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France's new Electricity Act: a barrier against the market and the European Union

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Abstract

This paper undertakes an ex ante assessment of the new French Electricity Act which was adopted in November 2010. This act gives EDF's rivals access to a portion of the electricity generated by EDF's nuclear power plants. It is supposed to develop competition and innovation in supply whereas maintaining the benefit of the nuclear rent to French consumers and incentivise investments in power generation. The paper shows this goals are unlikely to be achieved. The assessment is preceded by a description of the motivations of this new law and its detailed contents. It also discusses the potential incompatibility of the French Electricity Act with the EU law and potential windfall effect for electricity suppliers.

Keywords

Electricity, nuclear power, energy regulation, ex ante assessment

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France's new Electricity Act: a barrier against the market and the European Union*

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1. Introduction

In fall 2010, France passed a law to reform the organisation of electricity markets and prices. The new Electricity Act introduces numerous institutional and economic changes. In particular, it gives EDF's rivals access to a portion of the electricity generated by EDF's nuclear power plants. The contents of the act are not always readily comprehensible, in particular for foreign observers. Deciphering its details requires some familiarity with the current French electricity system and the way it is regulated. One of the aims of this article is to contribute to a better understanding of this highly specific reform in the European landscape; it consequently devotes considerable space to factual and descriptive aspects. This paper also undertakes a critical examination of the new act by assessing its impact on the development of competition and on investment, and by analysing the reasons for its instability.

In legal terms, the NOME Act responds to two concerns of the French government, one short-term and the other longer-term. The immediate reason for the new Electricity Act is to provide assurances to Brussels. In France, industrial consumers benefit from administered tariffs that are cheaper than market prices. The European Commission is strongly opposed to these tariffs. Suspecting an infringement of antitrust law on state aid, it opened a formal investigation. It also issued a reasoned opinion for failure to transpose Directive 2003/54/EC.

The long-term concern is to guarantee French consumers, households as well as enterprises, are the exclusive and lasting benefit of past investment in the nuclear fleet. There is a broad political consensus in France to see the passing on

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nuclear cost competitiveness to the final consumers as an essential prerequisite for the social acceptability of nuclear power development.

The problem is that low retail administered tariffs impede the development of competition for only EDF is able to offer them profitably.

To get out of the impasse, the new law's bright idea is to introduce a wholesale price per kWh of nuclear power while eliminating retail administered tariffs for business: it should continue to pass on to the consumers the fruits of EDF's past investment while enabling new entrants in electricity supply to develop. It is up to the regulator to set a tariff that reflects the full cost of nuclear generation, disconnected from the wholesale market price, which is aligned on the marginal cost of the marginal plant, in other words to cordon France off from the rest of European electricity market. This seems to square the circle. In fact, a basic ex ante assessment of the Act shows that this is deceiving.

We propose in this paper to only perform the simplest type of assessment, namely whether the new law will achieve its aims. We will not examine whether those aims could be achieved at less expense, or whether the new law maximises welfare.

The aims of the new Act have been expressed by the government and the parliament on a number of occasions. They are sevenfold:

1. Develop competition in supply in the short and medium term and competition in generation in the long term
2. Encourage innovation in supply and management of demand
3. Maintain the benefit of the nuclear rent for consumers
4. Avoid a windfall effect for alternative suppliers
5. Encourage efficient investment in base and peak electricity generation
6. Provide a stable regulatory and legal framework
7. End the European Commission's proceedings against France

To simplify the discussion of the aims in this list, we will group the first four together by examining the future development of competition, and the last three by analysing the future effects of the law on investment in generation.

The remaining paper is divided into seven sections. Section 2 looks at the source of the new electricity act and the reasons that prompted it. Section 3 examines how the cost advantage of nuclear electricity is passed on to consumers. Section 4 describes the act in detail. Section 5 sets out the basis and limitations of an economic evaluation of the reform. Section 6 comprises an ex ante evaluation of the impact of the act on the development of competition. Section 7 deals with investment efficiency. Section 8 concludes.

2. Source and reasons for the Act

The main source for the Electricity Act, or “Law on the New Organisation of Markets in Electricity” (hereafter “NOME”) is the report of the commission chaired by Paul Champsaur, the former chairman of ARCEP, France’s telecommunications regulator. The report¹, commissioned by the ministers of the economy and energy, was published in April 2009². The authors of the report propose a radically new regulatory measure, namely to “allocate to any supplier a right of access to baseload electricity at a regulated tariff that reflects the economic conditions of the historic nuclear fleet in a volume proportional to the supplier’s portfolio of domestic customers”³. In other words, EDF’s rivals in electricity supply to final consumers in France would be eligible to tap into electricity generated by EDF’s nuclear power plants at an access tariff. The nuclear fleet, owned by the incumbent utility, is equated with an essential facility⁴, access to which must be opened to downstream competition, which would otherwise only be able to develop on the margins. Regulated access to the historic nuclear fleet, recommended by the Champsaur Commission, is the cornerstone of the NOME. It is abbreviated in French as ARENH, for *Accès Régulé à l’Electricité Nucléaire Historique* (“Regulated Access to Historic Nuclear Power”).

The NOME bill was also inspired by another report, produced by a working group on electricity generation and management of peak demand chaired by two French MPs⁵. The group’s findings, published in April 2010, added another dimension to the Electricity Act, namely security of supply. Unlike the first

¹ The report of the commission chaired by Paul Champsaur on the organisation of the electricity market, April 2009, hereafter Champsaur Report.

² For a critical analysis of the Champsaur Report, see C. Crampes et alii (2009), who examine in particular the expected welfare gains from the introduction of regulated access to base electricity generated by EDF.

³ Champsaur Report, see above, note 1, p. 18 §5.

⁴ The Champsaur Report categorically rejects the idea that the fleet is an essential facility. See the half-page treatment of this point in section 3.3.3 p. 11. The members of the commission refute the argument that “nuclear energy [...] represents [...] an essential facility in the strict sense”, because electricity can be generated from other energy sources and access to nuclear power is not a necessary condition for supplying electricity. However, that position stems less from theoretical considerations than from practical contingencies and a prudent attitude. Invoking the essential facilities doctrine carries a legal risk for the mechanism. European jurisprudence has developed a set of essential facilities criteria that might not all be met here (see, for example, Marty and Pillot, 2009, or Defeuilley and Hauteclouque, 2010). Furthermore, the Champsaur Report recommends regulated access to the historic fleet, but insists that this should be transitional and rules out extending it to future nuclear power plants. Consequently, the reference to the concept of essential facility might not be sufficient justification for compelling access in the eyes of a European judge or, on the contrary, could lead him to extend access to all nuclear electricity. In its opinion on the NOME bill (Opinion No. 10-A-08 of 17 May 2010, hereafter “Opinion of the ADLC”), France’s competition agency, the Autorité de la concurrence, also rejects the idea that the nuclear fleet can be considered to be an essential facility. It points out that EDF does not have a monopoly on electricity generation and that there are other low-cost ways to generate electricity than nuclear power (see § 40, p. 9).

⁵ Poignant Sido Report, working group on management of peak electricity, April 2010.

versions⁶ of the NOME, the bill submitted by the government to parliament includes a capacity obligation incumbent on all suppliers⁷.

One last detail is that the NOME Act also includes a section amending local and departmental taxation of electricity consumption⁸. This was added by MPs to the original bill submitted by the government in order to bring local taxation of energy in France into line with EU law⁹.

In legal terms, the NOME Act responds to two concerns of the French government, one short-term and the other longer-term. By law, an existing regulated tariff for industrial consumers, known as TaRTAM¹⁰, was due to end by July 2010. TaRTAM enabled companies that had withdrawn from historic administered “yellow” and “green” tariffs to obtain cheaper power than on the free market. The European Commission is strongly opposed to all three tariffs for industrial consumers, which it considers to be artificially low. Suspecting an infringement of antitrust law on state aid, the commission opened a formal investigation, which may lead to a fine on France. The commission also issued a reasoned opinion for failure to transpose Directive 2003/54/EC¹¹. Furthermore, given the incumbent utility’s market power, the European antitrust agency is particularly attentive to EDF’s behaviour. In particular, it suspects the historic operator of having raised prices abusively on the wholesale market¹².

The immediate reason for the new Electricity Act is to provide assurances to Brussels. This is attested by an exchange of letters between the French government and the European Commission. In a detailed letter¹³ dated 15 September 2009, copied to Andris Piebalgs, the French prime minister, François Fillon, undertakes to Neelie Kroes, then European Commissioner for Competition, to eliminate tariffs for industrial consumers, beginning with

⁶ There are several versions of the NOME bill. This article refers mainly to two intermediate versions that were widely circulated on the Internet: version reproduced by Enerpress No. 9994 on 9 October 2009 and the version reproduced by Enerpress No. 9995 on 20 January 2010. The final version of the law adopted in November 2010 was issued in the Official Journal dated 8 December 2010.

⁷ This measure is a response partly to an objection by the chairman and CEO of EDF, Henri Proglio. Appointed in autumn 2009, the new chief executive of the incumbent utility had strongly criticised the lack of incentives for the beneficiaries of regulated access to invest and share the operating risks. See, for example, his hearing before the Economic Affairs Commission of the National Assembly on 27 October 2009.

⁸ Article 14 of NOME.

⁹ The local tax on electricity levied for municipalities and *départements* was contrary to Directive 2003/96/EC because it is optional and based on the amounts invoiced rather than on the volumes consumed.

¹⁰ This is the acronym from *Tarif Réglementé Transitoire d’Ajustement au Marché* (“Regulated Transitional Market Adjustment Price”). This price offered a way for industrial consumers that had switched to the market to return to regulated pricing. Although TaRTAM is roughly 20% higher than the regulated prices they had left, it is lower than the market price (see fig.1).

¹¹ To date, the European Commission has not yet filed a referral to the European Court of Justice, however.

¹² See the Commission’s press release of 11/03/2009 on: <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/104&format=HTML&aged=0&language=EN&guiLanguage=fr>

¹³ See section 7.2

TaRTAM as soon as the new act is passed, and followed by yellow and green tariffs in 2015. Mr Fillon concludes his letter with a detailed description of the mechanism of regulated access to base electricity and an appeal to the Commission to abandon its dispute with France¹⁴.

The practical necessity of avoiding the European Commission's displeasure is combined with an underlying national political concern, namely to guarantee French consumers the exclusive and lasting benefit of past investment in the nuclear fleet.

That wish is asserted constantly during the early stages of the NOME bill, from the engagement letter to Paul Champsaur on 24 October 2008¹⁵ to the discussion in parliament¹⁶ via the bill of 14 April 2009¹⁷. The Champsaur Commission's report asserts clearly that it is legitimate for French consumers to benefit from the competitiveness of French electricity generation capacity" and that "passing on that competitiveness to the final consumer is an essential pre-requisite for the social acceptability and sustainability of the French nuclear fleet, which has been a success both economically and in mitigating climate change". Eighteen months later, the explanatory memorandum of the NOME bill reiterated that the government's intention in reforming the electricity market was to "preserve, for all consumers, the benefit of the investment in developing nuclear power [...]"¹⁸.

To sum up, the electricity reform proposed by the government was designed and is presented as a lifeline. Its purpose is to safeguard the redistribution of the

¹⁴ "I would be grateful if you could kindly confirm whether the government's undertaking to implement the principles set forth here will end the dispute over state aid with respect to TaRTAM and regulated tariffs and over the failure to transpose Directive 2003/54/EC on common rules for the internal market in electricity." Letter from the prime minister of France, François Fillon, addressed to Commissioner Neelie Kroes [hereafter "Letter from F. Fillon"], 15 September 2009, p. 6.

¹⁵ In their letter of engagement to Paul Champsaur of 24 October 2008, the ministers Christine Lagarde and Jean-Louis Borloo state "that it is now crucial to clarify the rules that apply to the electricity market, in order to reconcile consumer protection, the development of competition [and] financing for investment [...]». They emphasise the need for "France to have a clear, stable framework [...] that protects the interests of consumers [...]" and to "ensure that opening the market to competition [...] benefits consumers, both households and businesses [...]". Champsaur Report, above note 1, Appendix 1, p. 19.

¹⁶ See, for example, P. Ollier: "The [Act] appears to be well designed to enable our country to protect its nuclear fleet and to continue to enable the French to benefit from it". Report No. 2557 of 26 May 2010 by Jean-Claude Lenoir on behalf of the Economic Affairs Commission of the National Assembly, hereafter "Report of the National Assembly", p 43.

