

Black-out concerns against markets: Capacity mechanisms in European electricity markets

Merethe Dotterud Leiren, Kacper Szulecki, Catherine Banet and Tim Rayner

Work in progress. Please to not cite without permission from the authors.

Paper to be presented at the panel P061 'Climate and Energy Policy Revisions in Europe' in the section 'New Challenges of Sustainable Energy Transformations? Ambiguity, Contingency, and Politics' at the General ECPR Conference 2018, 23 August, Hamburg.

Abstract: The increasing use of capacity mechanisms in the EU has created tensions between the European Commission, which encourages cross-country cooperation, and Member States that favour backup solutions such as capacity markets and strategic reserves. On this background it is interesting to understand why the countries have introduced capacity mechanisms and to what extent and how the EU has influenced the developments of national capacity mechanisms. Focusing on the United Kingdom, France and Poland, the analysis shows that black-out concerns have been given more emphasis than the functioning of the markets. The developments have primarily been domestically driven, but the Commission has forced the countries to integrate neighbouring countries and interconnectors in their systems.

Keywords: Capacity mechanisms, energy, electricity, security of energy supply, EU, public policy

Acknowledgements: The Research Council of Norway has funded this study through the Large-scale Programme for Energy Research ENERGIX (InGrid, project no. 243994 and REMIX, project no. 243756). Statkraft, Statnett, The Norwegian Water Resources and Energy Directorate, Swedish Energy Agency and Energy Norway have also funded this project and contributed with valuable feedback in discussions. We are grateful to the interviewees, making it possible to write this paper, and to Anne Therese Gullberg for her constructive thoughts in an early phase.

Introduction

An increasing number of countries takes actions to secure their electricity supplies and prevent potential black-outs by introducing capacity mechanisms. Capacity mechanisms are measures that offer additional rewards to capacity providers in return for maintaining existing capacity or investing in new installations to generate electricity. Developments like the green transition plays a role for such actions. Paradoxically, increasing shares of renewable energy pushes capacity out of the market, which is the same capacity that contribute to ensure integration of a high share of renewable energy in the energy system (González-Díaz 2015). While the European Union encourages the growth in renewable energy, the increasing use of capacity mechanisms has created tensions between the European Commission (Commission) and the Member States. Member States favour backup solutions, e.g. capacity markets and strategic reserves. In contrast, the Commission has been hesitant when it comes to capacity mechanisms, as they can affect the functioning of the internal market negatively and delay the transition towards more renewable energy sources within the electricity generation mix. Rather, the Commission encourages cross-country cooperation, i.e. countries secure their energy capacity across country borders via interconnectors. Given this conflict, it is interesting to understand the influence of the EU on the developments of national capacity mechanisms: Why have the countries introduced capacity mechanisms? Has the EU influenced the developments of national capacity mechanisms and, if so, how?

To respond to these questions, we draw on theories of Europeanisation and compare three European countries: France, Poland, and the United Kingdom. The comparison is important because there is a lack of comparative studies in the Europeanisation literature, which is dominated by single case-studies (Töller 2010). It is also interesting because of the conflict between the Commission and the Member States. While the Commission pushes in the direction of removing capacity adequacy mechanisms, a number of Member States have, since 1990, introduced new support schemes to address generation adequacy concerns. The discussions have been particularly tense in the selected countries. The United Kingdom carried out its first auctions for a capacity market in 2015; Poland followed suit the year after; and France

adopted a market-friendly capacity market mechanism with the first auctioning round in winter 2016-2017.

It is of interest to understand the interaction between national policies for capacity adequacy schemes and the EU. The Commission is concerned with the internal market and a level playing field and prefers cooperation between Member States rather than backup solutions (Commission 2017). In contrast, Member States want to be in control of their energy security themselves. Given such controversies, it is of interest to understand whether and to what extent the EU has influenced the developments of national capacity mechanisms.

The dispute is about to what extent an energy-only market can provide the necessary capacity and ensure security of energy supply and how far the EU should allow for interventions by the Member States. Given the increasing share of renewable energy, such questions become more and more important. Member States' concern about security of supply increases as, with the exception of hydropower, renewables are typically intermittent, increasing the likelihood of a blackout, unless other flexible mechanisms are in place.

In the following, we first introduce Europeanisation as a theoretical framework. Second, we present the methods used. Third, we describe the EU policies that address capacity mechanisms and the different capacity mechanisms in three countries. A discussion follows and, finally, a conclusion.

Europeanisation

Europeanisation as a concept has many meanings. One 'face' of Europeanisation (Olsen 2002) is that it refers to 'the consequences of European integration as they are observable within the Member States of the EU (and beyond)' (Goetz and Meyer-Sahling 2008: 4). As such, it is treated as an output caused by integration in many appearances. A large empirical literature has studied the effect of the EU on the Member States, highlighting different processes through which the EU changes domestic policies. Some processes are voluntary and include mechanisms like learning (Ladrech 1994), which occurs when government draws lessons from the experience of

others and then apply these lessons. While Claudio Radaelli (2008) argues that modes of governance that facilitates learning (e.g. the Open Method of Coordination) seldom facilitates Europeanisation, David Jacobs (2012) finds that such governance modes have effected Europeanisation via learning in the case of renewables policies.

In contrast, coercive adaptive pressures, such as ‘institutional compliance’ implies that EU legislation prescribes certain requirements with which the Member States have to comply (Knill and Lehmkuhl 2002). Such coercive pressures constrain domestic policy making not necessarily directly via EU law, but also due to legal uncertainty arising from EU’s market making policies (Schmidt 2008). Legal uncertainty related to judicialisation of policy-making, may make national actors change their plans of policy-making or it changes their opportunity structures (Töller 2010). Similarly, negotiations in the ‘shadow of hierarchy’ (i.e. legislative threats or inducements) may affect national policy-making (Héritier and Lehmkuhl 2008). Anette Töller (2010) mentions state aid guidelines as an example, where the Commission, given its far-reaching competence to ban certain activities, it negotiates with the Member States rather than adopting formal decisions.

Capacity mechanisms have an impact on competition in the internal electricity market. Many of these mechanisms involve state aid, so they are subject to EU State aid rules.¹ As the Commission aims to ensure a level playing field in the internal market, *it could be expected that the Commission pushes the development of national capacity mechanisms from being dispersed and disintegrated towards harmonised, cross-country cooperation.*

Europeanisation may be a combination of voluntary and coercive policies (Radaelli 2003), but the softer European law is, the more difficult it is to find evidence that supports it. This is further complicated by the fact that in practice there is no clear line between what is EU influence and what is influence from other sources. Because factors at the EU level and national level interact (Olsen 2002), there is a need to include policy change perspectives that have been developed studying domestic policy.

¹http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

We therefore explore the developments in domestic policy, expecting domestic policy concerns to pull in the opposite direction of the EU, towards dispersed and disintegrated capacity mechanisms.

Methods

We compare three European countries: France, Poland and the United Kingdom. It is interesting to study these three countries because they are all known for having relatively independent positions when it comes to energy policy: Poland is considered being a ‘brake’ in EU’s efforts to develop climate policy because of its reliance on coal; France seems relatively unaffected by EU renewable energy policy, being based on nuclear electricity generation; and Brexit amplifies the UK’s wish to act without EU interventions. The three countries have adopted different capacity adequacy mechanisms, yet they also share similarities.

The analysis mainly builds on qualitative data. Sources of written data include blogs, policy papers, consultancy reports and newspaper articles. Oral data includes collection of information from anonymous interviews carried out in the REMIX project from 2016 to 2017 (the numbering of interviews in the text refers to these interviews). The interviews have provided data about perceptions, ideas and negotiation processes, which is otherwise difficult to access.

