



**HAL**  
open science

# The redesign of electricity markets under EU influence: The capacity mechanism in France and Britain

Thomas Reverdy, Frédéric Marty, Ronan Bolton

## ► To cite this version:

Thomas Reverdy, Frédéric Marty, Ronan Bolton. The redesign of electricity markets under EU influence: The capacity mechanism in France and Britain. Janette Webb, Faye Wade, Margaret Tingey. Research Handbook on Energy and Society, Edward Elgar, pp.83-96, 2021, 9781839100710. halshs-03475634

**HAL Id: halshs-03475634**

**<https://shs.hal.science/halshs-03475634v1>**

Submitted on 29 Nov 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

*Chapter 7: The redesign of electricity markets under EU influence:*

*The capacity mechanism in France and Britain*

To be published in Research Handbook on Energy and Society, edited by Janette Webb, Margaret Tingey and Faye Wade, Sociology, University of Edinburgh, UK.  
Edward Elgar Publishing

Thomas Reverdy, Associate Professor in sociology, Grenoble Institute of Technology, University Grenoble-Alpes, PACTE, CNRS,

Génie Industriel Grenoble-INP (PACTE)  
46 av Félix Viallet, 38031 Grenoble Cedex 1

Thomas Reverdy is teaching Economic Sociology, Sociology of Work and Sociology of Organizations at Grenoble Institute of Technology. His research at PACTE - Social Science Research Laboratory is related to the sociology of market and sociology of market-base instruments in the field of energy transition. He is supervising doctoral research in the field of energy and environmental transition of the industry.

[Thomas.reverdy@grenoble-inp.fr](mailto:Thomas.reverdy@grenoble-inp.fr)

<https://orcid.org/0000-0002-5897-8218>

Frederic Marty, CNRS Research Fellow, Université Côte d'Azur; Researcher CIRANO, Montréal

Groupe de Recherche en Droit, Economie et Gestion (GREDEG)  
UMR 7321-Université Côte d'Azur  
250, rue Albert Einstein  
CS 10 269  
06905 Sophia-Antipolis

Frédéric Marty is a CNRS senior research fellow. PhD in economics, his work focuses on competition law and economics. He is a member of the Group of Research on Law, Economics, and Management (GREDEG), a joint research unit of the CNRS and of the Université Côte d'Azur. He is also affiliate researcher of the French Economic Observatory (OFCE - Sciences Po. Paris) and researcher at the CIRANO (Montréal).

[frederic.marty@gredege.cnrs.fr](mailto:frederic.marty@gredege.cnrs.fr)

<https://orcid.org/0000-0002-9881-2036>

Ronan Bolton, Reader in Science Technology and Innovation Studies

University of Edinburgh

2.29 Chisholm House  
High School Yards  
Edinburgh EH1 1LZ  
Scotland

Ronan Bolton is an interdisciplinary energy researcher with a background in mechanical engineering and environmental social science. His work examines the interconnected policy, market and regulatory challenges of transforming carbon based energy systems. He has particular research interests in the areas of energy network regulation and system integration, along with the history and development of liberalisation processes in the energy sector.

[Ronan.Bolton@ed.ac.uk](mailto:Ronan.Bolton@ed.ac.uk)

<https://orcid.org/0000-0003-3465-4013>

## Abstract

The liberalisation of the electricity sector in Europe has led to a decentralisation of investment decisions to economic actors. A key assumption behind this was that investors make their decisions based on price signals. Ensuring that there is adequate generation capacity in place to meet demand therefore became a function of the market, rather than a central planning authority. Nevertheless, in many countries, the risk of supply failure has led to the implementation of an addition to power markets known as the capacity mechanism. This chapter explains how this market reform was implemented in the UK and France, the political motivations behind it, the mobilisation of economic expertise and the process of validation by the European authorities. It highlights the increasing role of State Aid control in the framing of national regulations, defining the standard for electricity market organisation and conditions for legitimate deviation from the standard.

Keywords: Electricity Market, Capacity Mechanism, State Aid, Market Failures, Security of Supply, Sociology of Market, Energy Only Market

## <a> Introduction

Since the late 1990s, European Directives covering the energy markets have gradually been transposed into legislation by Member States, contributing to the consolidation of electricity sector organisation around a liberalised market model across EU nations. It was thought that this new organisational model was flexible enough to take into account the specificities of each country's electricity system and the inherent 'market failures' associated with electricity supply, notably the natural monopoly of the networks and the need for instantaneous balancing between supply and demand.

However, the introduction of variable renewables (wind and solar) into power systems has prompted some governments, industry groups, and economic experts to highlight an additional failure of the market: to produce adequate incentives for investments to secure capacities for peak load. In order to address this 'failure', a number of EU countries have introduced a capacity mechanism – a means of valuing capacity (MW) – alongside the conventional energy-only wholesale markets where buyers and sellers transact power (MWh). Capacity mechanisms are highly controversial and their rationales, merits and designs are continually being debated by economic and regulatory experts (Roques, 2008; Fabra, 2018).

The chapter does not engage directly in these substantive technical debates about market designs and capacity mechanisms. Instead we draw on perspectives from science and technology studies (STS), in particular contributions to the social study of electricity markets (Silvast, 2017; Breslau, 2011; Karnøe, 2010), to cast light on the articulation of technical concerns, economic tools, and political issues in the work of economists, regulators and other technical experts who shape these markets. Our aim is to use the debate about capacity mechanisms to analyse the evolving relationship between politics and economics in the construction of liberalised electricity markets.

