nelson 2013; Oiry 2015; Durand, Oiry & Palle 2018). In this case, we have seen that one of the main lines of opposition is the scale at which infrastructures and governance should be designed.

• Third, because of the technical nature of the electricity system, which is taking on an increasingly prominent part with the transition process and the electrification of end-uses (transport, heating etc.). As explained in part 6.1 and 6.2, this system must be managed in real time and requires that some decisions are made within a timeframe of 15 minutes, or sometimes less. This makes multilevel governance involving a wide variety of actors and overlapping competences at many levels very complex, if we are to ensure security of supply.

The self-evident nature of the European scale, which has been taken for granted by the energy integration and transition policy, needs to be questioned, both from a conceptual and a policy-making perspective, to reflect the fact that it is already being challenged in practice. Indeed, the different scales promoted by the actors of the energy sector and the energy transition in the EU are competing more than they are complementary. Inconsistencies or competitive processes lead to a clash when actors promoting different spatial arrangements are confronted with technical, political, management or governance problems, induced by the coexistence of different scales of action. Such issues can also lead to a conflict of scales, when actors compete to gain the same status or the same powers (of decision-making, of technical or market management, etc.), or if they promote a model aimed at excluding or destroying a competing scale (for example, the European model vs the local model).

The EU is currently in the process of building a scale for its transition towards renewable energy sources, in a departure from the EU-wide scale which had so far been considered as self-evident in EU energy policy. The analysis of energy transition dynamics show that various reference scales are proposed for the governance of this evolving system, each of them producing distinct spaces, representations and strategies (Lefèbvre 1991). The competition between these actors and the scales they promote threatens the security of supply by creating inconsistencies and clashes between actors over projects. It thus raises concerns about the legitimacy and the correct functioning of these scalar constructions.

Notes

[1] European Commission, Energy Union Package – *A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, 25 February 2015, COM(2015) 80 final.

[2] European Commission, Communication – *The European Green Deal*, 11 December 2019, COM(2019) 640 final.

[3] European Commission, Communication *Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people*, 17 September 2020 COM(2020) 562 final.

[4] COM/2015/080.

[5] *Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.*

[6] *Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme.*

[7] Annex to the Communication on the European Green Deal, Roadmap - Key actions, COM/2019/640 final.

[8] Article 5(3) of the Treaty on European Union (TEU) and Protocol (No 2) on the application of the principles of subsidiarity and proportionality.

[9] The 'proximity principle' is referred to in Article 10(3) of the TEU.

[10] Opinion of the Committee of the Regions of 17 November 2005 on *The Contribution of Local and Regional Authorities to Combating Climate Change*; Opinion of the Committee of the Regions of 5–7 October 2009 on the White Paper *Adapting To Climate Change: Towards A European Framework For Action*; Opinion of the Committee of the Regions, 8–10 December 2020 on *The Impact of Climate Change on Regions: an Assessment of the European Green Deal*.

[11] Opinion of the Committee of the Regions, 8–10 December 2020 on *The Impact of Climate Change on Regions: an Assessment of the European Green Deal*.

[12] EU Regulation 714/2009.

[13] See the interviews and presentations delivered by local and regional authorities coming from small rural municipalities at the conference '*Énergie et territoires ruraux. Vers des territoires à énergie positive*' ('Energy and Rural Territories. Towards Energy-Positive Territories') in Clamecy, France, October 2019.

[14] The first draft of this model has been created after a one-day visit and discussion with the security of supply team of the Institute for Energy and Transport at the Joint Research Center (JRC-IET) in Petten, whom we warmly thank for their welcome and insights.

[15] Directive on common rules for the internal market for electricity (EU) 2019/944, adopted as part of the *Clean energy for all Europeans* package.

[16] ENTSO-E, Regional Security Coordinators Factsheet, accessible on: https://eepublicdownloads.entsoe.eu/clean-documents/SOC%20documents/RSC%20Factsheet.pdf.

[17] Interview with the Coreso team, June 2014, Coreso, Brussels; interview with several room operators of European TSOs (France, Germany, Italy, Czech Republic) between March and July 2014, ENTSO-E, Brussels.

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