EU policies for capacity adequacy regulations

Capacity mechanisms are measures that ensure that electricity supply matches future demand². They are designed to support investment to fill the expected capacity gap and ensure security of supply. Typically, capacity mechanisms offer additional rewards to capacity providers, on top of income obtained by selling electricity on the market, in return for maintaining existing capacity or investing in new capacity needed to guarantee security of electricity supplies.³

At the EU level, the Electricity Directive from 2003 and 2009 have regulated capacity mechanisms (González-Díaz 2015). These directives have focused on the

²http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

³ *ibid*

need to attracting funding and securing investments that otherwise would not have been implemented. The “missing money” problem exists because it may not be particularly interesting for an investor to invest in capacity that there is seldom a need for and it is uncertain when such capacity needs arise. If investment decisions were made on a strictly commercial basis, and if markets were not subject to policy interventions or price caps, it is plausible that profit-motivated generation investment without explicit policy guidance could deliver adequate capacity (Newbury 2015). This depends, however, on investors having confidence that the revenues earned from the energy markets (including those supplying the ancillary services needed for short-term stability) will be adequate to cover investment and operating costs. ‘Missing money’ occurs when this confidence is not present, particularly when the likelihood of political intervention prevents prices rising high enough to reach the so-called ‘value of lost load’ frequently enough to remunerate investors.

EU climate policy has also affected the perceived need for capacity mechanisms. In 2007, EU leaders set three key climate and energy targets for 2020 (from 1990 levels): 20% cut in greenhouse gas emissions; 20% of EU energy from renewables; and 20% improvement in energy efficiency. These targets are included in the 2020 package, which was adopted in legislation in 2009, thereby making them legally binding. The same year the Renewable Energy Directive 2009/28/EC was published. It also required that 20% of the energy consumed within the EU is renewable and stated that there is a need to support renewables and the integration of renewables into the transmission and distribution grid. The 2030 climate and energy framework adopted in October 2014, builds on these policies, setting the following key targets for 2030 (from 1990 levels): At least 40% cuts in greenhouse gas emissions; 27% share for renewable energy; and 27% improvement in energy efficiency.

The EU climate packages and the Renewable Energy Directive 2009 have contributed to increasing the support for renewable energy and share of renewable energy. This development has made capacity mechanisms important as a back-up for intermittent solar and wind power.

The EU's integrated energy and climate strategy is based on the energy triangle, i.e. the three principles of sustainability, energy security and competitiveness, aims to secure sustainability, security of supply and competitiveness (often understood as affordable energy) (Commission 2010; 2011; Geden and Fischer 2008). In the energy triangle, renewable energy and capacity mechanisms highlight different goals, where renewable energy primarily serves the sustainability goal and capacity mechanisms energy security. The emphasis given to each of the objectives in the energy policy triangle remains open (Szulecki et al. 2016) and is related to the question of national versus EU level competence. Being of high priority to national politicians, energy security is a key concern in national energy policies. Member States therefore insist on their right to decide on their own mix of energy, also in a common European energy market (Tews 2015: 2). In contrast, the Commission tends to emphasize competition and internal market compatibility.

Capacity mechanisms have an impact on competition in the internal electricity market. Many of these mechanisms will qualify as state aids in the meaning of Article 107(1) TFEU, and will be subject to EU State aid rules.⁴ The Guidelines on state aid for environmental protection and energy (EEAG) (2014-2020) address capacity mechanisms. In these guidelines, the Commission acknowledges that Member States may need to introduce capacity mechanisms that contribute to sufficient capacity to have available power generation. The Commission states that the countries must define the capacity mechanism clearly, and that it should be consistent with the analyses regularly carried out by the European System of Network Operators for Electricity. At the same time, the Commission is calling for competition to be used in the allocation of such support and that different technologies and alternative solutions can participate in competition, such as demand side management, cables and storage opportunities.

The Commission has been adamant that its energy-only 'Target Electricity Model' would be sufficient to deliver reliability (Newbery 2015), without the need for

4
http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

separate arrangements to ensure adequate capacity was available. The Commission's Directorate General for Competition (DG COMP) has tended to be critical of capacity payments, arguing that they 'often have more to do with compensating generators for stranded assets than delivering reliability at least cost' (Newbery 2015: 2). 13 April 2016 the Commission published an interim report of the sector inquiry on capacity mechanisms. The Commission (2016) expressed concerns that capacity mechanisms may favour particular producers and technologies unduly and that they create electricity trade obstacles across borders. The Commission points out that the capacity mechanisms may distort cross-border electricity trade and competition.

In the following section we will describe the development of the capacity mechanisms in the selected Member States and explore whether and how the Commission may have influenced the development of capacity mechanisms in the countries.

National capacity mechanisms

An increasing number of Member States are taking action to secure their electricity supplies and prevent potential black-outs by introducing capacity mechanisms. Discussions about introducing capacity mechanisms are related to the extent to which prices should regulate demand and supply in energy shortage situations or whether governments should intervene. In an energy-only market, prices regulate demand and supply of energy. When there is a shortage of capacity, prices go high and reduces demand. While an energy-only market may be economically and technically feasible, it may not be politically feasible (see Skodvin et al. 2010). Extreme high energy prices and fears of blackouts are politically unacceptable. Therefore, Member States prefer to intervene in the energy market, introducing capacity regulation mechanisms for the purpose of reducing the frequency and level of price spikes (ACER 2013: 4). Although such interventions may be economically sub-optimal, they are politically legitimate (DNV GL 2014: 8), i.e., economically optimal solutions are not the only legitimate options.

The United Kingdom

Until 2014, the UK relied on an energy-only market to deliver sufficient capacity. Although there have been other mechanisms at various levels operating for decades, the UK Government introduced the first explicit capacity adequacy measure as part of its Electricity Market Reform package. It was decided on in 2010 and implemented in the Energy Act 2013 and the Electricity Capacity Regulations 2014 No. 2043). The Capacity Market is a bidding system, where electricity generators compete for long-term contracts. Successful bidders are awarded capacity agreements that define the payment for capacity to be delivered when required during the delivery period. They are obliged to deliver energy in periods of system stress.

In terms of the need for a mechanism in principle, around a quarter of existing capacity – mainly coal and nuclear power stations, were expected will close by 2020. All being well, they would be replaced by low-carbon generation. However, the Department of Energy and Climate Change (DECC) (since 2016: Department for Business, Energy and Industrial Strategy), which was responsible for the Electricity Market Reform, found that ‘de-rated’ capacity margins could fall below five per cent by around 2020, increasing the likelihood of ‘blackouts’. Moreover, the future electricity system was expected to contain more intermittent forms of generation (such as wind) and inflexible generation (such as nuclear), compounding concerns about security of supply (DECC 2010). A new instrument was therefore deemed necessary, to meet several objectives: (i) security of electricity supply: ‘to incentivise sufficient investment in generation and non- generation capacity to ensure security of electricity supplies’; (ii) value for money: ‘to implement changes at minimum cost to consumers’; (iii) coherence with decarbonisation: to ‘avoid unintended consequences [...] to minimise design risks and ensure compatibility with other energy market policies, including decarbonising the power sector’ (DECC 2014b).

It subsequently became clear that government had a fourth specific objective: to deliver new gas capacity. Later ministerial announcements made it explicitly clear that this is now something government was expecting of the capacity market (Orme 2016). Essentially, the government was persuaded by arguments based on the ‘missing money problem’ (Joskow 2008).