Our empirical focus is on the cases of France and Britain<sup>i</sup>, where market design and regulatory processes have followed very different paths. The question of whether to introduce a capacity mechanism and its optimal design appeared in both cases just after the 2008 financial crisis, with the issue being resolved much more quickly in the UK than in France. We discuss how the

processes and outcomes in each case can be partially explained by the history of liberalisation in each country, different technical and economic framings of the security of supply issue, national practices of energy market regulation, and relations between these countries and the European institutions<sup>ii</sup>.

With the Third Energy Package in 2009, the European Commission initiated a clarification of its electricity market legislation, putting forward the energy-only market model (without a capacity mechanism) as the norm for the European electricity sector, from which any deviation needed to be justified. Within this frame, electricity market design involves a procedure of validation whereby the technical expertise and political objectives of both the national governments and the European Commission enter into a dialogue. Market interventions which signal a deviation from the preferred model need to be justified in relation to this wider frame – composed of European electricity liberalisation Directives, EU competition policy and State Aid guidelines – but there is a necessary degree of flexibility and ambiguity in place to accommodate diversity (Bolton and Clausen, 2019).

Following Nik-Khah and Mirowski, (2019), we observe that by delimiting the economic arguments considered to be legitimate, this evolving institutional framework exerts a strong influence over the market shaping process. This alignment involves integrating, ex-ante, political concerns about common European objectives into the technical specificities of each market intervention, as shown in the French case, and one of retrospectively justifying deviations from the market norm, in the form of state-aid evaluation, as in the UK case.

The chapter begins with a comparison of the background to electricity market liberalisation in France and the UK, and then charts the introduction and design of their capacity mechanisms. Following this, we examine the influence of the EU institutions over the design of capacity mechanisms in each case, and in the final part of the chapter we reflect on the nature of the dynamic between the EU and national level in the market shaping process.

### **<a> Trajectories of electricity liberalisation**

In a liberalised energy sector, electricity generation capacity is in principle the result of suppliers' autonomous investment decisions. Given the specific characteristics of electricity, in particular its

non-storable nature, the ability of decentralised decisions to guarantee sufficient production capacity has been an important concern in all cases of electricity liberalisation, initially in the UK, and more recently in France, reflecting the technical and institutional inertia of the French sector. The difference in maturity and experience of liberalisation between France and the UK has influenced their approaches to market redesign and led to different evaluation procedures by the European authorities.

### **<b> Britain**

Britain was a pioneer in introducing competition to its electricity market in the early 1990s. Following the *Electricity Act* of 1989, the monopoly electricity generator and transmission company in England and Wales, the *Central Electricity Generating Board* (CEGB), was split into two competing private electricity generating companies – *National Power* and *PowerGen* – and a separate transmission company, *National Grid*, which was initially owned by the twelve Regional Electricity Companies (RECs) – also privatised – and later sold as a stand-alone entity.

What became known as the ‘British Model’ of electricity liberalisation had three distinctive features: Firstly, retail markets were opened up to competition and the distribution companies no longer held regional supply monopolies. This saw the progressive phasing out of regulated tariffs over the course of the 1990s and eventually, by 1998/1999, all electricity customers had the option of switching away from their regional supplier. Secondly, an *independent* electricity regulator (now called OFGEM) was established and its Director, Prof Stephen Littlechild, was given significant powers under the Act to interpret and enforce the licencing terms in the legislation.

A third significant feature of the model was the *Electricity Pool*, the wholesale market where National Power and PowerGen, along with new entrant generators, would compete. Generators above a certain threshold were subject to the *Pooling and Settlement Agreement*, requiring them to submit price bids into the market if they wanted their plant to be dispatched, i.e. called upon to generate and to sell their output.

National Grid was responsible for collecting the price bids for each half hourly trading period; and based on this information, it would calculate the economic dispatch and schedule plant. The overall aim was to maximise the output of the generating units with lowest marginal costs whilst meeting

demand, but due consideration was given to the physical constraints of the transmission grid and other technical parameters. These were factored in as part of National Grid's overall system optimisation, not dissimilar to the procedure used by its predecessor, the nationalised CEGB. Generators selling into 'the Pool', along with receiving the *system marginal price* (SMP) if dispatched, also received a capacity payment to ensure that there was adequate generation on the system to meet demand and to incentivise investment in new plant. The capacity payment was based on National Grid's rolling half-hourly calculation of the *Loss of Load Probability* (LOLP) and an administratively determined *Value of Lost Load* (VOLL).

During its years in operation from 1990 to 2001, the Pool was the subject of much debate and criticism, in particular a claim that the legacy incumbents which continued to dominate the market, *National Power* and *PowerGen*, could manipulate the pool price, for example by holding back generation at certain peak demand periods, thus increasing the LOLP and their capacity payments. The Pool was replaced in 2001 by an alternative trading platform, the *New Electricity Trading Arrangements* (NETA), and this was later expanded to Scotland in 2005<sup>iii</sup>, creating the *British Electricity Trading and Transmission Arrangements* (BETTA).

