

# **MARKET POWER MITIGATION PROPOSALS FOR THE SPANISH WHOLESALE ELECTRICITY MARKET**

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*The Spanish Electric Power Act intends to establish an electricity market carried out in a coordinated way according to the principles of free competition. Its resulting market price is aimed at being passed-through to consumers, but unfortunately it has not yet played the central role characteristic of a well-functioning power market.*

*There is a main reason behind the verified lack of trust the regulator (the administration) shows in the market: the horizontal concentration that characterizes the wholesale market. This distrust happens to be the reason behind some other negative regulatory design flaws, for instance, a mechanism of stranded costs recovery that has severely interfered with the market functioning and the fact that the tariff design does not fully pass-through this market price to consumers.*

*The main purpose of the “White Paper for the reform of the regulatory scheme of the power generation in Spain”, Pérez-Arriaga (2005), is to settle the regulatory conditions to revert this situation. This paper develops its main proposal, aimed at tackling the negative impact that the particular structure of the Spanish wholesale market has on the overall regulatory design.*

## **1 INTRODUCTION**

The Spanish Electric Power Act, CNE (2005), in concordance with the provisions contained in The European Parliament (2003) intends to establish an electricity market according to the principles of objectiveness, transparency and free competition. In principle, the

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price of this market should be passed to consumers, either directly through their purchases in the market itself, or through their purchases from any retailer, or even through the default tariff for those consumers who might decide to remain under the regulated scheme. Nevertheless, the price of the Spanish power market has not yet played this central role that is a fundamental characteristic of any well-functioning market.

Among many others, there is a main reason behind the verified lack of trust the Government shows in the market: the horizontal concentration that characterizes the wholesale market -with the consequent potential abuse of market power-. This lack of trust happens to be the reason behind some other negative effects, for instance, the design of the stranded costs recovery mechanism, the Competition Transition Costs (*Costes de Transición a la Competencia*, CTC) -or more precisely, the proper treatment for the investments that were made under previous regulatory regimes- that severely interfered with the market functioning and the fact that the tariff design does not fully pass-through this price to consumers.

This paper presents and develops some ideas that have been recently proposed for the reform of the Spanish system -see Pérez-Arriaga (2005)-, devised to mitigate that the particular structure of the Spanish supply market has on the overall regulatory design. The paper is structured as follows: in section 2 we briefly describe how the market has worked throughout these first years of operation, focusing on the impact that the structure of the generation agents has had on the overall evolution of the market itself and the regulation design. In section 3 we analyze the problems posed by market power measurement in electricity markets, and we describe the approach adopted here. Subsequently, section 4 presents the main market power mitigation proposal and the different ways in which it can be carried out, as well as their advantages and disadvantages. Conclusions are summarized in section 5.

## 2 THE CASE OF SPAIN

### 2.1 Market structure

At the same time that some liberalization measures were introduced with the 1997 Electricity Act, the Spanish Government allowed a major merger<sup>1</sup> that increased concentration in a power sector with already a significant level of concentration, as a result of other mergers<sup>2</sup> previous to the wave of regulatory reforms worldwide. The result was that, when the new Electricity Act was approved in November 1997 and a wholesale market started to function by January 1st 1998, the two major companies (Endesa and Iberdrola) generated 82% (45% and 37%, respectively) of the total Spanish electricity production and supplied 80% (41% and 39%) of the demand, which at that time was mostly captive, since liberalization of the retail market was scheduled to happen gradually and only the very large consumers were allowed to change supplier during 1998. Other two vertically integrated companies, Unión Fenosa and Hidrocantábrico with roughly 15% and 5% of the total production and supply, basically completed the Spanish electricity map. All companies were fully privately owned, except for a state-owned share in Endesa who was in the process of privatization (now it is 100% privately owned).