As part of the Electricity Market Reform process, DECC and its consultants considered four main options: a capacity payment, a decentralised capacity obligation, an auction-based capacity market and a targeted mechanism (strategic reserve). It signalled an initial preference for setting volume rather than price centrally (Bolton and Claussen 2017). Of the two volume-based mechanisms, the targeted mechanism or market-wide auctions, DECC indicated an initial preference for the former. Under a targeted capacity mechanism, payments are made only to those generators that provide the additional capacity needed to make up any anticipated shortfall, rather than paying all generators the same. DECC predicted that a targeted mechanism would result in more new-build gas plant (Bolton and Claussen 2017).

Responses were mixed. Many existing generators opposed the introduction of a targeted mechanism (ECC Committee 2011: 51), based largely on concern about a “slippery slope” effect, whereby remaining within the targeted subset of capacity receiving the capacity payment becomes more attractive than remaining in the market, thus undermining the energy only market further. This was deemed likely to exacerbate the ‘missing money’ problem. Many consultation responses and witnesses to the ECC Committee inquiry running concurrently cited difficulties where targeted capacity mechanisms have been introduced in other countries. Others were sceptical of the need for a Capacity Mechanism at all (Bolton and Claussen 2017). Significantly perhaps, with the exception of RWE, all the big six utilities favoured a capacity market.

In addition to growing attention to the risks of the ‘slippery slope’ and ‘missing money’, a further concern underlay the government’s shift in favour of a market-wide mechanism. Where the 2010 consultation document had suggested that the capacity margin could fluctuate within a range of 5-11% in the 2020s, new calculations taking into account interventions to reduce carbon emissions, incorporating the effects of plant closures and increasing amounts of low carbon generation indicated that de-rated capacity margins could fall to below five per cent in some years, by the early to mid-2020s. At the end of the consultation process, a Capacity Market was eventually justified as the preferred option as ‘it best addresses the market failures and is robust to a range of scenarios. It should also reduce regulatory and market risks for investors, potentially reducing investment costs’ (DECC 2011a: 1).

Critics of the capacity market have highlighted the role of National Grid and of the team within DECC that devised it. The National Grid's position gives rise to evident conflicts of interest, which are arguably evident in the methodological assumptions it adopts (Interview 3, 13, 14). In assessing future security of supply and advising on the amount of capacity to be procured, National Grid made what appear to be some conservative assumptions, particularly regarding generation availability and the contribution to be made by both interconnection and demand side response (Baker et al. 2015; Newbery 2015). Although its detailed assessment recognised that interconnection would likely contribute to security at times of peak demand, the amount of generation capacity to be procured for delivery in 2018/19 is based on the assumption of a zero net contribution from neighbouring systems, something 'at odds with the standard probabilistic approach to security of supply' (Baker et al. 2015).

As for the team within DECC that devised the overall concept:

'because DECC was so short of staff, and [...] although extremely bright [...] with not a great background in energy markets, what happened is they imported a lot of staff from people like Energy UK and from the big six [...]. And there are lots of working parties which helped design the detail of the capacity mechanism and the market [...] working parties were stuffed full of Big Six personnel. And so, to me it was no surprise at all that the capacity market came out as it did' (Interview 13).

An acute concern over the political implications of 'black-outs' must also be recognised. Since policy makers and system operators do not have to pay to avoid them, there will be a tendency to over-procure (Newbury and Grubb 2015: 15). While the independent Panel of Technical Experts was critical in its analysis of National Grid's methods, and made a number of strong recommendations, they were not taken up (Newbery 2015: 13-14).

The Commission's decision to approve contracts for difference in June 2014 was widely expected. Approval of the capacity market (Commission 2014), however, with few conditions, triggered controversy (van Renssen 2014), including internally at the Commission (Interview 14; Van Renssen 2016). The main commitment made by the UK, as described in the decision letter (Commission 2014), is to enable interconnected capacity excluded from the first auction to participate in the Capacity

Market ahead of the second auction, due in 2015 (for 2019-2020 delivery) (Commission 2014).

Critics were disappointed that the Commission, though noting criticism from the likes of the Panel of Technical Experts highlighting the likelihood of over-procurement, gave the UK government the benefit of the doubt. While the UK government cited the missing money problem as one of the main market failures that the Capacity Market would address, there were grounds to believe that the problem would be removed well before the first delivery year, by which time energy prices would more fully reflect scarcity value thanks to reforms to the Balancing Market (Baker *et al.* 2015; Wynn and Schlissel 2017). The Commission, in principle, could have picked up on this, to justify a full 18 month investigation. A further issue arose in that by not allowing demand-side-response providers contract lengths longer than a year, while new power stations got 15 years, the dominance of fossil fuel generation would be strengthened, contrary to point (233)(d) of the EEAG. Further objection focused on the provision of illegal indirect subsidies to achieve air pollution upgrades mandated by the EU Industrial Emissions Directive (Littlecott 2014). DG Comp's decision generated suspicion that it was politically, rather than legally motivated. At a time when relations between the UK and the Commission were already difficult owing to the December 2013 decision (Davey 2013) to launch a 'phase two' investigation into Hinkley Point, 'pre-Brexit when Europe still cared about keeping UK on-side [...] I think they just *gave* them the capacity market' (Interview 14).

For their part, UK civil servants working on the Electricity Market Reform found the role of the Commission to be 'very significant!' (interview 9), with DECC:

'in constant dialogue with the Commission and in particular DG Energy, DG CLIMA and DG COMP. Energy and CLIMA more in the policy development phase and then DG COMP obviously when we were informally discussing and submitting the state aid clearances. [...] It is a very onerous process. It is a very significant part of the process, it had material effects on the design' (Interview 9).

Documents confirm ongoing dialogues between the government and the Commission about the EEAG (see for example, DECC 2014a, p. 12). The fact that the UK received clearance for among others the capacity market makes some informants draw the

conclusion that the Commission tends to fall in line with national government wishes (Interview 4). Other informants argue that clearance is a result of the fact that the state aid guidelines had already been taken into account while designing the measure (Interview 9; see also 10; 11).

France

While France has traditionally been an energy-only market, the French government has recently established a capacity market. Consensus around the need for a generation adequacy mechanism was quickly established within the energy sector. In 2010, the principle of an obligation capacity mechanism promoting both generation capacity and demand response was enshrined in law. However, the design of the mechanism itself was subject to much debate and took several years to agree on. Once finally set at national level, the mechanism had to be revised within a short time frame to bring it in consistency with EU law and the requests from the Commission before being finally approved in November 2016. With the first delivery year starting 1 January 2017, the mechanism took seven years to establish.

In many respects, the challenges encountered by France today result directly from the choices made between the end of WWII and the 1970s/1980s, and in particular two issues related to production and consumption patterns. First, French authorities decided to develop nuclear energy as a main source of electricity production, with little diversity in the generation mix and the dominance of Electricité de France (EDF) as the incumbent operator. Second, they made the decision to rely heavily on electric heating, a choice which has resulted in situations of consumption peaks during the cold winter periods on a recurrent basis since the end of the 1990s, creating imbalance in the energy system between demand and offer, in the absence of storage capacity.⁵ In 2010, the French transmission system operator (Réseau de Transport d'Electricité; RTE), published its annual Offer-Demand Assessment Report

⁵ French Senate, Investigative committee on the real cost of electricity, Report No 667 (2011-2012) by Jean Desessard, *Électricité : assumer les coûts et préparer la transition énergétique*, 11 July 2012; CRE, *Délibération de la Commission de régulation de l'énergie portant avis sur le projet de décret pris pour application de l'article L.335-6 du code de l'énergie relatif au dispositif de contribution des fournisseurs à la sécurité d'approvisionnement en électricité et instaurant un mécanisme de capacité*, 29 March 2012.

where it depicted a growing alarming situation: risks of electricity supply will only increase in the coming years and will result in serious threats of energy shortage as early as during winter 2015-2016.⁶ Managing those peak situations is the main motivation in the adoption of a capacity mechanism.