¹⁷ The NOME bill of 14 April 2010 begins thus: "In order to ensure the freedom to choose an electricity supplier while enabling the competitiveness of the French nuclear fleet to enhance the attractiveness of France and benefit all consumers, the Act introduces [regulated access to base electricity generated by EDF]". A version a few days older submitted to the Council of State was even more direct, since it began, "The competitiveness of the French nuclear power fleet is a national asset which should enhance the attractiveness of France and benefit all consumers while respecting their freedom to choose an electricity supplier".

¹⁸ The explanatory memorandum of the NOME bill, hereafter "Explanatory Memorandum", can be viewed on: http://www.legifrance.gouv.fr/affichLoiPreparation.do;jsessionid=C5F863AA17C8040BC2E4BB3138A31455.tpdjo06v_1?idDocument=JORFDOLE000021751367&type=expose)

nuclear advantage to domestic consumers despite the European Commission's request to eliminate regulated retail tariffs.

3. Passing on the advantage of nuclear power to consumers and the impact on competition

In the 1970s France implemented an ambitious policy to develop nuclear electricity generation. The legacy of that policy is a fleet of 58 reactors representing total installed capacity of 63,200 MW. Nuclear power meets the bulk of domestic needs for base and semi-base electricity. In 2009, nuclear electricity generation account for almost 390 TWh, which was 75% of France's domestic electricity consumption. The predominance of nuclear power in France's energy mix is unique in Europe. Since the marginal cost of nuclear power is low and insensitive to oil and gas prices, France now enjoys a comparative advantage.

That advantage can be seen clearly on the western European wholesale market. Most of the time, the marginal power plant whose generation is necessary to meet instant/spot demand and whose marginal cost determines the equilibrium price, is a German coal- or gas-fired plant. Consequently, French generation of nuclear electricity enjoys a high scarcity rent. Let us specify what we mean by "high" here. There are two possible points of reference. First, the scarcity rent is high in comparison with the theoretical level, which remunerates exactly the fixed cost of a nuclear plant when the capacity of the fleet and the energy mix are optimal. For example, if nuclear generation capacity is insufficient, the competitive equilibrium price on the wholesale market will offer excess remuneration to the capital invested in reactors in the past. Many observers¹⁹ consider that this is the current situation in Europe: compared with an optimised electricity generation fleet, nuclear generation capacity in Europe is too low. Naturally, that excess profit encourages the construction of new nuclear plants, which would in time restore balance and eliminate the additional scarcity rent. However, this self-regulating mechanism is jammed in Europe because some countries refuse to build new reactors. Consequently, the nuclear advantage enjoyed by France is likely to endure.

Secondly, the scarcity rent is high compared with the theoretical situation of a closed domestic electricity economy in equilibrium. A competitive wholesale market within the borders of France would be characterised by an annual average price lower than that observed in western Europe. The hourly price would be determined for many more hours by the marginal cost of a nuclear plant in France, instead of a German plant. On a smaller geographical scale, the nuclear fleet goes from under-capacity to over-capacity. At equilibrium, the wholesale price remunerating nuclear capacity would tend towards the long-run marginal cost, which includes fixed and variable costs.

¹⁹ See, for example, D. Finon et alii (2009).

The latter reference situation is the one used by the drafters of the NOME bill. They insist that the opening of energy markets in Europe has led to “prices disconnected from the economic fundamentals of France’s electricity generation fleet”²⁰ and that “if the French electricity system were isolated from the rest of Europe, market prices would reflect the actual costs of French generation”²¹. Supposing that demand is inelastic, assuming that €40/MWh is a fair approximation of the equilibrium price for electricity in a competitive wholesale market within the borders of France (which would cover the fixed costs of nuclear energy exactly), and by observing that the average price of electricity on the wholesale market was €69.20/MWh in 2008, the additional scarcity rent in that year would be €11 billion $[(69.2-40)400\text{TWh}]$. For the time being, it is mainly pocketed by French consumers because almost all of them benefit from regulated retail tariffs, which theoretically should be based on the long-run marginal cost.

Naturally, the lifting of regulated retail tariffs, be they return, blue, yellow, or green, would automatically transfer the rent from consumers to EDF. The wholesale market price would become the driving price on which suppliers of final consumers would base their prices. The incumbent would no longer be required to supply its customers at an energy price below the wholesale market price, which has been the case since mid-2003 (see Figure 1). Competition in supply would thus develop. The maintenance of retail tariffs continues to block new entrants. To simplify, they must offer consumers base kWh at a lower price than the one at which they themselves source electricity. Their only flexibility comes from their own generating capacity (which is the case for GDFSuez, which has a drawing right on some EDF reactors as well as its own fleet in Belgium), their bargaining skills with EDF (which is the case for Poweo, which negotiated a long-term agreement with the incumbent utility on cross supply of generating capacity), or their performance in financial electricity markets and virtual capacity auctions. Unsurprisingly (see Table 1), alternative suppliers are only visible in the market segment where the regulated tariff is the highest (i.e., TaRTAM). In long-term contracts with industrial customers (i.e., unregulated offerings) and residential consumers, their market shares remain low.

²⁰ Impact study of the NOME bill, hereafter “Impact Study”, April 2010, p. 6.

²¹ Champsaur Report, above, note 1, p. 6.

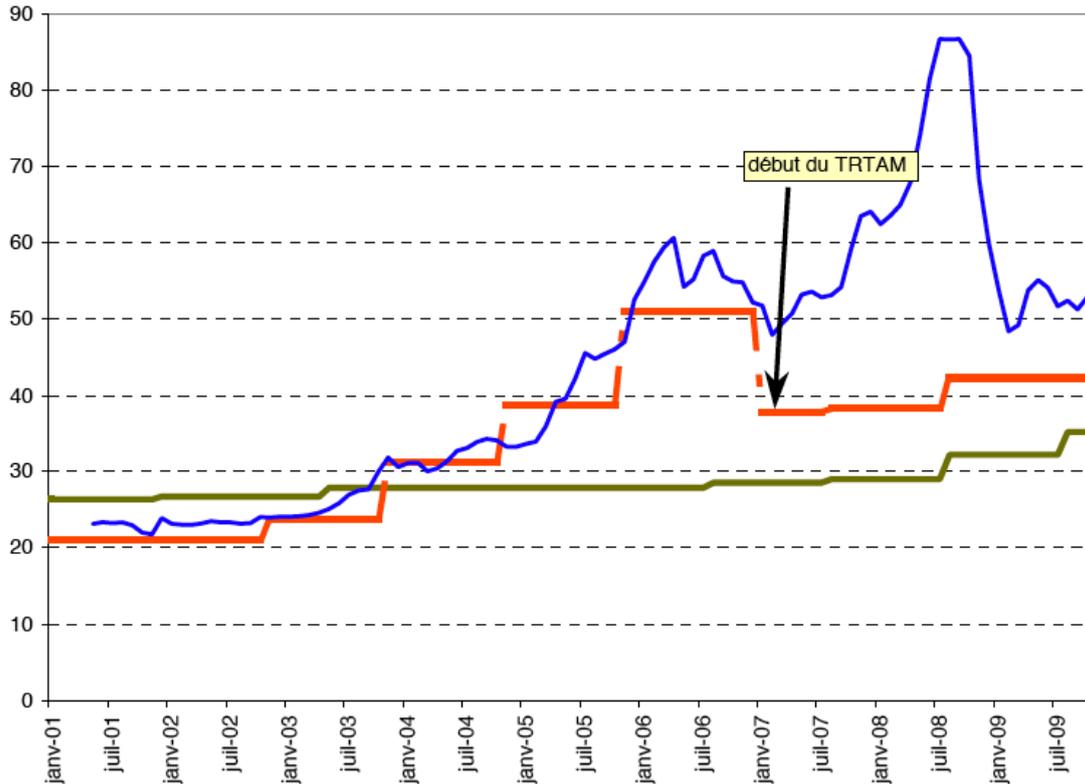


Figure 1: Comparative trends of supply tariffs and wholesale prices, excluding transport (price in constant euros per MWh ex-VAT; blue curve: monthly average wholesale market price at 1 year; red curve: estimated price paid by a baseload customer that left the regulated tariff; green curve: price from the regulated green A8 base price; estimate of the price paid by an industrial customer in the unregulated market for baseload electricity. Source: impact study)

	Residential		Non-residential					
	Number of sites	Consumption (TWh)	Number of sites	Consumption (TWh)	Unregulated offering		TaRTAM	
	Number of sites	Consumption (TWh)	Number of sites	Consumption (TWh)	Number of sites	Consumption (TWh)	Number of sites	Consumption (TWh)
EDF	28515000	135.4	4487000	259	382795	59.4	2205	44.6
Alternative Suppliers	1385000	5.6	367000	39	365705	9.6	1295	27.4
Total	29900000	141	4854000	298	748500	69	3500	72
EDF	95.4%	96%	92.4%	86.9%	51.1%	86%	63%	62%
Alternative Suppliers	4.6%	4%	7.6%	13.1%	48.9%	14%	37%	38%

Table 1: Market shares of alternative suppliers by category of consumer (Market shares according to price offering at 31 December 2009; CRE data, source: Impact study)

To sum up, using regulated tariffs to pass on the cost advantage of nuclear energy to consumers impedes the development of competition. Taking the European Commission’s side means harming the beneficiaries of the tariffs, whereas supporting French politicians obsessed with distributing the rent to domestic consumers leads to rejecting European energy liberalisation. To get out of the impasse, the new law’s bright idea is to introduce a wholesale price per kWh of nuclear power: it should continue to pass on to the consumers the fruits

of EDF's past investment while enabling new entrants in electricity supply to develop. It is up to the regulator to set a tariff that reflects the full cost of nuclear generation, disconnected from the wholesale market price, which is aligned on the marginal cost of the marginal plant, in other words to cordon France off from the rest of European electricity market. This seems to square the circle. But, before we see that this is deceiving, let's look at the details of the NOME Act.

4. The NOME Act in detail

First of all, the NOME Act can be described in terms of its intended – or dreamed of – endpoint, expressed in the explanatory memorandum and the impact study. What is the organisation of the French electricity system meant to look like in 2025, the implementation deadline for the NOME Act?

In future, EDF might sell by its own in France and abroad only half of the electricity generated by its historic nuclear fleet abroad. The other half would come under regulated access, or agreements and obligations that existed prior to the NOME Act and that are maintained after it²². In France, EDF's market share in electricity supply could fall to 60%²³ from 90% today. In other words, EDF's generation and marketing businesses would only be half integrated, and, using the standard expression in antitrust law, the incumbent utility would go from super-dominant to dominant²⁴.

By 2025, EDF's loss of market share in supply in France should come from industrial consumers – a trend that has already begun – and, on a much larger scale than now, from retail consumers (i.e., households and small businesses that subscribe for power of less than 36kVA). The latter's attraction to the offers of alternative suppliers should, according to the designers of the NOME bill, be based on both price and quality.

²² Assuming generation of 400 TWh (similar to today's level), of which 100 TWh are sold within the framework of NOME to EDF's rivals to supply consumers in France (the ceiling on regulated access to nuclear power), 58 TWh are sold to EDF's rivals to supply the market via auctions or exchanges of rights (e.g., with ENEL and GDF Suez), 20 TWh are sold to the operator of the transmission network, which EDF would no longer own, and 15 TWh are sold to international suppliers under existing contracts.

²³ This market share figure is based the following main assumptions: EDF's rivals access the 100 TWh foreseen in NOME and add 40 TWh to supply peak electricity. They therefore sell 140 TWh, as well as some of the sales they make now without NOME. In 2009, alternative suppliers sold 44.6 TWh, of which 27.4 TWh at TaRTAM. Assuming that half the non-TaRTAM volume represents profitable sales and that all TaRTAM sales are profitable, we estimate that sales by alternative suppliers from before NOME that continue after NOME amount to 36 TWh. Since the size of the market is 439 TWh, the market share of alternative suppliers after NOME is 40% (176TWh/439TWh).

²⁴ European jurisprudence considers that a company with market share above 50% is "dominant". Companies with market share above 90%, such as Microsoft in the operating systems market for personal computers, are called "super-dominant".

In terms of prices, alternative suppliers will be able to offer “blue” retail prices, which the NOME Act maintains for small consumers. Unlike now²⁵, the regulated offering should enable new entrants to make money. The Act stipulates that retail tariffs should be an addition of the regulated tariff for nuclear electricity, the market price for peak electricity, network costs and marketing costs²⁶. Whenever an alternative supplier’s marketing or peak electricity supply costs are lower than EDF’s, it will be able to make a higher profit than the incumbent utility by serving small consumers that have remained on regulated tariffs.