The philosophy behind NETA/BETTA is quite different, more closely resembling gas markets than traditional power pools. Unlike the Electricity Pool, which was a 'gross' market, requiring all trades for physical power to be routed through it, BETTA is a decentralised market where buyers and sellers of power are free to enter into bilateral contracts, or transact via an organised power exchange. They simply need to notify National Grid of their positions one hour prior to 'gate closure'; based on the costs of balancing the system close to real time, system prices are then calculated and used as a basis to charge licensed generators and suppliers (the balancing responsible parties) for their role in creating deviations between trading positions and actual physical exchanges. So alongside its decentralised structure, *BETTA* is characterised as a 'net' pool; where system pricing is based on the final positions of the traders rather than the overall, or gross, economic dispatch.

In the transition away from the Pool, the capacity payment was dropped: *BETTA* was originally designed an *energy-only market*. This was partly due to an underlying commitment to a particular economic logic; that market-based pricing would send clear signals to investors that new capacity is needed and that this would lead to a more efficient outcome than a centralised approach. There

was also a practical element as, throughout the 1990s, there had been significant levels of investment in new gas-fired power plant capacity, resulting in the UK having a comfortable capacity margin (approximately 17% in 2010).

### **<b> France**

Unlike the UK, the liberalisation of the French electricity sector has never been a political project supported at the national level. The French senior administration and political class have always considered that EDF's monopoly on electricity production was not contradictory to the objective of efficiency. The existence of scale effects, thanks to the standardisation of the nuclear production system and its control by a single company, was hardly compatible with a horizontal de-integration of EDF<sup>iv</sup>. Only French industrial customers were in favour of liberalisation. The French government's acceptance of the European directives has been mainly the result of a desire not to obstruct a wider European integration project, and to contribute to the political cohesion of the European Union.

The reluctant adherence to liberalisation largely explains the lack of sectoral structural reform. The French government has accepted only a limited number of transfers of EDF's generation assets to its competitors, seeking in this way to respond to European injunctions in favor of reciprocity, since EDF was acquiring generation assets in other European countries. Then, in 2003, EDF sold its shares in Compagnie Nationale du Rhône to the Suez group, which eventually merged with Gaz de France to form ENGIE. The liberalisation led to the creation of a decentralised wholesale market, organised around an auction market, EPEX Spot, promoting market price as a reference for the value of electricity and the decision to invest. The interconnections with other European countries developed and led to similar prices.

At the end of the first ten years of liberalisation, due to the particularly low marginal cost of nuclear-generated electricity, France's regulated tariff was maintained. However, competition in the supply business was developed in 2010 thanks to a law (loi NOME: *Nouvelle Organisation du Marché de l'Electricité*) that has obliged EDF to resell nuclear-generated electricity to EDF's competing suppliers, which, with the exception of ENGIE, have little generation capacity (Reverdy and Breslau, 2019). The European wholesale market price has now partly replaced a valuation of electricity previously based on its average generation cost.



Despite such specificities compared to the ideal-type of perfect competition, France has implemented EU Directives concerning the European electricity market, although somewhat reluctantly. The French electricity market is highly interconnected with the markets of other continental European countries and EDF is one of the major operators across this market. However, such integration has not become fully effective, due to political choices to maintain a regulated tariff for residential customers, and the tariff for reselling nuclear-generated electricity to competing suppliers.

This situation, which constitutes a significant exemption from the market model promoted by the European institutions, is reflected in the European institutions' suspicion of successive French Governments' adherence to the European liberalisation project, and their willingness to encourage the development of competition at the expense of incumbent interests (Reverdy and Breslau, 2019). This suspicion has led the French legislator to apply a 'precautionary principle' to any new regulatory change to avoid the risk of its compliance with EU rules being challenged by the European Commission.

### **<a> Design and introduction of the capacity mechanisms**

The design of the capacity mechanism within each country is indicative of how the issue of security of supply has been debated in the public arena, and the type of economic argument used to justify the mechanism.

#### **<b> *Britain's capacity market***

Since privatisation the British energy system as a whole became increasingly reliant on natural gas, and by 2010 gas accounted for 43 per cent of the country's primary energy consumption, up from 25 per cent in 1990 (Le Fevre, 2015). Perceptions of the threats to energy security resulting from this shift to gas in the energy system began to change during the 2000s as North Sea production reached its peak and the UK became a net importer of the fuel. Whereas during the 1990s the issue of energy security was not high up on the political agenda and was predominantly left to the market, in the 2004 Energy Act a statutory obligation was placed on the responsible Secretary of State for to 'publish a report dealing, as regards both the short term and the long term, with the availability of electricity and gas for meeting the reasonable demands of consumers in Great Britain'<sup>v</sup>.

In 2009, a highly influential report was published by the energy regulator, OFGEM, following a review of the UK's energy security situation (Project Discovery). One of the key risks raised by OFGEM during this time was that the deteriorating economic situation could result in power plant closures, in particular accelerating the shut down of the country's ageing coal plants. Between 2012 and 2013 the total capacity on the system reduced by almost 5 per cent.

Subsequently, OFGEM published an *Electricity Capacity Assessment* in 2013, an important justification for government intervention to increase the capacity margin at this time. This indicated that on current trends the loss of load expectation (LOLE, or the number of hours per year that electricity demand on the system would not be met), a key indicator of electricity system security, could rise to 9hrs/year in 2015/16, above the government's maximum target of 3hrs/year.

