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On the alleged need to strictly "Europeanize" the German Energiewende

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Germany has embarked on an ambitious project to transform its energy system until 2050 – the so-called Energiewende. Some critics contend that the Energiewende imposes unnecessary and avoidable welfare losses due to a lack of integration within the EU. In contrast, these critiques largely miss the point because the asserted lack of integration cannot be pinned on the Energiewende and the welfare consequences of EU-wide integration are less clear than the critiques imply.

Germany aims to completely redesign its energy system within the next decades. In particular, nuclear power shall be phased out by 2022 and the share of renewable energy sources (RES) in overall electricity supply shall be increased to at least 80 percent by 2050. While many international observers regard this ambitious set of energy transition targets with a mix of applauding respect and slight skepticism[1], some domestic critics judge very harshly about the transformation project. Specifically, they criticize that the *Energiewende* is a national and unilateral approach that fails to reap potential benefits of an EU-wide approach.[2] It has even been suggested that Germany, by rolling out *Energiewende* polices, acts as a kind of wrong-way driver heading in the opposite direction of a presumed mainstream of European energy policy[3] In consequence, the critics contend that Germany should only proceed with its energy transition policies (if at all[4]) in case they are aligned within a common EU-framework.

The critics bring forward two main economic arguments: First, the spatial allocation of electricity infrastructure (generation facilities and transmission lines) could be more efficiently organized on the EU level.[5] Second, the technology portfolio that emerges from Germany's

[1] E. g, D. *Buchan*: The Energiewende: Germany's Gamble. The Oxford Institute for Energy Studies: Working Papers, 2012, http://www.oxfordenergy.org/wpcms/wpcontent/uploads/2012/07/SP-26.pdf

[2] E. g., acatech (Hrsg.): Die Energiewende finanzierbar gestalten. Effiziente Ordnungspolitik für das Energiesystem der Zukunft. Acatech Position, 2012, Heidelberg; J. *Weimann*: Atomausstieg und Energiewende: Wie sinnvoll ist der deutsche Alleingang? Energiewirtschaftliche Tagesfragen, 2012, 62 (12): 34-38.

[3] H.-W. *Sinn*: Zu viele unrealistische Hoffnungen und zu wenig Pragmatismus, Energiewirtschaftliche Tagesfragen 2012, 62 (1/2): 54-56.

[4] J. *Weimann*: Rettet die Energiewende? Warum eigentlich? Wirtschaftsdienst 2013 (11): 793-795.

[5] M. *Frondel*, C. *Schmidt* and N. *aus dem Moore*: Marktwirtschaftliche Energiewende: Ein Wettbewerbsrahmen für die Stromversorgung mit alternativen Technologien. Zeitschrift für Energiewirtschaft, 2013 37 (??): 27-41; A. *Mundt*: Die Energiewende braucht Marktvertrauen. Zeitschrift für das gesamte Recht der Energiewirtschaft, 2013, 2 (6), 241-242.

feed-in tariff for RES is said to be inefficient compared to an EU-wide scheme of tradeable green electricity quotas.[6] In the following, the validity of these arguments is questioned. We argue that – while technically correct – they only hold under very narrow assumptions, which all but nullifies their warranted assertion.

Therefore, the perspective should be broadened so as to provide a more comprehensive picture. In particular, the following aspects are indispensable for an overall assessment of Germany's energy transition policies within the EU-context:

– Can Germany's *Energiewende* be meaningfully described as unilateral? First and foremost, it is an empirical question whether Germany's energy policy stands out compared to its neighbors. In fact, the analysis shows that the claim of unilateralism cannot be substantiated because the main pillars of the *Energiewende*, the nuclear phase-out and RES support policies (objectives as well as instruments), are not unique within the EU; the same also goes for Germany's RES shares and mid-term renewables goals up to 2020 that are completely in line with the EU average (Table 2). Furthermore, since energy policies are, on the whole, rather diverse in the EU, any perceived lack of integration cannot be blamed on one particular Member State.

