
SMART AND SUSTAINABLE GROWTH**Reconciling the Single Market Objective
with the Renewable Energy Objective****Georg Zachmann** Research Fellow, Bruegel

During the last two decades, large amounts of political capital have been spent on creating a single liberalised market for electricity. At the same time, administrative measures have been introduced to support renewable electricity generation. The success of these administrative measures (in terms of increasing shares of renewable) is challenging the development of the liberalised market. Consequently, institutional settings that reconcile the two policy targets are needed. The development of market based solutions that are compatible across the Union is essential to achieve the long term target of decarbonising the power sector without putting the internal electricity market into peril.

Renewables targets on a good track

Renewable energy is high on the European political agenda. By 2020, Europe wants to use 20% of its energy from renewable sources, such as water, wind, biomass and the sun.¹ The corresponding targets of the Energy and Climate Package from 2009 have been reiterated in the Europe 2020 Strategy. And it appears that these goals are among the few measurable targets in this strategy document for the next decade that can actually be reached. National support schemes incentivise the deployment of significant amounts of solar cells and wind turbines. Member States transpose their national renewable energy targets into action plans that seem actually capable of reaching the goals set in Brussels. This is an impressive achievement that many observers did not deem possible.

The success of the renewable energy policy is starting to affect other dimensions of European energy policy. Among the headline targets of the European energy policy is the creation of a single energy market. By combining the strength of 27 energy systems, such an internal market should lead to more competition, more efficient use of resources and installations,

1. We want to focus on renewable electricity sources, as this is supposed to bring the largest contribution to the overall renewable energy targets (that also includes biofuels for transport and heating).

as well as lower greenhouse gas emissions. However, the national approaches to deploy and integrate RES-E (electricity generated from renewable sources) in the existing electricity systems are often not based on market solutions and incompatible between Member States. Thus, continuing national policies towards RES-E deployment and integration might put the internal electricity market into peril.

During the next Trio Presidency, significant decisions to integrate the European energy market need to be taken in order to avoid a complete disintegration of the internal market. The good sign is that the “Energy Summit” on 4 February 2011, concludes that an internal energy market is to be reached in 2014. As the third energy market package is to be transposed into national legislation in 2011, the European Council should support the European Commission in ensuring that Member States do not only follow the letter, but also the spirit of the Directive.

Renewables success challenges the Single Market

The European renewable energy policy is in conflict with the internal market on at least four issues. *First*, electricity generated from renewable sources is not traded in a European market. This leads to an artificial divergence of the price for renewable energy in Europe. This is inefficient. *Second*, renewable deployment is one source for congestion in cross-border transmission lines and thus reduces the potential for intra-EU trade of electricity. *Third*, RES-E installations intentionally replace conventional power plants most of the time. Thus, conventional power plants are much less often called upon and median wholesale prices decrease. As conventional power plants are still needed as back-up, Member States are contemplating mechanisms to remunerate the provision of capacity. Those mechanisms risk being non-market based and incompatible across the Union. And *fourth*, every Member State develops its own system for dealing with the intermittency of RES-E. The value of the corresponding services (reserves, frequency control, etc.) is increasing with the deployment of RES-E. Thus, a growing share of the electricity value chain risks to be operated outside the Single Market.

To achieve their national renewable energy target, each Member State has developed a different policy mix. Policy tools include “green certificates”, “feed-in tariffs”, obligations, direct subsidies, preferential grid access regulations, tax breaks, etc. Due to the use of different fiscal, parafiscal and non-fiscal instruments the actual size of the state support for RES-E is very difficult to assess. Data on state aid for environmental protection, collected in the Directorate-General Competition state aid scoreboard –by many means an imperfect indicator for RES-E support, hints to large divergences inside the EU. In 2009, it amounted to 1.1% of the Gross Domestic Product (GDP) in EU27, while it was 2.4% of the GDP in Germany, but only 0.12% of the GDP in Italy.² Consequently, the national systems for RES-E support in

2. In comparison to electricity consumption, the distribution is equally wide. While the member states of the EU27 spend a total of €13 billion on environmental aid and consume about 3000 terawatt hour (TWh). For Germany this ratio is 2.5 times higher and for Italy 16 times lower.

Europe seem to differ, both in structure and in size. This is economically inefficient as it leads to different prices for the same good (electricity produced from renewable sources) within the Union. One striking illustration for the inefficiency of the fragmented support schemes is that there are currently higher incentives for installing solar cells in northern Germany than in southern Italy. This is one of the reasons why the European Commission has been pushing for a transferability of RES-E achievements. Such transferability – for example through the obligation of any Member States support scheme to accept foreign “green” electricity – should quickly lead to harmonisation. But the European Commission did not succeed in 2008-2009, as the present fragmentation is based on a political choice by the Member States at this time. The rationale for this choice lies in national security concerns about supply, but also in national “green” industrial policy considerations. From an economic point of view, an institutional competition argument might have partly justified differentiated approaches. But it is quite clear that the fragmented system based on national state aid and barriers to trade is not only at conflict with the Single Market idea, but also precludes reaching the renewable targets at least cost.

A second impact of RES-E deployment on the internal electricity market is linked to the electricity network. RES-E are characterised by limited predictability and generation far from centres of electricity consumption. Thus, the existing electricity networks will have to accommodate higher security margins and new flow patterns. In the current design of congestion management, both effects decrease the capacity for commercially available transmission capacity. Consequently, intra-EU electricity trade – a cornerstone of the internal market – will decline, if no measures are taken.

