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► **To cite this version:**

Thomas Reverdy. Legitimacy constraints and strategic interdependencies between political authorities and independent authorities in the French electricity-market regulation. SASE Conference,, 2017, lyon, France. halshs-01577995

HAL Id: halshs-01577995

<https://shs.hal.science/halshs-01577995v1>

Submitted on 28 Aug 2017

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SASE 2017

Network L. Regulation and Gouvernance

Title : Legitimacy constraints and strategic interdependencies between political authorities and independent authorities in the French electricity-market regulation

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Abstract

This communication develops a sociological perspective to analyze the distributed regulation of electricity market between political authorities and independent authorities in France. The extension of the regulatory state paradigm to the energy sector interferes with the energy transition policy, triggering a struggle of competencies and legitimacy in the design of economic instruments and market regulation. This communication focus on the controversial redesign of electricity market allowing the integration of demand-side management services as load shifting aggregator. It describes legitimacy constraints and deliberation process specific to each authority. It argues that the trajectory of market redesign is influenced by the rivalries between political and independent authorities and their claims of jurisdiction. Rivalries and struggles are contributing to a learning process. Authorities are aware of their interdependencies, trying to anticipate others reactions, and trying to manage interdependencies by informal coordination.

Introduction

With European directives for the liberalization of the electricity sector, the regulatory state paradigm (Mitchell 2008) has extended into energy production, transportation, and even furniture. Per that paradigm, markets and competition represent the most effective ways of addressing issues such as efficiency and environmental protection, the latter with the help of a complementary market for environmental externalities. Accordingly, the European electricity market should not only create attractive incentives for investments in sustainable energy through pricing, but also determine efficient energy mixes. Moreover, the paradigm suggests, the organization of the electricity market should be delegated to independent regulatory authorities (Coen, Thatcher, 2008).

However, the energy sector worldwide remains deeply concerned by politics and policy regarding technological risks, sociotechnical change, employment, and environmental impacts. Elected authorities, on their part, concerned by the market prices of electricity for industry and end-users, do not intend to entrust

the regulation of markets to independent authorities. Consequently, political interventions in the organization of the energy sector, both frequent and diverse, seek to support electro-intensive industries, modernize the network, hedge against supply risks, finance renewable energy investments, and develop electricity demand management. Although political authorities have accepted the competitive logic, they remain in the lead in much of the investment and design of energy mixes. And they can contest the electricity wholesale market whenever they detect that the market counters their objectives and fails to contribute to political ends.

However, in Europe, treaties and their legal interpretation have empowered market institutions, including the Directorate General for Competition and national independent regulatory authorities, to control the action of political authorities in the field of economic regulation. Independent regulatory authorities defend economic efficiency, generally assessed by the proximity of market rules with the energy-only market model, while the DG Competition seeks economic integration and the alignment of those rules (Djelic, Kleiner, 2006; Martino, Gilardi, 2011; Coen, Thatcher, 2008). Attempts at market regulation from national governments and parliaments are always subject to the evaluation of their consistency with existing legal principles, whereas according to independent authorities, the market fails if it does not achieve economic efficiency, which is exactly what happens when political authorities intervene in regulation and when market rules stray from the Walras market model.

At the European level, the conflict between competition policy supported by the European Commission and energy policies defended by parliamentarians over the design of renewable energy support mechanisms is well documented (Lauber, Schenner 2011). However, the way in which that tension emerges at the national level is not well known and, in any case, depends on national institutional configurations (Lauber and Jacobsson 2016), as well as how political authorities and independent authorities defend their domains of jurisdiction.

The present communication offers an account of the trajectory that the definition a new rule for the electricity market is taking: a rule defining how demand-side management (DSM) services can contribute to the equilibria of the network and how consumer's electricity load-shedding can be directly traded in the wholesale market. DSM services exist at the crossroads of energy transition policy and liberalization policy. As a new activity limited by the existing technical regime of production, an asymmetric regulation in favor of DSM development could gain legitimacy. At the same time, as key elements of the electricity market, the rules by which load-shedding activities may be integrated in the spot market should be defined meticulously. Given the coexistence of two incompatible frames of requirements, the process of regulation has been highly explorative, and rules changed four times before being stabilized in 2015 in an experimental law.

Unlike researchers who have described the organizational, legal, and financial autonomy of independent regulatory authorities (Gilardi, Maggetti, 2011), we have sought to understand the real role of each authority in the regulation process by following the controversial definition of the mentioned new market rule. In that

case, the distribution of competencies between political authorities and independent authorities has not been stabilized, and controversies about market rules led to further controversy about the legitimacy of each authority in the design of market rules. As such, the analysis of the controversial trajectory of the new rule can help to identify the overlap, rivalries, and interdependencies of different authorities.

1. Independent regulatory authorities at the crossroads of energy and market policies

During the past 20 years, the energy sector has faced two public policies that address economization: one associated with the liberalization of the sector, the construction of a competitive European market, and the marketization of energy services and the other associated with environmental issues and the promotion of energy efficiency, renewable energy, and climate change mitigation via new economic instruments (Voß, 2007, Block, 2011, Callon, 2010, MacKenzie, 2010). Important parts of energy activities, including energy efficiency and energy demand management, are also at once concerned with those two public policies. Therein, sector-based independent regulatory authorities play key roles by carefully defining new market rules and economic devices.

The role of independent authorities in the regulatory state paradigm

In Europe, the liberalization of different network industries has been based on doctrine and expertise according to anglo-saxon model. If the actions of the European Commission can be qualified as political—after all, it sought to revive halting efforts toward European integration (Jabko, 2006)—then its actions undeniably gained legitimacy from economic expertise and prevailing competition rules. With the support of the Court of Justice of the European Communities, the Commission could also rely on European legislation to extend the rules of the single market to network industries (Schmidt 1998, Schmidt 2000, Woll, 2009). Once those sectors had been liberalized, economic activities became subject to the same requirements of other economic activities in terms of competition. As such, regulation of those sectors mobilized a legal foundation already well established at the European level, applied to nearly all economic sectors, and that included rules against cartels, and state aid (Cini 2001; Cini and McGowan 1998; ; Davies 2016; Fligstein and Sweet 2002).