Since 1997 many minor adjustments to the market rules have taken place and, more importantly, some changes in the structure and ownership of the companies have occurred. Endesa sold Viesgo (about 3% of production and demand) to ENEL, EDP from Portugal presently controls Hidrocantábrico, and there are several new entrants (among which the most relevant one is Gas Natural, the dominant gas supply company in Spain, with a 6% of electricity

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<sup>1</sup> Endesa, in a previous move to its full privatization, got hold of 100% ownership of three medium size utilities (Sevillana, FECSA and Enher) where it previously only owned just a fraction of their shares.

<sup>2</sup> Unión Eléctrica merged with Fenosa to become Unión Fenosa in November 1982 and Hidroeléctrica Española merged with Iberduero to become Iberdrola in November 1992.

generation share that is quickly growing), most of them belonging to some of the strongest electric utilities worldwide.

## **2.2 The separate lives of the market performance and the tariff design**

The 1997 Electricity Act establishes the creation of a wholesale electricity market whose energy price must be paid by consumers, who have the option of purchasing their electricity from the organized short-term market directly, via bilateral contracts with suppliers or retailers or through an integral default tariff. Since January 2003 all consumers are eligible. All energy destined to the consumers that have decided to stay with the default tariffs has to be purchased from the organized short-term market that is run by the Spanish Power Exchange OMEL<sup>3</sup>.

The main problem stems from the fact that the secondary regulation, Royal Decree 1432/2002, CNE (2004), determined that, almost independently from the energy market price, the value of the regulated default tariff -which every consumer has the right to use- has to follow a prescribed path (actually it is a narrow band) from 2003 to 2010. The values of these tariffs are not updated in any form once the actual market prices are known<sup>4</sup>. This is obviously a non sustainable situation.

Why the Government does not want to pass-through the market price to the default tariff, as it should be the case in any market that functions correctly? Simply stated, the spot price resulting from the organized short-term market (a combination of a day-ahead market with 24 hourly prices plus six intra-daily markets and other markets for operating reserves) is not

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<sup>3</sup> [www.omel.es/frames/en/index\\_eng.jsp](http://www.omel.es/frames/en/index_eng.jsp)

<sup>4</sup> Moreover, the calculation of the default tariffs during some of the last years has seriously underestimated market prices, therefore resulting in the so-called “tariff deficit” at the time of the economic settlement of the different business activities. Evidently this has led to conflicts between the utilities and the Government. So far, in all instances the Government has decided that the “tariff deficit” will be paid by the consumers, conveniently spread over the next few years.

considered to be a reliable indicator of the price that would exist under truly competitive conditions. The level of concentration is simply too much for a truly competitive market to exist. The two largest generators, Endesa and Iberdrola, produced 34% and 26% of the total generation in the peninsular Spanish market in 2004.

It is true that only in a few occasions the regulatory authorities have found motives to start an in-depth investigation on possible abuse of market power by the generation companies since the wholesale market started in January 1998. In any case, the dominant generation companies could have easily increased the prices well above the values that have actually happened. But, besides self-restraint and fear of regulatory actions, there are two major reasons for this behaviour, whether alone or combined: the mechanism of recovery of CTC and the peculiar design of the default tariffs.

Indeed, the mechanism of recovery of CTC by differences has seriously distorted the normal behaviour of the generators that are subject to this regime. In addition, the mechanism itself acts as a mitigation measure of the market power of the two dominant generators. However, regarding the needed regulatory reform, the intricacies of the current CTC scheme are largely irrelevant, since it is the future what really matters, not the present situation. It is clear that this CTC recovery scheme is to be finalized somehow or replaced soon by a new method that hopefully does not interfere with the functioning of the market, see Pérez-Arriaga (2006). And this means that in the future the only existing significant instrument of mitigation of market power will be lost.