Two additional factors, which appeared in the years 2000s, increased the level of threat for security of supply in France. The first consisted in the management of thermal energy generation capacity (fossil fuel, coal) and the lack of investments in the capacity able to contribute to consumption peaks situations. Some thermal production facilities were to be closed for economic or environmental reasons (compliance with new EU environmental norms). Other plants newly commissioned in the early 2000s were soon facing a missing money problem due to decrease in energy consumption in the aftermaths of the 2008 financial crisis and the depreciation of the wholesale electricity price, which prevent them from covering their costs on the markets (for most of them, combined gas cycle power plants).⁷ The lack of investment and profitability in new capacity worried electricity producers which informed public authorities of the difficulties they face in recovering costs in the energy-only market. The second factor related to the increasing share of renewable energy sources in electricity generation and its effect on the energy system (intermittency) and market dynamics (competitiveness of sources able to contribute to peak situations).⁸ Between November 2012 and November 2013, the renewable energy production grew by more than 33%, due to advantageous support measures.

The combination of those factors, together with low CO₂ and coal prices and the absence of mechanism to develop demand response, prompted discussions on security of supply at the national level. The French government's immediate reaction was, first, to adopt in 2009 a new multi-year plan of investment to define short term

⁶ RTE, *Bilan prévisionnel de l'équilibre offre-demande d'électricité en France* (2010), p 13.

⁷ RTE, *Un mécanisme de capacité révisé pour améliorer la sécurité d'approvisionnement et maintenir la concurrence dans le secteur électrique*, Rapport d'accompagnement du nouveau jeu de règles, 2017.

⁸ French Senate, Investigative committee on the real cost of electricity, Report No 667 (2011-2012) by Jean Desessard, *Électricité : assumer les coûts et préparer la transition énergétique*, 11 July 2012, p 97.

objectives,⁹ and, second, to establish a working group to study the consumption peak phenomenon and make proposals on how to best manage it. The conclusions from the working group were presented in April 2010 in the so-called Poignant-Sido Report (named after the two members of the Parliament who led the work: one from the National Assembly, one from the Senate).¹⁰ The Report confirmed the diagnostic and the existence of market and regulatory failures, and made 22 proposals. Notably, the Poignant-Sido Report concluded that an energy-only market could not deliver the necessary solutions alone and proposed the establishment of a capacity mechanism in France consisting of a capacity obligation on all suppliers along with a certificate market (Proposals No 16 and 17). As the problem applies to the whole territory, the mechanism should be nationwide and, in order to involve all actors and capacity, it should be decentralised. One exception to that principle will be the specific tender for the construction of a new gas-fired power plant in Brittany, approved by the Commission in 2017.¹¹ Quickly after the publication of the report, the principle of a capacity obligation mechanism was enshrined in the Electricity Market Reform law (NOME law) adopted in December 2010.¹² Importantly, the purpose of the mechanism is to stimulate investments in generation capacity and demand response at the same time, with the same goal of better managing consumption peaks and ensuring security of supply.¹³ In that way, generation and demand response capacities should be equally valued. Both the Poignant-Sido Report and the parliamentary debates during the adoption of the NOME Law refer to foreign experiences with capacity mechanisms, both in Europe and in the United States, as a source of inspiration and comparison. The mechanism was to enter into force in 2015.

In order to implement the new mechanism defined in the NOME law, transmission system operator was tasked by the Ministry in charge of Energy and Industry to elaborate the detailed rules of the mechanism. Intense debates took place

⁹ *Programmation Pluriannuelle des Investissements de production électrique (2009-2020)*.

¹⁰ Poignant-Sido Report, *Groupe de travail sur la maîtrise de la pointe électrique*, April 2010.

¹¹ European Commission, State aid case SA.40454 - Tender to support gas-fired power plant in Brittany (CCGT), Approval Decision of 15 May 2017.

¹² French law No 2010-1488 of 7 December 2010 reforming the electricity market (NOME), Art. 6; codified in Article L. 335-1 et seq of the Energy Code.

¹³ Article L. 335-1 and 335-2 of the Energy Code.

during the phase of elaboration of transmission system operator's report, which was subject to consultation. The Union of the French Electricity industry (*Union Française de l'Électricité*, UFE) was concerned about the equity of the system, and argued in favour of sharing amongst suppliers the burden of what they argued amounts to a public service obligation.¹⁴ The electricity-intensive industry and aggregators defended the valorisation of demand response. The transmission system operator delivered its report in October 2011, defending a decentralised mechanism.¹⁵ Although a decentralised model seems to advantage them, new market entrants like alternative suppliers were concerned that a decentralized model would in practice favour the historic incumbent EDF, and proposed a centralized bidding process based on investment projects. The transmission system operator rejected the latter proposal. The implementation decree was adopted in December 2012, confirming the decentralised model and a market-based approach relying on a tradable certificate scheme.¹⁶

The manner to further implement the new system of capacity mechanism was again subject to consultation and discussion with the sector. The wide process of consultation led by the General Directorate of Energy and Climate (DGEC) of the Ministry of charge of Energy took place between 2012 and 2014, although the transmission system operator played, again, a central role in the design of the mechanism. The government asked the national regulatory authority (*Commission de Régulation de l'Énergie*, CRE) and the national competition authority (*Autorité de la concurrence*) to deliver an opinion on the draft text.¹⁷ Both authorities came with a series

¹⁴ In its Final Decision approving the scheme under state aid rules, the European Commission found out that the allocation of capacity guarantees does constitute a selective advantage on capacity operators which cannot be defined as a compensation for a public service obligation under Article 3 of Directive 2009/72/EC as argued by the French authorities.

¹⁵ RTE, *Rapport au Ministre chargé de l'Industrie, de l'Énergie et de l'Économie numérique sur la mise en place du mécanisme d'obligation de capacité prévu par la loi NOME*, 1 October 2011.

¹⁶ Article 2, Decree n° 2012-1405 of 14 December 2012.

¹⁷ CRE, *Délibération de la Commission de régulation de l'énergie portant avis sur le projet de décret pris pour application de l'article L.335-6 du code de l'énergie relatif au dispositif de contribution des fournisseurs à la sécurité d'approvisionnement en électricité et instaurant un mécanisme de capacité*, 29 March 2012; Autorité de la concurrence, *Avis No 12-A-09 concernant un projet de décret relatif à l'instauration d'un mécanisme de capacité dans le secteur de l'électricité*, 12 April 2012.

of critical comments on the envisaged mechanism, such as the extent to which it contributes to security of supply, the lack of impact assessment,¹⁸ the additional costs for final customers, risks of distortion of competition on the envisaged capacity due to the dominant role of the historic incumbent EDF and the fear that EDF could benefit from all the capacity payments. The rules were finally approved by the Ministry in charge of energy in an Order of 22 January 2015.¹⁹ The 2015 Order is completed by ‘Capacity Market Rules’, also called ‘The Rules’, which specify the certification parameters, the suppliers’ obligation, the trading of certificates as well as the associated transparency mechanisms.

The legislative basis for this mechanism has been challenged before national and EU courts, although the procedures are now closed.²⁰ The applicant before national courts was the national association of alternative retail energy providers (*Association nationale des opérateurs détaillants en énergie*, ANODE) has been particularly active, notably arguing that the mechanism would automatically put EDF in a position to abuse its dominant position on the future market for capacity certificates, with consequences on both the generation and supply markets.

The mechanism has also been under the scrutiny of the Commission, Directorate General for Competition (DG COMP), both as part of the Sector Inquiry²¹ and an individual state aid case.²² DG COMP raised several questions as to its compatibility with state aid rules, and in particular the EEAG Guidelines. After intense

¹⁸ In 2018, RTE performed a review of the existing impact assessments concerning the implementation of capacity mechanisms in general and specifically the mechanism implemented in France. Source: RTE, *Analyse d’impact du mécanisme de capacité*, January 2018.