The regulation of competition is the key element of regulatory capitalism (Levi-Faur, 2005), reinforced in Europe by strengthening the DG Competition and other independent regulatory authorities, including the Competition Authority in France (Djelic, Kleiner, 2006). Such authorities rely on law to arbitrate disputes concerning the organization of markets, as well as use economic expertise and academic knowledge to define efficient markets, with the equilibrium-oriented mechanism of supply and demand as the primary method of achieving collective wealth (Veljanovski, 2010). By limiting the regulation of the economy to the organization of competition, the equilibrium-oriented mechanism of supply and demand effected via pricing has clearly become normative. Today, economic experts' definition of conditions for market efficiency has become the

chief reference for guiding the work of independent regulatory authorities and provides tools and concepts (e.g., neoclassical economics, new institutional economics, game theory) to identify market failures (Dumez, Jeunemaître, 1998). At the same time, in the network's industries, the development of independent regulation has been associated with technical constraints, particularly the facilitation of third-party access to the network. By extension, the identification of market failures by academic economists has helped to legitimate regulation by independent authorities (Coen, Thatcher, 2008, 2005, Martino, Gilardi. 2011).

In the energy sector, Catherine Mitchell (2008) has characterized the new institutional context with the concept of the regulatory state paradigm (RSP), a dynamic of economization that has prompted the diffusion of a market model for electricity. Because electricity is a non-storable good whose production and consumption have to match precisely in real time, the market has to strike a balance of production and consumption by way of pricing. Market design and price control involve economists' expertise (Breslau 2013), especially about telecommunications regulation (Mirowski, Nik-Khah, 2007), authorities of which seek the support of academic economists to clarify market operating procedures, adapted to respect the requirements of economic efficiency and rationality (Breslau, 2011). That chain of delegation, from political authorities to independent authorities and onward to economic experts, is a means of curbing political debate and political pressures by relying on the legitimacy of new technical expertise.

The RSP can easily mitigate a major market failure recognized by most economic textbooks: environmental externalities. Economic expertise can contribute to the political engineering of markets, and market devices can become a means to achieve environmental goals (Mackenzie, 2009). Supporting that thesis is the creation of the European Emission Trading Scheme and the Clean Development Mechanism in the Kyoto Protocol.

However, it remains unclear whether some political influences linger in the market design process, especially in the absence of consensus among economic experts. The question continues to be whether room for the maneuvering of political influence is limited to a sphere of decision making with reduced consequences or whether political influence has major outcomes in terms of economic revenues or activities. It is important to clarify on which basis independent regulatory authorities or judicial authorities arbitrate in contexts of ambiguity or uncertainty (Mirowski, Nik-Khah, 2007, Dumez, Jeunemaître, 1998), and those political influences are more explicit in the marketization of environmental externalities. Accordingly, Michel Callon (2009) has suggested that the mobilization of no-governmental organizations, scientists, and economists create a favorable context for a new network of problems and solutions that could prompt an exploratory market design.

Energy policies as exceptions to the regulatory state paradigm

As the market for energy in Europe liberalized, European states became involved in transitioning their energy mixes, often in light of European directives requiring the states to develop renewable energy. Such a

development necessitated the exceptional financial support of those energies and, always being in direct contradiction with the RSP, relied on strong political legitimacy at the European level. However, the degree of the autonomy of those policies compared to the influence of the RSP ceased to be reassessed at the European level as it was in each country. The authorities in charge of the construction of a European market of electricity attempted to promote regulations to preserve the integrity of the electricity market or facilitate market mechanisms in support of renewable energy (Mitchell, 2008).

Jan-Peter Voß (2014) has identified how a new field of knowledge about transition management has come to inform a normative policy model for governing sociotechnical change and become performative via policymaking. The specialized research field has interacted with political alliances and policy programs “in the process of realizing transition management, both by establishing the model as collective knowledge and by materially enacting it.” The result has been the transition management paradigm (TMP), which directly opposes the RSP. According to the TMP, political authorities influence the energy mix and allocation of revenues in order to sustain the coexistence of various energy technologies and industries. Energy policies are driven by the redistributive interests of economic actors, and the economic share of a technology depends on political consideration as much as industry competitiveness and employment. Energy policies rely on different sources of legitimacy, including national specificities of the inherited energy mix and the path-dependency of technological investments, although the chief source of power comes from political coalitions around technology and media support of the discourse of the sociotechnical transition. According to the RSP, revenues are determined by the wholesale market and investment decisions by wholesale market prices.

Articulating energy policies and the regulatory state paradigm

Arguably, the RSP and TMP compete in the design of economic instruments in the energy sector. The two paradigms support the performativity of economic and political knowledge, as well as are involved in what Callon (2007) has called “performativity struggles,” which suggests the dynamic by which different knowledges compete, along with “the cooperation it triggers” and “oppositions and controversies that it generates” until “the end of the tests” that evaluate its effectiveness (p. 330). In that sense, the present paper contributes to the debate by developing and illustrating those struggles and by describing both the institutions in which and the procedures by which it takes shape.

The so-called performativity struggle between the policy paradigms has been intense. For one, the paradigms are contradictory and, by extension, supported by different powerful institutional and political forces. On the one hand, the RSP is supported by particularly powerful institutional levers, namely the Treaty of Rome and European case law; on the other, the TMP is supported by a new discourse of public policy and political coalitions, both national and European. The rivalry of the paradigms offers wide room for action by economic operators, which, according to their economic interests, may request one or another authority to defend their own interests while seeking a definition of the public interest consistent with the authority.

Despite the continued struggle for influence, many attempts toward hybridization have been made to allow each paradigm to extend its territory without reducing the territory of the other. Such hybridizations are invented at all levels of political action and regulation activity, including the technical level of regulation assumed by regulatory authorities.