Then, the critical issue is that the expected level of future market concentration will impede that the price of energy that the market provides could be considered as the key economic signal in the new regulatory framework<sup>5</sup>. But, if the energy market price is not

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<sup>5</sup> It would not be fair to state that there has not been competition in the Spanish market. But it has been a peculiar competition, where the agents have tried to maximize their net revenues in unorthodox ways, which were dictated by the ad hoc rules of the recovery of CTC and the high level of market concentration. Besides, the rivalry among the agents has grown significantly, spawned by the opposing

reliable, the entire orthodox regulatory approach collapses, since the Government will not accept that the market price is passed through to the default tariffs. Then, the default tariffs will offer a lower cost refuge for any consumer. They, in the case that market price had been passed through to the standard tariff, might have decided to choose other options, like purchasing electricity directly from the market or from a retailer. Therefore, retailers will not be able to compete with the regulated tariff and their business will disappear. The tariff deficit will persist, since the revenues from the tariffs will be insufficient to pay the market price to the generators. It is unlikely that any long term contract markets will flourish, if the underlying market price is not reliable. And the Spanish market will not have the credibility that is essential to attract new investments.

### **3 EVALUATING MARKET POWER IN POWER MARKETS**

#### **3.1 Defining the concept**

Before starting to discuss about market power measurement methods, it is desirable to agree on a definition of the matter. In his *Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings*, European Commission (2004), the European Commission defines “increased market power” as ‘the ability of one or more firms to profitably increase prices, reduce output, choice or quality of goods and services, diminish innovation, or otherwise influence parameters of competition’.

Although “market power” is the theoretical basic term to refer to the just defined concept, the European legislation opts for the term “dominant position”, defined by the European Court of Justice in the *United Brands* case, European Court (1978), as ‘a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by giving it the power to behave to an appreciable extent independently of its competitors , customers and ultimately of its consumers’.

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strategies regarding the reform of the CTC recovery mechanism, the allocation of emission rights or the several takeover attempts.

In this paper, market power is understood as the ability to modify market price respect to the level that would result from perfect competition with the aim of maximising self profit<sup>6</sup>. Some other definitions of market power specify that this ability has to be maintained over a significant time period. But the key factor hereafter is to clarify the distinction between market power existence –i. e., this ability as defined above- and abuse –that is to say, for market agents to actually take advantage of their market power-. Believing that it is not realistic to demand self-restraint to agents or perfect market monitoring, this work deals with market power existence independently of its actual abuse.

### ***Common rules on competition in the European Union***

The Treaty establishing the European Economic Community, European Community (2002), in his Title VI develops the common rules on competition, structured mainly in the articles 81 and 82. The first one sets the rules aiming to prohibit ‘all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the common market’. This article is further developed in the “Council regulation on the control of concentrations between undertakings”, Council of the European Union (2004), centered explicitly on the analysis of the impact of mergers on competition -a focus that could be defined as *ex ante*-.

On the other hand, the article 82 establishes criteria for the *ex post* control, rules to prohibit any abuse by one or more undertakings of a dominant position -just the abuse, not the existence of dominant position-.

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<sup>6</sup> Market power can be exercised to modify prices in both directions, not only increasing it –offering prices above production costs or by capacity withdrawal- but also lowering it –which can also be profitable under certain conditions.

### ***The Spanish case***

The main aspects of the control of mergers established by the Spanish legislation<sup>7</sup> are:

a) its scope is limited to operations that allow an undertaking to enjoy a certain market share above a predetermined limit; b) it establishes a notification procedure for the operation; c) the application of the rules corresponds to two administrative organisms that act sequentially, the “Tribunal de Defensa de Competencia” (the “Antitrust Court”) and the “Servicio de Defensa de la Competencia” (the “Antitrust Service”), relying the final decisions on the Ministry of the Economy and Finance and on the Government itself<sup>8</sup>.

The Spanish antitrust model is characterized by a horizontal application system, i. e. it is equally applied to all the economic sectors. However, certain sectorial regulators coexist together with the aforementioned antitrust institutions -e. g. the National Energy Commission-. The sectorial regulator has to inform the antitrust authorities about the potential uncompetitive practices that might occur as well as to assist them in the consequent investigations.

