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Towards a general "Europeanization" of EU Member States' energy policies?

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Abstract It is often argued that energy policy is too fragmented across EU Member States and should be "Europeanized" to pave the way towards an efficiently organized European power system, which rest on the internal market for energy and a pan-European super-grid. However, this view neglects i) the factual heterogeneity of European energy policies in terms of harmonization and centralization, ii) economic arguments in favor of decentralization and iii) legal as well as political-economic obstacles against centralization of decision making. In this vain, we point out that a plea for a stronger role of the EU needs to be made with care and differentiation.

Keywords centralization, energy transition, EU climate and energy policy, fiscal federalism, harmonization, political economy

1. Introduction

Europe currently discusses the post-2020 framework for its common climate and energy policy – how "common" the respective policies should be, however, is exactly the point at issue: the European Commission (2014a) has proposed to scrap binding targets for renewable energy sources (RES) on the Member State level, leaving only a common target on EU-level.[1] However, this might be interpreted more as a sign of re-fragmentation than a move towards a more Europeanized RES-policy because the proposal reflects increasing conflicts between more and less ambitious Member States regarding the future course of the EU's climate and energy policy. Parallel to the debates on the European level, individual Member States are pushing their specific energy policies. For instance, Germany is moving ahead – under worldwide scrutiny – with its ambitious energy transition project, the "*Energiewende*"; and

[1] Some call for abolishing RES targets (e.g., Businesseurope 2013, Stavins 2014) but this paper assumes that they are politically given (and probably also economically justified in a second-best setting of multiple externalities but imperfect direct internalization, cf. Gawel et al. 2012) and addresses only the question on which governance level they are (should be) regulated.

the *Energiewende* is particularly criticized for an asserted lack of "European context" (e.g., Hübner et al. 2012), or, in stronger words, for being a unilateral approach (e.g., Teyssen 2013, Weimann 2012). Furthermore, the expected economic benefits from a potential harmonization of renewable policies in the EU are regularly brought forward (e.g., Söderholm 2008, Unteutsch and Lindenberger 2014). This leads to two main issues. The first issue refers to a positive analysis: how do European and Member States' energy policies align (or not)? In other words, how diverse, respectively European, *is* energy policy in the EU? The second issue is normative: how Europeanized *should* matters of energy policy be? That is, should decision making be centralized and should policies be homogeneous across the EU? In order to shed some light on these questions, this paper conducts both a positive and a normative analysis of the European energy policy landscape.

The paper starts with a twofold conceptual clarification because firstly "Europeanization" is too vague as to properly function as analytical category. Thus, two main dimensions of Europeanization are differentiated: centralization of decision making structures and the degree of homogeneity of policies. While it is often implicitly suggested that both go hand in hand, the paper demonstrates that this needs not be the case. On the one hand, there might be bottom-up convergence of policies without centralized decision-making; on the other hand, centralization does not necessarily imply homogenization. Secondly, different areas of energy policies have to be differentiated ranging from climate policy up to and including technology or single market issues. The upshot is that any call for Europeanization of energy transition policies should be specific about the respective relevant dimensions.

Building on this conceptual basis, the paper provides an overview of energy policies in the EU. Specifically, the paper investigates how Germany's energy transition policies fit into the context of European energy policy. The analysis shows a very diverse picture of partly centralized decision making on EU level but mostly decentralized approaches by Member States, which are implementing rather heterogeneous energy policies. Here, the degree of heterogeneity is not equal across policies: while at the one end, climate policies are the most homogeneous of energy-related policies, technology-oriented policies (nuclear power, renewables), on the other end, greatly differ across Member States.

Against the background of this positive overview, a normative analysis building on the theory of Fiscal Federalism (Oates 1972, 1999) assesses the arguments for and against centralized decision making and/or homogeneous policies. The evaluation differs from policy to policy, which implies that there is no overall efficient degree of centralization/homogenization. As a result, the extreme position "all matters of energy policy should be, for economic reasons, centralized and homogenized on the EU-level" must be refuted. Yet the analysis also points to some policy areas that, from a Fiscal Federalism point of view, should be more centralized/homogeneous compared to the current fragmentation.

What are the prospects, then, of moving towards more centralized/homogeneous approaches? In order to address this question, the paper reviews those legal and political-economic factors,

which may inhibit further Europeanization: since the present legal framework hardly allows for uniform energy policies across the EU, nationally elected politicians, in particular, have strong incentives not to agree on further transfer of decision making power to supranational bodies. Therefore, the paper subsequently assesses the possibility of achieving more integrated energy policies by bottom-up processes that do not rely on sovereignty-transfer.

The paper proceeds as follows: in Section 2, a conceptual clarification emphasizes the different dimensions of Europeanization. Section 3 provides a positive overview of energy policy within the EU. In Section 4, the theory of Fiscal Federalism is used as framework for a normative assessment of more integrated approaches in different areas of energy policies. Section 5 evaluates the political-economic restrictions to more centralization/homogeneity and investigates the political options, given these restrictions. Section 6 summarizes and concludes.

2. What is "Europeanization"?

2.1 Two dimensions of "Europeanization": Centralization of decision-making and homogeneity of policies

Figure 1 illustrates that Europeanization may occur and may be measured along two dimensions. First, the degree of centralization of decision making structures is one important aspect of Europeanization (vertical axis in Figure 1). The crucial criterion here is the involvement of supranational bodies in decision making, or what political scientists refer to as "vertical integration" (Leuffen et al. 2013, Börzel 2005). At the "decentralized" end of this dimension, decision making power exclusively lies with the Member States while at the "centralized" end, decisions are made by supranational EU bodies only. Between these extreme poles, several hybrid forms of cooperative decision making can be differentiated (ibid.). The aim of this paper, however, is not to give detailed accounts of possible steps in centralization processes but rather to review the relation of energy policy within the EU's system of multi-level governance (cf. Hooghe und Marks 2001). Hence, the important point here is that centralization is not a 0/1-issue.