In terms of quality, alternative suppliers should be able to compete with EDF by offering small consumers innovative offerings: modulated prices for different hourly and day slots, related services (e.g., electrical repairs, remote management of home appliance consumption and heating), load shifting bonuses, guaranteed carbon content or share of renewable energy, etc. Innovation in electricity supply is one of the major effects expected by the designers of the NOME Act²⁷.

The NOME Act contains a reversibility clause²⁸, which should encourage small consumers to switch to unregulated offerings, in particular offered by EDF’s rivals. Households and small businesses that regret having left the protective wing of regulated tariffs will be able to change their minds at any time²⁹.

In terms of investment, the desired endpoint of the NOME is an upgraded historic nuclear fleet, ready for replacement, combined with new peak generation capacity.

It is planned that the regulated tariff for nuclear electricity will take into account the investment necessary to extend the life of the existing nuclear reactors³⁰.

²⁵ The Impact Study (above note 20, p. 33) states that, “Currently, to capture new customers, suppliers generally make similar offerings to the regulated retail tariff, to which they apply a ‘discount’. That kind of behaviour is unsustainable within the current competitive environment, because it is loss-making for the suppliers that practise it. However, it will be economically viable under the new organisation of the electricity market”.

²⁶ “By the deadline of 31 December 2015, regulated retail tariffs for electricity will be established gradually by adding the regulated access tariff to historic nuclear electricity, the cost of electricity supply supplement which includes the capacity guarantee, electricity transmission costs and marketing costs, plus normal remuneration”. Article 4. of the NOME Act.

²⁷ See introduction to the Explanatory Memorandum (above, note 18), which states that, “This bill will contribute to targeted, efficient regulation of the electricity market, which will enable consumers to continue to benefit from the investment in nuclear power, while fully developing innovation and choice for consumers.” See also Impact Study (above, note 20) which looks forward to a “wide variety of attractive price offerings” p. 33 and the development of “innovative offerings” p. 50.

²⁸ Article 5 of the NOME Act.

²⁹ Large consumers that leave yellow and green tariffs will have to wait a year before they are eligible again to be supplied at the yellow and green tariffs. That constraint was introduced in an amendment by parliament to avoid switching back and forth because of summer and winter differences between unregulated and regulated tariffs. See Senate Report No. 643 of 7 July 2010 by Ladislas Poniatowski on behalf of the Commission on the Economy, Sustainable Development and Infrastructure Development, hereafter “Senate Report”, p. 61.

³⁰ The access tariff for base electricity “takes into account [...] the investment costs required to maintain or extend the approval to operate”. Article 1 Title VI of the NOME Act.

Theoretically, therefore, that investment in upgrading should not be delayed or neglected by EDF.

Furthermore, the NOME Act creates the conditions for the replacement of the nuclear fleet. It mentions the possibility of factoring the development cost, i.e., the cost of building new plants, into regulated tariffs in the future. When the progress reports on the mechanism are due in 2020 and 2025, the government will be able to propose “gradually factoring the costs of developing new capacity for generating base electricity into electricity tariffs for the final consumer and setting up a specific system to ensure that adequate financial resources are amassed to start replacing the nuclear fleet”³¹. The Explanatory Memorandum of the NOME bill also states that “Between 2020 to 2025, it would be appropriate to start preparing for the replacement of the nuclear fleet. The cost of replacement can then gradually become a relevant price reference for consumers”³² and adds that the ARENH tariff “will enable companies in the electricity sector to have a sound financial situation towards the end of the life of the historic nuclear fleet, and be in a position to contribute to the replacement of electricity generation capacity”³³.

Lastly, according to the government, the NOME Act should encourage investment in peaking power plants operated by EDF and its rivals. The NOME Act requires all suppliers to have generation capacity, either owned or via third parties, and/or load shifting. Unlike now, EDF will no longer be the only operator to guarantee security of supply. Article 2 of the NOME Act states that “Every supplier contributes to the security of electricity supply in accordance with the characteristics of its customers in mainland France”. The system enforcing this obligation has not yet been decided. Its terms will be set out in a decree issued by the Council of State. Given that NOME stipulates that the load shifting guarantees and security generation by suppliers are tradeable³⁴, the system should eventually become a capacity market.

To achieve the future organisation of the French electricity system described above, The NOME Act introduces a cumbersome regulation of prices and volumes. which will be entrusted to a new energy regulation commission and will be implemented in several stages. To reveal that unwieldiness, let us describe the regulation of access to nuclear electricity introduced by the Act.

Regarding the level of the ARENH tariff, the NOME Act states that it must be “representative of the economic conditions of electricity generation [by the historic nuclear fleet] in order to guarantee fair remuneration for EDF”. The Act stipulates³⁵ that the regulated tariff should include operating costs, plus investment, plus the provisional costs of dismantling the plants and managing the waste, plus interest, taking into account the nature of the activity. This description of the principles and terms on which the ARENH tariff is to be based

³¹ Article 1 Title VII of the NOME Act.

³² Explanatory Memorandum, see above, note 18, p.6.

³³ Explanatory Memorandum, see above, note 18, p.6.

³⁴ “The capacity guarantees shall be tradeable”. Art. 2 of the NOME Act.

³⁵ Article 1 Title VI of the NOME Act.

is so vague³⁶ that it is not possible to draw any conclusions about its level. The economic or accounting method that will be used to calculate the ARENH tariff will be set forth in a decree³⁷. It should be borne in mind, however, that the same data can yield different results depending on the method used.

The accounting information used to set the ARENH tariff will be collected from EDF by the Energy Regulation Commission (Commission de régulation de l'énergie – CRE), which can hire an independent organisation to audit it. The CRE will not set the ARENH tariff, however. The NOME Act gives responsibility for setting tariffs to the government, specifically to the ministers of energy and the economy. The CRE is empowered to issue opinions and subsequently proposals regarding the tariff. Regarding the opinions, planned for a provisional period of three years after the introduction of the Act, the government is not bound by the CRE's recommendations. Regarding the proposals, the government cannot set a tariff that differs from that proposed by CRE, but it can reject it and ask CRE to make a new proposal. It is not until 2014³⁸ that the ministers of energy and the economy will have their hands more tied when it comes to the ARENH tariff.

The CRE will also have to ensure that the suppliers entitled to the ARENH tariff do not buy more than the volume they need to satisfy their customers in France³⁹. The first article of the Act stipulates that the nuclear electricity tariff is reserved for industrial consumers located in France⁴⁰. To enforce that implicit destination clause (the permissibility of which is discussed in the next section), the CRE must regulate the volume subject to the ARENH tariff. The CRE must therefore calculate, then notify, the quantity to which each supplier is entitled based on its portfolio of customers and the estimated growth of that portfolio⁴¹. In order to correct errors and avoid cheating, the NOME Act provides for an adjustment mechanism, or penalty, in the form of a surcharge on top of the ARENH tariff. Suppliers that are allocated volumes in excess of what their customers in France actually consume, will have to pay for every excess MWh received, an amount at least equal to the difference in value between the ARENH and the market price (see section 7.2).

³⁶ In its opinion, the competition agency (see above, note 4) identifies two pricing principles in the bill: a rule of coverage of the full costs and a rule excluding margin squeeze on EDF's prices for its own sales (see § 114 and sections III B and III C).

³⁷ "A decree issued by the Council of State [...] shall set forth in particular [...] the methods to use to identify and account for costs [...]" Article 1 Title VIII of the NOME Act.

³⁸ In an earlier version of the bill, submitted to the Council of State, the transition period was five years instead of three years.

³⁹ The CRE "calculates the entitlements and controls regulated access to historic nuclear electricity [...] and monitors transactions by the supplier and ensures the consistency between the volumes of historic nuclear power allocated under regulated access and consumption by final consumers in mainland France". Art. 7 Title I of the NOME Act.

⁴⁰ "Every annual contract provides for the sale of a maximum volume of electricity based on the characteristics and estimated growth in actual final consumption by final consumers supplied by the supplier in mainland France". Art. 1 Title III of the NOME Act.

⁴¹ "[The] volume is set by the Energy Regulation Commission [...] and is notified to the supplier and to EDF". Art. 1 Title III of NOME.

Lastly, the CRE will have to calculate retail tariffs for final consumers. As we have already mentioned, Article 4 of the NOME Act stipulates that these tariffs must factor in the ARENH tariff, the cost of additional supply to cover peak electricity and meet the capacity guarantee, transmission and distribution costs, and marketing costs. Like the ARENH tariff, the retail tariff is set by the government (i.e., the ministers of energy and the economy), not by the CRE, which only issues a proposed tariff. As for the ARENH, the CRE will issue only an opinion in the first three years of the NOME, thus leaving the government more leeway. The CRE's power with regard to setting retail tariffs has a time limit as far as the green and yellow tariffs are concerned since the Act sets forth that these shall be phased out by 31 December 2015. That deadline also represents the end of the adjustment process between current and future retail tariff, which must be factor in the costs cited above. The next section will examine that gradual alignment and the problems it will inevitably raise.

The NOME Act gives the CRE more appropriate organisation. In 2006⁴² Parliament increased the commission's membership to nine, with the additional requirement that two members be chosen from among consumers. Unsurprisingly, in previous years, these members behaved as spokespeople for industry and households. The draft bill cleared up that anomaly. It also proposed reducing the number of members to five and that they be full-time office holders. Parliament's Economic Affairs Commission found even that number too high and opted for a three-member board, but the senate reverted to a five-member commission.

In short, the NOME is designed to achieve a near idyllic situation in terms of investment and competition in 15 years' time through regulation of virtually every aspect, but despite its great complexity. We can legitimately wonder about how successful it will be given that the bigger the regulator's role, the more scope it has to make mistakes, particularly due to insufficient expertise or information.

5. An economic evaluation of the NOME: methodological aspects

An economic evaluation of the NOME Act is more a subject of discussion for the future. At the time this paper was written, the final version of the law was just issued in the Official Journal⁴³ but the system will only be complete once a long list of decrees has been drafted and issued⁴⁴. Some economic evaluations have nevertheless already been published. This section summarises them and

⁴² Act 2006 - 1537 of 7 December 2006.

⁴³ The Act was passed by the National Assembly on the first reading on 15 June 2010. It was discussed and amended by the senate in the end of September, and returned to the National Assembly for a second reading and final adoption in 24 November 2010.

⁴⁴ More than ten decrees, some of which are key to studying impact, in particular those relating to the method used to calculate the regulated tariff and to suppliers' obligation to contribute to security of supply.

describes the evaluation method that will be used in the subsequent sections of this paper.

5.1. Initial evaluations

An initial evaluation of the NOME was done by Crampes et alii (2009). These authors criticise the main recommendations of the Champsaur Commission's report at the origin of the NOME bill, in particular the system for accessing some of the electricity generated by EDF. Crampes et alii question the gain for society of regulating that access. They point up the very high costs and low benefits of doing so. Firstly, regulation is likely to lead to considerable expenditure capture and highly likely to reduce EDF's generating performance. Secondly, the benefits of competition and innovation are limited to supply, which accounts for less than 10% of the final consumer's electricity bill. The authors conclude that "the introduction of an administered wholesale price for nuclear generated electricity is probably adverse to welfare".

In April 2010, simultaneously with the bill, the government disseminated an impact study⁴⁵. The study aims to inform parliamentarians about the economic and social benefits expected from the new regulation of the electricity sector. The study is a document of around 100 pages, including the appendices, which provides a great deal of facts and figures largely unknown to the general public. The analysis of impacts, however, reads more like an advertisement than an economic evaluation. According to the study, the NOME Act will be completely successful and will resolve all the problems with the current situation: competition will develop, investment will occur, innovation will spread, security will increase and the consumer will continue to enjoy the cost advantage of nuclear energy. Lévêque and Saguan (2010) criticise this idyllic picture, which assumes that the design and implementation of the NOME Act are perfect. They show that the claimed effects of the NOME in the impact study are at best uncertain (e.g., investment in peak generation), and at worst opposite to those suggested by the study (e.g., disincentives not incentives for EDF to invest in extending the life of nuclear power plants).

The competition agency (ADLC) also published an opinion on the NOME bill as to the extent to which the planned reform will enable effective competition to develop. The ADLC stresses that it will be difficult for alternative suppliers to compete with EDF in supplying electricity to small consumers before 2015⁴⁶. In the longer term, the ADLC expresses doubt about the development of competition: "[T]he market situation might not have changed substantively by the expiry of the system [of regulated access] compared with now". The ADLC's reasoning is based on the idea that only companies that are vertically integrated in generation and supply can effectively compete in electricity markets⁴⁷. In its

⁴⁵ Impact Study, see above, note 20.