– How strong is the economic case for EU-wide integration of energy transition policies? This normative question is not reducible to the issue of geographical production costs of RES: instead, a range of arguments concerning general issues (e.g., decentral vs. uniform provision of public goods) and specific aspects of the energy transition are to be considered here. For instance, a complete evaluation needs to take possible preference heterogeneity concerning externalities from electricity production (e.g. nuclear risks, landscape impacts of renewable energy plants) into account.

– Specific questions on the appropriateness of particular policy instruments must not be conflated with the analysis of the adequate governance level for energy transition policies. For instance, the issue whether a feed-in tariff or a quota system is preferable for supporting RES needs to be separated from the question whether RES-policies should be implemented on the EU-level or on the level of Member States.

– Assuming that closer cooperation on some aspects of *Energiewende* policies is to be welcomed, which pathways are most conducive towards integration, given specific legal and politico-economic side constraints? Against the background of past developments in EU energy policy, it is clear that bottom-up processes are far more likely to facilitate cooperation than centralization and forced top-down harmonization of policies.

Thus, the abovementioned critiques of the energy transition are, at the end of the day, hardly ever convincing and should not guide policy advice: an EU-wide scheme of tradable green

[6] M. *Hübner*, C. *Schmidt* and B. *Weigert*: Energiepolitik: Erfolgreiche Energiewende nur im europäischen Kontext. Perspektiven der Wirtschaftspolitik, 2012, 13(4): 286-307; J. *Haucap* and J. *Kühling* 2013: Zeit für eine grundlegende Reform der EEG-Förderung – das Quotenmodell. Energiewirtschaftliche Tagesfragen, 2012, 63 (3): 41-49.

electricity quotas neither is a readily available policy option, nor should it constitute the goal of German energy transition polices. The rest of this paper demonstrates that neither implication is valid by setting out the above points in more detail.

Nuclear power and RES policies in the EU

To which extent can the main pillars of the electricity-related *Energiewende*, the nuclear-phase out and the specific RES support policies, be considered as outliers in the EU?

First, as regards nuclear power, a rather diverse picture emerges: Table 1 displays the number of nuclear reactors, which are currently in operation, under construction or in planning within the EU-28 Member States and Switzerland. Several observations seem noteworthy. To start with, there is a huge spread between the countries that do rely on nuclear power: on the one hand, the nuclear share of overall electricity production in France reaches almost ¾; on the other hand, the nuclear share in the Netherlands stands at slightly below three percent. In addition, a number of EU-Member States do *not* rely on nuclear energy, among them Italy, Austria, Portugal and Ireland. An exception is Poland, which currently does not have nuclear plants but envisages building two plants in the future. Furthermore, two European countries, Switzerland and Belgium, also have recently decided to phase out nuclear power. Summing up, portraying Germany’s nuclear phase-out as an outlier somewhat distorts the actual status-quo of nuclear power in Europe. As there is no discernable trend or mainstream to which all nuclear policies could be said to converge, singling out Germany’s phase-out as unilateral seems unjustified.

Second, regarding the targets for RES expansion by 2020, Germany might even be considered as below-average, as Table 2 shows. In fact, both Germany’s share of RES at final energy consumption in 2012 and the corresponding target for 2020 are slightly below the average on EU-level. Thus, any claim about exceptionality of Germany’s RES policies must refer to the 2050 horizon, where Germany’s RES targets are indeed ambitious and other Member States lack comparative long-term frameworks. In a sense, the ambition of Germany’s energy transition lies not so much in the mid-term targets for RES, but rather in the fact that a thoroughly industrialized country, which often praises itself for being “World Champion” in exporting goods, aims at completely transforming its energy system in the long run. However, other European countries will be forced to set appropriate energy policy goals for 2050 in line with the overall EU decarbonisation scheme for the energy sector. Comparing German 2050 goals with present-day EU-wide energy policies does not make much sense.