Second, the dimension of homogeneity of policies (horizontal axis in Figure 1) addresses the question how similar energy policies are across the EU. In principle, policies may be completely heterogeneous or completely homogeneous, no matter how decision making power is allocated. In reality, the framework of EU multi-level governance often creates policy patterns that are partly homogeneous, partly heterogeneous (see Table 1 below).

Distinguishing the two dimensions of centralization and homogeneity allows for a differentiated assessment of energy policy integration in the EU. In particular, it helps to clarify whether a top-down or a bottom-up process is giving rise to homogenous policies: top-down processes are often referred to as "harmonization" (cf. Scharpf 1994), while bottom-up processes are referred to as "convergence" (cf. Jacobs 2012). In case of heterogeneous policies, one may equally distinguish between centrally promoted heterogeneity – which we refer to as "diversi-

fication" – and heterogeneity that arises from decentralized decision making structures, or "divergence".

This differentiation enables a more structured discussion in that calls for the "Europeanization" of energy policy then should specify the dimension they address. For instance, the argument that support policies for renewables should become more similar across the EU does not entail the conclusion that decision making on renewables policies should be centralized as both convergence and harmonization could yield the desired result.

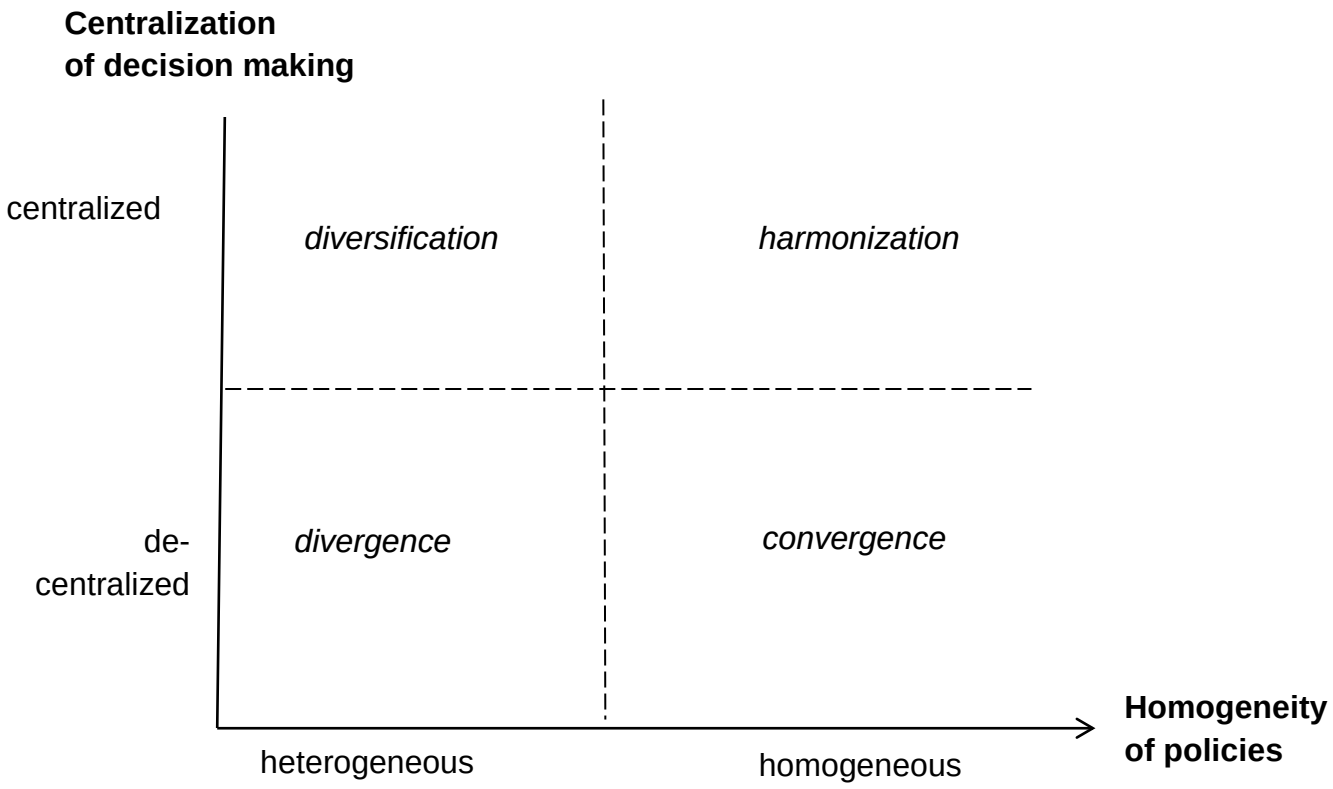

Figure 1: Two dimensions of "Europeanization"

2.2 Areas of energy policies

When arguing on the proper level of energy-related policy-making in the EU a second clarification ought to be made. Energy policy in the EU is composed of several, legally as well as economically different areas, as depicted in Table 1: climate protection, which may be considered as a related policy area with strong implications for energy policy, internal market policies, security of supply, specific technology policies and energy efficiency. These policies, in turn, consist of aims and instruments, both of which may be analyzed as to their degree of centralization of decision making and homogeneity. Table 1 demonstrates that the areas differ significantly in these respects and subsequent Section 3 lays out these differences in more detail. Moreover, the different areas exhibit their own characteristics from an economic point of view. Thus, as will be argued in more detail in Section 4, also the efficient degrees of centralization and homogeneity are not necessary equal across these areas.