Arguably, energy market regulation is an explorative, uncertain process in which legal and economic knowledge is unstable. Expertise is largely distributed among economic actors, academics, NGOs, and regulatory authorities, and the capacity of market organization or political instruments to achieve political goals has not been demonstrated. The energy sector faces significant economic uncertainties, including overcapacity, new technologies, and unstable prices, that influence the effects of energy policies, the market, and various instruments. Although market and policy instruments can afford new space for innovation and initiatives, they also create room for opportunistic behavior and the exploitation of all sorts of organizational failures and windfall profits.

Empirical case and methodology

With the growth of intermittent renewable energies, the need for demand-side flexibility continues to increase. The first, most accessible solution to meet that need consists in shifting the energy loads of large electricity consumers, since rerouting their activity can free up significant power on the network. However, the flexible management of consumption can target end-consumers as well. An innovative company, Voltalis, created in 2006, has developed distributed load-shifting devices for private individuals. Its technique entails reducing electricity consumption at certain times by remotely controlling particular consumer appliances. Using an electronic box installed in homes or small businesses, Voltalis can switch off electrical devices for brief periods. By installing such boxes in a host of consumers' homes, the company frees up electricity in sufficiently large quantities to be taken into account by the French transmission system operator (TSO), Réseau de Transport de l'Électricité. However, such activity requires an initial investment in automation equipment in private homes.

Our analysis starts with the struggle between experts over the financial transfers generated by the activation of load shifting. Though the Energy Regulatory Commission (ERC) published a resolution on July 9, 2009, following widespread political mobilization, its decision was annulled by the Council of State in 2011. That decision was followed by another decision by the Competition Authority, three laws in 2004, 2013, and 2015, respectively, and yet another decision from the Constitutional Council in 2014, all before the mechanism of financing distributed load shifting had been stabilized.

Energy	Regulatory	9/7/2009	Deliberation on integration of distributed load shifting in
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Commission (ERC)		adjustment mechanism
Council of State	3/5/2011	Cancellation of the ERC decision
Competition Authority.	20/7/2012	Decision n° 12-A-19
Parliament	16/4/2013	Brottes Law
Parliament	10/10/2014	Amendment of the energy transition law
Government	11/1/2015	Premium level announce
Council of State	1/2015	UFC-Que Choisir (Consumer association) submitting a complaint against the premium
Government	2/2015	Premium withdrawal
Parliament	18/02/2015	Amendment of the energy transition law
Parliament	26/5/2015	New article (n°46)

Our systematic investigation of the authorities' decisions was based on a sociological analysis of a new economic regulation (Fourcade, 2011, Ehrenstein, Muniesa, 2013, Hirschman, Berman, 2014). We collected public documents addressing parliamentary, including research papers, expert reports, legal decisions, technical documents from independent regulatory authorities. During interviews with some contributors, we sought commentary on decisions in order to illuminate certain milestones and breaks in the dynamic of the exploration of market design. In particular, we examined how economic arguments about technical areas of experimentation, the public sphere represented by media, the political sphere represented by parliaments and governments, and legal institutions such as the Council of State or Constitutional Council had been constructed, translated, and simplified from one decision body to another (MacKenzie, 2011).

Our analysis comprised two phases. The first aimed at reconstructing the trajectory of the definition of new rules. The trajectory took paths unlike those of the formal trajectory, including in regard to the definition of the legal framework that took place after the first technical specification. Each of those decisions produced rules different from previous ones, with very significant effects on the profitability of demand-response management. In the first phase, we analyzed each decision in order to identify a robust explanation of the results. To situate each decision amid the two paradigms and to measure the dynamic of the trajectory, we considered two scales of economic organization, each associated with one paradigm or the other. At the top of the scale of RSP, we observed the energy-only market model, associated with the CO₂ european trading scheme. At lower levels, we observed the degradation of that pure market model in terms of market redesign, including the security of supply. At an even lower level, energy market exceptions and direct subsidies emerged. The scale of the TMP surfaced on top of the political control of the energy mix, where economic revenues emerged with a protected space for each technology. Lower levels allowed more room for

competition within technological fields and between technologies. Lower levels also accommodated redistribution uncertainties associated with market price.

The second phase of analysis aimed at characterizing the role of each regulatory authority in the decision process and the relations among authorities. Each decision was considered to indicate the institutional mandate of the authority, its legitimacy requirements, and its frame of knowledge. Accordingly, the legitimacy of the ERC originated from a mandate from French Parliament and the fulfillment of economic-efficient reasoning. The legitimacy of parliamentarians and governments relies on their ability to organize the participation of economic actors, NGOs, and public movements, as well as to formulate energy policy on that basis. In general, their discourse and their actions are inspired by the TMP.

Overall, analysis characterized dependence relationships among authorities and strategies stemming from rivalries, influence, conflict, and cooperation. Dependence relationships also derived from the fact that each decision has been influenced by previous decisions in a path-dependent way. Given the high cost of overriding previous decisions, although each decision can be invalidated by an authority superior in terms of formal institutional hierarchy, that authority can be influenced by controversy and debate.

Results

A history of the design of load-shedding regulations and a detailed analysis of each decision made therein is necessary to enlighten the significance of issues, either technical or political, and the distribution of responsibilities between independent and political authorities that has changed throughout the process. Such a history can be divided into four periods. During the first, the ERC led the market design and sought to solve what seemed to be a technical dilemma, chiefly by relying on logical reasoning associated with the market model. During the second period, when the entrepreneur firm Voltalis took the lead, it triggered the politicization of the dilemma. The third period was characterized by a coalition between the ERC and the energy administration that, via a new law, clarified the mechanism with a perfect division between market revenues and public subsidies. The fourth and final period involved a conflict of influence from Voltalis, the supplier Electricité De France (EDF), the administration, and the ERC among parliamentarians and French's minister of the environment. The different versions of the Energy Transition Law and the final vote on the measure reflected that struggle of influence.

1. Designing the economic mechanism under the responsibility of independent authorities

Voltalis requested load shifting to be recognized by the TSO in the framework of the adjustment mechanism, which was used to balance production and consumption in the network in real time. The mechanism was leveraged in real time by the TSO when a supplier could not meet its customers' demand. Since each supplier is a balance responsible entity, it is responsible for the real-time balance between what it injects into the

network, either produced or purchased on the wholesale market, and what its customers consume. Suppliers are required to forecast consumption to supply an adequate quantity. However, if customers consume more and the suppliers cannot meet the demand, then the TSO needs support from new production capacity or load-shifting aggregators.