Table 1: Nuclear power in Europe (EU-28 plus Switzerland)

Source: Adapted from European Nuclear Society[7] and Eurostat[8]

	Country	No. of reactors in operation	Nuclear share at overall electricity supply	Future development
Countries that rely on nuclear power or intend to phase in	Netherlands	1	2.9%	-
	Slovenia	1	33.4%	-
	Bulgaria	2	33.2%	-
	Romania	2	21.2%	-
	Finland	4	33.3%	1 reactor in construction
	Hungary	4	51.5%	-
	Slovakia	4	54.7%	2 reactors in construction
	Czech Republic	6	35.9%	-
	Spain	7	19.7%	-
	Sweden	10	42.6%	-
	UK	16	18.8%	1 reactor in planning
	France	58	73.6%	1 reactor in construction
	Poland	-	-	2 reactors in planning-
Countries that have no nuclear power or intend to phase out	Austria	-	-	-
	Croatia	-	-	-
	Cyprus	-	-	-
	Denmark	-	-	-
	Estonia	-	-	-
	Greece	-	-	-
	Ireland	-	-	-
	Italy	-	-	-
	Latvia	-	-	-
	Lithuania	-	-	-
	Luxembourg	-	-	-
	Malta	-	-	-
	Portugal	-	-	-
	Switzerland	5	36.4%	Nuclear phase-out by 2034
	Belgium	7	52.1%	Nuclear phase-out by 2025
	Germany	9	15.4%	Nuclear phase-out by 2022

[7] http://www.euronuclear.org/1-information/maps.htm (Data for 2014)

[8] http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Electricity_production_and_supply_statistics#Source_data_for_tables.2C_figures_and_maps_on_this_page_.28MS_Excel.29 (Data for 2013)

Table 2: Share of RES at final energy consumption and EU targets for 2020[9]

	RES share 2012	RES target 2020
EU-27	*14.1 %*	*20.0 %*
BE	6.8 %	13.0 %
BG	16.3 %	16.0 %
CZ	11.2 %	13.0 %
DK	26 %	30.0 %
DE	*12.4 %*	*18.0 %*
EE	25.9 %	25.0 %
IE	7.2 %	16.0 %
EL	11.6 %	18.0 %
ES	14.3 %	20.0 %
FR	13.4 %	23.0 %
IT	13.5 %	17.0 %
CY	6.8 %	13.0 %
LV	35.8 %	40.0 %
LT	21.7 %	23.0 %
LU	3.1 %	11.0 %
HU	9.6 %	13.0 %
MT	1.4 %	10.0 %
NL	4.5 %	14.0 %
AT	32.1 %	34.0 %
PL	11 %	15.0 %
PT	24.6 %	31.0 %
RO	22.9 %	24.0 %
SI	20.2 %	25.0 %
SK	10.4 %	14.0 %
FI	34.3 %	38.0 %
SE	51 %	49.0 %
UK	4.2 %	15.0 %

[9] http://de.statista.com/statistik/daten/studie/29592/umfrage/anteil-der-energieerzeugung-durch-erneuerbare-energie-in-der-eu-27-in-2005/

Furthermore, Germany's support scheme for RES is no misfit within the EU. The Renewable Energy Sources Act ("EEG"), which prioritizes RES as regards electricity feed-in into the system and guarantees a fixed remuneration for every kWh of RES-electricity produced, had been introduced in 2000. At the time, only six other EU-Member States has implemented similar RES support policies. However, as can be seen from Table 3, by 2010 this form of support via feed-in tariff had become the mainstream way of pushing RES in the EU. Interestingly, also the recent revisions of the EEG are perfectly aligned with the general development of support policies: In 2012, Germany introduced a premium scheme in order to steer dispatchable RES. Questions about the economic merit of this measure notwithstanding,[10] it directly corresponds to the continuous EU-wide trend of complementing feed-in schemes by premium schemes. The most recent revision of the EEG in 2014 envisages (skeptically: ponders – depending on the reading of the rather vague formulations within the law) a long-term transformation away from feed-in tariffs and towards tender schemes. Again, this conforms to the overall direction, if the EU Commission's guidelines may serve as point of reference.[11]

Table 3: Number of Member States that have implemented specific RES-instruments

Source: adapted from Kitzing et al. (2012: 196; see fn 12) and www.res-legal.eu

	2000	2005	2010	2013
Feed-in tariff	7	16	23	17
Feed-in premium	-	4	7	10
Quota	1	6	6	6
Tender	2	2	6	2

On the basis of these general trends, and more detailed analyses of parallel developments in some EU countries, some have even argued that there is evidence of bottom-up convergence of RES policies.[12] In any case, what the analysis clearly demonstrates is that Germany's RES support policies are far from being an outlier or a wrong-way driver in the EU; to the contrary, in comparison to the quota scheme, Germany's introduction of a feed-in tariff (and revisions thereof) can reasonably even be considered as mainstream policies.