Area		Centralization of decision making	Homogeneity of policies	
			Aims	**Instruments**
Climate protection		partly centralized	2020 and 2030: EU-overall aim for ETS-sectors, diversified aims of the MS for non-ETS-sectors in addition, partly national climate protection aims	partly homogeneous: ETS on EU-level, but national exemptions and/or additional instruments heterogeneous for non-ETS-sectors
Internal market and transnational transmission lines		partly centralized	internal market: finalization in 2014 as EU-aim	partly homogeneous: binding rules (e.g., unbundling, network codes), guidelines for transnational transmission lines heterogeneous for national transmission lines
Security of supply		mostly decentralized	no specific EU-aim	heterogeneous non-binding guidelines on "appropriate production capacities"
Technology	**Nuclear power**	decentralized	no EU-aim, heterogeneous aims of the MS	heterogeneous
	RES	mostly decentralized	2020: EU-aim, diversified aims for the MS 2030: EU-aim without diversified aims for the MS	partly homogeneous
Energy efficiency		decentralized	2020: EU-aim requiring MS to implement national action plans with efficiency targets (sectors: transport, households, industry) 2030: no EU-aim, further process not yet defined	heterogeneous

Table 1: Different areas of energy policy

Source: authors; Information for 2030 based on propositions by the Commission (2014a);

MS = Member States, ETS = Emissions Trading Scheme

3. Energy policies in the EU: a short positive analysis

3.1 Legal framework

For the first time, the Lisbon Treaty (Treaty on the Functioning of the European Union - TFEU) specifies explicit EU competences in energy policy matters (Article 194 TFEU). In particular, four aims of common energy policy in the EU are defined: ensuring i) the functioning of the internal energy market and ii) security of supply, as well as promoting iii) energy efficiency, renewables and iv) the interconnection of transmission grids. While European Parliament and Council "shall establish the measures necessary to achieve the objectives", these 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" (Article 194 (2) TFEU). In other words, although the EU institutions now dispose of explicit legitimation to actively conduct energy policy, Member States still retain their right to eventually decide on issues crucially affecting national energy mixes. Sure enough, the vague formulations of Article 194 (2) leave ample room for debates on how to appropriately demarcate the respective competencies.

In this context of shared and overlapping governance, guidelines and directives (e.g. on support policies for renewables, see below) are the EU's main *direct* way to influence national energy policies. In contrast, the "Open Method of Coordination (OMC)" constitutes an important *indirect* way for the EU Commission to influence Member States' energy policies (Borrás and Jacobsson 2004, Kerber and Ekardt 2007, Ania and Wagener 2014): the OMC relies on a process of voluntary exchange and cooperation between Member States, which is assisted and steered by the Commission. Thus, indirect approaches, supporting bottom-up convergence may equally contribute to homogeneous policies. As Callies and Hey (2013: 88) conclude their review of the EU's legal energy policy framework: "The EU impact on the national energy mix is predominantly indirect, yet powerful".

In sum, the guidelines, directives and initiatives by EU institutions set the frame within which Member States pursue their individual energy policies. In some instances, this entwined mix of rules and actions leads to more centralized and/or more homogeneous results, while in others it leads to more decentralized and/or more heterogeneous results. However, it should be clear that the legal framework still gives Member States the last word on numerous relevant energy policy matters. On the whole, energy policy is far from being a centralized and homogeneous policy area – some exceptions notwithstanding. Subsequently, this pattern will be set out in more detail. Table 1 provides an overview.

3.2 Strongly centralized areas within energy policy

3.2.1 Climate policy

Climate protection exhibits the most centralized decision making structure of all energy-relevant policy areas. This, however, does not imply that climate protection is fully centralized and homogeneous. On the one hand, the EU has set itself binding emission reduction targets for 2020 and the European Commission (2014a) has proposed to focus the post-2020 climate and energy package on an emissions reduction target. The main instrument to achieve these aims is the Emissions Trading Scheme (ETS) – basically the only common energy policy instrument on EU level. On the other hand, the ETS does not cover sectors such as transport, agriculture and heating: in these sectors the reduction aims of the Member States are diversified across the EU. Furthermore, the ETS notwithstanding, the Member States obviously try to pursue their individual climate protection ambitions: for instance, some Member States in Eastern Europe would like to see less climate protection and so they successfully lobbied for special regulations such as postponed full auctioning of emission allowances. Other Member States would like to see more climate protection: in this vain the UK introduced a carbon floor price to hedge against low ETS allowance prices[2]. Therefore, even EU climate policy is characterized by only partly centralized decision making and only partly homogeneous policies.

3.2.2 Internal energy market and transnational transmission lines

As the internal market traditionally occupies a central place within the project of European integration, an internal market for electricity is equally important for EU energy policy. The internal market directive (2009/72/EC) can be considered the main instrument to achieve this objective.[3] However, it has become clear that the initially targeted date for finalizing the internal electricity market, the year 2014, cannot be met (EC 2012). In order to achieve the internal market in a step-wise process, initiatives for "Market Coupling" have been set up, which lead to the coupling of day-ahead markets in central Europe in 2010. In addition, internal market regulation also indirectly affects the choice and design of RES policies, as these have to comply with state aid law. Currently, this framework is fostering a transition from feed-in tariff to market premium schemes as well as a reorganization of the funding mechanisms for RES schemes (European Commission 2014b, Gawel and Strunz 2014). Furthermore, other initiatives such as the "Agency for the Cooperation of Energy Regulators" have been founded and regulations for the alignment of network codes (regulation (EC) Nr. 714/2009) have been implemented so as to foster cooperation among the relevant actors and facilitate a European transmission grid. Yet, as in the case of climate protection, Member States are not willing to dispose of their eventual sovereignty in deciding upon crucial aspects of energy markets. In particular, the EU-wide finalization of the internal market would not be compatible with persisting national understandings of security of supply; yet, as laid out in the following, security of supply is one the more decentralized aspects of EU energy policy.

[2] http://www.hmrc.gov.uk/climate-change-levy/carbon-pf.htm

[3] For instance, the directive establishes unbundling between producers of electricity and transmission system operators.

3.3 Strongly decentralized areas within energy policy

3.3.1 Security of supply policy

Albeit the Lisbon treaty stipulates that it is one of the objectives of EU energy policy to "ensure security of energy supply in the Union" (Article 194 TFEU), the most important decisions on security of supply are made on a national basis. While there is EU-level cooperation with regard to grid stability, that is, the short-term aspect of security of supply, there seems to be no substantial cooperation concerning the adequacy of generation capacity, that is, the long-term aspect of security of supply. On the contrary, most Member States are currently discussing the separate implementation of "capacity markets" in order to ensure long-term adequacy of generation capacity (some Member States already have introduced capacity markets, others are in various stages of the implementation process) (Keay-Bright 2013: 10). This should not come as a surprise given that the level of security of supply, as measured in the amount and duration of interruptions of electricity supply, still significantly varies across the EU (CEER 2011: 27 ff.). Thus, a common EU-wide understanding of what "appropriate" security of supply means would be necessary as a first step towards more integrated approach.