¹⁹ Order of 22 January 2015 concerning the capacity mechanism rules, taken in application of Article 2 of Decree n° 2012-1405 of 14 December 2012, OJFR of 25 January 2015.

²⁰ French Council of State, Decision No 369417 of 9 October 2015; Court of Justice of the European Union, Case C-543/15, ANODE v Premier minister and Ministre de l’Ecologie. For a review of the case, see presentation C. Banet, ‘Capacity markets and the internal market: the French court case C-543/15. A missed opportunity?’, EU Energy Law Seminar, Energy Norway, 26 April 2016. Available at:

<
<https://www.energinorge.no/contentassets/2f3a19cc68ec47d8bd20ca4db39cea90/presentation-banet-cap-mech-france-energi-norge-uio-seminar-26042016-final.pdf>>

²¹ Procedure launched in April 2015 under the state aid rules. Interim report published in April 2016. Final report expected by the end of 2016.

²² State aid case SA.39621 - Country wide capacity mechanism. Latter amendments to the scheme focusing on demand response were also subject to a separate decision of the European Commission: State aid case SA.48490 – Demand response scheme.

negotiations between the French government and DG COMP, and the consecutive adoption of some amendments, the French capacity market mechanism was finally deemed compatible with EU rules and so authorized by the Commission. The dialogue with the Commission services also involved the Directorate-General for Energy (DG ENER), although the signals sent were not always similar with the line defended by DG COMP.²³ DG ENER was at that time in the phase of finalizing its proposal for the Clean Energy for All European Package and preparing for a further step in the liberalization of the internal energy market.²⁴ DG ENER therefore saw some value in more temporary and targeted mechanisms, targeting plants to be decommissioned.²⁵

Looking at its functioning, the French capacity mechanism imposes obligations on both electricity suppliers and operators of generation and/or demand response capacities. It is based on a capacity obligation on suppliers, along with a certificate market. Every year, electricity suppliers are assigned a capacity obligation. They are required to hold a certain amount of capacity guarantees (ie capacity certificates), determined by the TSO in proportion of the electricity consumption of their consumers in peak periods (PP) (usually in winter), in the four coming years (multi-annual generation adequacy forecast). By fulfilling their obligation, they contribute to the security of supply in proportion to the electricity consumption of their customers. In doing so, they attest of their capacity to provide the actual consumption of their clients during critical times.²⁶ On their side, all operators of generation capacity and/or demand response are required to certify all of their capacity through a contract to be concluded with the transmission system operator, who issues the guarantees (contracted capacity). There is consequently a certification process, where the capacity owner must actively seek certification from the responsible grid manager. At the end of the process, each certified capacity is attributed a volume of capacity guarantees. After winter, the generation adequacy forecast and the scheduled availability declared

²³ F. Marty and T. Reverdy, *Le Marché français de capacité d'électricité*, *Revue de l'OFCE*, 154 (2017) 179-210.

²⁴ Communication from the European Commission, *Clean Energy Package for All Europeans*, COM(2016) 860 final, 30 November 2016.

²⁵ European Commission, *Final Report of the Sector Inquiry on Capacity Mechanisms*, Commission Staff Working Paper, COM(2016) 752 final, 30 November 2016, p 10.

²⁶ Art. L335-1 to 335-6, Energy Code.

during the certification process will be compared to that actually observed during peak periods, and updated if necessary. A financial settlement will be calculated for the resulting differences. However, the producers subject to purchase obligation are not covered.

Redemption of capacity guarantees proves the contribution of the suppliers to the risk reduction of failure during peak periods. To meet their obligation, the suppliers will have to secure capacity guarantees either by relying on their own means (production plant or demand response capacity), or by acquiring them from other guarantees holders (buying from capacity operators or from the capacity guarantees market). The capacity guarantees are tradable and transferrable,²⁷ and can notably be traded on EPEX Spot. The capacity guarantees are recorded in a trade register held by the transmission system operator, which has been made public on the request of the Commission.²⁸ The settlement of capacity imbalances shall provide an incentive to achieve higher availability. Default by the suppliers to surrender sufficient capacity guarantees is sanctioned by a financial penalty. The national regulatory authority is responsible for supervising the capacity guarantees market. The capacity mechanism follows an insurance logic. By starting four years ahead of the delivery period, it intends to give economic signals complementing those of the energy market in order to secure the necessary investments in new generation capacity or demand response measures to fill a potential adequacy gap.

The mechanism applies to the continental French metropolitan territory and takes into account the interconnection of the French market with other European markets. The transmission system operator and the national regulatory authority play a central role in the monitoring of the mechanism, and so ensuring both transparency and liquidity on the market.

The reflection on the need for a generation adequacy mechanism and the design of the capacity market started at national level. By choosing a market-based, decentralised, market-wide and technology neutral scheme, the French authorities

²⁷ Art. L.335-3 para 2, Energy Code.

²⁸ Website of the registry for capacity guarantees: <https://rega-rte.fr/>

intended to integrate EU competition law and internal market requirements from the start. Meanwhile, remaining doubts about the compatibility of the proposed scheme with EU law forced the French authorities to re-design several elements of the capacity mechanism, after that the Commission opened in 2015 an official investigation under state aid rules against the French capacity mechanism.²⁹ As stressed by the minister in charge, the approval decision required ‘an intense work between the Commission and the French authorities.’³⁰ The amendments made, happened at three levels, resulting in a more stringent control of the mechanism by public authorities than what was originally foreseen by the French government: (i) The one of the internal market, with the opening of the national mechanism to cross-border capacity as from the delivery year 2019; (ii) an improved transparency on the capacity market in order to prevent any distortion of competition resulting from the dominant position of EDF. Mechanisms to improve transparency on capacity pricing have been adopted. (iii) The feared lack of signals for new investments was addressed by providing for an additional incentive through the conclusion of multiannual contracts between RTE and new capacity operators at a fixed price for seven years, following on a bidding process.

In its approval decision, the Commission stressed out the fact that France started implementing the measure before the Commission reached its final decision, which is in breach of Article 108(3) TFEU and therefore unlawful.³¹ Nevertheless, based on the different remedies proposed by the national authorities, it decided to approve the scheme under state aid rules. The scheme has been approved for a limited period of 10 years in consistency with the duration of the UK capacity market mechanism.³²

²⁹ While the French Council of State rejected the qualification of state aid in its decision No 369417 of 9 October 2015, the European Commission came to the conclusion (both in the Opening Decision and the Final Decision) that the proposed French capacity market constitute state aid within the meaning of Article 107(1) TFEU, even taking into account the proposed amendments (Commission Decision of 8 November 2016 on State Aid Scheme SA.39621 2015/C (ex 2015/NN), C(2016) 7086 final; Press release IP/16/3620).

³⁰ Ministry of the Environment, Energy and the Sea, press release, 8 November 2016.

³¹ Final Decision in state aid case SA.39621, para (215).

³² See Commission decision of 3 October 2001, SA.35980 – GB capacity mechanism, para (162).

Poland

Poland has had strategic reserves, or "cold reserves", for a long period, but they have been expanded as temporary solution for capacity adequacy since 2013. While the public authorities have proposed to call the capacity scheme a "decarbonization reserve", the primary reason for introducing it has been to provide an additional source of income for large utilities. The debate in Poland has been about avoiding lack of power in future when fossil plants are being decommissioned and because of increasing coal costs, as well as tackling the visible chronic lack of investments in new large scale capacities (i.e. the "missing money" problem).