During 2008, experts failed to agree on financial transfers associated with the activation of load-shifting offers. Meanwhile, suppliers considered that the load-shifting aggregator had to reimburse the balance responsible entity—that is, the supplier of the customer that was shed—for the electricity that the suppliers injected into the network. Disputing that dynamic, Voltalis's CEO Pierre Bivas maintained that the load-shifting aggregator should not have to pay for the supply of electricity when consumers had been shed. In the absence of consensus, the TSO appealed to the ERC to clarify the rules, and the ERC published a resolution on July 9, 2009, in which it justified payments to the supplier whose consumers has been shed by the load-shifting aggregator.

The proposition of a simplified economic mechanism

Voltalis's argumentation was based on a simple formalization of the imbalance and adjustment problem. The organization considered that, amid imbalance, TSO's alternative solutions were to either use additional production infrastructure or resort to consumer load shifting. From the perspective of network balance, the two solutions were equivalent, meaning that load shifting had to be remunerated at the same level as peak production. Such reasoning had the merit of being simple, for it did not involve the abstractions of the adjustment market, the balance responsible entity, or consumption profiles. It distinguished the problem of network balance, which was the responsibility of the TSO, from transactions between suppliers. Thus, in response to the ERC's argument, Voltalis proposed that the supplier needing the adjustment should remunerate the other supplier for the energy that the latter injected but that its customers did not consume.

Clarifying economic value via an abstract market mechanism

To clarify the struggle and set a reliable rule, the ERC sought the help of Claude Crampes, a neoclassical economist at the Toulouse School of Economics. Crampes's consultation helped to define the role of load shifting in the adjustment mechanism, the ERC's reasoning for which, as formalized in a resolution, stemmed from the postulate that the adjustment mechanism was based on a market mechanism used by the TSO when a market actor cannot either produce the electricity that it has committed to produce or satisfy the consumers that it has committed to satisfying. In such cases, the TSO chooses between the offers of producers on the adjustment market regarding additional capacities and offers of load-shifting operators to restore the balance. The TSO purchases not only the service that contributes to restoring the balance, but also electricity that it sells to the supplier that defaulted and needs it for consumers. The sole way for the load-shifting aggregator to participate in the network balance is to integrate the adjustment mechanism, which means selling electricity on the market. However, the load-shifting operator does not produce that electricity, but instead obtains it from a

supplier that had committed to supplying it to its customers, as a balance responsible entity, who then did not consume it. The operator can supply that electricity for the adjustment mechanism because the supplier of customers shed honored its supply-related commitments. It is therefore logical for the load-shifting aggregator to remunerate the supplier for the electricity that the latter injected, at least at the price of the supply, which is what customers would have paid had they not been shed.

Based on that organization of the adjustment market, the ERC could articulate the rule of economic precedence between production and load shifting formalized in the French Energy Code. Respecting the order of economic precedence involved ranking offers according to their economic contribution to social surplus. In other words, it had to be possible on the market to orient actors toward an economic solution optimal for all concerned. By clarifying the adjustment mechanism, the ERC demonstrated that the optimization of social surplus entailed paying the energy shed to the supplier that injected it.

From the viewpoint of ERC and suppliers, the rules defended by Voltalis created an important asymmetry between the DSM services developed by a supplier for its clients and the same services provided by an independent aggregator such as Voltalis. Those activities would not be remunerated at the same level whether they were integrated by the energy supplier offer or introduced by an independent actor.

2. The politicization of the market design in media and the political sphere

Faced with the ERC's technical argument, Pierre Bivas, founder of Voltalis, tried to shift the debate to a political level, first by directly appealing to the government and, later, by turning to media. Bivas's capacity to introduce the debate to political bodies stemmed from his background and career that legitimated him among actors in the field. Hardly a political sphere outsider, Bivas had graduated from the École Polytechnique and École des Mines and, in 1995, had served as a technical advisor to various ministries.

Receptiveness to Voltalis's arguments was connected to their political relevance. On the eve of the ERC's decision, Voltalis sent a letter to Nicolas Sarkozy, President of the Republic, and to his ministers Jean-Louis Borloo and Christine Lagarde. This letter asked the President to take action to ensure that the ERC would *“fully recognize the value of the new business and therefore put an end to EDF's absurd constraints designed to destroy it barely after it has emerged, burdening it with a tax paid to EDF to compensate for the energy savings achieved”*. In this letter, the ERC's economic authority and expertise were overshadowed, turning this controversy into a struggle between EDF and Voltalis (the ERC was cited only three times, whereas “EDF” appeared 19 times). Pierre Bivas denounced lobbying, which he attributed to EDF, claiming that it *“exacerbates its pressure on the ERC for it to decide to introduce a tax on energy savings”*. A few days later the title of the press release concerning the ERC's deliberation attested to this strategy of controversy: *“How EDF circumvented the ERC by making it adopt suppliers' point of view at the expense of consumers, therefore preferring ever greater production to energy savings and reinforcing EDF's dominant position in France”* (press release published in 2009). On many occasion, Voltalis presented itself as an

innovative entrepreneur restricted by the historical monopoly. According to Voltalis, the ERC's opinion was the result of a "*corruption of minds*". Its strategy was to weaken the representation of the adjustment mechanism conveyed by the ERC to influence the audience towards its own reasoning, built around the claim that, from a network balance perspective, electricity production and load shifting were equivalent solutions.