#### *<c> The rise of the missing money argument*

In the lead up to the 2013 Energy Act, which introduced the capacity market and other elements of the UK's Electricity Market Reform (EMR), a number of options for a capacity intervention were considered in a consultation document published in December 2010 by the Department of Energy and Climate Change (DECC) (DECC, 2010b).

At the outset, DECC signaled a preference for a limited strategic reserve, with a number of plants held back from the market and dispatched only if the energy-only market could not meet demand. DECC predicted that such a targeted mechanism would offer greater flexibility in the type of resource supported and, given the uncertainty surrounding future market developments, it would provide an additional option value. This was based on a market analysis which found that a revenue stream from a capacity market, involving an auction open to all plants operating in the market, would benefit existing old and inefficient plants who would otherwise face closure due to the costs of compliance with European environmental legislation, in particular the Industrial Emissions Directive.

However, following a consultation in late 2010, DECC changed its view and instead opted for a capacity market. The key economic argument for this was that Britain's electricity market had a *missing money* problem, based on a structural flaw in liberalised electricity markets with regards to long-term system adequacy. The conceptual argument with missing money is that prices in the

energy-only market are unlikely to be allowed to rise to the extremely high levels required to motivate private investment in new capacity, due to both political interference in price setting and intervention by the system operator to dispatch its emergency reserves. As a result, there is a fundamental market failure with respect to investment in peaking plant, and the energy-only market will fail to deliver the level of energy security required by society.

Although barely mentioned in the initial 2010 government consultation on options for the capacity intervention, *missing money* emerged as a key argument in the consultation submissions and the subsequent follow-up analysis conducted by DECC. DECC began to incorporate missing money as a new variable into their cost-benefit calculations. They conducted a sensitivity analysis with a ‘stress test’ scenario, which included a £5,000/MWh price cap, representing the missing money, and found that under certain assumptions the capacity market would be economically efficient<sup>vi</sup>.

The argument that such structural reform was necessary gained credibility as updated modelling projections, based on OFGEM’s Electricity Capacity Assessment, indicated that the capacity margin could drop below 5% in the near future and in a number of the scenarios analysed, the LOLE would be greater than 3 hours/year. This analysis incorporated the effects of plant closures and increasing amounts of low carbon generation, and on the back of it, it was decided to introduce a centralised auction for capacity contracts of varying lengths to provide an additional layer of electricity system security.

<c> *Too much energy security?*

Following the commencement of capacity auctions in 2014, the most notable outcome of the market so far has been the low clearing prices<sup>vii</sup>: The price in the main auction<sup>viii</sup> peaked in 2016, at £22.50 per kW/year. This was well below the cost of new entry (CONE), a key parameter in the auction design which represents the government’s view of the likely cost of constructing a new plant to serve peak demand, a combined-cycle gas turbine plant (CCGT) in this case. If the market was undersupplied to a level which threatened security of supply, one would expect the market clearing price to reach these levels and for new power plants to be constructed. As a result, the amount of capacity purchased in the auctions has seen the loss of load expectation (LOLE) security standard set by government (no more than 3hrs/year) being greatly exceeded<sup>ix</sup>. This has occurred

to the extent that some are questioning whether the capacity market is providing too much energy security, such that the electricity customer does not benefit.

Key reasons cited by government for this outcome are ‘plants without capacity agreements staying open for longer than was expected, with additional procurement through the capacity auctions making a minor contribution’<sup>x</sup>. In the UK government’s view, this capacity mechanism is considered to be the most cost-effective outcome for the consumer. In their recent appraisal of the market, they stated that they ‘do not intend or expect to maintain such low levels of LOLE into the future, as the reliability standard represents the most cost- effective amount of LOLE for consumers. Therefore, we expect LOLE to rise over the coming years (but remain below three hours), as plant without capacity agreements close’ (ibid, p.10).

### **<b> The French capacity market**

#### *<c> Political demand for security of supply*

Before the liberalisation of the French electricity sector, EDF's planning of generation resources, which was based on their long term demand forecasts, incorporated the risk of shortage at peak load. Following liberalisation, the security of supply issue was first raised with the publication of the 20 September 2006 decree on forecast balances. This decree defined a criterion for matching supply and demand: like the UK, the loss of load must remain below three hours per year. The French electricity producers (through the French Electricity Union), underlined the contradiction: how to set an objective for available production capacity, given that the sector is liberalised? In the context of liberalising the sector, EDF is no longer in a monopoly position and no longer wishes to assume this responsibility alone, using its own generation resources. The French electricity producers also highlighted the specificities of electricity consumption in France, where the large share of electric heating leads to consumption peaks associated with low temperatures in winter.

#### *<c> A political coalition in support of demand side response*

As soon as this subject of generation failure emerged in France, it was formalised as a political demand external to the functioning of the market. This differs from many other cases where a capacity mechanism has been set up by the sector-specific regulator and internalised within the functioning of the market. This reflects the fact that, in underlying economic doctrine, the need for

a capacity mechanism is contested; it is seen as a complement to the current market design, and regarded by some as a political demand for additional assurance of security of supply, hence reflecting a social (not an economic) choice. Political requirements were clearly expressed at this stage, despite the absence of any demonstration of the market's inability to meet security of supply requirements, or of a 'market failure'.