Poland's electricity market has for years been energy only, however, due to problems with adequacy and reliability of the system, as well as investment instability, there has been a discussion about introducing some additional capacity payments already since 2009 (Sadowska 2015). Capacity measures introduced in 2013-14 by the national transmission system operator include the "cold reserve" (aka cold intervention reserve) where the transmission system operator pays selected energy producers to keep their capacity ready for use in case of a sudden shift in the system. In 2014 a contract was signed with the hydro plant "Dolna Odra" owner PGE for a "cold reserve" of 454 MW to be made available in 2016 and 2017 (PAP 2014a). Also in 2014 an operating capacity reserve was introduced, and its "budget" was set at 450 mln PLN in 2014 and up to 500 mln in 2016. In 2014 the TSO has also started organizing demand side response tenders (Sadowska 2015).

An independent energy think tank pointed out that this "reserve", which pays an additional premium to plants which also participate in the regular and balancing markets, is in fact a form of Capacity Remuneration Mechanism (CRM), and does not seem to be playing the role prescribed to it – but rather provides additional income to the major energy companies (Chojnacki 2016). However, wholesale energy prices which kept falling, steadily increasing renewable energy capacity, ageing infrastructure and strict EU industrial emissions regulations were all cited as reasons for introducing an explicit capacity market, meant to support the conventional baseload generation with additional funding.

While it was the transmission system operator that initiated the debate, improved prognoses on capacity adequacy have decreased the urgency of such measures (Sadowska 2015). Unsurprisingly, however, once the idea was put on the table, it has been picked up by the industry itself. Energy industry organisations commissioned E&Y consultancy to develop a proposal for a capacity market, which was submitted to the Ministry of Economy and the regulator in November 2014. The proposal shows awareness of the constraints imposed by 2014 EU state aid guidelines, and so it develops two options, drawing on existing capacity measures in Europe: the UK centralised model and the French decentralised model (Sadowska 2015).

The energy sector lobby has been pushing for a capacity market already since 2014, but the Civic Platform (PO) government (2007-2015) resisted these postulates, fearing a hike in energy prices. However, as the Commission was already looking at European capacity mechanisms, and inquiring into the Polish “operational reserve”, the government’s representatives suggested that the capacity market could be called a “decarbonization reserve” to frame it in climate-friendly terms – even though the main goal would be to keep coal plants online and support vertically integrated mining/energy conglomerates should they be created (Zasuń 2015).

In 2016, the new Ministry of Energy in the Law and Justice (PiS) government proposed a framework for a market-wide capacity mechanism, modelled on the UK approach. This initiative came in the context of the newly introduced Renewable Energy Law, which replaced green certificates (quota) with volume-restricted feed in tariff tenders for specific technologies (based on auctions) (Szulecki 2017). As a result, some of Poland’s oldest coal plants, which benefited from green certificates from biomass co-firing, faced potential economic problems, while the age of the entire plant “fleet” called for phase out or rapid retrofit.

The dual goal of the energy sector and the government was to secure funding for extending the life (modernising) numerous baseload coal plants, as well as improving the economic rationale for their functioning (subsidising). Thus, the capacity market had to deliver on both – allowing for modernization funding, filling

the “missing money” gap for new plants, and helping the industry face increased climate policy pressures.

Poland pre-notified the Commission in November 2016 and sent the full draft of the proposed capacity market legislation in December that year. All capacity over 2MW was to be subject to certification and allowed to take part in capacity auctions (Zasuń, Derski 2016). The TSO would then project the capacity needed in a given year, the Minister of Energy would design the tenders while a “capacity fee” to finance the mechanism would be set by the national regulator and added to electricity bills of final consumer – industrial and household. The project, however, omitted two important guidelines which the Commission issued earlier or at the same time. In November 2016 the Commission proposed that in future capacity measures, most carbon intensive generation (above 550 kg/MWh) should be excluded, which effectively bans coal plants from capacity mechanisms (Neslen 2016). The Polish project also did not initially envision capacity in neighboring countries and interconnectors to be part of the system – an important requirement for the Commission which seeks to support regional solutions, harmonization and cross-border generation adequacy measures. Intensive consultations and exchanges between Poland and DG Competition took place between January 2017 and January 2018 (with 14 meetings and teleconferences).³³

The Commission agreed with Poland’s arguments, most importantly the demonstration of the “missing money” market failure, though the national transmission system operator was asked to conduct a modelling exercise based on a methodology approved by the European Network of Transmission System Operators for Electricity (the Mid-term Adequacy Forecast), which indeed showed that lack of investments will lead to considerable scarcities. However, in the process the Commission emphasized that significant parts of the “missing money” problem can be dealt with through adjusting price signals on the existing energy market, without the need of state aid – and obliged Poland to introduce important reforms in the balancing market, making it more flexible and adding mechanism targeting scarcity, including demand side response.

³³ http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_46100

The delay in introducing a capacity market allowed Poland to learn from the experience of other EU members, most importantly the UK. In order to avoid some perceived mistakes in the British design, Polish legislators came up with the idea of three “capacity baskets” in auctions: for existing, modernized and newly constructed capacity. However, the Commission, which saw the UK model as a preferred mold for new capacity market legislation, opposed the idea of baskets, and in October 2017 Poland’s Energy Ministry offered an amended legislation project which did not include these. Energy experts agreed that without an additional build in mechanism boosting investment in new capacity, the “UK model” applied to Poland only result in subsidizing the modernization of 1950s and 60s coal plants.³⁴

The final version of the legislation was introduced on 8 December 2017 (the Capacity Market Law, Dz. U. z 2018 r. poz. 9), with the Commission issuing its final acceptance in February 2018. The first year of capacity delivery will be 2021, and by that time Poland is obliged to phase out all other reserve and capacity subsidy mechanisms (e.g. the “cold reserve”). The introduction of energy storages (potentially allowing renewables to enter the capacity market through the back door) as well as a premium for cogeneration (power and heat), was welcomed by more green-minded experts. At the same time, Padera and Swierczynski point out that the capacity market will initially only petrify the existing four-company oligopoly, and that without decarbonization measures and better RES support, the capacity mechanism alone will not deliver any emissions reductions, making Poland’s chances to reach its 2030 targets dubious.³⁵

Importantly, however, as the final justification published by the Commission in April 2018 shows, the December 2017 Capacity Market Law will have to be significantly reformed to reflect the compromise reached between Warsaw and Brussels. One is the already mentioned necessary reforms of the balancing market, which are aimed at minimizing the need for capacity subsidies. More important for the Polish energy sector perhaps is the rule that all other investment support and aid will be deducted from capacity payments – which includes free emission allowances in the

³⁴ <https://wysokienapiecie.pl/6568-debata-o-rynku-mocy/>

³⁵ <https://wysokienapiecie.pl/8132-rynek-mocy-plaster-czy-panaceum-dla-polskiej-energetyki/>

ETS, translating to millions of Polish zlotys.³⁶ The last point is the increased role for cross-border capacities (through interconnectors), which have been made much more important and assigned a larger share in the capacity market than the Polish authorities ever intended. The final amendments are to be introduced in August 2018.

Discussion

The following table summarises the key characteristics of the development of the capacity mechanisms in the three selected countries.