Regarding investigation of mergers, it is necessary to define quantitative criteria to determine which operations can or have to be subject to any control. Typically these criteria are based on two types of indexes: absolute (e.g. total sales) and relative indexes (e.g. market shares). The Spanish legislation considers two thresholds: a) the acquisition or growth of the undertaking market share in the national market or in an enclosed regional market of at least 25%; b) a joint volume of sells of at least €240 mln, whenever that at least both parties volume is €60 mln.

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<sup>7</sup> “Ley 16/1989 de 17 de julio de Defensa de la Competencia”, developed in the Royal Decree “Real Decreto 1080/1992 de 11 de septiembre”.

<sup>8</sup> The recent “White Paper on the Reform of the Antitrust Spanish System” proposes the creation of one single and independent antitrust institution -the Antitrust National Commission-, that gathers the present functions of the Antitrust Service and Court.



### 3.2 Market power measurement in power markets

Power markets pose special characteristics that make them different from other classical markets. Firstly, the underlying asset is an essential good, with practically no substitute and that cannot be economically stored. Generation side has a very low elasticity, and demand side is almost completely inelastic. Production capacity is exposed to high operational risks and investments are very capital-intensive. Transport grid introduces complex constraints to the market. All these reasons make the analysis of power market a difficult task.

The state of the art of the research on concentration measurements in the context of power markets is rich. A good revision can be found in Newbery (2004). Another excellent and recent reference is Hope (2005). Traditionally, a set of simple indicators that provide with reasonable approximations in other markets have also been applied to power markets<sup>9</sup>.

The simplest one, but widely used, is market shares. It is important to note that, despite they supply interesting information, they do not determine market power by themselves, see e. g. Office of Fair Trading (2004). There are key aspects, like resources or technology control, they are unable to capture. These difficulties become even more important in the case of power markets, making crude indexes unsuitable for their study.

In particular, the most popular index is based on market shares: the *Herfindahl-Hirshman Index* (HHI), broadly used in all economic sectors. Although it can give a general perspective of market structure, it cannot inform of other factors with an important impact on market power, as the amount of base production –that will never fix the price– or marginal

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<sup>9</sup> The European Parliament's Directorate-General for Research, in the European Parliament Fact Sheets “Abuse of a dominant position and investigation of mergers”, states that ‘The main indicator of dominance is a large market share; other factors include the economic weakness of competitors, the absence of latent competition and control of resources and technology’.

capacity, the technology mix, the availability of manageable hydro resources or the coverage margin in a certain moment<sup>10</sup>.

The *Pivotal Supplier Index* informs of the amount of hours that a generator was indispensable to meet demand. Again, this is not enough to characterise the complex peculiarities of power markets<sup>11</sup>.

Another frequently used index is the amount of hours that a generator is marginal, that is to say, it fixes the price. However, market power can be exercised not only by price increase but also by capacity withdrawal. As this figure does not provide with any information about infra-marginal capacity, again, it is not enough to capture market power.

The aforementioned peculiarities become even more important in the case of Spain. Its market cannot be fairly compared to others in the E.U., regarding the weakness of the interconnection capacity with France practically isolates the Iberian Peninsula. The current mechanism of CTC recovery by differences introduces distortions into the market. Thus, even trying to make inferences about its future performance based on the present or past exercise of market power, provided the CTC mechanism will disappear soon, is not justified.

### **3.3 The main indicator proposed**

If neither classical indexes nor past experiences analysis can be applied to the problem, how can then market power be measured? The answer adopted by the authors is to resort

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<sup>10</sup> Surprisingly, the Federal Energy Regulatory Commission (FERC) has adopted this index in its Merger Guidelines, although just as a filtering methodology of the various cases -in some of them it has resorted to more sophisticated tools-. The European Commission states in its guidelines that this index can be useful but it does 'not give rise to a presumption of either the existence or the absence of such concerns'.