⁴⁶ Opinion of the ADLC, see above, note 4, § 162.

⁴⁷ "[The] emergence of genuine competition requires incentives for alternative suppliers to invest in baseload and peak generating capacity." Opinion of the ADLC, see above, note 4, § 225 indent 6. "Effective competition in the supply market implies the existence, alongside EDF, of several integrated

opinion, the NOME Act does not provide any guarantee that alternative suppliers will invest in generation. Firstly, the rules introduced by the Act do not offer sufficient stability whereas new operators need visibility over a long period⁴⁸. Secondly, since the maximum volume provided to suppliers is not reduced over time, suppliers in competition with EDF have no incentive to invest in their own base electricity generation capacity⁴⁹. Thirdly, the incentives to invest in peak generation remain uncertain because the NOME Act is too general about how the design of the capacity obligation, which in any case will not be implemented for several years⁵⁰.

5.2 Many Unknowns

A lack of precise information about the main parameters that will determine the impact of the NOME is a major obstacle to conducting an ex ante evaluation. Let's start with the example of the calculation of the ARENH and retail tariffs⁵¹.

In its current wording⁵², the Act stipulates that the ARENH tariff will be initially aligned on TaRTAM. In practice, that means that the initial tariff will be aligned on the level of the implied baseload price, i.e. between €38 and €42 per MWh, according to the rapporteur of the bill to the National Assembly⁵³. That may appear to be a fairly small range. It should be borne in mind, however, that a

operators, which are also present in generation and invest in new capacity." Opinion of the ADLC, see above, note 4, §186.

⁴⁸ "Effective competition obviously requires rules that are clear and public, but also that offer stability over time. That stability is essential in the case at hand because electricity is a sector with a long and costly investment cycle, and new operators need visibility in order to design their development plans. This bill does not the bill [...]" Opinion of the ADLC, see above, note 4, § 117 et 118.

⁴⁹ "The law should create incentives to invest in baseload generation. This may be through the price for regulated electricity, which is related to the rules for calculating the regulated access tariff. The bill leaves an opportunity for this, with the possibility [...] of reviewing the rules in 2015 or 2020 to factor the cost of renewing baseload generation capacity into the regulated access tariff. The ambiguity of the bill on this key point cannot be stressed enough. An incentive could also be created through a gradual, staggered reduction of the maximum volume available to alternative suppliers at the regulated access tariff over the regulated period." Opinion of the ADLC, see above, note 4, §213 and 214. The parliamentarians retained the latter recommendation in part by adding to the bill that in the progress report in 2015 the government could propose "if necessary, specific conditions for the end of the system in order to ensure, if necessary, a gradual transition for electricity suppliers." Article 1, Title VII of the NOME Act.

⁵⁰ "Given the general wording of Article 2, and the fact that the authorities give themselves three years to implement the mechanism of certificates, it is only possible to make general remarks about its possible impact on competition." Opinion of the ADLC, see above, note 4, §199. "The mechanism of certificates does this [encourages alternative suppliers to invest]. But the design and application of the mechanism are extremely complex." Opinion of the ADLC, see above, note 4, §225.

⁵¹ The conditions for the allocation of regulated wholesale electricity to suppliers are another example. For an in-depth, critical discussion of these conditions, see Opinion of the ADLC above, note 4, Section 2 C § 84-112.

⁵² Consistency between the initial regulated access tariff and TaRTAM was mentioned in the Explanatory Memorandum to the government's bill. The inclusion of this principle in an article of the bill enhances its enforceability. That amendment brought by parliamentarians was interpreted as a victory for EDF and its CEO, Henry Proglio.

⁵³ See Jean Claude Lenoir's comments, p. 47 and 96 of the report of the National Assembly, above, note 16.

difference of one euro per MWh for this price represents plus or minus €100 million in revenues for EDF⁵⁴. Furthermore, the tariff might move outside this range. Firstly, the range is calculated using different assumptions of the peak price, but the rule for the allocation of volumes is not yet known. It will probably be based on a percentage of energy consumed (between 60% and 80%) rather than on a certain number of hours of power demand (e.g., 6,000 or 8,260 h). Secondly, the level of TaRTAM was set without an in-depth analysis of the generating costs of EDF's nuclear plants. But the NOME Act introduces the principle of an ARENH tariff that reflects costs, in particular fixed capital costs. Depending on the accounting methods and criteria applied, the cost of nuclear generation can vary by almost 100%⁵⁵. Yet the methods and criteria have not yet been decided. Detailed information about the method that will be used to calculate the ARENH tariff will not be stipulated until a decree is issued by the Council of State. Lastly, as we have already mentioned, the initial ARENH tariff will not be set by the regulator, but by the government, on the basis of an opinion from the Energy Regulation Commission. The government thus retains considerable leeway. If the commission recommends a price that the government considers too low or too high, the government can ask the commission to issue a new opinion that suits it better.

The NOME Act does not set the future trend of regulated retail tariffs in stone either. Yellow and green retail tariffs for industrial consumers are supposed to disappear by 2016, while blue tariffs for small consumers will be maintained beyond that date. A wholesale price and a retail tariff will therefore coexist until 2015 for industrial consumers and at least until 2025 for small consumers. That double pricing should, theoretically, be consistent. For example, if the wholesale price goes up by one euro per MWh, the base energy component of the retail tariff should also go up by one euro. That parallel adjustment does not pose any problem. A consistency problem arises because of the discrepancy between the base energy component of the colour tariffs, currently around €30, and that component of TaRTAM, the basis for the ARENH tariff, currently around €40. If the base energy component of retail tariffs stays at, say, €30/MWh and the ARENH tariff is, say, €40/MWh, alternative suppliers will not be able to compete for EDF customers that benefit from its retail tariffs. To maintain the consistency of double pricing, the retail tariffs must increase by €10/MWh⁵⁶. The Act stipulates that retail tariffs must catch up to the ARENH tariff by 2016: "By 31 December 2015, regulated retail tariffs for electricity should take into account the addition of the tariff of regulated access to historic nuclear electricity [to the other cost components (particularly the cost of electricity transmission)]"⁵⁷. This wording gives the authorities some leeway. The government and the regulator will have to "take into account" the ARENH tariff when they set retail tariffs. They do not have to *include* the ARENH tariff or *strictly add* the ARENH tariff to the other components. Moreover, the costing of some components – such as the cost of non-nuclear energy required to cover all consumers' needs – can also vary.

⁵⁴ Assuming that the regulated volume sold by EDF to alternative suppliers is 100 TWh.

⁵⁵ Between €30 and €50 per MWh according to the report of the National Assembly, see above note 4, inset, p. 68.

⁵⁶ Or that the initial level of the regulated access tariff be set at €30/MWh instead of €40/MWh.

⁵⁷ Article 4 indent 4 of the NOME Act. For the full quote, see note 26.

This margin for manoeuvre is important for the government because the catch-up can lead to significant increases in retail tariffs over the upcoming years. According to the chairman of the CRE, Philippe de Ladoucette, at an ARENH tariff of €42/MWh, tariffs would have to be raised by 14.8% for business consumers in 2011 (and by 11.4% for small consumers), then by 3.7% per year until 2025 (by 3.5% for small consumers)⁵⁸. The discussion of the NOME bill at the National Assembly suggests that these increases will not necessarily be made and consequently that the tariff for access to nuclear power and the retail tariff will be mismatched⁵⁹.

Given the current lack of precision about the wholesale price and the evolution of retail tariffs, it is not possible to evaluate the impact of the NOME Act accurately. The levels of the ARENH tariff and colour tariffs will determine a large proportion of EDF's revenues and its financial resources for investing, particularly in extending the life of its fleet of nuclear power plants. They also limit the amount of the playing field open to competition from alternative suppliers. An ARENH tariff of around €40 when NOME is introduced would prevent rivals from challenging EDF's supremacy on the market of consumers that benefit from colour tariffs. These market segments will subsequently be more or less open to competition, depending on whether the catch-up in tariffs is fast, slow or does not happen at all.

The imprecision of the NOME Act about the key parameters, which we have just illustrated in the case of tariffs⁶⁰, limits us to hypotheses. It also means that we can only perform the simplest type of evaluation, namely whether the new law will achieve its aims. We will not examine whether those aims could be achieved at less expense, or whether the new law maximises welfare.

5.3 Aims

A pre-condition for an evaluation of the achievement of the aims is that the aims have to have been clearly expressed by the promoters and defenders of the Act. There is no such difficulty here. The aims have been stated on a number of

⁵⁸ The chairman of the CRE was heard twice by the Economic Affairs Commission, once during a public session (see report of the National Assembly, above, note 16), and once by the members of the commission only. It was during that hearing, the minutes of which were not made public, that the tariff scenarios reported in the media (see *Les Echos*, 14/05/2010) were outlined. They are reported by Frédérique Massat as follows. "According to the forecasts, a sale tariff of €37.20/MWh for residential consumers would imply a 7.1% increase in prices in 2011, followed by a 3.1% annual increase between 2011 and 2025. At the tariff of €42 favoured by EDF, prices would rise by 11.4% in 2011, then by 3.5% per year between 2011 and 2025." National Assembly, ordinary session, third session, Tuesday, 8 June 2010, complete minutes, p. 5.

⁵⁹ See below, note 73.

⁶⁰ Unlike the Impact Study, which nowhere indicates its assumptions on tariffs and their trends, making its results unconvincing. For a criticism of that approach, see Lévêque and Saguan (2010).

occasions:⁶¹ by the government in the bill's Explanatory Memorandum⁶², the impact study⁶³ and the testimony of ministers⁶⁴ to parliamentarians; by the legislator in the report of the assembly's Economic Affairs Commission⁶⁵ and the report of the senate's Economic Commission⁶⁶; by the energy regulator⁶⁷ and by the competition agency⁶⁸.

The problem is rather that there are too many aims in these various position statements, namely seven:

2. Develop competition in supply in the short and medium term and competition in generation in the long term
3. Encourage innovation in supply and management of demand
4. Maintain the benefit of the nuclear rent for consumers
5. Avoid a windfall effect for alternative suppliers
6. Encourage efficient investment in base and peak electricity generation
7. Provide a stable regulatory and legal framework
8. End the European Commission's proceedings against France

⁶¹The people and institutions cited express more or less the same aims in their speeches and writing. Differences concern less the aims than their order of importance. For example, the energy regulator and the competition agency put the aim of developing competition first, whereas the government and the legislator put the emphasis on ensuring that consumers in France benefit from the low cost of nuclear power.

⁶² The Explanatory Memorandum (see above, note 18) lists only three aims (preserve the cost advantage of nuclear power for consumers regardless of their choice of supplier; provide financing for the generating fleet and investment; enable competition) but associates them with principles, some of which amount to sub-aims (e.g., manage demand, avoid windfall effects).

⁶³ See the title of section 2 of the Impact Study (see note 20 above) "Aims: Ensure that consumers benefit from the investment in nuclear power, encourage innovation and manage demand for electricity, and encourage investment in the European electricity market."

⁶⁴ "[P]rovide predictability and security for actors while preserving those aspects of the current French [electricity] system that we believe are essential." Report of the National Assembly, note 16 above, p. 44. "These provisions of [NOME] will enable us to put an end to two pending disputes [with the European Commission], which is not the least advantage of the bill." Report of the National Assembly, note 16 above, p. 45. "The [NOME] law will at last enable us to guarantee genuine legal stability for the sector in order to increase investment." Jean-Louis Borloo, *Les Echos*, 20 September 2010.

⁶⁵ See in particular the comments of the rapporteur of the bill to the National Assembly, Jean-Claude Lenoir, who summarises the aims of the NOME as follows. "The law will enable us to allow consumers to benefit from the competitiveness of our nuclear fleet while respecting their freedom to choose; to offer satisfactory responses to the European Commission; and to generate long-term financing for nuclear facilities. Those are the main aims of this bill. Report of the National Assembly, note 16 above, p. 46.

⁶⁶ See in particular the report of Senator Ladislas Poniatowski, which says that the bill "seeks to create an area for effective competition in the French electricity market." Report of the Senate, note 29 above, p. 7.

⁶⁷ "[T]he NOME bill pursues three aims. [...] facilitate competition across all customer segments, [...] provide financing for the existing generating fleet, [...] and extend the duration [...] of its operation, [...] preserve for all consumers the benefit of past investment in developing nuclear power." Testimony of Philippe de Ladoucette, Report of the National Assembly, note 7 above, p. 17.