Table 1. Capacity mechanisms in the UK, France and Poland

	The UK	France	Poland
What?	Centralised capacity auctions	Decentralised capacity obligations	Centralised capacity auctions
When? - First decided on - Implemented	2010 2014	2010 2016	2013/2014 2017/2018
Why? - Key reason - Other reasons	- Missing money - Renewable policy	- High winter load and missing money - Renewable policy	- Support utilities - Modernisation
Relation to the EU	Domestically driven with certain coercive elements	Domestically driven with certain coercive elements	Domestically driven with certain coercive elements

The evidence shows that the development of capacity mechanisms has been domestically driven in the UK, France and Poland. There has been an environment of learning from each other, which is particularly clear for Poland which has gone from strategic reserves to a capacity market. Before deciding on the design of its new capacity mechanism, Poland learnt from the experience of other EU members, most importantly the UK. Moreover, the UK model resembles the one in France, as it includes payments to large electricity consumers for them to reduce their demand

³⁶ <https://wysokienapiecie.pl/9729-bruksela-opublikowala-decyzje-w-sprawie-ryнку-mocy-w-polsce/>

during peak periods (so-called demand-side response), in addition to making payments to certain generators for being available to generate and to generate at times of system stress. Although there are many different capacity instruments in Europe, the studies of the development in the UK, France and Poland suggest that policy transfer via learning has made the forces towards dispersion less effective (see the first expectation in the theoretical section).

In all the countries the missing money issue better explains the introduction of capacity mechanisms than increasing share of renewables (and therefore irregular electricity sources), although the latter was also part of the decision to introduce capacity mechanisms. In the UK lack of willingness to invest has been the most important reason. The UK government wanted new gas capacity. While renewable sources can attend the capacity market, the instrument has been heavily criticized for destroying the conditions for renewable energy, because the capacity market is too generous in its support of fossil power. France introduced capacity obligations primarily because of the high load in winter due to heavy reliance on electric heating and lack of investment in particular with the decrease in energy consumption following from the 2008 financial crisis. The key concern in Poland has been future black-outs when fossil plants due them being decommissioned and because of increasing coal costs.

When it comes to stakeholders, the big six utilities in the UK have had considerable influence on the design of the capacity market. Five of these utilities favoured a capacity market and they were seconded into the Department in government that was responsible for drafting the policy instrument. To some extent this case represents regulatory capture. Similarly, the large public utilities in Poland had great influence on the design of the Polish capacity market and the capacity markets have been shaped to favour the incumbents. The Polish energy minister has for example argued, 'Poland needs a power capacity market to help coal-fired power plants compete with producers of renewable energy and to avoid power shortages' (Euractiv 2016). The primary reason for introducing a capacity market in Poland has been to provide an additional source of income for large utilities. Also, in France the design of the capacity mechanism is in favour of the dominant utility. New market entrants

opposed the decentralised solution, fearing that the dominant utility, EDF, would benefit from all the payments.

We expected that the Commission is pushing the development of national capacity mechanisms towards harmonised cross-country cooperation. Although we find that the development of capacity markets is mainly domestically driven, the Commission has enforced some harmonisation, yet to a lesser extent than critics of capacity markets have argued in favour of. In the UK, the Commission was rather lenient in granting state aids approval at a sensitive time for UK-EU relations. The relationship between the UK and the Commission was not conflictual, but characterized by extensive dialogue about the details and certain design elements that were enforced by the Commission. For example, the UK accepted to enable interconnected capacity, which was originally excluded from the auctions. Critics argue that the Commission could have pushed for more.

In France the capacity obligation instrument had been discussed for several years domestically, before it was revised to become consistent with EU law and the Commission's requests. The relationship between the French government and the Commission has been characterised by intense negotiations in particular about the compatibility with state aid rules. France intended to adopt an instrument in line with EU law, choosing a market-based, decentralised, market-wide and technology neutral scheme. However, there were doubts about the compatibility and the French authorities were forced to re-design several elements of the capacity mechanism, including: opening the national mechanism to cross-border capacity; improve transparency to prevent distortion of competition by EDF; and an additional incentive for investments through multiannual contracts between transmission system operator and new capacity operators, following on a bidding process.

Poland had to change its capacity mechanism, to take into account that in future most carbon intensive generation (above 550 kg/MWh) should be excluded (proposed by the Commission in the Clean Energy for All Citizens from 2016). This limit would ban coal plants from capacity mechanisms. Furthermore, the Polish authorities also had to integrate capacity in neighboring countries and interconnectors

in its system. Poland also had to delete its idea of having different auctions for existing, modernized and newly constructed capacity, as the Commission opposed this proposal.

In summary, the analysis shows that black-out concerns have been given more emphasis than the functioning of the markets. Critics of capacity mechanisms express that they have been disillusioned by the fact that the Commission has not been 'tougher' in its stance, when allowing to entrench often fossil fuel companies with taxpayers' cash, which would be better spent on clean renewables. Yet the Commission has forced the countries to incorporate interconnectors into their designs.

Conclusion

The evidence shows that while the Commission encourages cross-border solutions rather than capacity adequacy mechanisms, the UK, France and Poland prioritise capacity adequacy mechanisms and develop them largely unaffected by the possibilities that interconnectors pose. While the Commission seeks to phase out capacity adequacy mechanisms, so that they should only be used if there are concerns that there are insufficient resources for power generation, the Member States prefer to exaggerate the actual need for capacity to be on the 'safe side' against black-outs, although it contributes to distort the internal market. However, the Commission has possibilities to affect the Member States capacity adequacy mechanisms: it has initiated state aid inquiries into such mechanisms. The UK, France and Poland have had extensive negotiations with the Commission and have adopted their designs more or less in alignment with the State Aid Guidelines. However, the development of capacity adequacy mechanisms has largely been domestically driven in all the three countries, while adaptations to EU rules have primarily been about details. The developments have mostly been voluntary and are characterised by learning from other countries: The UK capacity market share similarities with the French capacity obligations; and the French authorities have introduced auctions, inspired by the UK. Similarly, Poland considered both the UK and the French option before settling on a capacity market and was able to consider the UK experiences with the first rounds of capacity auctions before implementing its own. While there are a number of different capacity

mechanism solutions in the EU today, the analysis shows that some convergence has taken place.

Although the increasing share of renewables has changed the perception of capacity mechanisms from “the missing money problem” to a “back-up” for intermittent electricity, the UK, France and Poland have introduced capacity mechanisms for reasons other than renewable energy. The key reason has been lack of investments. However, increasing shares of irregular electricity, will push for more back-up solutions. The Commission is likely to continue to use its power to promote cross-country solutions, and Member States are increasingly investing in interconnectors. In future interconnectors and flexibility solutions are likely to change the European power market.

References

- ACER (2013). Capacity remuneration mechanisms and the internal market for electricity. Accessed 25/11/2015: http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf
- Baker, P., E. Bayer, J. Rączka (2015). Capacity Market Arrangements In Great Britain. [Place of pub] Forum for Energy Analysis.
- Bolton, R. and Clausen, T. (2017). The capacity question: Electricity decarbonisation and market reform in Britain and Germany. Draft paper, 31 July. Edinburgh: University of Edinburgh.
- Crevel-Sander, D. and C. Beaugonin, France, in Capacity mechanisms in the EU energy market, L. Hancher, A. de Hauteclouque, and M. Sadowska, Editors. 2015, Oxford University Press: Oxford. p. 256-270.
- Chojnacki, Ireneusz (2016): FAE: operacyjna rezerwa mocy nie działa dobrze. In Wirtualny Nowy Przemysł, 2016 (5 January).
- Davey, E. (2013). Written statement to Parliament. Hinkley Point C State aid – EU Commission Opening Decision. Available at: <https://www.gov.uk/government/speeches/hinkley-point-c-state-aid-eu-commission-opening-decision>
- DECC (Department of Energy and Climate Change) (2010). Electricity Market Reform. Consultation Document. Cm 7983. London: The Stationary Office.
- DECC (2011a). Consultation on Possible Models for a Capacity Mechanism: Impact

Assessment. London: Department of Energy and Climate Change.