The reasoning used by the ERC to clarify the adjustment mechanism provided Voltalis with many opportunities to discredit it into political fields and media. Voltalis declared that the ERC "*adopted the perspective of the suppliers, who complain about the shortfall, and not the perspective of the consumers who benefit from the energy savings made*". The term "*shortfall*" was somewhat ambiguous here. For a reader who had not understood the abstraction that is the adjustment market, the "*shortfall*" concerned electricity which consumers had not consumed, and therefore which had not been produced. This is how the expression "*shortfall*" was interpreted by the green party Europe Écologie les Verts and the NGO Sortir du Nucléaire, which claimed that it meant "*that if a number of EDF customers agree to reduce their consumption, EDF demands to be paid as though they had consumed!*" However, in the context of the adjustment market, this "*shortfall*" corresponded to electricity which the supplier had committed to supplying, which they had indeed produced and which had been valorized by the aggregator.

With this argument, Voltalis was able to disseminate doubt about the ERC. The company managed to convince quite a large proportion of the audience, including environmentalists and elected representatives from all sides, willing to believe that EDF, given its dominant position, was able to manipulate regulatory bodies and economic experts. This discourse was widely shared in the media and was particularly visible in the media and the political spheres. Throughout the summer of 2009, many media outlets reported and commented on the ERC's decision. Each newspaper published a significant number of articles on the topic: Le Monde (seven articles), Le Figaro (seven), Le point (four), Libération (eight), Le Nouvel Observateur (four), Les Echos (three), and L'Usine Nouvelle (six). These articles used the terms employed by Voltalis in its statements. Here are a few examples of titles: "*Why compensate EDF?*"; "*When EDF fights energy savings*"; "*When 'energy savings' clash with the electricity market?*".

Voltalis drew also on environmental arguments, highlighting coherence with the "*Grenelle de l'Environnement*", a large participatory political event in 2009 that shaped the French environmental policy. It aligned with a shared representation of load shifting as consumption reduction, an action with a positive political value. It declared that its infrastructure ensured that EDF did not have to use "*fossil fuel plants, which are expensive and polluting*". This environmental argument, just like the figure of the innovator against the historical monopoly, was soon taken up by the Europe Écologie les Verts party and by the NGO Sortir du Nucléaire, which denounced "*organized racketeering*", an "*energy waste premium*".

The success of Voltalis's argument in the media can be explained by the ambition that the company exemplified. For most politicians interested in energy issues, the need to develop the modulation of consumption had become obvious. This company, which was the only one to provide a concrete solution, therefore had a large audience. Moreover, this debate that enjoyed broad media coverage, secured its legitimacy in the political sphere, and Pierre Bivas was regularly asked to speak in parliamentary debates. The support of Jean Louis Borloo and Europe Écologie Les Verts gave Voltalis legitimacy that it did not have in the technical sphere of the elaboration of the adjustment mechanism where economic expertise prevailed.

The main result of this media coverage and this politicization of the debates was the involvement of political representatives. On 22 July 2009, Jean Louis Borloo, Minister of Ecology, Energy and Sustainable Development, denounced "*the existence of legal and financial obstacles to the development of innovative energy saving offers*". He stated that he wished to remedy this situation and announced the creation of a working group to "*propose the necessary changes to the legal framework*", with the primary objective of "*encouraging energy savings while respecting each of the stakeholders' interests*".

Voltalis successfully fostered the conviction, in the public space, of the relevance of distributed load shifting and of its environmental, economic and social benefits. This promise owed its strength to the fact that it was consistent with a projection towards the future, which is characteristic of the energy transition: the projection towards energy savings, carbon-free electricity production, and the development of an electricity sector unbalanced by intermittent energy sources.

The identification of "market failures" by academics

The difficulties encountered by the TSO and the ERC in clarifying the market rules emanated from the novelty of the concept. The ERC was the first regulator to have accepted to regulate the integration of distributed load shifting on an electricity market. Elsewhere around the world, the debate was still ongoing. It was particularly intense in the United States. In 2010 the powerful Federal Energy Regulation Commission (FERC) gave its support to advocates of load shifting and demand response, ruling that the electricity shed could be valued on spot markets with the same value as energy produced (Order 745 Demand Response Compensation in Organized Wholesale Energy Markets), despite opposition from the suppliers and from a part of the academics. The FERC was highly intent on developing demand response as it considered that the lack of demand elasticity in relation to the electricity price made very steep increases in producer prices possible (it attributed the crisis in California to a lack of elasticity). It nevertheless recognized that this measure had to be re-evaluated according to a "net benefit test" to ensure that it still provided a greater overall economic benefit.

The FERC's decision to value load shifting as equivalent with production created strong uncertainty in France regarding load shifting regulation. The fact that the regulation authority in the United States, the precursor

country in terms of energy regulation, had positioned itself in favor of the equivalence between load shifting and production, contributed to weakening the ERC's credibility. Moreover, on 20 May 2010, two renowned economists, academics and consultants, Jean-Marie Chevalier and Fabien Roques, published a column in the newspaper *Les Échos*, drawing on the same reasoning as Voltalis to criticize the ERC's decision: "(...) *the current regulatory framework does not allow for the development of demand shifting. The companies offering demanding shifting services (using smartboxes) are required to compensate producers for the electricity which the load shifting prevented them from selling. This appears to be contrary to the laws of market functioning, and breaks the symmetry between production and demand shifting.*"

In its 3 May 2011 a decision of the Council of State censured the ERC's decision of 9 July 2009. The Council challenged the Commission's right to establish new obligations based on this economic reasoning. The law did indeed state that distributed load shifting offers and peak production offers should be ranked by order of economic precedence. However, for the Council of State, no article indicated that the price of the energy shed had to be paid to the supplier that injected it to calculate this order of economic precedence. The Council of State considered that it was up to the law, and not the ERC, to rule on "*choices regarding the fairness and sustainability of the systems*". It reminded the ERC that "the law must be applied as it is and not as the regulator would like it to be."

It is very difficult to assess the impact of the political controversy and whether or not it influenced the decision of the Council of State, which gave its verdict based on legal and not technical arguments. This controversy and its political repercussions contributed to relativizing the ERC's technical-economic reasoning and therefore to causing this technical decision to be seen in a new light, as a political decision. The Council of State expressed the need to organize a hearing of both Voltalis and the ERC. Voltalis called on several witnesses, including the economist David Spector and the former President of the ERC, Jean Syrota, who both put forward several critical arguments against the ERC's decision: the failure to take into account energy savings, the reasoning upheld by the FERC, etc. Since the ERC's reasoning had been debated and had become potentially disputable, the Council of State considered that the ERC had not restricted itself to just applying the law on a technical level. Other forms of reasoning were possible and therefore other valuation of load shifting. To clarify the law, the ERC had ventured into producing law. This decision was also made in a context of rivalry between the ERC and members of the Government and the Parliament who felt that the ERC had become the spokesperson of the European competition policy and of a market model that went against the Government's energy policy.