⁶⁸ "[The bill] seeks to introduce a new organisation of the electricity market that will facilitate the development of competition while passing the benefit of France's generating fleet, in particular its nuclear power plants, on to consumers." Opinion of the ADLC, note 4 above, § 3.

To simplify the discussion of the aims in this list, we will group the first four together by examining the future development of competition, and the last three by analysing the future effects of the law on investment in generation.

6. The development of competition in electricity supply

The evaluation of the efficiency of a law in terms of whether it achieves its aims takes those aims as a given. Its role is not to question their merits. Let us make an exception to that rule here, however.

The NOME Act's aim of developing competition primarily concerns the market in electricity supply. However, energy economists⁶⁹ do not consider the liberalisation of the supply market to be the core of electricity sector reform. The main thrust should be to develop competition in electricity generation and to organise an efficient wholesale market. Introducing competition in retail markets is secondary and even optional. The NOME Act takes the opposite step, by seeking to create effective competition downstream, through regulated access, and to encourage alternative suppliers to invest upstream in the hope that in 15 years' time they will be able to rival EDF in generation. We share the competition agency's scepticism about this very long-term aim being achieved. As the ADLC points out (see section 5.1), and as the next section explains, the effects of the NOME Act on investment by alternative suppliers are uncertain and perhaps even economically inefficient.

In short, introducing competition in supply, which the NOME Act seeks to achieve, is the wrong aim, and is not a good way to achieve effective competition in generation either⁷⁰.

After that general remark, let us examine the competition in the supply market that is supposed to result from the NOME Act. This will involve looking at two different markets and two different periods. The conditions of competition in the segment of small consumers and large consumers should differ. Large consumers have buyer power because of their size and expertise, which small consumers do not. Most small consumers will continue to benefit from a regulated sale tariff, whereas all the administered tariffs for large consumers must disappear by end-2015. Therefore competition in the market of large consumers before and after 2015 should look quite different. Moreover, the assumption is made that the ceiling of 100 TWh will be reached in 2015, which, as we shall see, makes that deadline even more of a turning point.

⁶⁹ See, for instance, P. Joskow (2008).

⁷⁰ On the aim of developing effective competition, i.e., competition that can reduce EDF's market power. This is an ambitious aim because the incumbent utility generates 95% of France's electricity and serves roughly 92% of customers. It is hard in these conditions to imagine the introduction of effective competition without asset disposals, for example in the form of stakes in some nuclear power plants, as suggested by the rapporteur of the bill to the senate (see report of the Senate, note 29 above, p. 7-8).

6.1 Competition in the small consumer market

By end-March 2010, suppliers other than EDF served approximately 1.5 million out of a total of 30 million sites. How many will they serve in 2015 and after that date?

Before 2016

Over the next five years, competition is likely to remain low and the penetration of alternative offerings modest because the base and semi-base energy component of the retail tariff will probably remain below the ARENH tariff. Two developments are expected. Firstly, the initial level of the ARENH will probably be set a level of around €40 at end-2010. That hypothesis has become likely since parliamentarians wrote into the law that the initial ARENH tariff must be consistent with TaRTAM⁷¹. Secondly, the retail tariff probably will probably increase only slowly over the next few years⁷².

The latter hypothesis is based on several statements by the government. The debate between the party in government and the opposition has focused on the issue of whether the NOME Act would lead to an increase in retail tariffs, in particular for small consumers, who represent the bulk of voters⁷³. The debates were particularly heated as they came after a leak to the media of CRE scenarios that indicate steep price hikes⁷⁴. The minister for energy forcefully denied “rumours about electricity tariffs”, adding that “the government is in charge of setting regulated tariffs and no one else has the authority to establish pricing policy”⁷⁵. In a parliamentary session, the government’s spokesperson insisted

⁷¹ Which some MPs, like Jean Dionis du Séjour, have understood perfectly, “If the people we have heard are to be believed, EDF’s generating arm sells electricity to its marketing arm at a price of around €30 per megawatt hour for the blue tariff, which annihilates any competition.” Report of the National Assembly, note 16 above, p. 75.

⁷² As the MP Daniel Fasquelle says, “If the regulated access tariff is set at the level of TaRTAM, in the transition period EDF will continue to sell more cheaply to retail customers than to suppliers that wish to gain a foothold in the market. For three years, there will be no competition. Some operators will not be able to survive, so that EDF will remain the only operator in the market.” Report of the National Assembly, note 7 above, p. 95. Or F.-M. Gonnot (National Assembly, ordinary session, third session of Tuesday, 8 June 2010, full minutes, p. 7) “I don’t see how the same firms [EDF’s main rivals] could offer deals that compete with EDF’s offerings if the regulated access tariff is around €37/MWh or higher]. Therefore not much will happen.” Or D. Paul, “The only way for competition to emerge is to raise prices.” National Assembly, ordinary session, third session of Tuesday, 8 June 2010, full minutes, p. 7 p. 47.

⁷³ See, for example, the following exchange between the government MP, Jean-Claude Lenoir, and the shadow MP, François Brottes. FB: “If I understand correctly, [you are] implying [there will be] a significant increase in prices.” / JL: “Objection!” / FB: “And the minister confirmed this by agreeing that we could hardly do otherwise.” / Minister: “Not at all”. Report of the National Assembly, above, note 7, p. 93. See the testimony to the National Assembly during the plenary session on 8 June 2010 by F. Gonnot (p. 7) and P. Ollier (p. 32) indicating that NOME will not increase prices, and that of F. Brottes (p. 41 et 43), Gaubert (p. 45), D. Paul (p. 47 and 51), B. Cazeneuve (p. 55), F. Massat (p. 5) and N. Dupont-Aignan (p. 12) claiming the opposite.

⁷⁴ See note 58.

⁷⁵ *Les Echos*, 14 May 2010

several times that there would be no increase in tariffs as a result of the NOME Act⁷⁶.

In the future, as now⁷⁷, to win a large share of EDF's customers that currently pay blue tariffs, alternative suppliers would lose money. Unlike now, however, they will be able to combine the ARENH tariff with their limited low-cost resources⁷⁸ and lose less money to maintain their existing customers (1.5 million sites, representing consumption of 7 TWh⁷⁹).

In addition, the costs of changing supplier for a customer and of acquiring customers for a supplier are not zero. The NOME Act allows consumers to return to retail tariffs if they are not happy with the free market offerings. The option to change their minds reduces the risk incurred by households and small business users, but does not eliminate all the costs inherent in changing supplier or price (e.g., the time spent finding out information and comparing different offerings). New suppliers must compensate customers for these costs of changing supplier by offering lower prices and/or higher quality. Although they have the same supply cost as EDF's marketing arm, alternative suppliers probably have the advantage of lower marketing costs than the incumbent utility, because EDF is penalised in this business by a large payroll. Higher quality can come from innovative offerings in terms of types of contracts, price structure and demand management services. The Champsaur Commission's report and the Impact Study estimate an unprecedented boom in innovation. It is hard to share their enthusiasm, at least as far as the next five years are concerned. The pace of innovation will depend on the introduction of capacity obligations, the installation of smart electricity meters, and the higher cost of energy in regulated retail tariffs – three developments that will take time. Suppliers' marketing and advertising expenses to acquire new customers must also be taken into account. An exception is GDF Suez, which already has a full portfolio of customers from its gas supply business. The company is also the only alternative supplier on the market that is not about to go broke. To sum up, the market shares of rival suppliers and the boom in free market offerings will be prevented from taking off by the not negligible costs of changing supplier and acquiring customers.

⁷⁶ For example, during the discussions before the Economic Affairs Commission of the National Assembly (Report of the National Assembly, note 16 above): "In the past few days, a rumour has gone around that the NOME Act would increase electricity prices. The minister answered earlier, and I confirm again: no, the NOME Act will not lead to an increase in electricity prices. That's perfectly clear." (p. 89), or the minister, "I confirm before the commission and will repeat it during the public session, the law will not lead to a change in prices for the final customer" (p. 95). Another example was during the general discussion of the bill (National Assembly, ordinary session, second session of Tuesday, 8 June 2010, full minutes, p. 40): to F. Brottes' assertion that "Tariffs [would] automatically increase and by a significant amount", the energy minister, Jean-Louis Borloo replied categorically, "That's not true".

⁷⁷ According to Wolfgang Anzengruber, chairman of the board of Verbund, the parent company of Poweo (which lost €93.5 million in 2009), a lack of reform would force it to shed its 400,000 retail customers and return them to the incumbent utility (comments reported by D. Paul, National Assembly, ordinary session, second session of Tuesday, 8 June 2010, full minutes, p. 49).

⁷⁸ Poweo's swap with EDF, access via the auctions imposed by the competition agency in the Direct Energie matter, and GDF Suez's hydroelectric and nuclear capacity.

⁷⁹ Philippe de Ladoucette's testimony to the Economic Affairs Commission of the National Assembly, Report of the National Assembly, note 7 above, p. 16.

Lastly, most of EDF's competitors can also serve the large consumer segment, in particular former TarTAM customers. The greater attraction of this segment could turn alternative suppliers away from residential customers. The risk there is that most of the 100 TWh for regulated access will be used by suppliers to serve industrial customers, diminishing the volume available for challenging the incumbent utility on the small consumer segment. The legislator foresaw that risk and added the proviso that when the ceiling is exceeded, the volume sold at the ARENH tariff must be allocated among suppliers "in such a way as to enable competition to develop on all segments of the retail market."⁸⁰

After 2015

After 2015, the government will no longer be able to dodge the issue and continue postponing the steep increase in retail tariffs required to bridge the gap between the ARENH tariff and the base and semi-base energy component of the retail tariff, which penalises alternative suppliers. The difference must be caught up by 31 December 2015. With that barrier lifted, effective competition could emerge on the retail market for small consumers. However, that scenario requires that a sufficient volume of electricity at the regulated access tariff is left to serve small consumers, after the needs of large consumers have been catered for. As we shall see, before 2015, alternative suppliers are expected to strongly expand their business in the large consumer segment, which will be even more profitable after that date than the small consumer segment.

In conclusion, for the next few years the government still has the power to stall or accelerate competition in the supply of electricity to small consumers. The government's opinion prevails over that of the regulator until 2013 (see section 3) and it has until end-2015 to bring retail tariffs into line with the ARENH tariff. After 2015, the NOME Act introduces asymmetry between the two market segments, since only small consumers will benefit from regulated retail tariffs, which should continue to make that segment less attractive to alternative suppliers.

6.2 Competition in the large consumer market⁸¹

The period that will entail the biggest changes in the large consumer segment will begin in 2016.

⁸⁰ Article 1, Title III resulting from amendment 63 introduced by the National Assembly, the wording of which was then altered by the senate (the version approved on first reading at the National Assembly read "so as ensure the development of balanced competition across the whole retail market" (underlining by the author of this paper).

⁸¹ For the sake of convenience, this section uses the figures from table 1 on non-residential consumers. Note, however, that this category is not exactly the same as the category of large consumers, or industrial consumers, because it includes small businesses, including those eligible for blue tariffs. By volume, those small consumers represent roughly 30 TWh of annual consumption, which is around 10% of non-residential consumption.

Before 2016

During this first stage in the implementation of the NOME Act, competition can be expected to be strong, even before sale tariffs are caught up. From 1 January 2011, when TaRTAM is phased out, 3,500 sites representing consumption of 72TWh, will depend only⁸² on market offerings.

On the segment of TaRTAM consumers, alternative suppliers, buying electricity at the ARENH tariff, will be able to challenge EDF's position. Their market share, currently around 38%, should increase further. It should reach at least 50.1% fairly quickly if EDF decides to position itself, like many incumbents before it, under the threshold of half the market, so that it is no longer considered to have a dominant position. Drawing lessons from liberalisation in telecommunications, EDF will probably not seek to hinder entry by offering lower prices than competitors for the same services, which the competition agency could consider to be an anti-competitive practice.

The NOME Act would be seen to have failed if competition was limited to former TaRTAM customers. Market share of 50.1% corresponds to a volume of 28.8 TWh at the AREHN tariff⁸³, which is not even one-third of the maximum.