3.3.2 Technology policy I: nuclear power

Nuclear energy policies are probably among the most diverse aspects of energy policy in the EU. Decision making is completely decentralized and policies are very heterogeneous. Some Member States, such as Poland intend to get in on nuclear power while Germany and Belgium decided to phase out. Italy has already phased out nuclear power, while other Member States, such as France, continue to rely on nuclear power as a main source of energy. Therefore, the overall picture on nuclear power in the EU looks very diverse (EU Commission 2013: 34).

3.3.3 Technology policy II: renewable energy sources

As regards renewables policies, the overall picture is mixed. On the level of aims, recent discussions illustrate this point: Hitherto, the EU's climate and energy package sets binding targets for the expansion of renewables within the 2020-timeframe. As individual targets are specified for each Member State, responsibilities are clear. However, following the European Commission's proposal (2014a) for the time between 2020 and 2030, binding targets for renewables on the Member State level should be scrapped, leaving only a common target on EU-level. Beyond the 2030 horizon only Germany has set ambitious long-term goals that could substantiate the declarations of intent from the EU's Energy Roadmap 2050.

On the level of instruments, Member States decide independently on how to support renewables. While the relevant directive for renewables support policies (2009/28/EC) provides the possibility for extensive cooperation, Member States hardly use these possibilities (Klinge-Jacobsen et al. 2014). Then again, there is some empirical evidence for bottom-up convergence of renewables policies: Jacobs (2012) demonstrates how – prior to the financial crisis in Europe – the support schemes of France, Germany and Spain aligned in many respects. Similarly, Kitzing et al. (2012: 200) conclude for the whole EU that "[t]here is certain reason to expect a further development into the direction of a bottom-up convergence of RES-E policy supports […]". It should be clear, however, that convergence here does not imply that there exists some pre-determined final state to which the different schemes converge. Rather, bot-

tom-up convergence means that policy makers often face similar challenges and, therefore, they are not unlikely to employ similar solutions. From this perspective it is not surprising that 17 out of 28 Member States have implemented a feed-in tariff scheme (or a mix of feed-in tariff and premium scheme) to support renewables. This trend notwithstanding, an outlook on future development of EU energy policy yields an ambivalent picture: On the one hand, the weakened EU RES targets suggest a more decentralized and heterogeneous future for these policies in the EU. On the other hand, the EU seems to gaining influence on RES policies via its internal energy market regulation (see above).

3.3.4 Energy efficiency policy

Energy efficiency can be considered a very decentralized and heterogeneous aspect of energy policy. On the one hand, the EU's energy efficiency directive (2012/27/EC) committed Member States to precisely defined reductions of energy use by 2020. Yet, most Member States will probably fail to meet these targets (Coalition for Energy Savings 2014). What is more, the Commission's proposal for climate and energy policy until 2030 does not include efficiency targets. Finally, on the instrument level, there always has been a broad heterogeneity of instruments, from "white certificates" in Italy, France and the UK to tax regulations and other support forms in other Member States such as Germany (c.f. Harmelink et al. 2008, Steuwer 2013). Therefore, energy efficiency is set to remain a highly fragmented aspect of energy policy in the EU.

Summing up, the degree of homogeneity and centralization varies significantly across the diverse fields of energy policies in Europe. Consequently, undifferentiated calls for a "Europeanization" of energy policy are misleading. For instance, while Germany's energy transition policy is sometimes scathed as "unilateralism" (e.g., Weimann 2012), this reproach does not hold up to scrutiny: in particular, neither Germany's feed-in tariff for renewables, its 2020 goals for renewables nor the planned waiving of nuclear power really represent singularities in Europe (Gawel et al. 2014). To provide useful policy recommendation, analyses, therefore, need to specify (1) the respective policy field (climate policy, internal market, security of supply, technology policy, energy efficiency), (2) the policy elements (aims and instruments), and (3) the dimension of "Europeanization" (centralization and homogeneity) they refer to. What is more, unambiguous pleas for homogeneity and centralization may also call for a qualification from a normative economic point of view – as will be outlined in the next section.

4. Fiscal Federalism and EU energy policy: a normative assessment

The economic theory of fiscal federalism (e.g., Oates 1972, 1999) suggests that a priori there is no reason to prefer full harmonization or centralization of energy policy in the EU. Rather, the trade-off "between internalizing spill-over benefits (and costs) and allowing local differentiation" (Oates 1999: 1130) needs to be weighed for specific contexts. Subsection 4.1 outlines the general theory of fiscal federalism and Subsection 4.2 applies these arguments to the different areas of energy policy.

4.1 Economic theory on the pros and cons of centralized decision making and homogeneous policies

4.1.1 Homogeneity of policies?

Building on Musgrave (1959), Olson (1969) and Oates (1972, 1999), the theory of fiscal federalism emphasizes the beneficial role of decentralized government in tailoring the output of public goods according to local and regional preferences. In this respect, a differentiated provision of public goods is welfare-increasing if local preferences are heterogeneous. Hence, preference-matching is one important argument against the homogenization of policies (Lockwood 2006).

In the context of European energy policy, we need to identify, therefore, the degree of preference heterogeneity across Europe. How differentiated are attitudes concerning the environmental impacts and other external costs (e.g., aesthetic impacts of landscapes dominated by RES) of energy provision? Are preferences on the appropriate level of security of supply different across MS? How do risk preferences on nuclear power differ? And at which governance levels are all of these preferences most homogeneous – is heterogeneity more prominent across MS or within MS? In the latter case, not only EU-wide homogeneous policies would be inefficient, but also national policies without regional differentiation.

As *political* preferences of the MS are obviously heterogeneous, we might ask how these differences are to be explained: On the one hand, the differences might be mostly due to historical and structural reasons (see also Section 5.1 on politico-economic constraints below). On the other hand, the differences might also be justifiable from a normative efficiency perspective: First, in democratic electoral systems, political preferences will, at least to some degree, reflect the population's preferences. Second, as energy provision leads to multiple externalities that are not sufficiently internalized in energy markets, the unavoidable *political* assessment of these externalities cannot be expected to be homogeneous across Europe. Hence, technology policies such as the German nuclear phase-out or RES-support do not necessarily contradict economic reasoning. To the contrary, such policy interventions may also be interpreted as adequate national answers to these issues within second- or third-best settings (Gawel et al. 2012).