[10] Cf. E. *Gawel* and A. *Purkus*: Promoting market and system integration of renewable energies through premium schemes – A case study of the German market premium, 2012, Energy Policy 61: 599-609.

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

[12] D. *Jacobs*: Renewable Energy Policy Convergence in the EU: The Evolution of Feed-in Tariffs in Germany, Spain and France, 2012, London: Ashgate; L. *Kitzing*, C. *Mitchell* and P. *Mothorst*: Renewable energy policies in Europe: converging or diverging? Energy Policy, 2012, 51: 192-201.

EU-wide integration of energy transition polices?

In order to address the question how “Europeanized” Germany’s energy transition policies should be, it is necessary to clarify analytically what “Europeanization” actually means.[13] On the one hand, Europeanization might refer to the degree of homogeneity of policies across the EU. On the other hand, Europeanization might refer to the location of decision making power on a continuum from completely decentralized on the level of Member States to fully centralized on the EU-level. Based on this differentiation, then, specific criteria for more integration on each of the dimensions could be set up. For the scope of this contribution, however, it suffices to point out that there are two aspects to Europeanization and that these need not necessarily align: for example, a more homogeneous pattern of policies might be achieved by centralized decision-making at the EU level as well as via decentralized cooperation between Member States.

In general, a tension exists between the EU’s aim of a common internal market for energy and the Member States sovereignty over energy policy. This tension materializes both legally and economically. Legally, the Treaty for the European Union (TFEU) is sufficiently vague in providing both supranational EU-institutions and the Member States with competing and overlapping competences (see also below). Economically, the welfare benefits from an internal market need to be traded off with possible welfare losses from overriding national peculiarities – the case of the *Energiewende* is a prime example in this respect, as will be argued in the following.

To what extent, then, would an EU-version of the *Energiewende* be desirable? As regards the nuclear phase-out, the obvious heterogeneity of policies in the EU challenges the notion that there might be welfare gains from harmonizing policies: The diversity of nuclear policies points to an underlying diversity of preferences about the risks associated with nuclear power. In particular, (hypothetically) imposing a nuclear phase-out on France would imply overriding French risk preferences. Certainly, also the systemic costs of a rapid French nuclear phase-out related to the much higher dependence on nuclear power compared to Germany would be huge. Certainly, some supranational coordination may be warranted as some nuclear risks may be transboundary. However, such issues do not necessarily call for a uniform EU-wide approach but may also be addressed by bilateral agreements.

Turning to the deployment of RES: assume, for the sake of argument, that there was a clean sweep and Europe’s energy supply could be rebuilt from scratch. In order to minimize production costs, RES should be allocated according to most favourable geographical conditions, placing photovoltaic installations in Southern Europe and so on. Additionally, a European-wide supergrid could be implemented, possibly including North African deserts as large-scale

[13] For an extended discussion of the arguments presented in this subsection see E. *Gawel*, S. *Strunz* and P. *Lehmann*: Wieviel Europa braucht die Energiewende? UFZ-Discussion Papers, 2014, Working Paper No. 2014-4 and S. *Strunz*, E. *Gawel* and P. *Lehmann*: Towards a general “Europeanization” of EU Member States’ energy policies? UFZ-Discussion Papers, 2014, Working Paper No. 2014-17

production location and Norway’s fjords as storage facilities[14]. Such seems to be the hidden vision behind some of the *Energiewende* critiques.