However, competition should expand rapidly beyond that consumer segment. On 31 December 2009, the CRE identified 748,500 sites, representing total consumption of 69 TWh, which were already supplied through market offerings (see table 1). There is no public information about these offerings, but it can be assumed that they are more advantageous than TaRTAM. Otherwise, customers would have switched to TarTAM, as they are entitled to do. The price level of market offerings for base electricity must therefore be at least slightly below the ARENH tariff. A significant share of that segment could however become open to challenge fairly soon. Many of these contracts, in particular EDF's market offerings, expire in 2010⁸⁴. Moreover, the European Commission recently forced the incumbent utility to reduce the length of contracts it signs with industrial consumers. EDF undertook to put 60% of total volumes under contract back on the market every year⁸⁵. EDF's share of this segment of market offerings accounts for 86% of consumption. Falling below 50% for the benefit of alternative suppliers would lead to consumption of an ARENH-priced volume of around 30 TWh⁸⁶.

⁸² We exclude here, although NOME is not completely clear on this point, that the customers that benefit now from TaRTAM could, when it is phased out, be eligible for yellow and green tariffs, which would nip any competition in the bud.

⁸³ Assuming that 80% of electricity consumed by industrial customers is eligible for the ARENH tariff ($72 * 0.8 / 2 = 28.8$).

⁸⁴ When they were signed, EDF did not have any visibility beyond the deadline for terminating TaRTAM and therefore did not wish to commit to a longer period.

⁸⁵ See the European Commission's press release dated 17 March 2010, IP 10/290.

⁸⁶ Consumption by customers via market offerings is 69 TWh; assuming that 80% of these volumes are eligible for the ARENH tariff, EDF's half of the market would represent 27.6 TWh ($69TWh * 0.8 / 2$).

Lastly, yellow and green tariffs must catch up to the level of the ARENH tariff by 1 January 2016. This tariff hike is far more likely to go through than an increase in retail tariffs for small consumers. The risk in electoral terms of a price increase for industry is lower than that of a price increase for households. In addition, electricity-intensive businesses have an alternative, namely Exeltium's long-term contracts⁸⁷ for nuclear electricity at attractive prices. The catch-up of yellow and green tariffs should therefore further expand the size of the market accessible to alternative suppliers. The segment represents a volume of 157 TWh, of which EDF's rival suppliers currently supply 2 TWh, or 1.2%. If their share rose to 10% in 2015, the corresponding need for ARENH-priced volume would be around 15 TWh.

By adding the three market segments, suppliers' needs for volume at the ARENH tariff would total just over 70TWh in 2015. Their total market share for all volumes of electricity consumed by large consumers would be 29%, compared with 13% now. That rate of growth in five years requires a very high pace and level of effort by companies. It is probably worth it because, as we shall see, the final elimination of regulated tariffs and the reaching of the ceiling of 100 TWh can cause a windfall effect which will be all the more beneficial to alternative suppliers as they will have a high market share.

After 2015

For the sake of simplicity, we assume here that demand by alternative suppliers for ARENH will reach 100 TWh on the date that regulated tariffs are eliminated, i.e. 31 December 2015. We also assume that the authorities decide not to raise the ceiling in response to higher demand. If that were not the case, the reasoning below would remain the same except that it would only apply from a later date, after retail tariffs are eliminated and the final ceiling is reached. For it is the combination of those two events that is worth analysing.

If the ceiling is reached while retail tariffs still exist, there will not be any upheavals. By design, sale tariffs must reflect the costs of supplying the electricity. There is nothing to stop the regulator from factoring into its calculations the fact that the needs of alternative suppliers' customers have exceeded 100 TWh. The regulator will alter yellow and green tariffs by taking into account that a smaller proportion of their supply will be obtained at the regulated access tariff and a larger proportion at the market price. If, for example, the needs of alternative suppliers' customers can only be 70% covered at the ARENH tariff, compared with 80% when the ceiling was not reached, and if the wholesale market price is 20% higher than the ARENH tariff, the retail tariff must increase by 2%. If it rises by more, alternative suppliers' margins will be inflated; if it rises by less, EDF's marketing arm will be favoured. In other words,

⁸⁷ Exeltium is a company made up of electricity-intensive industrial companies. It has formed a partnership with EDF to obtain advantageous conditions for nuclear electricity supply in exchange for sharing some risks related to the performance, schedule and development of EDF's generating fleet.

the reaching of the ceiling does not stop the regulator from continuing to control suppliers' margins and enable industrial consumers to benefit from prices close to costs.

The elimination of yellow and green tariffs alone does not cause major change either. Once price levels catch up, the market price offered to major consumers after 2015 should be fairly close to the administered retail tariffs. Large consumers are informed buyers. They are aware of the ARENH tariff, peak prices on wholesale and capacity markets and network prices. They also have a fairly accurate idea of suppliers' marketing costs and know how to play them off against each other. Consequently, suppliers are unlikely to get away with prices that include a high margin. A supplier that decides to set a price much higher than the sum of the costs above would lose its customers and therefore its entitlement to the ARENH tariff. The loss of that entitlement is costly for the supplier even though it is allocated free of charge. As the competition agency stresses⁸⁸, under the NOME Act alternative suppliers are only charged for the use of nuclear electricity; the access right itself is free. In other words, the ARENH tariff has no fixed term, independent of the nuclear electricity extracted by the supplier; it has only a variable component that depends on the amount of energy purchased. Once demand from alternative suppliers exceeds the ceiling of 100 TWh, access becomes a scarce resource and acquires value because demand exceeds supply.

That shortage explains intuitively⁸⁹ why, once the ceiling is reached and retail tariffs are eliminated, the price paid by large consumers to purchase electricity will leap to a level close to the electricity price on the wholesale market⁹⁰. All consumers, representing a need of around 240 TWh (300 TWh*0.8 allocable by ARENH), will want to be supplied from the 100 TWh quota. But how can this cheap quantity, accounting for little over one-third of demand, be allocated other than through competition between consumers? And therefore resulting in a price close to that of alternative supply, i.e., the wholesale market. All industrial consumers will buy their electricity at the wholesale market price plus the variable cost of marketing. In other words, if the ARENH tariff is set at, say, €45/MWh, large consumers will buy their electricity at a market price that will be much higher, say, €90/MWh. This creates a windfall effect for the alternative suppliers that share the 100 TWh quota.

Thus, once administered tariffs are eliminated and the ceiling is exceeded, companies located in France will no longer obtain their electricity more cheaply than their counterparts in Germany or Belgium, while alternative suppliers' profits will increase substantially. The NOME Act thus leads to a situation for industrial consumers that is similar to a lack of upstream regulation of access and a sharing of a portion of the nuclear rent that benefits alternative suppliers. In this market segment, the NOME will achieve neither the aim of maintaining the benefit of France's past choice to go nuclear, nor the aim of avoiding a windfall effect.

⁸⁸ Opinion of the ADLC, note 4 above, § 73 p. 13.

⁸⁹ See Maillard (2010).

⁹⁰ For a more detailed analysis, see Lévêque and Saguan (2010)

The designers of the NOME Act do not appear to have realised that such a mechanism would operate in 2016⁹¹. Unless they deliberately ruled it out by making ad hoc assumptions on the basis of the behaviour of EDF or of the regulator.

Our reasoning above indeed assumes that EDF will behave like an ordinary company and tend to maximise its profit. It therefore has no interest in blocking the change in prices to a level close to the wholesale market price. On the contrary, it also profits from the windfall when administered tariffs are eliminated and the ceiling is reached. And legally, there is nothing preventing EDF from raising its retail tariffs. The NOME Act obliges EDF to sell the 100 TWh at full cost, but does not impose any price obligation on the rest of its electricity available for export or for the organised or OTC market⁹². EDF therefore has no economic or legal reason to oppose the change.

However, EDF is not quite like an ordinary company, chiefly because its main shareholder is the French state. It does not impose a binding obligation to create value on its senior executives. The designers of the NOME Act may be betting that EDF will not seek to profit from the windfall in 2016 so as not to go against its shareholder's strong political will to keep electricity prices low for large consumers. EDF's position in that market makes it a price-maker. When retail tariffs are eliminated, if EDF decides to sell to those customers at a price close to the ARENH tariff, rival suppliers will have no choice but to align their own prices. Consequently, they will not benefit from a share of the nuclear rent. Let us stress, as Finon does (2010), that this would make EDF a rather unusual price-maker, since it would seek to lower its prices and profit⁹³ rather than increasing them!

Another scenario that would result in the maintenance of low prices for industrial consumers is based on a rule of allocation at the ARENH tariff that preserves an incentive for alternative suppliers to sell at a price close to their average supply cost, once the ceiling has been exceeded. The regulator, which allocates the volumes to suppliers, could require them, more or less explicitly, to sell those volumes on to their customers at a similar price or have their quota for the next half-year or year reduced.

⁹¹ The Impact Study (note 20 above, p. 37) asserts that "The implementation of regulated access to base electricity accompanied by maintaining regulated tariffs for small consumers and a gradual disappearance of regulated tariffs for industrial consumers [ensures] the most direct possible transfer [...] of competitiveness of the historic nuclear fleet to the final consumer of electricity." It estimates the gain brought by NOME to industrial consumers compared with a deregulation scenario (i.e., no regulated retail tariff and no regulated access tariff) between €1.2 billion and 3.5 billion.

⁹² Note that the equilibrium price on the retail market for large consumers does not reflect anti-competitive behaviour by EDF or by all suppliers. It maintains a rent for suppliers but this is due to a scarcity of capacity, not to a unilateral or collusive restriction of the quantities offered.

⁹³ In a Stackelberg duopoly model in which EDF is the leader and must sell some of its low-cost generating capacity to its rival, Creti and Sanin (2010) also show that there is no windfall effect for the follower, even though EDF maximises its profit as the price-maker. That apparent contradiction with our argument can be attributed to the absence of a scarcity rent in their model. The profit is due to the imperfect competition and not to sub-capacity in low-cost nuclear power.

In conclusion, contrary to what is claimed, the NOME Act does not avoid a transfer of the rent to suppliers at the expense of all consumers. Only small consumers remain protected because the maintenance of regulated retail tariffs alongside the ARENH tariff enables the regulator to control suppliers' margins. Of course, as we draw close to the ceiling and to the date for the elimination of yellow and green tariffs, it is likely that the government, anticipating an increase in the price of electricity for industrial customers and in suppliers' profits, will intervene to counter it. The government could, for example, amend NOME or even pass new legislation on regulation of the electricity market. The Act that has just been passed is not necessarily immutable for the next 15 years.

7. Efficient investment in generation

Evaluating the effect of the NOME Act on investment in electricity generation is an essential but difficult exercise.

It is essential because – since the NOME leaves little room for the market – future investment will be chiefly directed by regulation. Retail prices will remain mostly administered, the wholesale price for nuclear power will be largely regulated and suppliers will be subject to capacity obligations. Only import and export prices, prices for large consumers in five years' time and wholesale prices for peak electricity (including capacity prices) will be determined by market mechanisms.

The exercise is difficult because we do not know the level of the ARENH tariff or how it is calculated, nor the future trends in administered retail tariffs for small and large consumers, nor the volume of the capacity obligation that will be set by the authorities, nor the architecture of the capacity market.

The authors of the Impact Study appear to be unbothered by this lack of key data. They forecast with certainty that investment by EDF⁹⁴ and by its rivals⁹⁵ in base electricity, peak electricity and load shifting, will be made at the right time and in the right amount⁹⁶. In fact, that certainty is based on an assumption of perfect regulation (e.g., prices, or the signals sent to economic agents, are free of error; the capacity market is perfectly designed) and on a durable law laying down stable rules of play until 2025 and thus providing high visibility to operators' investment decisions.

⁹⁴ "The proposed regulation [...] guarantees financing for all the investment in the historic nuclear fleet that will be necessary to improve its performance or extend its operating life." Impact Study, note 20 above, p. 30.

⁹⁵ "The capacity obligation will encourage actors to exploit load shifting opportunities. If necessary, they will be encouraged to invest in new load shifting or peak generation capacity. [...] The capacity obligation will make alternative suppliers fully-fledged actors that take responsibility for the proper operation of the electricity system." Impact Study, note 20 above, p. 28

⁹⁶ "The planned reform will clarify economic signals, encourage better management of demand for electricity and help achieve the targets of multi-year investment planning." Impact Study, note 20 above, p. 49.

It is impossible to concur with these overly optimistic assumptions. Economic analysis of regulation – both theoretical and empirical – has highlighted the necessarily imperfect nature of public intervention in general and of administered tariffs in particular. Moreover, the NOME Act has high instability built into it.