4.1.2 Centralization?

Preferences aside, the economic theory of federalism also provides arguments for and against centralizing decision-making structures (e.g., Dalmazzone 2006). The most prominent argument for centralization highlights the economies of scale and scope to be realized by centralized decision making. Economies of scale arise when the centralized provision of public goods brings about lower average costs than decentralized provision. Economies of scope arise when centralized production of several outputs leads to lower costs than decentralized production. For instance, a centralized EU-wide deployment of RES could be more cost efficient than national deployment because of lower administrative costs and optimized geographical allocation of RES capacities (assuming, for the moment, that local externalities are appropriately taken into account). In general, centralization of decision making is a means of addressing spill-over effects (or positive and negative externalities) between smaller units. For instance, Banzhaf and Chupp (2012) show that in the case of US air pollution, a centralized

approach on the federal level significantly outperforms decentralized approaches on the states' level. The main reason is that pollutants do no only produce damages in the state where they are emitted but also in neighboring states.

The main argument against centralization of decision making points to the experimental function of decentralized problem-solving. In this "laboratory federalism" (Oates 1999, Ania and Wagener 2014) view, decentralization provides the opportunities for trial-and-error problem solving on small scales. Thus, compared to a centralized approach, a higher number of alternative policy options can be tested which raises the chances to find better solutions. In particular, the issue of environmental problems has been said to benefit from decentralized approaches (Anderson and Hill 1997). And as current energy transitions face a range of uncertainties and unsolved challenges, the "laboratory federalism" argument may apply very well to this context.

4.2 Evaluation

4.2.1 Climate policy

Climate change as a global externality should ideally be regulated on a global level as well. In absence of a global approach, it would be preferable to regulate aims and instruments on a European level. Therefore, diversified climate targets for Non-ETS sectors should be removed and all sectors that so far remained outside the ETS should be included so as to increase efficiency by equating marginal abatement costs across the EU. Also, additional instruments such as the UK's carbon floor price decrease the scheme's cost efficiency unless they are implemented on an EU-scale.

4.2.2 Internal energy market and transnational transmission lines

The basic economic argument for having a common electricity market in the EU builds on increased competition and more efficient geographical allocation of production capacities following local comparative advantages. The ensuing welfare benefits would primarily raise consumer rents. Moreover, as transmission grids in the EU are already linked, centralized decisions might lead to the most cost-effective EU-wide grid expansions. At the same time, however, it remains unclear whether and how nationally diverging evaluations of relevant externalities (e.g. spatial impact of renewables and of nuclear risks) would be taken into account.

4.2.3 Security of supply policy

Finalizing the internal market for electricity would also imply that security of supply was to be transformed into a truly European matter: different levels of grid stability would converge and production capacities would be optimized on an EU-wide scale so that some Member States became importers, others exporters of electricity. Thus, overcapacities could be avoided and cost-efficient production secured via division of labor. Yet, it is not clear whether a centralized understanding of security of supply might also lower overall efficiency: insofar as preferences over security of supply are heterogeneous, decentralized approaches would enable preference-matching. Unfortunately, there is not sufficient empirical evidence on the question

whether willingness-to-pay for avoiding disruptions of electricity provision diverges across the EU (e.g., Schmidthaler et al. 2012, Schubert et al. 2013). In any case, the argument for centralizing security of supply in the EU is stronger the more homogeneous relevant preferences are.

4.2.4 Technology policy I: Nuclear power

The case of nuclear power shows most clearly how difficult it can be to determine efficient levels of centralization and homogeneity. On the one hand, preferences concerning the risks and benefits of nuclear power are heterogeneous within the EU (EU Commission 2007). On the other hand, there is not only preference heterogeneity between Member States but also within Member States. Furthermore, nuclear risks are of a trans-boundary nature. This implies that leaving the decision whether to employ nuclear power with the Member States will certainly not lead to perfect preference-matching, but it might still be the best available option within the EU's political system of multiple and overlapping governance levels.

4.2.5 Technology policy II: RES

Similarly, the characteristics of renewables and uncertainty about the distribution of preferences make it hard to determine efficient levels of centralization and homogeneity for renewable support policies. The expansion of renewables affects all scales: negative externalities from renewables in the form of environmental effects and NIMBY-situations accrue on the local and regional level; renewables' impact on grid stability concerns the national and, via linked transmission grids, the trans-national level. Against this background, there are two arguments for keeping renewables support to some extent heterogeneous and decentralized: First, the evaluation of technology-specific externalities is not homogeneous across the EU (EU Commission 2007, see also Welsch and Biermann 2012), so policies should reflect this heterogeneity. Second, the laboratory federalism argument points to the merits of decentralized problem-solving. For instance, the question of how to make current energy-only markets compatible with high shares of renewables – which exhibit marginal production costs of zero – might better be tackled by decentralized rather than EU-wide policy-experiments. At the same time, the alignment of renewables policies would considerably improve the efficiency of renewables capacities' spatial allocation in terms of production costs (Unteutsch and Lindenberger 2014). In conclusion, while a full and immediate centralization and homogenization of renewables policies would probably be inefficient (due to preference heterogeneity and laboratory federalism), more cooperation between Member States seems advisable because of the expected gains in terms of production-cost efficiency.

4.2.6 Energy efficiency policy

In order to equate marginal abatement costs across the EU, energy efficiency aims and instruments should be addressed on the EU-level. A trading scheme for so-called white certificates, which guarantee a specific reduction of energy consumption, would constitute one cost-efficient way to achieve politically set energy saving aims. However, it should be noted i) that the recent proposal of the EU Commission (2014a) does not include explicit energy saving targets and ii) that it has been demonstrated that the combination of support policies for re-

newables and ETS already yields reductions in energy consumption so that additional white certificates may be redundant (Meran and Wittmann 2012).