Regulatory complexity and technical controversies among academics provide opportunities for lobbyists to discredit the independent authority and thereby catalyze an intervention by the government or parliamentarians. Briefly, weakening the technical arguments displaces the limits of what political authorities have authority over and of what depends on independent authorities. In particular, the strategic focus on

technical uncertainties seeks to demonstrate that the positioning of the independent authority is justified by not only economic efficiency, but also arbitrariness or even orthodoxy.

Going further than merely illuminating a technical uncertainty, Voltalis used a simplified representation of the market in order to discredit the ERC's decision and thereby mobilize political authorities. The more technical and complex a regulation, the more likely a simplified presentation can be manipulated and provide political arguments that will win widespread support. Using one such simplified representation, Voltalis achieved to make its request public, mobilize the specialized press, and defend its political claims. In Voltalis's cases, the mobilization of media had especially significant effects. It revealed again that elected political authorities are keenly attentive to issues with partisan meaning such as entrepreneurship and innovation, as right-wing parties and the center-left respectively showed. Meanwhile, others such as environmentalist parties are sensitive to arguments of energy saving, whereas left-wing parties are sensitive to arguments about consumer rights. On top of all of that, Voltalis's success also took support from the fact that it had translated the load-shifting valuation into a political framework that was easily understood by political actors.

3. The clarification of the mechanism: insulating market from political support

In 2013, the arguments of the ERC and academic economists gained currency in the administration and among government advisors. The ERC called on renowned academic economists in the field of energy, who regularly advised the European Commission and regulators: J. M. Glachant, Y. Perrez, C. Crampes, T-O. Léautier and M. Rious. These researchers then published a few press articles and scientific studies. They expressed a consensus around the remuneration of the supplier shed by the load shifting aggregator. Moreover, the FERC's decision was still fiercely challenged by US electricity suppliers and by renowned economists like W.W. Hogan, an economics professor at Harvard, followed by Richard J. Pierce, a law professor at George Washington University. Both stressed that the equation of "negawatts" with "megawatts" had to remain purely metaphorical. Pierce proposed that the value of load shifting be equal to the difference between the spot market price (the "marginal price" at Time t) and the selling price of the supply to the consumer, the same equation than the French ERC.

The administration wished to avoid the development of a speculative bubble around load shifting, similar to the one that had disorganized the photovoltaics industry, and understood the value of a rigorous conception of market rules. In the same period, the members of parliament were more involved in other issues like the redesign of the regulated tariff, in order to create a progressive tariffs producing strong incentives in favor of consumption reduction.

The Brotttes law, published in the Journal Officiel on 16 April 2013, is reflecting the influence of the ERC and the administration and define "*a system of payment by the load shifting operator to the electricity suppliers of the sites shed*". Given the risk of this payment reducing the load shifting operator's remuneration, the law provided for a

premium, paid to load shifting operators, taking into account the benefits of load shifting for society. The administration suggested that the ERC calculates a premium that should reflect the “socio-economic” benefits of load shifting, the benefits for society that are not reflected by the existing mechanism. For the ERC, this law had the merit of clarifying the market mechanism, on the one hand, and the subsidy on the other: this subsidy could thus be calculated and debated, based on the identified benefits of the system for society. This subsidy could potentially be challenged by the other actors if they contest its legitimacy.

The ERC was mandated to calculate the “premium”. Different kinds of socio-economic benefits were listed: capacity reserve, reduction of peak prices and of CO₂ emission. The ERC first identified which benefits should be taken into account or not, based on the electricity market rules and the other existing mechanisms. For example, the contribution to securing capacities was excluded from the premium as it was financed by the existing capacity mechanism (defined simultaneously).

The ERC considered only the benefit in terms of CO₂ emissions avoidance as being relevant for calculating the premium. It evaluated the volume of CO₂ avoided, based on data that still remained uncertain: the share between the postponement of consumption and the reduction of consumption. If the postponement was null and the reduction of consumption equal to the shed electricity, the value of the CO₂ avoided would be €27/MWh, and if it was 50/50, the value of the CO₂ avoided would be €13.5/MWh.

The “technical” and “independent” calculation by the ERC revealed the spread between the political support and the economical valuation of the socio-economic benefits. It helped opponents to develop legitimate economic arguments against the support. The debate enlarged to new actors that were not involved since this calculation, the consumer rights associations, associated with the ERC and the suppliers in the defence of the market mechanism (including CO₂ valuation) against an unconditional support.

The redesigned mechanism fit well with the RSP by properly reflecting the instantaneous socioeconomic value of load shifting. At the same time, it did not account for the transition constraints, the fact that existing suppliers such as EDF dominated the market, or that its past investment had partly disabled the development of new activity.

This delegation of the calculation of the premium to the ERC helped indirectly to reopen the political debate to new actors. In December 2014, considering that a premium of €13.5/MWh would be inadequate for the development of load shifting activities, Ségolène Royal defended the upper value, €27/MWh. It was justified by the wish to provide significant economic support to launch the activity, knowing that the premium could quickly be reduced if it was too generous. But, according to the ERC reasoning, this choice suggested that there was no postponement effect in load shifting. The ERC communicated an unfavourable evaluation.

The calculation was immediately debated by the Conseil Supérieur de l'Énergie, a consultative committee composed of members of French Parliament, ministries, local authorities, suppliers, suppliers' employees, and consumers. Having become an important arena for deliberation, despite its weak formal status, the committee was, as usual, systematically questioned by the government and ERC regarding its debate over new proposals. In general, the committee follows an original deliberation method; proposals are sent in advance, each member sends its amendments with detailed arguments, and amendments are debated at a meeting. According to participants, the technical debate made particularly visible the strategic issues of each participant, which had not been the case during auditions organized by parliamentarian commissions.