A third threat to the internal market is the sheer success of the RES-E support instruments in certain Member States. Since 2005, Germany has deployed about nine gigawatt hour (GW) of wind turbines and 14 GW of solar panels. This is about 18% of the total installed electricity generation capacity in Germany. Spain deployed 10 GW of wind and four GW of solar, which represents 15% of its total installed capacity. Through the zero-variable cost of wind and solar power, those installations typically run irrespective of the electricity price³. Thus, conventional power plants are much less often called upon and median wholesale prices decrease. But, some conventional plants might be essential to meet consumption when a cloudy, low-wind hour coincides with high-demand. However, in the current system those plants will only stay in the market if they can recover their fixed cost by charging very high prices in the few hours they are called upon. To date there is no consensus whether such a system of highly volatile prices (very low prices when RES-E plants are sufficient to meet demand and very high prices if they are not) is politically sustainable and sufficient to incentivise the provision of back-up capacity needed to run the system securely. Consequently, Member States are contemplating alternative mechanisms to remunerate the provision of

3. In countries that have fixed feed-in tariffs, the variable cost of RES-E generators is actually negative, as commercial operators would only accept curtailing production when the operator obtains more money for not supplying than he would obtain from supplying at the feed-in tariff.

capacity. Member States discussions show that those mechanisms risk being non-market based and incompatible across the Union.

And finally, the fourth impact is that the growing share of RES-E increases the need for so called ancillary services. In simplified terms, ancillary services consist of the provision of electricity (or load) to the network at a certain network point at short notice. That is, if the wind does not blow as expected in a certain region, the system operator has to balance the difference between demand and supply by either (i) bringing in electricity from another region, (ii) increasing conventional generation in this region or (iii) reducing demand in this region. Electricity markets in Europe essentially evolved out of nationally optimised systems of power plants and networks built in the pre-liberalisation period. Networks are remunerated from regulated tariffs. Thus in most European countries, liberalisation mainly consisted of implementing one Single Market-based price signal – a wholesale electricity price. The idea was that the price signal could coordinate the optimal scheduling of power plants (switch on only the cheapest plants to meet the demand), the cross-border electricity trade (export as long as you are cheaper than your neighbour), as well as power plant investments (build a power plant that can create profit given the expected distribution of prices). Since electricity traded at the wholesale-level represented the largest part of the non-regulated value in the electricity sector, this idea was deemed sufficient. Other services, essential to maintain electric-system reliability, only represented a negligible share in the variable electricity cost of the final consumer. Consequently, many Member States allowed system operators to procure these services and bill them to the customers as a part of their regulated tariffs. Due to the limited predictability and intermittency of RES-E system, operators will have to provide significantly higher volumes of these services than in the past. Consequently, the procurement of ancillary services will feature an increasing share in the value of electricity. Contrary to the standardised trade of electricity at forward and spot markets, ancillary services are typically not traded across border – because market arrangements in Member States are incompatible. Thus, a growing share of the electricity value chain risks to be operated outside the Single Market.

In the following section, a couple of recommendations are presented to solve the outlined issues and to accommodate both the renewable and the internal market targets.

Compatibility of national market design choices is essential

Reconciling the renewable energy target with the internal market target is feasible and beneficial. Only in a functioning single electricity market can the feed-in of an increasing amount of renewable electricity be managed at reasonable cost. Wide geographic averaging of intermittent generation and consumption reduces the need for expensive back-up capacities. Trade of ancillary services decreases market power in this segment. And optimal management of transmission lines reduces losses. Accommodating the renewable and the internal market targets requires, first, an acknowledgment of the need to reform the design of electricity markets in

order to prepare national electricity systems for increased deployment of RES-E, and second, the EU must also make sure that the national market designs are compatible.

The electricity sector is a complex system with many actors. The corresponding market designs are quite heterogeneous. At the high voltage level alone, the spectrum ranges from countries with state-owned monopolies with regulated prices to countries that separate prices according to time, location, response time, capacity made available, quality of the power delivered etc. In Europe, the most widespread system is a national wholesale market with hourly prices combined with a national solution for renewable support, capacity provision and ancillary services. Thereby, only the electricity at the wholesale market can be traded across borders. As lined out in the last section, the increasing share of RES-E is challenging the ability of this market designs to efficiently manage the system.

Thereby, the challenge of defining functioning markets for the different dimensions of electricity has been accepted by Member States to different degrees. While Poland seems to accept that prices for electricity at different locations of the network cannot have the same price in the presence of internal congestion and network losses, Germany is still fighting this insight. And while Nordic countries allow integration of demand-side measures to increase reliability, the United Kingdom does not do so. So, the big challenge is to get development of new market designs going without ending in incompatible national systems. Member States should not strive to find the optimal solution for deploying and accommodating RES-E in their respective markets. For in such a national approach, the political economy around the differing legacies of power-plant-parks would favour the development of up to 27 almost equivalent though incompatible systems. Thus, the general rule should be that all dimensions of the commodity electricity should be freely tradable inside the Union.

Consequently, the next Trio Presidency should make sure that the converging prices between Member States in (the declining) wholesale segment are not mistaken for the fulfilment of the internal market. It should in fact monitor much closer developments in the other – still nationally dominated – segments. Beyond pure monitoring, a bold step towards the development of compatible market designs that, at the same time, allow reaching both the renewable energy and the internal market targets is needed. For this purpose the Agency for the Cooperation of Energy Regulators (ACER), set up in the third liberalisation package, should be upgraded from its role of coordinator, for certain narrowly defined processes, towards an institution that possesses own powers to enforce compatibility. Only then, the hundreds of main stakeholders (27 governments, 27 national regulation authorities, 33 TSO's, a dozen power exchanges, hundreds of electricity trader, producer, large consumer, etc.) could be incentivised to cooperate. Above this, the possibility to make the RES-E feed-in tradable across Member States should be revised.

The big advantage of linking electricity systems is that a joint system can be much more than the sum of its parts. But to make this happen the parts have to fit.