<sup>11</sup> These two and some other indexes -e. g. the use of a production costing model to compare the market prices with the levels determined by the marginal generation costs- are used by the Department of Market Analysis of the California ISO in its analysis of the market functioning, see e. g. California ISO (2004).

directly to the market power definition and measure the difference between prices in perfect competition and actual prices if the agents used all its potential to manipulate market outcomes to maximize their benefits. The so obtained index takes the form of other well known one, the Lerner index, without the usual simplifications that accompany it in theoretical texts.

This can only be achieved by using oligopolistic models that are sophisticated enough to represent reasonably well the complexities and details of electricity markets and the agents' strategies, see Rodilla (2005). This is the reason for the authors to rely on oligopolistic simulation models in order to get a quantitative estimation of the market power mitigation measures needed to drive market power to acceptable levels. The nature of the proposed mitigation measures will be presented in the next section.

## **4 HOW TO TACKLE MARKET CONCENTRATION? MITIGATION MEASURES**

### **4.1 Background and experiences**

In the article 23.8 of the Directive 2003/54/CE it can be read that 'Member States shall create appropriate and efficient mechanisms for regulation, control and transparency so as to avoid any abuse of a dominant position, in particular to the detriment of consumers, and any predatory behaviour'. The anti-trust European Union rules –as well as the Spanish ones, inspired in the latter ones- are focused in banning anti-competitive conducts and in controlling economic mergers that might alter the market structure against the general interest. They do not provide guidelines or instruments to correct inadequate structures that impede a correct and competitive market functioning. Open access to the network and fully eligibility together with the general anti-trust rules and their corresponding institutions are supposed to be sufficient to limit potential market power abuses<sup>12</sup>.

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<sup>12</sup> A key factor behind the high levels of horizontal concentration in the European power sector is without any doubt the proven resistance of many governments to fragment their powerful formerly

Conversely, in the United States of America, the Federal Energy Regulatory Commission holds the mandate under the 1935 Federal Power Act of guaranteeing that the regulatory commissions of the States are able to keep prices at ‘fair and reasonable’ levels in the liberalization processes, see Newbery (2002). A utility can only sell energy at market prices if ‘the seller (and each of its affiliates) does not have, or has adequately mitigated, market power in generation and transmission and cannot erect other barriers to entry’. Even under these circumstances, it can be compelled to sell at administratively-determined prices if ‘any change in status that would reflect a departure from the characteristics the Commission has relied upon in approving market-based pricing’. Therefore, the wholesale power market liberalization explicitly requires the incumbent power companies to reduce their market power.

The governments of the different countries that have gone for various approaches to tackle the market power affairs during the liberalization and restructuring processes of their electricity sectors. Usually, these matters were faced by negotiations between utilities and the regulator, implying divestitures to mitigate market power. When it was expected that the market price might not fully remunerate the existing generating assets, utilities only accepted the reforms if they were allowed to recover the corresponding stranded costs, see e. g. EIA (2000). At the same time, to approve these measures, it was required that the structure of the resulting power market could provide certain guarantees of absence of market power, what lead in many cases to processes of divestitures to reduce their market shares.

In Australia and Argentina the national generating utilities were split into several small companies that were afterwards privatized. On the contrary, in Chile and UK the new private utilities had large market shares. In other systems, as it is the case of Italy, where ENEL’s market share was around 80%, was compelled to divest until its market share was around 50% (lately additional measures are being considered).

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national power companies -linked to various justifications, such as agravios comparativos or the suitability to hold European-size “national champions” with a local and implicit investment compromise-protecting them from potential foreign takeovers.

In Spain, the Royal Decree-Law, of June 23rd 2000, established that generating companies whose installed capacity was larger than 40% of the total peninsular amount could not increase their installed capacity in a five year period time. If the installed capacity share was under the 40% but above 20%, the limitation was defined for a three year term. Both terms have not been renewed from that time, so the rule is not longer in force.