In sum, following the economic theory of fiscal federalism, a full centralization of energy policy decisions on the EU-level would probably not be desirable from an economic point of view: Partly heterogeneous preferences and the laboratory function of decentralized government call for keeping major competences on energy policy with the Member States.

5. Towards an EU-wide sustainable energy system

5.1 Politico-economic constraints

Even if the economic analysis calls for genuine European policy-making in some policy-field, politico-economic constraints have to be considered: due to the lack of respective EU legal competencies, a consensus of Member States' politicians would be required for transferring respective sovereignty to EU institutions. In this regard, however, there are strong obstacles impairing more centralization of decision making from a public choice point of view: Member States' politicians are incentivized to reject the EU-wide allocation of energy production capacities within the EU in order to prevent potentially disruptive change in national industry structures. Energy mixes strongly diverge between individual Member States (cf. Knopf et al. 2013); for instance, France's electricity production relies to three quarters on nuclear power while in Poland the share of fossil fuels passes eighty percent and in Sweden the share of renewables reaches fifty percent. If technological composition and spatial allocation of production capacities would be established through EU-wide market-based mechanisms, the Member States' energy mixes might be fundamentally altered. In particular, some of the existing production capacities might be shut down and relocated so as to follow EU-wide regulations and regional comparative advantages (e.g., no more photovoltaic installations in Northern Germany; drastic reductions in Poland's coal share following a hypothetical tightening of the ETS). Yet the according loss of regional creation of economic value would weigh hard on the respective regional politicians' electability: in order to maximize their chances of (re-)election, politicians have strong incentives to satisfy relevant pressure groups; in this understanding of politicians as transfer brokers between interest groups (McCormick and Tollison 1981), energy policy constitutes an important bargaining token within the political process. As a result, strong path dependencies inhibit fundamental structural changes in Member States' energy mixes.

Against this background, visionary proposals, such as the pan-European super-grid (e.g., Czisch 2005) or the "New Deal" for pushing an EU-wide transformation to renewables and simultaneously solving the financial and budget crises in Southern Europe (for a critical discussion see Creutzig et al. 2014) appear to be rather far-fetched. In general, there seems to be considerable demand for research that does not assess the technological feasibility of such proposals but rather their political feasibility. An important contribution in this respect is made by Gullberg (2013) who analyzes the political feasibility of transforming Norway into a "green battery" for continental Europe. Gullberg argues that in the long term, it might be realistic to envision a more important role of Norway within a pan-European electricity system; in

the short term, however, Norway's incremental political process does not allow for using the electricity storage potential of Norway's geography.

5.2 "Europeanization" without centralization

Given that such grand proposals relying on centralized decisions are hampered by politico-economic constraints, bottom-up approaches might be more conducive towards reaping the benefits of coordination on EU-level. For instance, in case of renewables support policies, Jacobs (2012), following the convergence theory of Holzinger et al. (2008) argues that three mechanisms contribute to a convergence of Member States' policies: transnational communication, regulatory competition and a common problem solving pressure. As outlined above, the EU legal framework sets a common background against which individual Member States operate; that is, they communicate, compete and cooperate in finding ways to align their national interests in energy policy with the EU's guidelines and directives. Via the Open Method of Coordination the Commission does influence Member States within that process (e.g., Kitzing et al. 2012). In this way, a Commission-supported bottom-up process of voluntary coordination could lead to a more homogeneous policy pattern than top-down efforts to harmonize policies at once.

5.3 Options and priorities

Taking into account i) relevant legal as well as politico-economic constraints, as well as ii) normative considerations based on Fiscal Federalism arguments, increased cooperation should be particularly considered in the following areas:

First, EU climate policy and the ETS as its main instrument are to be strengthened. Current deficiencies of the ETS can probably be traced back to vested interests and concerns over national sovereignty (Markussen und Svendsen 2005, Anger et al. 2008, Skodvin et al. 2008). Yet, climate policy is already the most centralized aspect of energy policy with important co-determination by supranational institutions – this path can and should be further intensified.

Second, on the long way towards an internal market for electricity, coordinating grid extensions and capacity markets would be important steps. In this respect, organizations such as the "Agency for the Cooperation of Energy Regulators" (ACER) and "European Network of Transmission System Operators for Electricity" (ENTSO-E) may facilitate the integration of transmission grids. However, net expansion plans are still developed on a purely national basis, so a truly EU-wide planning for grid expansions does not yet exist. Furthermore, capacity markets are hitherto only discussed on the level of Member States and it is questionable whether there will be meaningful coordination in the medium term.

Third, the expansion of renewables might benefit from increased cooperation between Member States, even if the overall "efficient" level of centralization/homogeneity is eventually unclear. Interestingly, the corresponding directive 2009/28/EC already provides for several cooperation mechanisms (cf. Klessmann et al. 2010); so there would be no immediate need to change any treaty or pass new directives so as to increase coordination – Member States just need to rely on the three suggested pathways to coordinate their support instruments: statisti-

cal transfers of renewable electricity, joint projects and joint support schemes. Yet, Member States are, so far, very reluctant to use these possibilities. Moreover, current debates rather hint towards a more national future for renewables. In particular, the repeated rejection of common EU-aims for renewables by scientists as well as interest groups (e.g., Businesseurope 2013, Stavins 2014) undermines the arguments for more coordinated renewables policies.[4] In contrast, it seems plausible to us that a strong and binding framework for renewables expansion on EU-level would be most conducive to increased cooperation between Member States. The Commission's proposal (2014a), unfortunately, rather points into the direction of more fragmentation.

6. Conclusion

The overall picture of energy policy in the EU is diverse; within a common framework of EU binding treaties and directives, as well as non-binding guidelines, Member States pursue their individual agendas. For some aspects of energy policy, such as nuclear power and security of supply, the result is decentralized decision-making and heterogeneous policies. For other aspects, such as climate policy and the internal market, decision making is partly centralized and policies are less heterogeneous. What is more, the development of support policies for renewables demonstrates that decentralized decision-making may, nevertheless, yield partly homogeneous policies via processes of bottom-up convergence.