Yet, this counterfactual scenario is no appropriate yardstick for assessing current RES policies. Sure enough, there are sizable benefits from coordinating RES-support schemes to be expected.[15] However, this does not necessarily imply that a completely harmonized approach should be aimed for. Firstly, RES-related preference heterogeneity has to be taken into account: negative external effects of RES are highly technology-specific but mostly local (compare wind and biomass), so potential benefits from economies of scale in centralizing RES at geographical hotspots have to be traded-off with according negative externalities in the form of acceptance problems. EU-wide optimization of production facilities would also lead to increased need for transmission line extensions – current protests in Germany against new transmission lines attest to the related difficulties. Additionally, the idea of transforming Norway into a “green battery” for Europe should not be taken as a politically available short-term option due to ambivalent Norwegian preferences (landscape conservation vs. economic benefits from storing electricity) and the prevalent political culture of incremental change.[16] For the same preference-related reason, it is not clear whether the use of Norwegian fjords as “green batteries” would really improve the overall efficiency including environmental and resource costs of land-use change. Thus, spatially allocating RES is not reducible to a one-dimensional optimization problem following geographical patterns of energy yields and direct generation costs. Secondly, beyond these RES-specific aspects, there is a more general issue that deserves consideration: decentralized regulatory “experiments” may improve the overall result of policy intervention (aka the laboratory federalism argument). In case of uncertainty about the best regulatory solution to address a given problem, trial-and-error on lower government scales supposedly yields faster feedback-processes and policy adaptation and reduces societal learning costs compared to a uniform top-down EU approach.

In sum, a thorough and rapid “Europeanization” of German energy transition policies is unlikely to constitute the adequate policy recommendation from a comprehensive economic point of view. Instead, while more coordinated RES-support seems worthwhile for increasing production cost efficiency, a fully harmonized EU support scheme is not to be called for. In case of nuclear power, broad policy diversity in the EU means that a fully harmonized approach would override diversity of risk preferences.

RES-support: distinguishing “on what level?” and “by which instrument?”

The above-mentioned argument that Germany’s RES-support scheme leads to an inefficient technology portfolio unduly mixes two levels of analysis: a given preference for regulating RES-policy on a specific governance level does not entail a distinct preference for a specific

[14] Cf. C. *Macilwain*: Supergrid: Is a vast undersea grid bringing wind-generated electricity from the North Sea to Europe a feasible proposition or an overpriced fantasy? Nature, 2012, 468: 624-625.

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

[16] A.-T. Gullberg: The political feasibility of Norway as the “green battery” of Europe. Energy Policy, 2012, 57: 615-623.

instrument. While the proponents of the argument suggest (partly implicitly, partly explicitly) that a trading scheme for green electricity certificates – analogous to the emissions trading scheme – is the most appropriate for an EU-wide approach towards RES, such a general proposition is not warranted. In the following, we outline some criteria by which to evaluate the question of how to support RES.

Assuming, for the sake of argument, that a harmonized RES-support scheme is desirable – how to decide upon the best instrument to reach a common EU-target for RES? Naturally, each instrument exhibits specific (dis-)advantages. Focusing on feed-in tariffs and quota schemes allows us to see the according pros and cons in more detail. Since Weitzman's seminal 1974 study[17] it is common wisdom in economics that the relative slopes of marginal costs and marginal benefits are crucial when deciding between a price (feed-in tariff) and a quantity (quota) instrument.[18]

Thus, the question becomes one of determining and evaluating costs and benefits from deploying RES. It has been argued that a stronger focus on the cross-boundary benefits of RES would speak in favor of feed-in tariffs: in particular, benefits of increased security of supply (due to lower fossil fuel imports from potentially unstable world regions) might be rather constant over the whole range of RES-deployment, which would speak in favor of a price instrument.[19] In contrast, if local employment impacts are of main concern to policy makers, benefits from RES may mainly accrue in the early stages of deployment, suggesting preferability of a quota scheme. The latter point, however, is somewhat self-defeating: in case local benefits are a main driver of RES-support, political willingness to coordinate across boundaries will usually not be given in the first place (see also below). Likewise, common arguments in favor of quantity instruments, cost efficiency and precise regulation of progressive damage functions, seem to cancel each other out in the case of RES: consider wind energy, which, as cheapest volatile RES, would mostly benefit from a quota scheme. However, the negative externalities (i.e., the aesthetic impact on landscape scenery and the ecological impact on bird populations) are increasing per windmill built. So in order to limit these progressive damages, regulators might want to set technology-specific quotas.[20] Then again, this technology-differentiation would reduce the benefits of a quota scheme in terms of cost savings from supporting only the cheapest technologies.