- DECC (2014a). Electricity Market Reform: Allocation of Contracts for Difference. A Government response on Competitive Allocation. Retrieved 1 March 2017 from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/310272/competitive_allocation_government_response.pdf
- DECC (2014b). 'Electricity Market Reform – Capacity Market: Impact Assessment'. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/354677/CM_-_revised_IA_and_front_page__September_2014__pdf_-_Adobe_Acrobat.pdf
- DNV GL (2014): Potential interactions between capacity mechanisms in France and Germany. Descriptive overview, cross-border impacts and challenges. Study on behalf of Agora Energiewende. Accessed 18/02/2016 from: http://www.agora-energiewende.de/fileadmin/Projekte/2014/kapazitaetsmodelle-deutschland-frankreich-vergleich/Agora_DE-FR-CRM_EN_web.pdf
- ECC Select Committee (House of Commons Select Committee on Energy and Climate Change) (2011). Electricity Market Reform. Fourth Report of Session 2010-12. HC 742. London: The Stationery Office Limited.
- Euractiv (2016, 19 May). Poland needs capacity market to avoid power shortages, says minister. Available at: <https://www.euractiv.com/section/all/news/poland-needs-capacity-market-to-avoid-power-shortages-says-minister/>
- European Commission (2010). Communication from the Commission. "Energy 2020. A strategy for competitive, secure and sustainable energy. COM(2010) 639 final.
- European Commission (2011), Communication from the Commission, 'Energy roadmap 2050', COM(2011) 885 final. Available online: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0885&from=EN>
- European Commission (2014). European Commission (2014c). State aid SA.35980 (2014/N-2) – United Kingdom Electricity market reform – Capacity market. C (2014) 5083 final, Brussels, 23.7.2014
- European Commission (2016). Report from the Commission. Interim Report of the Sector Inquiry on Capacity Mechanisms. (C(2016)2107 final). Brussels: European Commission.
- European Commission (2017). Proposal for a Regulation of the European Parliament and of the Council on the internal market for electricity. Brussels, 23.2.2017. COM(2016) 861 final/2, 2016/0379 (COD). Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:9b9d9035-fa9e-11e6-8a35-01aa75ed71a1.0012.02/DOC_1&format=PDF
- Leiren, M.D., T. Rayner & T.H.J. Inderberg (2017). The United Kingdom as an unstable frontrunner in renewable energy policy. Paper presented at the General ECPR Conference 2017, 7 September, Oslo.

- Littlecott, C. (2014). *Keeping coal alive and kicking: Hidden subsidies and preferential treatment in the UK Capacity Market*. London: E3G.
- Geden, O. and S. Fischer 2008. *Die Energie- und Klimapolitik der Europäischen Union. Bestandsaufnahme und Perspektiven*. Baden-Baden: Nomos. *Denkart Europa* 8.
- Goeetz, K. H., & Meyer-Sahling, J.-H. (2008). The Europeanisation of national political systems: Parliaments and executives. *Living Reviews in European Governance*, 3(2).
- González-Díaz, F.E. (2015). EU Policy on Capacity Mechanisms, L. Hancher, A. de Hauteclocque, and M. Sadowska, Editors, *Capacity Mechanisms in the EU Energy Market*, Oxford University Press: Oxford. p. 3-31.
- Héritier A., & Lehmkuhl, D. (2011). *Governing in the Shadow of Hierarchy New Modes of Governance in Regulation*. In: Héritier A., Rhodes M. (eds) *New Modes of Governance in Europe*. Palgrave Studies in European Union Politics. London: Palgrave Macmillan.
- Joskow, P.L. (2008). Capacity payments in imperfect electricity markets: Need and design. *Utilities Policy*, 16, 159-170.
- Knill, C., & Lehmkuhl, D. (2002). The National Impact of European Union Regulatory Policy: Three Europeanization Mechanisms. *European Journal of Political Research*, 41(2), 255-280.
- Ladrech, R. (1994). Europeanization of domestic politics and institutions: The case of France. *JCMS: Journal of Common Market Studies*, 32(1), 69-88.
- Neslen, Arthur (2016): EU targets energy waste and coal subsidies in new climate package. In *The Guardian*, 2016 (30 November).
- Newbery (2015). *Missing Money and Missing Markets: Reliability, Capacity Auctions and Interconnectors*. EPRG Working Paper 1508 Cambridge Working Paper in Economics 1513.
- Newbery, David, and Michael Grubb. (2015). 'Security of Supply, the Role of Interconnectors and Option Values: Insights from the GB Capacity Auction'. *Economics of Energy & Environmental Policy* 4(2): 65–81.
- Olsen, J. P. (2002). The many faces of Europeanization. *Journal of Common Market Studies*, 40(5), 921-952.
- Orme, B. (2016). *Incapacitated: Why the Capacity Market for Electricity Generation is not Working, And How to Reform it*. London: Institute for Public Policy Research.
- PAP (2014a): Dwa bloki Elektrowni Dolna Odra będą interwencyjną zimną rezerwą mocy. In *Cire.pl*, 2014 (20 January).
- Radaelli, C. M. (2003). The Europeanization of Public Policy. In K. Featherstone & C. M. Radaelli (Eds.), *The Politics of Europeanization* (pp. 27-57). New York: Oxford University Press.

- Radaelli, C. M. (2008). Europeanization, policy learning, and new modes of governance. *Journal of Comparative Policy Analysis*, 10(3), 239-254.
- Sadowska, M., Poland, in *Capacity mechanisms in the EU energy market*. In Leigh Hancher, Adrien de Hauteclocque, Malgorzata Sadowska (Eds.): *Capacity mechanisms in the EU energy market. Law, policy, and economics*. Oxford: Oxford University Press, pp. 335–350.
- Schmidt, S. K. (2008). Beyond Compliance: The Europeanization of Member States through Negative Integration and Legislative Uncertainty. *Journal of Comparative Policy Analysis*, 10(3), 299-308.
- Skodvin, T., Gullberg, A. T., & 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.
- Szulecki, K., Fischer, S., Gullberg, A. T., & Sartor, O. (2016). Shaping the 'Energy Union': between national positions and governance innovation in EU energy and climate policy. *Climate policy*.
- Szulecki, K. (2017). Poland's Renewable Energy Policy Mix: European Influence and Domestic Soap Opera. *CICERO Working Papers 1/2017*. Available at SSRN: <http://dx.doi.org/10.2139/ssrn.2964866>
- Töller, A. E. (2010). Measuring and Comparing the Europeanization of National Legislation: A Research Note. *Journal of Common Market Studies*, 48(2), 417-444.
- Van Renssen, S. (2014). Brussels sets dangerous precedent by clearing UK capacity market. <http://www.energypost.eu/brussels-sets-dangerous-precedent-european-energy-policy-clearing-uk-capacity-market/>
- Van Renssen, S. (2016). Capacity mechanisms: DG Competition and DG Energy clash over future of EU energy market. [energypost.eu/capacity-mechanisms-dg-competition-dg-energy-clash-future-eu-energy-market/](http://www.energypost.eu/capacity-mechanisms-dg-competition-dg-energy-clash-future-eu-energy-market/)
- Willis, P., United Kingdom, in *Capacity mechanisms in the EU energy market*, L. Hancher, A. de Hauteclocque, and M. Sadowska, Editors. 2015, Oxford University Press: Oxford. p. 365-382.
- Wynn, G. and Schlissel (2017). *Electricity Grid Transition in the UK*. Institute for Energy Economics and Financial Analysis.
- Zasuń, Rafal (2015): Czy jest plan dla enegretyki? In *Wysokie Napięcie*, 2015 (17 December).
- Zasuń, Rafal; Derski, Bartłomiej (2016): Ustawa o rynku mocy — wprowadzamy, ale nadal nie wiemy, ile ma kosztować. In *Wysokie Napięcie*, 2016 (6 December).