From the normative perspective of Fiscal Federalism, it is not possible to positively specify a unique degree of centralization and homogeneity for energy policy as a whole – nevertheless, we can state that an immediate and full centralization of energy policy at EU level would *not* be efficient because of partly heterogeneous preferences and the prospective benefits of laboratory federalism. Apart from this general conclusion, efficient degrees of centralization/homogeneity would need to be established for specific aspects of energy policy. In practice, as the case of support policies for renewables shows, it might be impossible to denote the efficient level of centralization and homogeneity with precision. Yet, some conclusions on the appropriate direction can be drawn: in case of support policies for renewables, there is certainly underused potential for cost savings through cooperation between Member States. In case of nuclear power, on the other hand, current decentralization, which leaves decision making exclusively with Member States, may be the only politically feasible way to address preference heterogeneity in the EU – even if the trans-boundary nature of nuclear risks implies that the overall outcome is probably not efficient.

In general, the legal and politico-economic constraints in the way of such proposals as the "EU-wide super-grid" should be acknowledged. Path dependencies and general reluctance of national politicians to transfer sovereignty towards Brussels and Strasbourg constitute im-

[4] Of course, these critics of EU-wide aims for renewables would like to dispense with support for renewables in the first place so as to concentrate on emission reduction aims: while critics such as Weimann (2012) indirectly suggest that if there "must" be renewables-support it should be done on an EU-level, this neglects economic justifications for renewable support schemes (e.g., Lehmann and Gawel 2013); also, such a tentative, conditional concession does not acknowledge the factual policy environment – since in most Member States expansion of renewables is a fixed point on the energy policy agenda, any argument against common EU-aims for renewables will rather harm the cause of efficiency than support it.

portant obstacles in the face of visionary ideas for integrated energy policy across the EU. Yet, as our normative analysis has shown, such "big integration jumps" would not necessarily be desirable in the first place. So a step-wise process of increased Member State cooperation seems to be both the most realistic and the least economically harmful way forward.

References

Ania, A., Wagener, A. (2014). Laboratory Federalism: The Open Method Of Coordination (OMC) as an evolutionary learning process. Journal of Public Economic Theory DOI: 10.1111/jpet.12079.

Anderson, T. L., Hill, P. J. (Eds.) (1997). Environmental Federalism. Lanham, MD: Rowman and Littlefield.

Anger, N., Böhringer, C., Oberndorfer, U. (2008). Public Interest vs. Interest Groups: Allowance Allocation in the EU Emissions Trading Scheme. ZEW Discussion Paper no. 08-023.

Banzhaf, H. S., Chupp, A. B. (2012). Fiscal federalism and interjurisdictional externalities: New results and an application to US Air pollution. Journal of Public Economics 96(5): 449-465.

Borrás, S., Jacobsson, K. (2004). The Open Method of Coordination and New Governance Patterns in the EU, Journal of European Public Policy 11: 185-208.

Böckers, V., Haucap, J., Heimeshoff, U. (2013). Benefits of an Integrated European Electricity Market, DICE Discussion Paper No 109, September 2013.

Börzel, T. A. (2005). Mind the Gap! European Integration between level and scope. Journal of European Public Policy 12(2): 217-236.

Businesseurope (2013). A competitive EU energy and climate policy. http://www.bdi.eu/download_content/KlimaUndUmwelt/20130618_FINAL_Brocure_2030_energy_and_climate_LOW_RESOLUTION.pdf.

Callies, C., Hey, C. (2013). Multilevel Energy Policy in the EU: Paving the Way for Renewables. Journal for European Environmental and Planning Law 10(2): 87-131.

Coalition for Energy Savings (2014). Analysis of Article 7 Member States reports. Available at: http://energycoalition.eu/sites/default/files/20140422 20Coalition 20for 20Energy 20Savings 20Art 207 20Report 20FINAL.pdf

Council of European Energy Regulators CEER (2011). 5th Benchmarking Report on the Quality of Electricity Supply. http://www.energyregulators.eu/portal/page/portal/EER_HOME/CEER_5thBenchmarking_Report.pdf.

Creutzig, F., Goldschmidt, J.C., Lehmann, P., Schmid, E., von Blücher, F., Breyer, C., Fernandez, B., Jakob, M., Knopf, B., Lohrey, S., Susca, T., Wiegandt, K. (2013). Catching two European birds with one renewable stone: Mitigating climate change and Eurozone crisis by an energy transition. Working Paper prepared for the 2013 Dahrendorf Symposium, Berlin.

Czisch, G. (2005). Szenarien zur zukünftigen Stromversorgung. Kostenoptimierte Variationen zur Versorgung Europas und seiner Nachbarn mit Strom aus erneuerbaren Energien.

https://kobra.bibliothek.uni-kassel.de/bitstream/urn:nbn:de:hebis:34-200604119596/1/DissVersion0502.pdf.

Dalmazzone, S. (2006). Decentralization and the environment. In: Ahmad, E., Brosio, G. (Eds.), Handbook of fiscal federalism, Edward Elgar: Cheltenham, 459-477.

European Commission, ed. (2007). Eurobarometer 262. Energy Technologies: Knowledge, Perception, Measures.

European Commission (2012). Making the internal energy market work. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Abrufbar unter: http://ec.europa.eu/energy/gas_electricity/internal_market_en.htm.

European Commission (2013). EU Energy in Figures. Statistical Pocketbook 2013. Available at: http://ec.europa.eu/energy/publications/doc/2013_pocketbook.pdf.

European Commission (2014a). A policy framework for climate and energy in the period from 2020 to 2030. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Available at: http://ec.europa.eu/clima/policies/2030/docs/com_2014_15_en.pdf.

European Commission (2014b), Communication from the Commission: Guidelines on State aid for environmental protection and energy 2014-2020, April 2014: http://ec.europa.eu/competition/sectors/energy/eeag_en.pdf.

European Union (2009a). Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. Official Journal of the European Union, 5.6. 2009.

European Union (2009b). Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community. Journal of the European Union, 5.6. 2009.

Gawel, E., Korte, K., Lehmann, P. and S. Strunz (2012). To be or not to be efficient? That is the question! Is the German energy transition policy really free of efficiency? GAiA 23 (1): 14-17.