Apart from these issues, there is another, energy system-related objection to be made against the "inefficient technology portfolio" charge that is meant to prove the superiority of the quota scheme: the argument is based on a static conception of efficiency, which is somewhat at odds with the long-term project of the *Energiewende* and general characteristics of the energy system (path-dependency, lock-in effects) suggesting we should rely on a dynamic perspective. Under simple quota systems, private actors may fail to take optimal long-term invest-

[17] M. L. *Weitzman*: Prices vs. quantities. 1974, Review of Economic Studies 41: 447-491.

[18] Without uncertainty about marginal costs and benefits, both approaches are theoretically equal because the regulator can either set a quantity target or implement an equivalent price instrument.

[19] P. *Söderholm*: Harmonization of renewable feed-in laws: A comment, 2008, Energy Policy 36: 946-953

[20] Ensuring grid stability by putting a portfolio of complementary RES in place is another reason why technology-specific quotas would be preferable (e. g., a combination of wind and solar is more robust to meteorological fluctuations than each of the technologies by itself).

ment decisions for a variety of reasons, including externalities (knowledge spillovers), myopic decision-making or improper consideration of uncertainty. In the presence of these market failures, feed-in tariffs might be preferable in addressing the long-term market prospects of specific RES – particularly those that are in rather early development stages and, therefore, would not benefit from a pure quota scheme. For instance, the feed-in tariff-driven, large-scale deployment of photovoltaic installations in Germany during the last decade contributed to driving down module costs.[21]

Summing up, there is no theoretical reason a priori to prefer a specific instrument to support RES. Considering the actual distribution of instruments in the EU (as outlined above), however, it might be argued that since feed-in tariffs (or feed-in premiums) are more common than quota schemes, the former could more easily be merged into a joint, supranational support scheme. In the following, we describe the conditions for more coordinated RES-policies.

Fostering the EU-embedment of RES policies: bottom-up instead of top-down

The historical development of RES policies in the EU has shown, above all, that Member States consistently resist the Commission's attempts to implement an EU-wide quota scheme: the origins of both the directive 2001/77/EC and the substituting directive 2009/28/EC have been interpreted as failed attempts to do so.[22] Recently, the Commission seems avid to push Member States into the direction of uniform tender schemes.[23] Given the history of Member States' refusal to adopt top-down harmonization and their insistence on national sovereignty over the energy mix in the Lisbon Treaty – article 194(2) TFEU affirms "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 prospects for the success of this plan could be meager.

Furthermore, the European Court of Justice (ECJ) has upheld Member States' rights to pursue purely national RES-policies: in its decision concerning Finish Åland Vindkraft's complaint to access the Swedish RES-support scheme, the ECJ stated that although national support schemes might be distorting the internal market, they can be justified as policy interventions aiming at the common interest (environmental protection, combating climate change).[24] Hence, both from a political and a legal point of view, the future of RES-policies in the EU is likely to be decided bottom-up rather than top-down.

Clearly, the politico-economic interests giving rise to this constellation should be acknowledged within policy recommendations. In other words, as Member States' politicians are motivated by protecting regional and national energy infrastructures (so as to secure voter sup-

[21] H. *Wirth*: Recent Facts about Photovoltaics in Germany, 2014: 8 ff, http://www.ise.fraunhofer.de/en/publications/veroeffentlichungen-pdf-dateien-en/studien-und-konzeptpapiere/recent-facts-about-photovoltaics-in-germany.pdf

[22] See *Jacobs* 2012 (fn. 12): 28 ff.