7.1 The instability of the Act

The stability of the legal and regulatory framework is a determining factor for investment in the electricity sector. The investment life cycle is extremely long and commits irreversible costs. Investment is therefore highly vulnerable to changes in the market and regulation. Once an investment has been made, if the opportunism of the regulator or the government is not restrained, they could impose prices on operators that do not enable them to recoup their fixed costs. In other words, investors need legal security, and a changeable regulatory framework is a brake on investment and increases its cost.

The NOME Act has three sources of instability: (i) an insufficiently independent regulator, (ii) the complexity of the legislation and its openness to amendment, and (iii) the risk of incompatibility with European law.

Under the new Act, the power to set administered tariffs for electricity continues to be shared by the government and the regulator. The forthcoming decree specifying the method used to calculate the ARENH tariff and setting its initial level will be drafted by the ministry of energy and finalised by the Council of State, with the Energy Regulation Commission issuing only an opinion. The tariff will then be set annually by the ministers of energy and the economy on the basis of a proposal by the CRE. That *modus operandi* has been in place since the sector regulator was set up in 2000. It was not changed even when the CRE acquired recognised expertise and competence in pricing and cost assessment. The new Act would be an opportunity to give the now mature regulator full power to set tariffs⁹⁷. The executive's control over electricity prices has not been removed, so the ARENH and retail tariffs will remain influenced by the political agenda and the electoral concerns of future governments. These play against price rises⁹⁸. Precedents⁹⁹ demonstrate that French politicians are extremely averse to raising prices and have no qualms about intervening to block increases. In conclusion, the NOME Act does not diminish politicians' discretionary power over electricity

⁹⁷ But whose governance is unstable. The membership of the commission has been changed three times by law, with the most recent amendment in 2006 adding two members to represent consumers. The NOME provides for a fourth change, which would abolish the consumer representatives, which of course removes one of the brakes on raising prices.

⁹⁸ See note 69 on the testimony of Philippe de Ladoucette, chairman of the CRE, to the Economic Affairs Commission of the National Assembly on 12 May 2010 and the reactions it sparked.

⁹⁹ Gas prices are a good example. The French government intervened several times to block or reduce increases in GDF's retail tariffs even though the increases were part of an adjustment plan the government had endorsed. In the long run, gas prices were not high enough to cover the incumbent utility's expenditure (Muizon and Saguan, 2009).

prices, which risks preventing even strictly cost-related price increases, and therefore hindering investment.

The complexity of the NOME Act, due mainly to the inclusion of some tariffs in others (e.g., the ARENH tariff is a component of some retail tariffs) and superimposed mechanisms (e.g., price control, volume control, capacity obligations), creates loopholes and errors. Loopholes offer opportunities for regulated companies and politicians to bend or circumvent the rules in their interests. Errors will delay the achievement of aims. Both will create a need for stopgap measures, which will continually change the regulatory framework. The changing nature of regulation is reinforced here by a deliberate wish for it to be dynamic¹⁰⁰: retail tariffs will probably be brought into line with the ARENH price only gradually before the end of 2015, by which date yellow and green tariffs must be terminated; progress reports that can lead to major adjustments are planned in the form of an assessment submitted every five years by the government to Parliament on the basis of reports by the energy regulation commission and the competition agency¹⁰¹; some options are open, such as the possibility, introduced by Parliament¹⁰², for the government in 2015 to propose a gradual reduction in the volume available to alternative suppliers and allow them to participate in some of EDF's investments. The adaptable nature of the regulatory framework is made necessary by the long timeframe – 15 years – that its designers wish to give it. The longer the planned framework, the less it must be fixed because the greater the uncertainty about future techniques, demand, and general economic conditions. At the same time, the less it is fixed, the less security and stability it offers economic agents¹⁰³. Thus, paradoxically, a longer regulatory horizon is not necessarily synonymous with greater visibility for firms.

The uncertainty about the NOME Act's compatibility with European energy and competition law is a third source of instability. A whole section needs to be devoted to this vital question. As senator Philippe Marini pointed out, "The first decisive factor in the success [of the NOME Act] is its conformity with EU law. If it does not conform, [it] will be useless and will soon need to be reworked"¹⁰⁴.

7.2 The risk of the NOME Act being incompatible with European Union law

There is no doubt that the NOME Act overlooks some major principles of European energy and competition law. However, it is less clear that it infringes any particular article and could be deemed partly incompatible with the Union

¹⁰⁰ "Regular assessments [are planned] to implement adaptable, dynamic legislation within the new framework for the operation of the electricity market." Explanatory Memorandum, note 18 above, p. 5.

¹⁰¹ Article 1, Title VII of the NOME Act.

¹⁰² See note 49.

¹⁰³ See Holburn and Spiller (2002)

¹⁰⁴ Report of the Senate No. 617 of 6 July 2010, Opinion presented by Philippe Marini on behalf of the Finance Commission.

Treaty. Let us draw a distinction here between betrayal of the spirit and infringement of the letter of the law.

As we briefly mentioned – and as we will set out below – the ARENH tariff for nuclear electricity can only benefit consumers in mainland France. To simplify, suppliers purchasing a volume of, say, 100 MWh of this cheap electricity must prove that their customers located in France consume 100 MWh. The NOME Act is designed so that it is impossible for a company located across the border in Germany or Belgium to enjoy the same conditions of supply as its counterparts in France.

That territorial restriction goes against the construction of the domestic market wanted by European law on energy, and against market integration, one of the aims of European competition law.

The electricity sector was first opened to competition in 1996 with the adoption of the first European directive on energy. The directive not only sought to liberalise the markets, i.e. to promote competition in electricity generation and supply. The long-term objective is to create a broad European market in electricity and gas common to member states. The juxtaposition of national markets, each competitive but relatively independent from one other, is not the ultimate aim pursued. The necessity of integration is reiterated in the Directive of 13 July 2009¹⁰⁵. Its first article stipulates that the common rules for the businesses of the electricity sector that apply to all member states are established “with a view to improving and integrating [underlining by the author] competitive electricity markets in the Community”. The NOME Act, on the contrary, isolates part of the French electricity market from the European wholesale market. It removes volumes from that market, which had gradually expanded, and increases the volumes bought and sold within a strictly national framework¹⁰⁶.

Similarly, European competition law does not only seek to protect competition by combating collusive and exclusionary practices. It also seeks to contribute to the establishment of an internal market by combating practices by firms that segment national markets and actions by member states’ aid for national firms that distorts competition at the expense of firms from other member states. The Commission has on several occasions cited competition law to denounce destination clauses in contracts between producers and suppliers. These territorial restrictions, which limit the use of the good purchased, in particular its resale, have been condemned on many occasions in the gas sector¹⁰⁷. As we shall see, it is uncertain whether the legislation that results in firms in Germany or

¹⁰⁵ Directive 2009/72/EC of the European Parliament and Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC, OJEC L 211 of 14 August 2009, p. 55-93.

¹⁰⁶ See EPEX (2010).

¹⁰⁷ See, for example, the rulings against GDF (Cases COMP/38.662 - GDF/ENI and COMP/38.662 - DF/ENEL, rulings of 26 October 2004) and the cancellation of the destination clauses in Sonatrach’s contracts (Press release IP/04/1310 of 26 October 2004, “The Commission confirms that territorial restriction clauses in the gas sector restrict competition”).

Belgium being unable to benefit indirectly from the ARENH tariff can be considered a destination clause or state aid. In spirit, however, the NOME Act definitely disregards the principle of the non-segmentation of markets. It also betrays the principle of free movement of goods within the European Union. However, it is not with any certainty condemnable in terms of export restrictions.

Indeed, the NOME Act does not expressly prohibit the suppliers that buy electricity at the ARENH tariff from supplying customers outside France with the volumes they purchase. It simply removes the incentive to do so by adding a surcharge. If they exceed the volume they were allocated on the basis of their portfolio of domestic customers, they will have to pay the difference between the ARENH tariff and the market price. This surcharge eliminates the profit on sales to other markets. In fact, it could even dissuade suppliers rather than simply making them indifferent between the two options. The NOME Act stipulates that the surcharge shall be at least equal to the difference between the administered tariff and the market price¹⁰⁸. The degree of dissuasion for suppliers that exceed their volume will only be known in a few months' time when the Council of State decree setting forth the method for calculating the surcharge is issued. Moreover, the Act provides for a specific penalty mechanism in the event of abuse of the access right¹⁰⁹. A supplier that buys a quantity of electricity substantially higher than it needs to supply its French customers can be fined up to 8% of its revenues. In short, there is no explicit destination clause, but the combination of the allocation of volumes based on customers in France, the prior and subsequent verification by the CRE of the allocated volumes, the surcharge and the fine creates a de facto territorial restriction.

Is the NOME Act likely to be invalidated by EU institutions anyway?

From the European Commission, the guardian of the treaties, the risk appears to be fairly limited. The French government has taken pains to inform and communicate in advance with the commissioners in charge of competition and energy. In a letter to Neelie Kroes dated 15 September 2009 (copied to Andris Piebalgs), the French prime minister, François Fillon, explains the system of regulated access and the phasing out of retail tariffs for large consumers. He provides a detailed description of the surcharge mechanism, gives a figure for the ceiling of the accessible volume (namely 100 TWh), and sets out the stages

¹⁰⁸ “[T]he surcharge, which takes account of the financing cost linked to the deferred nature of its payment, is at least equal to the positive average difference between the prices observed on the markets and the regulated access tariff to historic nuclear electricity.” Article 1, Title V of the NOME Act.

¹⁰⁹ Abuse of the access right is defined as “purchases of historic nuclear electricity through the regulated access mechanism without the intention to develop the portfolio of customers on which eligibility is based, in particular purchases of quantities of historic nuclear electricity that substantially exceed those needed to supply its customers and that bear no relation to the actual development of its business and the resources devoted to it, and more broadly any action that directly or indirectly contributes to the misappropriation of historic nuclear electricity made available at regulated tariffs.” Article 7, Title VII of the NOME Act.

and schedule. The prime minister stresses that the access mechanism would be open without discrimination to all European operators¹¹⁰, that it does not prohibit resale and does not limit exports¹¹¹. In her reply, co-signed by the commissioner for energy, Neelie Kroes indicates that the general principles of regulated access seem to comply with EU law and that, in theory, the terms on which retail tariffs for large consumers will be maintained transitionally until 2015 are compatible with the treaty's provisions on state aid. The Commissioner for Competition nevertheless refrains from giving the French government a blank cheque. She insists several times on the need to respect fully the principles and commitments that the prime minister mentions in his letter and the problems of conformity with EU law that the technical terms of their implementation could raise, particularly with regard to the rules on free movement of goods¹¹². According to rumour¹¹³, this prudence is dictated by purely institutional considerations; a political agreement between the French government and the Commission has apparently been reached, ensuring that Brussels will not bring action against France over the NOME Act before the European Court of Justice.

But the Court of Justice could become involved in other ways. Even if the preceding rumour is true, the risk of a challenge to the mechanism of regulated access to nuclear electricity (or another section) of the NOME Act is not nil. A supplier that feels it has been underserved in access rights or an electricity-intensive firm that does not benefit from a comparable price to its main rival in France could, of course, lodge a complaint.

In particular, the plaintiffs could claim an infringement of Article 35 or Article 101 of the Treaty on the Functioning of the European Union (TFEU). Article 35 prohibits quantitative restrictions on exports and all measures having equivalent effect. It refers to "all trading rules enacted by member states which are capable of hindering, directly or indirectly, actually or potentially, intra-community

¹¹⁰ "The regulator [...] would be responsible for calculating the volume of regulated access to historic nuclear electricity [...] in a clear, transparent and non-discriminatory manner [...]. The mechanism would, in particular, be open to any operator, particularly European operators interested in starting a business in retail electricity supply in France." Letter from F. Fillon, note 14 above, p. 2

¹¹¹ After having described the surcharge, François Fillon says that "The system would not limit in any way the potential for export of electricity, since the suppliers that will have acquired the volumes of base electricity will remain free to sell them to final customers in France or in other markets [underlining by the author]." F. Fillon, note 14 above, p. 2.

¹¹² Letter from Commissioners Neelie Kroes and Andris Piebalgs to François Fillon, Brussels, 15 September 2009; see, for example: "While the general principles of regulated access to base electricity, detailed in your letter, appear to comply with Community law, we would like to draw your attention to the importance of the technical terms derived from these general principles. The technical terms [...] must not deviate from the general principles and infringe Community law, in particular the rules on competition and the operation of the internal market. We could cite in this respect the provisions of Article 29 of the EU Treaty. p. 3; or "Any of the principles and commitments mentioned in your letter, including the absence of electricity export restrictions concerned by the system, that might be incompatible with the free movement of goods are crucial" p. 3; or "[T]he Commission can only reserve the right to examine the situation in detail in the future if it appears that the principles and commitments you have set forth are not implemented fully or if problems of conformity with Community law emerge in the terms of their implementation." p. 4.