Gawel, E., Strunz, S., Lehmann, P. (2013). “The German Energiewende under Attack. Is there an Inscrutable German Sonderweg?” Nature and Culture 8(2): 121-133.

Gawel, E. and S. Strunz (2014). State Aid Dispute on Germany’s Support for Renewables: Is the Commission on the Right Course? Journal for European Environmental and Planning Law 11(2): 139-152.

Gawel, E., Strunz, S. and P. Lehmann (2014). On the alleged need to Europeanize the German Energiewende. UFZ-Discussion Paper 2014 (18).

Gullberg, A.-T. (2013). The political feasibility of Norway as the “green battery” of Europe. Energy Policy 57: 615-623.

Harmelink, M., Nillson L. and R. Harmsen (2008). Theory-based policy evaluation of 20 energy efficiency instruments. Energy Efficiency 1: 131-148.

Holzinger, K., Knill, C. and B. Arts (eds.) (2008). Environmental policy convergence in Europe, Cambridge: Cambridge University Press.

Hooghe, L. and G. Marks (2001). Multi-level governance and European integration, Lanham, MD: Rowman and Littlefield.

Hübner, M., Schmidt, C. M. and B. Weigert (2012). Energiepolitik: Erfolgreiche Energiewende nur im europäischen Kontext. Perspektiven der Wirtschaftspolitik, 13(4): 286-307.

Jacobs, D. (2012). Renewable Energy Policy Convergence in the EU: The Evolution of Feed-in Tariffs in Germany, Spain and France. London: Ashgate.

Keay-Bright, S. (2013) Capacity Mechanisms for Power System Reliability. Regulatory Assistance Project. Available at: www.raponline.org/document/download/id/6805.

Kerber, W., Eckardt, M. (2007) Policy Learning in Europe: the Open Method of Co-ordination and Laboratory Federalism, Journal of European Public Policy 14: 227-247.

Klessmann, C., Lamers, P., Ragwitz, M., Resch, G. (2010). Design options for cooperation mechanisms under the new European renewable energy directive. Energy Policy 38: 4679–4691.

Kitzing, L., Mitchell, C., Mothorst, P. E. (2012). Renewable energy policies in Europe: converging or diverging? Energy Policy 51: 192-201.

Klinge Jacobsen, H., Pade, L. L., Schröder, S. T., Kitzing, L. (2014). Cooperation mechanisms to achieve EU renewable targets. Renewable Energy 63: 345–52.

Knopf, B., Bakken, B., Carrara, S., Kanudia, A., Keppo, I., Koljonen, T, Mima, S., Schmid, E., van Vuuren, D. (2013). Transforming the European energy system: Member States' prospects within the EU framework. Climate Change Economics, 4, 1-26.

Lehmann, P., Gawel, E. (2013). Why should support schemes for renewable electricity complement the EU emissions trading scheme? Energ. Policy 52, 597-607.

Leuffen, D., Rittberger, B., Schimmelfennig, F. (2013). Differentiated Integration. Explaining Variation in the European Union. Basingstoke: Palgrave Macmillan.

Lockwood, B. (2006). The political economy of decentralization. In: Ahmad, E., Brosio, G., (Eds.), Handbook of fiscal federalism. Edward Elgar: Cheltenham, 33-60.

Markussen, P., Svendsen, G. T., 2005. Industry lobbying and the political economy of GHG trade in the European Union. Energy Policy 33: 245–255.

McCormick, R. E. , Tollison, R. D. (1981). Politicians, Legislation and the Economy, Boston: M. Nijhoff.

Meran, G., Wittmann, N. (2012). Green, brown, and now white certificates: Are three one too many? A micro-model of market interaction. Environmental and Resource Economics, 53(4):507-532.

Musgrave, R. A. (1959). The Theory of Public Finance. New York: McGraw Hill, 1959.

Oates, W.E. (1972). Fiscal Federalism. New York: Harcourt Brace Javanovich.

Oates, W. E. (1999). An Essay on Fiscal Federalism. Journal of Economic Literature 37: 1120-1149.

Olson, M. (1969). The Principle of "Fiscal Equivalence". The Divison of Responsibilities among Different Levels of Government. The American Economic Review 59(2): 479-487.

Schmidthaler, M., Reichl, J., Schneider, F. (2012) Der volkswirtschaftliche Verlust durch Stromausfälle: Eine empirische Untersuchung für Haushalte, Unternehmen und den öffentlichen Sektor. Perspektiven der Wirtschaftspolitik 13(4): 308-336.

Schubert, D., Selasinsky, A. von, Meyer, T., Möst, D. (2013) The blackout in Munich: how do households value security of supply? Presentantion at 8th Enerday – Conference on Energy Economics and Technology 19 April 2013, Dresden.

Skodvin, T., Gullberg, A., Aakre, S. (2010). Target-group influence and political feasibility: the case of climate policy design in Europe. Journal of European Public Policy 17 (6), 854–873.

Söderholm, P. (2008). Harmonization of renewable electricity feed-in laws: A comment. Energy Policy, 36, 946–953.

Steuwer, S.D. (2013). Energy Efficiency Governance. The Case of White Certificate Instruments for Energy Efficiency in Europe. Berlin: Springer.

Teyssen, J. (2013). Stop unilateralism. The German Energiewende needs a European context. Energlobe, 13 May 2013. Available at: http://energlobe.eu/economy/stop-unilaterism

Unteutsch, M., Lindenberger, D. (2014). Promotion of Electricity from Renewable Energy in Europe Post 2020 – The Economic Benefits of Cooperation. Zeitschrift für Energiewirtschaft 38(1): 47-64.

Weimann, J. (2012). Atomausstieg und Energiewende: Wie sinnvoll ist der deutsche Alleingang? Energiewirtschaftliche Tagesfragen 62(12): 34-38.

Welsch, H., Biermann, P. (2013). Electricity supply preferences in Europe: evidence from subjective well-being data. Available at: http://www.uni-oldenburg.de/fileadmin/user_upload/wire/fachgebiete/vwl/V-359-13.pdf