A parliamentary committee, under the responsibility of Senator Bruno Sido and Deputy Serge Poignant tackled the subject. The Directorate General for Energy and Climate, from the Ministry of Energy, provided the secretariat. This committee chose a capacity obligation covering all suppliers as the preferred mechanism to achieve the politically mandated security of supply target: The proposal was to distribute the liability for the risk of generation failure amongst the various suppliers. This distributed obligation had to be set sufficiently in advance to give visibility to investors. The parliamentary committee gave priority to demand side response, a technical strategy very favourable to electro-intensive industrial customers who were able to enhance their load-shifting potential and revenues from this practice. The creation of a pool of industrialists able to contribute to demand flexibility was been supported during a transitional period, in advance of the establishment of an enduring mechanism.

At this first stage, the solution aimed to reduce the effects of market distortion on customers or competitors. The projected mechanism, a decentralised capacity obligation placed on suppliers, satisfied both the dominant supplier, EDF, which was no longer solely responsible for the security of supply, and the electro-intensive industrialists, who could increase their load-shifting capacity. Thus, it reflected the political compromise reached by parliament.

#### *<c> Learning processes throughout stakeholder consultations*

The proposals of Sido and Poignant's report were incorporated into the law on New Organisation of the Electricity Market (NOME) in 2010. The Minister delegated to Réseau de Transport de l'Electricité (RTE), the French electricity network operator, the design of the capacity mechanism, which was then considered a purely technical matter. The official independent regulator of energy (Commission de Régulation de l'Energie) was not in charge of the design of the instrument. But RTE's leeway was limited, since there was no consensus at the EU level on the need for a capacity mechanism. RTE had to anticipate the risks of a judicial dispute initiated by consumers or suppliers

which could be referred to the Court of Justice of the European Union. RTE's arbitration was, then, mainly guided by the concern to make the mechanism acceptable to the European Commission.

The consultations with interested parties organised by RTE had however revealed significant controversies. These consultations required the reopening of the debate on the nature of the mechanism, in particular whether it should be decentralised or not. According to independent electricity suppliers, the law did not require the use of a decentralised mechanism. Indeed, EDF's competitors considered that the decentralised mechanism was excessively fragile, too opaque, did not offer a sufficiently accurate price signal, did not offer a real guarantee of remuneration for suppliers and risked deterring them from investing in adequate capacities to meet security of supply targets. Conversely, they argued, a centralised auction mechanism, as was implemented in the UK, which would directly remunerate the market participants proposing investment projects, would be much more effective in creating the necessary capacity, and would also be much more transparent.

RTE based its argument on a calculation of the financial transfers from consumers to suppliers induced by the mechanism. RTE, supported by electro-intensive industrial consumers, argued that the centralised mechanism was likely to be costlier, as it would encourage an overestimation of capacity needs and additional production investments.

In spring 2012, the independent authorities that supervise the electricity sector, the sector-specific regulator, the Energy Regulation Commission (CRE), and the French Competition Authority (AdIC), expressed strong scepticism about the need for the capacity mechanism, and the effect of a decentralised mechanism on financial transfers between consumers and producers. This scepticism led to a delay in the publication of the ministerial order to implement the mechanism. The CRE's scepticism was based on the fact that France already had a significant production overcapacity and its concern about the coherence of the French mechanism vis-à-vis the rules of the European internal market. The development of interconnectors with European neighbours was highlighted a more efficient strategy for developing security of supply.

Circumstances of the French power market added to these concerns. In 2015 and 2016, large imports via interconnectors, combined with French overcapacity, resulted in significant price reductions on the wholesale market, thus affecting EDF's revenues, margins and ability to finance new investments. As the French State is EDF's largest shareholder, the Government saw in the

capacity mechanism a way to raise the price of electricity in order to restore EDF's financial position. Emmanuel Macron, then Minister of Economy and Finance, explained the issue of the low price of electricity: 'The Government is working on the regulatory side. This includes capacity mechanisms (...), the introduction of a price floor for CO<sub>2</sub> (...). The adoption of such a measure would be decisive because, by increasing the "spot price", it will create in fact a price floor for a megawatt hour of electricity'<sup>xi</sup>. The Government therefore wished to speed up the regulatory process and the validation of the capacity mechanism by the European institutions.

At this stage of the design, the mechanism was based on obligations on suppliers to hold certificates for an adequate amount of generation and/or demand side response related to their customer portfolio. Certificates are allocated initially via an administrative procedure of certifying existing capacities of production or demand response, and then, certificates may be traded over-the-counter or on an organised market as suppliers seek to cover their obligations<sup>xii</sup>. The incumbent benefits from the implementation of this mechanism because it contributes to the covering of costs of its installed base (the cost of operation and maintenance of existing installations). Also, the decentralised mechanism has the advantage of remunerating all capacities and not only those utilised at peak periods. It is thus suited to the particular needs of EDF, as all of its nuclear production capacities are weakened by a very low market price for electricity.

### **<a> Evaluation by European Authorities**

The trajectory of the development of national capacity mechanisms reveals the strengthening of the role of the EU's Directorate-General for Competition in the validation of national regulations, through the procedure for control of State Aid. This procedure evaluates the justification of national-level electricity market interventions, and their effect on competition in the European integrated market.