¹¹³ See Finon (2010), footnote 20.

trade”¹¹⁴. The plaintiff could argue here that the NOME Act creates a de facto clause that restricts exports and therefore infringes Article 35. It should be noted, however, that the Treaty authorises export restrictions for reasons of public order or public security¹¹⁵. The French government could claim before the European judge that the surcharge and other factors restricting the resale of electricity are essential to ensure security of supply to consumers in France. If alternative suppliers sell all the electricity they purchase at the ARENH tariff to customers outside France and continuously saturate exports, there may not be enough of the 100 TWH left to meet domestic demand. The argument could prevail because energy security, like the choice of energy mix, comes under national sovereignty.

The plaintiff could also claim an infringement of competition law via Article 101 of the TFEU. Paragraph 1 of the article prohibits agreements which have as their object or effect the distortion of competition within the internal market, in particular through restrictions on resale. The success of such a claim is uncertain, however. Theoretically, the article refers to agreements between undertakings that have willingly entered into a relationship and signed a binding contract. The contracts for the sale of electricity at the ARENH tariff signed between the historic monopoly and alternative suppliers are imposed on EDF. In addition, neither of the parties negotiates the tariff – which is set by the minister – or the volume – which is set by CRE. Case law only deals with settings where the undertakings had freely negotiated and signed agreements from which they could have refrained. Moreover, Paragraph 3 of Article 101 provides for exemptions under certain conditions. A restriction on the resale of electricity purchased at the ARENH tariff could meet those conditions since this is they essential to the development of competition on the French market, which represents an economic progress that benefits consumers.

Instead of having a long-term framework for investment, in the event of a complaint, operators will have to wait several years for clarification from a court ruling.

7.3 Incentives to invest efficiently

There are too many unknowns to anticipate the impact of the NOME Act on investment. The main unknowns were identified in the introduction to this section. After two simple examples, we will show that it is possible, however, to analyse the distorted incentives created by the new Act.

EDF’s investments to extend the life of the power plants in its fleet or to build new reactors are conditioned on the many regulated tariffs for its wholesale and retail sales. These are unknown. But even if they could be seen in a crystal ball,

¹¹⁴ CJEC, 11 July 1974, case 8/74, Dassonville, Reports of Cases before the Court, CJEC, p. 837.

¹¹⁵ “The provisions [of Article 35] shall not preclude prohibitions or restrictions on imports, exports or goods in transit justified on grounds of public morality, public policy, or public security, protection of health [...]” TFEU, Article 36.

those data would not be sufficient because the costs would also have to be known. Without that knowledge, it is impossible to say, for instance, whether an ARENH tariff of €45/MWh would leave enough margin for EDF to invest in upgrading its power plants. It should be borne in mind that a single reactor would cost more than half a billion euros to upgrade.

The second example looks at whether there will be a windfall effect. As we have seen, under the NOME Act, after 2015 retail tariffs should be based on the wholesale prices in the European market. That prospect should stimulate investment by both EDF and alternative suppliers. However, if the government, aware of the combined impact of eliminating yellow and green tariffs and the ceiling of 100 TWh, decides to intervene to prevent the transfer of some of the nuclear rent to the generator and suppliers, the incentive of the windfall effect will vanish.

At the same time, the NOME Act creates imbalances in investment which can already be identified.

The first of these imbalances is EDF's choice between investing in extending the life of existing power plants or building new reactors. The NOME Act introduces asymmetry since regulated access is limited, as its name suggests, to historic nuclear electricity. In time, therefore, there will be a dual system¹¹⁶: market prices for electricity generated by new reactors, and administered tariffs¹¹⁷ for electricity generated by old reactors. This dual system should shift the balance towards the construction of new power plants. If the government does not intervene on electricity prices, investment in upgrading old reactors will prevail over investment in building new reactors. Old reactors are far more profitable from an economic viewpoint. They have a cost per MWh that cannot be bettered by any kind of new power plant, whether it runs on enriched uranium, gas or coal. In financial terms and compared with a new nuclear power plant, the amounts risked per reactor are lower; budget and deadline overshoots are more manageable; and the horizon for forecasting revenues is 15-20 years, compared with more than 50 years for a new reactor. In short, the risk premium and the cost of capital are lower. Lenders feel more reassured compared with a project to build a reactor, which will start to make money only five years after the first stone is laid and which will be amortised over more than half a century.

The NOME Act completely alters the economic equation. The cost advantage for EDF of extending the life of the reactors over building a new thermal or nuclear power plant disappears. Under the NOME Act, the differential will benefit the

¹¹⁶ That duality will be hard to manage because the origin of the electrons supplied to consumers is not traceable and everyone will want to benefit from the most advantageous source of supply.

¹¹⁷ Theoretically, the administered market is limited to electricity sold to alternative suppliers, i.e., a maximum of 100 TWh. However, the level of the ARENH tariff will affect far more of the market than that segment alone. Since it is included in regulated retail tariffs, it will become a reference price for baseload electricity in all the administered offerings. It will also be a driving price in market offerings, since it will be known to consumers and is presented as the price level that covers the generator's costs. In fact, only electricity generated by the historic fleet that is exported will not be influenced by the administered setting of the ARENH tariff.

consumer, not the incumbent. Regulation via the ARENH tariff will probably be cost-plus regulation with a limited rate of return on the invested capital. If the investment performs better than expected, the regulator will ensure that the additional profit is redistributed to the consumer via the tariff. The incentive to invest most efficiently disappears¹¹⁸. In financial terms, however, the situation remains essentially the same¹¹⁹, since the cost of capital is still much higher to build a new power plant than to extend the life of an existing one. The economic and financial consequences, and therefore the new equilibrium point in the trade-off between investing in upgrading existing power plants or in building new ones, are shifted by the NOME Act in favour of new reactors.

The second imbalance concerns investment in base and semi-base electricity generation by alternative suppliers. The choice here is between supply guaranteed by the legislator, with a low price and volume risk, and less certain supply because it carries industrial risk. The access volume is taken from the whole of EDF's historic fleet. A technical malfunction in a power plant therefore has no impact on the regulated electricity supply. The operating risks are incurred entirely by EDF. Conversely, a supplier that invests in its own power plant will incur the industrial risk stemming from construction and operation. Furthermore, the ARENH tariff should for a long time¹²⁰ remain aligned on the unbeatable cost of investing in upgrading existing power plants and not in new power plants. There is therefore no hesitation between investing in one's own base generation capacity and the benefits of regulated access. That disincentive against investment was pointed up by the competition agency¹²¹. In its opinion on the bill, the ADLC recommended that the NOME Act provide for a gradual lowering of the ceiling on the ARENH-priced volume¹²². The senate only partly included that recommendation. It added¹²³ in Article 1 that at the progress

¹¹⁸ Note that this disadvantage of the administered tariff applied to investment in upgrades persists in relation to tax. Some countries like Germany and Belgium have chosen to tax the exceptional profits of operators resulting from extending the life of nuclear power plants rather than intervening on price. Under that system, operators still have an incentive to invest as efficiently as possible because they pocket the return on their investment. They have an interest in performing better than what the government's estimated when it set ex ante the amount of the tax transferred to general government revenues or special funds. Conversely, price acts ex post and can be readjusted according to expenditure and the volume of electricity generated.

¹¹⁹ If the regulated tariff applied to electricity generated by new power plants, the financial equation would have been altered. If the government intervened to guarantee the price, it would have considerably reduced the cost of capital which is very high due to the uncertainty of the very long term profitability of a nuclear power plant.

¹²⁰ The Explanatory Memorandum, note 18 above, p. 5, states that "[B]etween 2020 and 2025, it will be appropriate to start preparing to replace the nuclear fleet. The cost of replacement can then gradually become a relevant reference price for consumers." See also note 31 above.

¹²¹ "Without an incentive to invest also in baseload generation, there is a risk that alternative suppliers [...] will only invest in peak generation." Opinion of the ADLC, note 4 above, § 209.

¹²² "[R]egarding the total volume of regulated electricity available to alternative suppliers, the law should provide for a gradual reduction in the ceiling of 120 TWh staggered over the 15-year period. The aim would be to encourage suppliers to gradually prepare for the deadline of 31 December 2025, after which they will no longer be able to purchase electricity on non-market price and volume terms." id. §225.

¹²³ The justification for this amendment by senator Ladislas Poiniatowski, the rapporteur, is that it is "necessary to stress now the transitional nature of the ARENH tariff, so as to encourage the electricity

reports in 2015 and 2020, the government could propose conditions for the termination of the system. The amendment is too vague at this stage to counter the NOME Act's powerful disincentive against investment by alternative suppliers in base electricity generation.

The third imbalance relates to the energy mix. From an economic viewpoint, the optimum combination of electricity generating technology is the one that can satisfy highly fluctuating demand at the least cost. That means choosing technology with low fixed costs and high variable costs to meet surplus demand at peak times – power plants that only generate for a limited time during the year (fewer than 2,000 hours) – and technology with high fixed costs and low variable costs to meet base demand – power plants that run continuously throughout the year. The curve of the hourly demand of a business or household from 1 January to 31 December with its peaks and troughs, looks like a thick ribbon with lace running across the top, i.e., a solid block representing constant demand and a crest representing variations in demand.

The distinction between peak and base electricity is a simplification because there is in fact a range of technologies with different proportions of fixed and variable costs. For example, a combined-cycle gas power plant operates ideally in semi-base generation, i.e. between 2,000 and 6,000 hours per year, while gas-fired super-peaking power plants can be built to meet demand just a few dozen hours a year. In a perfect electricity market, operators invest optimally in every kind of technology, which results in an optimum energy mix.

For reasons relating to the market (e.g., imperfect competition), government intervention (e.g., capped spot market price) or simply the fundamental uncertainty about the future (e.g., lack of knowledge about the least expensive new-generation technologies) the installed capacity is far from ideal. It is nevertheless appropriate in an imperfect world to strive for the best possible energy mix. Here the NOME Act sends the wrong signal because it discourages investment in semi-base. The allocation of electricity volumes at the ARENH tariff will be based on a percentage of the energy consumed – the assumption is four-fifths – rather than on length of use – a need for power of more than 6,000 hours per year, for example. As a result, suppliers will have nuclear electricity at the regulated tariff to serve some peak demand. For example, a consumer whose electricity needs break down into half as regular consumption of more than 6,000 hours in the year, and half as erratic consumption of fewer than 3,000 hours. Under the 80% rule, the supplier has nuclear electricity to serve all of that customer's constant demand, and 60% of its fluctuating demand. If the ARENH allocation rule were based on demand of more than 6,000 hours, the supplier would only obtain electricity at the regulated tariff to cover the customer's constant consumption. In the first case, the supplier needs to generate additional supply of 20% from its own power plants, and in the second case, 50%. In the first case, it will invest in peak technology, in the second it will need to invest in semi-base also. The marginalisation of semi-base generation by the 80% rule is

suppliers that benefit from it to invest in their own generating capacity [...].” Report of the Senate, note 29 above, p. 39.

reinforced by the obligation on suppliers under the NOME Act to have generating capacity that can be implemented in the event of a short-term mismatch between supply and demand. The kind of investment that meets that obligation will be in peaking or super-peaking power plants.

In short, the NOME Act tends to favour investment by suppliers in peak generating facilities and to discourage investment in semi-base. It polarises the energy mix at both extremes, i.e., base generation and peak generation. In practice, this leads to higher costs because nuclear plants must cover semi-base generation and therefore power up and down instead of generating continuously at full capacity, as they are designed to.

8. Conclusion

In conclusion, the NOME Act will not deliver on its promises. The development of competition will be mostly limited to the segment of electricity supply to large consumers. Investment will be imbalanced and uncertain, because of a regulatory framework that will be barely more stable than now. Regulated access to EDF's reactors was seen as the dream way to reconcile two contradictory political aims: continuing to enable domestic consumers to benefit from the cost advantage of nuclear power, and creating a competitive European energy market. In economic terms, these two principles are antagonistic, unless we believe in competition without a market and in regulation without loopholes. The NOME Act allows market mechanisms to play no more than a bit part. The market will only operate on the margins, supplying some electricity and resolving capacity guarantees. The core of the market, i.e., wholesale electricity generation, will be largely administered by the regulator and the government via mechanisms of an unwieldiness and complexity unprecedented in electricity sector regulation.

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