Returning to ERC expertise and the debate at the Conseil Supérieur de l'Énergie, the consumer's association UFC Que Choisir presented a complaint against the premium before the Council of State. According to various accounts, the complaint was likely to succeed given the overestimated environmental benefits of load shifting. In effect, the complaint created new judicial uncertainty about the mechanism, yet found less political support than expected.

By mapping out the new territory between market mechanisms and political support, the actions of the ERC and energy administration supported the development of a new techno-political debate backed by the Conseil Supérieur de l'Énergie about the opportunity for additional financial support for load shedding. The debate was framed inside the RSP, which, dominated by the canonical market model, required that the additional support reflected socioeconomic benefits.

4. Political investment into the definition of the market mechanism

In 2014, the economic context was less and less favorable to load shifting (overcapacities of electricity production, low peak prices, and low incentives to invest in peak-load capacities). But there was a political opportunity for a new support for load shifting: deputy François Brottes wanted to develop Demand-Side Response Services, because the major section of his law of 2013, the progressive tariff, had been cancelled by the Constitutional Court. A political support in favor of the Demand-Side Management services could overcome the defeat of the progressive tariff. François Brottes considered the load shifting as an alternative to the progressive tariff and wanted to find ways to support distributed load shifting despite the low remuneration by the electricity market, so as to anticipate the development of renewable energies.

The question of payment by the load shifting aggregator to the supplier to compensate for the supply of "*injected electricity*" was once again brought up for discussion in Parliament by François Brottes, in the form of an amendment (no. 16) in the framework of the debate on the energy transition law (on 10 October 2014). This amendment held that: "*The payment is made by the load shifting operator for the share of shed electricity consumption (...) that does not result in energy savings, and by all electricity suppliers for the shed electricity consumption (...) that does result in energy savings.*" The justification for this amendment was based on a definition of "*injected electricity*" fully

coherent with Voltalis's reasoning, but contradictory with the initial reasoning of the 2013 Brottes law. This amendment provided a new definition of "*injected electricity*", associating this notion with the additional electricity effectively injected through the "*postponement effect*"¹.

According to several participants in the discussions, Voltalis exerted significant influence on members of Parliament and the Minister Ségolène Royal. Furthermore, Brottes and other deputies did not understand the ERC reasoning requiring the aggregator to pay the supplier whose consumers were shed. The deputies did not understand the notion of "*injected electricity*". There was a debate as to whether the shed electricity was saved or postponed. Some deputy understood it was postponed, others that it was saved. The deputies did not either understand why the supplier had to be paid for electricity saved. The amendment, drafted by government advisors, provided for new financing for load shifting and, at the same time, closed the debate in Parliament: if consumption was postponed, a payment to the supplier seemed legitimate. If it was saved, and therefore not produced, the suppliers could finance it. This new presentation of the mechanism was more comprehensible to deputies than the original mechanism defended by the ERC.

The weakening of the legitimacy of Voltalis and the decline of the political support

The change of the position of consumer association had an important effect on the political debate. Consumer associations saw Voltalis as an actor that just automatically cut heating installations for 20 minutes at the time when it seemed that consumers needed heating the most. In consumer's forums, Voltalis was accused of misleading consumers by arguing that their equipment would reduce consumption without consequences on the comfort, and by preventing the withdrawal of the "box" by costly intervention. Some consumer associations enlighten the fact that Voltalis install the equipment in low rent social houses with the complicity of some lenders, seduced by the concept and the possibility of energy bill control of the residents.

The attacks were not only directed toward the supporting mechanism or the premium, they were directed toward the technology, the contracting practices, the absence of benefits for consumers. The political valuation of the load shifting practices had more influence in the opposition of consumer association, than the miscalculation of the societal benefits.

The controversy associated with the premium led the Senate to make a new proposal. Amendment no. 934, presented by Mr Poniatowski during the discussion of Article 46 bis at the Senate, on 18 February 2015, introduced a call for tender mechanism to replace the premium for load shifting operators. With a call for tender mechanism, the economic value of load shifting totally changed: it was determined no longer by an estimate of the socio-economic benefits it provided (through the premium, defined by a specific calculation) but by a sufficiently high price level to remunerate load shifting actors. The TSO and ERC experts

¹ The postponement effect refers to additional consumption after load shifting, linked to the fact that the heating or the boiler runs on full power after being stopped to restore the setpoint temperature in the home.

nevertheless questioned the appropriateness of this new call for tender, which added to many existing frameworks. They felt that they had already done a lot to develop load shifting, particularly with the calls for tenders for load shifting capacity set up by the TSO, and they questioned the relevance of an additional support.

In fact, the proposal reversed the economic reasoning. Distributed load shifting would no longer constitute a market device, but something akin to renewable energies, which were secured by subsidies. According to TMP, innovative energy technologies and services should be protected from the uncertainties of the market, and load shifting would benefit from such a protective space for new, uncompetitive technology that needs investment and sociotechnical improvement to become competitive (Smith, Raven, 2012). However, to succeed, the proposal needed political support as strong as that given to renewable energies. Although the load-shifting activity should not have been questioned, at that moment of the political debate, it was questioned by consumer representatives and ecologists, which were concerned actors in the energy transition project.

The load shifting market rules were once again debated in Parliament in spring 2015. Several amendments supporting distributed load shifting were proposed by opposition deputies, who accused the government and majority deputies of supporting the strategy of large companies. Voltalis's influence was very clear in these statements as they reproduce directly its initial proposal. The opposition suspected the government of having changed the text between the Senate and the Assembly. Conversely, influenced by consumers associations, the Greens representatives expressed doubts as to the actual energy savings achieved with distributed load shifting. In view of the virulence of the debates and the confusion they had caused, the deputy François Brottes organized a round table with the economic actors concerned (essentially EDF and Voltalis) for a more direct examination of the conflicting technical and economic arguments.