#### **<b> Britain**

From an EU perspective, a key issue was whether and how non-British capacity (e.g. from France, Netherlands, or Ireland) could participate in the capacity auctions. When the European Directorate General (DG) for Competition appraised the UK application for state-aid approval in 2014, one point of note was the UK government commitment to allow foreign capacity to benefit from

contracts. This was not to be the case in the first capacity auction as interconnector flows were not permitted to bid into the auction; rather they were valued *implicitly*, i.e. incorporated into the demand curve for the capacity auction based on historical trends and statistical analysis of flows under different scenarios.

The Commission raised this as a point of concern, which was discussed at length during the pre-notification stage of the state-aid assessment. DECC asked for more time to assess the technical feasibility of opening up the market, given uncertainty about interconnector flows under different operational scenarios; for example, how the obligation to provide energy at certain times might distort neighbouring markets. They committed to ensuring that subsequent auctions would value non-British capacity *explicitly* i.e. it could bid into the auction if judged to be capable of physical delivery and subject to the same penalties as domestic providers if obligations are not met.

From Jan 2020, all EU capacity mechanisms must be open to direct cross-border participation by capacity providers located in another Member State. This is to be achieved through cooperation agreements with the transmission system operators in the neighbouring countries, in order to avoid bidders receiving double payments from two national mechanisms<sup>xiii</sup>. A new EU requirement, following the updating of the Electricity Regulation in 2019, is that any new capacity with a carbon intensity of more than 550g/Kw will be prohibited from participating in any auction. Depending on the extent to which the UK aligns with EU Electricity Regulations in the future, it is likely that the British Capacity Market will accept bids from non-British capacity providers directly.

Aside from the question of foreign participation in the auctions, a recent, and surprising, development at the EU level saw the capacity market being suspended in late 2018 due to controversy about the eligibility of demand-side response (DSR) providers to access auctions for long term (15 year) capacity contracts. Under the original market rules approved by the Commission, DSR was part of ‘Transitional Arrangements’ under which they had a choice to either bid into a DSR-specific auction or the main auction, and compete against conventional capacity. DSR at the outset was only permitted to be awarded one-year capacity market contracts, not 3 or 15 year contracts as available to conventional generators, interconnectors and storage operators. This was on the basis that unlike generators or interconnectors, DSR does not incur significant fixed costs and, as such, does not suffer from the missing money problem.



A small-scale DSR provider challenged this rule, taking a case to the European Court of Justice (ECJ); and, following a protracted legal case, the court ruled in November 2018 that the market should be suspended, pending a review by the Commission<sup>xiv</sup>. The UK Department for Business, Energy and Industrial Strategy (BEIS) – responsible for energy policy following the dissolution of DECC in 2016 – made a statement to the effect that this is a matter of providing clarification to the ECJ, rather than a fundamental rethinking of the scheme<sup>xv</sup>. The UK Government’s view regarding DSR contract length, which the Commission eventually agreed with, was that ‘no quantitative evidence was presented ... that could be used to inform a policy decision on whether multi-year agreements for DSR are necessary’ (ibid). The UK’s capacity market has now received retrospective approval from the Commission following its more in-depth investigation.

### **<b> France**

Unlike the UK case where approval was gained retrospectively, the compatibility of the French mechanism with European competition rules was a key consideration in the design process. This was prompted by a controversy which emerged in 2015 when electricity retailers claimed that they may be constrained from acquiring certificates from EDF, the dominant player in the generation market, and hence exposed to an unjustifiable level of risk. Faced with a technical controversy about the effects of the mechanism, the EU Court of Justice was solicited by the French State Council in 9 October 2015 to ensure that the planned French mechanism was compatible with European competition rules.

In the same period, the EU Commission was more active following its decision to perform a sector specific inquiry on capacity mechanisms across a number of EU states. Acknowledging the usefulness of these mechanisms, but also encouraging heterogeneity between Member States, the EU Commission sectoral inquiry recommended specific measures which aimed to provide a framework for national initiatives, even if European rules recognised the autonomy of the latter in energy policy (Marty, 2016). The Commission's objective was to avoid distortions to competition, particularly benefiting incumbents, and to strengthen the harmonisation of mechanisms. The Commission’s 8 May 2012 communication on State aid modernisation set as a key condition for validating State Aid the identification of a “*situation where aid can bring about a material improvement that the market alone cannot deliver, for example by remedying a well-defined market failure*”.

The European Commission introduced a significant change in the French mechanism, adding a centralised tendering mechanism for new generation capacity. Within the centralised mechanism, the public authority decides on the eligible technologies and the required capacities, and implements a competition four years before the date on which the capacities must become available. This centralised mechanism has been introduced to strengthen the bankability of new investments by guaranteeing them a minimum remuneration. Functioning like a contract-for difference, the price is guaranteed for seven years; if the market price is below this amount, the investor receives the difference. This mechanism addresses the demands of alternative suppliers other than EDF who have highlighted the fact that the decentralised mechanism may not sufficiently encourage investment in new facilities.

The work of validation not only concerned the design of the mechanism, but also its economic justifications. However, the economic literature provided diverse justifications; the Member State, France in this case, had to select the one most easily accepted by the European Commission. RTE quickly eliminated the main justification associated with the capacity mechanism in energy economics, namely the missing money issue resulting from price caps. Mobilising this argument would require an intrusive investigation into price formation in the French power market and assessment of the level of this missing money, which, given the dominance of EDF, would most likely turn out to be an adversarial procedure. According to RTE experts, this calculation was very complicated, because the counterfactual would be difficult to appraise and the results of such a procedure would be highly challengeable. According to the French Government and RTE, the mechanism was a justifiable response to a structural problem of its electricity market, its particular configuration and France's reliance on nuclear power. Unless a very rapid technological breakthrough could increase production flexibility (storage), and make consumption responsive to price signals, the capacity mechanism was accepted by the European Commission as a necessary market adaptation<sup>xvi</sup>.