[23] EU Commission: Communication from the Commission. Guidelines on State aid for environmental protection and energy 2014-2020. Official Journal of the European Union (2014/C 200/01).

[24] Cf. E. *Gawel* and S. *Strunz* (see fn. 11).

port), policy advice that ignores actual political decision processes renders itself irrelevant. A completely technology-neutral RES-support scheme without reference to national peculiarities would imply structural reallocations that are not politically palatable: if, for instance, support for photovoltaic installations in Germany were to cease – in favor of more convenient locations from a meteorological point of view –, considerable political protests from beneficiaries and lobby groups would have to be overcome.

Given these restrictions, what is the most realistic pathway towards more cooperative RES policies that take cross-boundary benefits into account? Interestingly, the relevant legal provision, the directive 2009/28/EC, already provides for cooperation between Member States (statistical transfers, joint projects, joint support schemes). So far, these cooperation mechanisms have not been used, however. On the one hand, from a pessimistic outlook, one could argue that if not even these existing options are realized, RES policies are likely to remain an exclusively national issue for the time being. The apparent failure of Member States to agree on an extension of binding RES-targets for the post-2020 period[25] might be raised as support for this perspective. On the other hand, the hypothesis of bottom-up convergence implies that explicit cooperation between Member States is not necessarily the crucial *mechanism* at work. Instead, some of the benefits of allocating RES on above-Member-State-level could be indirectly secured – by different national policies aligning (e.g. via spill-over of best-practice regulations) providing a more levelled playing field for RES across the EU. Additionally, the other instruments such as the EU emissions trading scheme and increased cooperation regarding transnational transmission grids would also contribute to integration on RES.

Conclusion

Criticizing Germany’s *Energiewende* as a unilateral approach that inhibits an EU-wide optimization of energy transition policies is misleading. To begin with, the two main pillars of the energy transition project, the nuclear phase-out and the deployment of RES, are less exceptional than sometimes suggested. Nuclear policies in the EU are highly diverse and Germany’s support scheme for RES is very similar to the other Member States’ schemes. Regarding the 2020 horizon, Germany’s RES targets might even be considered as below-average; as for the 2050 horizon, Germany’s RES targets are surely very ambitious. On the other hand, as Germany stands alone with respect to these long-term targets, a comparison with comparative policies is not yet possible.

Moreover, in case of nuclear power, an EU-wide approach would probably not be – due to preference heterogeneity – desirable in the first place. As the nuclear phase out can and should not be imposed on neighboring countries that use nuclear power (France, Czech Republic), a national approach including bilateral negotiations on near-border power plants (e.g., Fessenheim in France, Temelin in the Czech republic) seems more appropriate. Sure enough, phasing-out nuclear power in Germany must be complemented by an according increase in RES deployment so as to avoid substituting domestic with imported nuclear power. Regarding support policies for RES, increased cooperation would increase the cost efficiency of RES

[25] The proposition for the EU‘s Climate and Energy Policy towards 2030 does contain a common EU-wide target for RES. Without identifying clear responsibilities for specific Member States, however, the EU-target can hardly be considered as legally binding.

deployment in the EU. Yet, concerning the externalities of specific RES, there might be preference heterogeneity as well and the argument for laboratory federalism should caution us against unambiguous calls for a completely harmonized EU-wide approach.

Furthermore, the suggestion that a German switch to a green electricity quota scheme would mark the beginning of policy harmonization[26] flies in the face of the actual developments in EU energy policy during the last two decades. The quota scheme has never represented the mainstream way of supporting RES in the EU. In contrast, feed-in tariffs and feed-in premiums, such as implemented in Germany, proved to be most common.

So, considering the European embedment of the *Energiewende* from a more comprehensive perspective, yields the following conclusions: A full and immediate “Europeanization” of the *Energiewende* could not be recommended. Yet albeit such proposals seem too visionary in the first place, there might still be a path towards improved cost efficiency of RES deployment, which is both sensible and feasible: bottom-up alignment of support policies for RES poses no legal obstacles and incurs the least political hurdles.

[26] *Hübner et al*. 2012 (fn. 6): 303.