The bill, ultimately passed by Parliament upon a new reading on 26 May 2015, shows quite a limited decline of Voltalis's influence on Parliament and the Environment Minister. The doubts had grown due to the virulence of the debates. The administration, the government and the Parliamentarians were convinced of the need to be more cautious about providing economic support for distributed load shifting.

Thus, Article 46 bis concerning load shifting clarified the payment to the supplier by drawing on the ERC's technical argument of its first decision (Article L. 271-3). The law clarified the mechanism: the call of tender will correspond to the capacity mechanism. Moreover, the law did not allow for a combination of the benefits obtained on the grounds of energy savings (L. 271-3) with the remuneration obtained through the calls for tenders for capacity. The writers of the bill (deputy, administration and advisers) wished to avoid the uncontrolled accumulation of sources of financing for distributed load shifting.

During the debate in different political forums (e.g., parliaments, senates, the Energy Superior Council, the Council of State), the societal benefit of load shifting faced increasing interrogation. The analytic work done by the ERC and the administration helped to qualify and calculate the benefit in economic terms, yet also fueled the debate about the non-calculable benefits. The political valuation chafed against the idea that load shifting should be supported regardless of costs and market valuations. Doubts about the benefits of load-shifting encouraged a stricter definition of the mechanism, thereby reducing the spread between its value and market valuation.

Conclusion

Polarization of competencies of authorities in the regulation debate

It is unsurprising for an independent regulatory authority to adopt an institutional role that aligns as much as possible with the RSP, including European electricity market integration and economic efficiency by way of competition and prices, and gives limited space, if any, to strategies inspired by the TMP. It is also unsurprising for parliamentarians and the government to assume the TMP and seek to manage the energy mix (Mitchell, 2011), even when it includes new energy services.

In France, the division of competencies between independent energy authorities and political authorities seems to be exaggerated. The French ERC remains loyal to the neoclassical economic model, and political authorities regularly intervene directly in market regulation. By contrast, the division of competencies seems to be more pragmatic in other countries—the Office of Gas and Electricity Markets (OFGEM) in the United Kingdom and Federal Energy Regulatory Commission in the United States come to mind—as well as more political and less respectful of microeconomic textbook thinking than the French ERC. However, those foreign institutions also have more influence and greater institutional power in market regulation. The positioning of the ERC can be explained by the recent development of independent authorities in France and by the ERC's strategy of developing its legitimacy by strictly conforming to both microeconomic knowledge, which has tremendous legitimacy in the history of the French electricity sector, and seeking independence from political pressure.

The division of competencies in France is based on an implicit divide between political decisions and technical decisions. According to that partition, the independent authority is limited to making technical decisions and the political authority to political ones. However, that division is not obvious in the energy sector, where decision making depends on the dominant paradigm instead. On the one hand, according to the RSP, political decisions are limited to qualifying externalities such as environmental impact, while market design is considered to be technical. On the other, according to the TMP, designing economic support for a sociotechnical transition is a political process. At the beginning of the trajectory of the regulation of load-shifting services, the ERC, upholding the RSP, considered that market design was technical. However, Voltalis

argued for the activity to shift into the TMP and for the support mechanism to be defined by political authorities. The source of confusion stemmed from the fact that Voltalis wanted to benefit from the market without accepting the RSP. Of course, the shift to the TMP was not completely achieved, and load-shifting services stayed incompletely qualified in the midstream. Both paradigms competed along the regulatory trajectory, and the design of market rules was thus a field for rivalries of the paradigms as well as of authorities.

Interdependencies created by the polarization of competencies

The implicit divide between political decisions and technical decisions, distributed between political authorities and independent authorities, weakens the regulation process. Indeed, each authority is organized according to the partition; parliamentarian commissions are organized to manage political debates, not in-depth technical ones. Reciprocally, ERC lacks the legitimacy for political deliberation and arbitrage. Therefore, developing a new rule for such regulation is a real challenge. According to the RSP, the presence of the electricity spot market as a source of revenue for load-shifting services implies a rigorous market design that requires technical competencies. However, political involvement in favor of demand-side flexibility advocates a support mechanism in coherence with the TMP. Consequently, political authorities and independent authorities are closely interrelated in the regulatory activity.

The coexistence of two paradigms and the lack of coordination between different authorities create an opportunity for economic actors to weaken the legitimacy of new rules that contradict their interests. It results in an uncertain process of regulation wherein strategic influences can succeed with a series of minor victories and benefit from irreversibility and lock-in phenomena.

Moreover, the interdependencies between authorities are unorganized. The institutional hierarchy of political authorities and the ERC—the mandate of the ERC comes from energy laws passed by the French Parliament—is limited by the fact that the Parliament and government depend on higher judicial authorities, including the Council of State, the Constitutional Council, the European Commission, and the European Court of Justice, that endorse the RSP and rely on the ERC for technical expertise. Hence, Parliament and government depend on the perspective formulated by the ERC. Other decisions from the Parliament and government about, for instance, regulated tariffs and capacity markets have been annulled by the Council of State and Constitutional Council because they were considered to constitute breaches of the RSP and not be supported by sound justifications.

Benefits of the polarization of competencies for the learning process

The polarization of competencies, in which each authority is associated with a policy paradigm, favors learning, which occurs when the trajectory of regulation concerns different authorities. For example, the electricity market rule designed by the ERC has been challenged by economic actors, politicians, and experts

who uphold the TMP. Reciprocally, the support mechanism designed by political authorities has been challenged by the ERC. Along with that learning dynamic, the technical debate evolved, and some arguments initially refuted became acceptable. The debate gained formality, and the learning process provided each authority with the opportunity to regain its influence by accumulating knowledge.

Such distributed regulation improved with the informal coordination of authorities that was absent at the beginning of the trajectory. Namely, the ERC did not anticipate that the government or French Parliament would intervene. At the same time, the informal coordination developed with the controversy. To avoid legal uncertainty, the administration consulted the ERC about its condition of accepting an exception to market rules. Accordingly, the ERC and government sought to define a more robust division of work in the regulation process. However, that informal articulation could be weakened by free-rider strategies by each authority when one considers that the other authorities are not sufficiently cooperating.

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