## **<a> Conclusion**

The difference between the British and French cases of introducing capacity remuneration mechanisms illustrates the European dimension of electricity market governance and transformation. In Britain, before circa. 2010, the security of supply issue was considered to be an outcome of the functioning of the free market, largely outside the political realm. While the UK

has since changed its position, the EU has come to the view that the energy-only market should be the standard bearer, the legitimate market norm from which national regulations and political interventions became framed as deviations. But beneath the surface there remains significant scope for agency at the national level, with deviations from the preferred market model being authorised on condition that they are successfully framed as addressing market failures and that their economic scope is within certain limits.

Through this procedure of articulating a high-level market norm for Member States to follow, and the scope for deviation from it, the European Commission is conditioning how political objectives can be integrated into the market design process. However, as we have discussed earlier in this chapter, this ‘normalisation’ does not reflect a consensus in the academic literature on electricity market design where there are different views on the need for separate capacity mechanisms. Rather, the promotion of the energy-only market model in Europe reflects a political project – of European market integration – and a sensitivity of European regulators, who seek to limit deviations from a version of the market which most closely resembles a Walrasian ideal of market equilibrium.

Due to its limited powers to directly impose its preferred market design, and the need to maintain political legitimacy, it tolerates exceptions and deviations from the standard (Reverdy, Breslau, 2019), that is if they are justified as the expression of a national political will that cannot be delivered by the market. The Member State must demonstrate, and articulate, an economically framed argument that the market is unable to achieve a political objective due to the existence of a ‘market failure’ (Davies, 2013, 2016). It must also be demonstrated that the remedy is no worse than the failure, that it is appropriate to the objectives and proportionate. Political objectives must be translated into the frame of economic expertise in order to justify an exception to the standard. Through this control of exception, the DG Competition tries to make progress towards greater integration through progressive alignment. Aware of the diversity of national policy issues and priorities, it seeks harmonisation.

As this chapter has shown, the process of negotiating these derogations can differ between cases. For the UK, European influence over the design of the capacity market was largely carried out ex-post, as the country was a first mover in introducing a capacity mechanism and had already gained initial EU approval. For France, the organisation in charge of the design of the mechanism, RTE,

anticipated the requirements and the justification that could be expected by the European Commission. The influence of EU institutions was therefore most significant through implicit channels (Töller, 2010). RTE, in a situation of legal uncertainty about the assessment of its mechanism by the DG Competition, had strong incentives to negotiate before a formal examination of its proposal. The Europeanisation of the French capacity mechanism reflects the influence of the EU 'beyond compliance' (Schmidt, 2008).

The other differences among Member States in terms of market design and economic justification can be explained by national and temporal contingencies. Their designs are path-dependent and also related to economic issues other than security of supply, and both of the mechanisms had been introduced in a context of a drop of electricity prices after 2008. The British mechanism was suited to the protection of privately owned thermal generators, while the French mechanism was a strategy to avoid a huge loss for the predominantly publically owned EdF and its fleet of nuclear plants. Even if the regulation could be technically justified whatever the economic context, the political mobilisation in favour of the implementation of capacity mechanisms was accelerated in this specific economic circumstance.

Along with ensuring security of supply, in each country the executive authorities were concerned by the difficulties faced by the market players in coping with an increasingly volatile and uncertain electricity price trend, and most likely had an interest in protecting the companies themselves. Of course, this motivation was never written or proclaimed officially, being contradictory with State Aid doctrine. This willingness to override the market and the trend in political commitments to free markets, varying with the economic cycle, has also been observed by Borenstein and Bushnell (2015).

The implementation of capacity mechanisms reflects an ongoing search for a balance between the European Commission's desire to standardise and integrate the electricity market, by adopting a market model supported by some experts and academics, and the desire of countries to adapt this model to address local issues. Some of these can be legitimised in economic terms, such as the framing of security of supply as a market failure, while others are less explicit, such as financial support for domestic energy companies during an economic crisis. The European state aid control procedure has been evolved to accommodate these competing agendas. Behind the mainly

technical discussions are ongoing debates about the ability of the market to achieve political objectives of common interest.

#### <a> Acknowledgements

This research received funding from the program CNRS-NEEDS (Nucléaire : Energie, Environnement, Déchets, Société)

## <a> Endnotes

---

<sup>i</sup> The British electricity market covers England, Wales and Scotland and is under the jurisdiction of the UK government

<sup>ii</sup> The material in this paper covers a period when the UK remained a member of the EU and the transition period which, at the time of writing, is due to conclude at the end of 2020. Brexit will of course fundamentally change the energy relationship between the EU and the United Kingdom. The nature of this future alignment is not something we cover in this chapter.

<sup>iii</sup> There are two transmission owners in Scotland; Scottish Power Transmission in the South and Scottish Hydro Electric Transmission covering the Highlands and Islands. Prior to their privatisation in 1991, these were part of vertically integrated electricity companies, the South of Scotland Electricity Board (SSEB) and the North of Scotland Hydro Electricity Board (NSHEB). Until the full integration of the electricity systems of England/Wales and Scotland, the Scottish companies had been selling into the Electricity Pool on the basis of a long term contract.

<sup>iv</sup> With the liberalisation of the sector, privatisation of EDF was initiated but was stopped immediately, when politicians realised that they needed to retain control of the company in a context of uncertainty about electricity prices. The French State still retains 80% of the company's shares.

<sup>v</sup> Energy Act 2004

<sup>vi</sup> DECC. Consultation on Possible Models for a Capacity Mechanism: Impact Assessment, Department of Energy and Climate Change, London (2011)

<sup>vii</sup> Following the example of capacity market auctions already implemented in the USA, the UK capacity market has been designed as a “descending clock auction”. Capacity providers place bids into the auction over multiple rounds indicating the amount of capacity they would be willing to make available at a particular price level. After successive rounds, when the supply curve coincides with the demand curve, a clearing price (£/kW/year) is determined which is paid to all bidders still in the auction at this point (known as “pay as clear”).

<sup>viii</sup> In the capacity market there are two types of auctions: T-4, the main auction for delivery of capacity where the obligation would commence in four year’s time, and T-1, a top up auction for delivery in one year’s time which is used to top-up the T-4 auction if required.

<sup>ix</sup> Falling to 0.001 hours in 2018/19 for example. In 2014/15, when the market commenced, it was 1.6 hours

<sup>x</sup>BEIS (2019) Capacity Market Five Year Review (2014-2019)

<sup>xi</sup> Minister Macron Tuesday, March 22, 2016, Commission for Economic Affairs of the National Assembly.

---

<sup>xii</sup> Traded are published on the EPEX Spot website. The average price, given by the 2019 Electricity Balance established by RTE in January 2020, was characterised by a strong upward trend, from 10 K€/MW in 2017 to 16 K€/MW in 2020. In 2019 the mechanism contributed to an increase of 3.2 €/MWh for an average tariff including taxes of 176 €/MWh

<sup>xiii</sup> Article 26 of Regulation (EU) 2019/943

<sup>xiv</sup> ECJ ruling in favor of Tempus energy: Judgment in Case T-793/14

<sup>xv</sup> <https://www.gov.uk/government/collections/electricity-market-reform-capacity-market> (accessed on 19.2.19)

<sup>xvi</sup> State aid: Commission approves revised French market-wide capacity mechanism, 8 November 2016

## <a> References

Bolton, R., Clausen, T. (2019). Ambiguous interventions: Capacity remuneration mechanisms and the politics of energy transition in Britain and Germany. *Energy Research & Social Science*, 56, 101218.

Borenstein, S., Bushnell, J. (2015). The US Electricity Industry after 20 Years of Restructuring. *Annual Review of Economics*, (7), 437-463.

Breslau, D. (2011). What Do Market Designers Do When They Design Markets? *Social Knowledge in the Making*, 379.

Breslau, D. (2013). Designing a market-like entity: Economics in the politics of market formation. *Social Studies of Science*, 43(6), 829–851.

Davies, W. (2013). When is a market not a market?: “Exemption”, “externality” and “exception” in the case of European state aid rules. *Theory, Culture & Society*, 30(2), 32–59.

Davies, W. (2016). *The limits of neoliberalism: Authority, sovereignty and the logic of competition*. Sage.

DECC. Consultation on Possible Models for a Capacity Mechanism: Impact Assessment, Department of Energy and Climate Change, London (2011)

- 
- Fabra, N. (2018). A primer on capacity mechanisms. *Energy Economics*, 75, 323–335.
- Karnøe, P. (2010). Material disruptions in electricity systems: can wind power fit in the existing electricity system? *Débordements. Mélanges Offerts À Michel Callon*”, Paris: Presse Des Mines.
- Le Fevre, C. (2015). *The Role of Gas in UK Energy Policy*. Oxford Institute for Energy Studies.
- Leiren, M. D., Szulecki, K., Rayner, T., Banet, C. (2019). Energy security concerns versus market harmony: The Europeanisation of capacity mechanisms. *Politics and Governance*, 7(1), 92–104.
- Marty F. (2016). L’Europe de l’énergie : de la concurrence à la solidarité ?, *Document de travail OFCE*, n°2016-04.
- Nik-Khah, E., Mirowski, P. (2019). On going the market one better: economic market design and the contradictions of building markets for public purposes. *Economy and Society*, 48(2), 268–294.
- Reverdy, T., Breslau, D. (2019). Making an exception: market design and the politics of re-regulation in the French electricity sector. *Economy and Society*, 48(2), 197-220.
- Roques, F. A. (2008). Market design for generation adequacy: Healing causes rather than symptoms. *Utilities Policy*, 16(3), 171–183.
- Schmidt, S.K. (2008). ‘Beyond Compliance: The Europeanization of Member States through Negative Integration and Legal Uncertainty’. *Journal of Comparative Policy Analysis*, 10(3), 297–306.
- Silvast, A. (2017). Energy, economics, and performativity: Reviewing theoretical advances in social studies of markets and energy. *Energy Research & Social Science*, 34, 4–12.



---

Töller A.E. (2010). Measuring and Comparing the Europeanization of National Legislation: A Research Note. *Journal of Common Market Studies*, 48(2), 417-444