## **4.2 Two extreme approaches**

The application of every possible indicator concludes that market power in the Spanish (or Iberian) electricity market is excessive. However, it is much more difficult to assess up to which point it should be mitigated and how. Crude concentration indices as the just reviewed are not suited to this second type of job. Comparison with the markets of other countries may not be fair, since one has to recognize that the weak commercial capacity of the interconnection with France implies that the Iberian market is the true relevant market to be considered. Comparison with the markets of other commodities is not appropriate either, since the trade of electricity needs networks of sufficient capacity, electricity cannot be stored and it is an essential good, basically without a substitute and with very low price elasticity in the short term. Comparison with the present or past exercise of market power in the Spanish market is not meaningful, since we are only interested in the existence and mitigation of market power in the future power system and under different market rules that the ones that are presently used (no recovery of CTC “by differences” or a remuneration of generators that is based on the market price). This is why, as explained at the end of this section, the White Paper has relied on models of simulation of the oligopolistic behaviour of the market agents in order to have a quantitative estimation of the severity of the market power mitigation measures that would be necessary.

Which market power mitigation measures are applicable here? As mentioned, both the EU and Spanish competition legislation focuses on: a) forbidding those conducts of market agents that could distort or impede competition and b) controlling operations of concentration -such as mergers and acquisitions- which could impair competition in the corresponding markets. But this legislation, contrary for instance to the US approach, see Newbery, (2002),

does not provide guidelines or instruments to fix inadequate market structures *ex ante*. However, electricity markets have specific characteristics that make them particularly prone to the exercise of market power and therefore may justify *ad hoc* preventive measures for this sector. The Spanish electricity legislation has already adopted some of these measures, such as a low price cap in the day-ahead and intra-daily markets, energy release programs (not used yet) or the mentioned transitory limitations (already expired) to capacity increases.

What should be recommended? Is supervision and self-restraint by the market agents a sufficient approach to obtain reliable prices in such a market? Should drastic measures, requiring divestiture of a significant fraction of the assets of the dominant companies be required instead?

When proposing regulatory reforms in Spain, one should not forget that several Governments, from different sides of the political spectrum, have always favoured a policy of “national champions”, despite the liberalization efforts that were made in parallel. Therefore, it does not seem realistic to try to fix the concentration problem by just requiring the two dominant companies to divest their assets.

On the other hand, market supervision, although necessary, is a very limited regulatory instrument. When a substantial part of the data that are required to make an investigation are confidential (this is the case of the fuel purchase costs, the opportunity cost of water that each company has estimated, the expected price of the ton of CO<sub>2</sub>, the allocation of the plant start-up costs to the expected hours of operation, etc.), it is very difficult for the regulator to find a smoking gun. Moreover, the judicial process in Spain is very slow (it may take two years to reach a final decision on a minor case of potential abuse of market power) and the final decision is made by non specialists in electricity regulation. Thus, consumers may be suffering unjustified high prices for a couple of years before the Fair Trade Court can make a decision perhaps wrong on some episode that took place a long time ago.

Considering then that market monitoring is not enough and discarding drastic measures as asset divestiture, we have adopted an intermediate approach. A set of alternative measures is proposed to achieve the goal of limiting market power.

### 4.3 An intermediate solution: the effective concentration rule

‘When structure is not conducive to competition, the regulator & pool operator will find themselves unsuccessfully chasing after conduct. The solution is not a better rule, but a change in structure’, Barker (1997). This correct sentence perfectly reflects the approach we propose. A basic principle of economic regulation is that it is not possible to prevent from market power just by modifying “smartly” the corresponding market rules. Therefore, the idea underlying the analysis is that, if none of the agents has more of a specific percentage of the estimated peak power of the whole system at its free disposal then their ability to modify market price will not allow them to increase yearly average prices above a reasonable level.

The central element of the proposal is a simple rule of limitation of horizontal concentration in the short-term markets, to ensure that market power has been reduced to an acceptable level. In other words, to make sure that the capability of any market agent to modify the market price for its own benefit does not exceed a threshold that the regulators may consider tolerable.

The proposed rule establishes that the amount of *effective production capacity* that any market agent would be allowed to bring to the *short-term* Spanish (or Iberian, soon) wholesale electricity market cannot exceed a prescribed percentage of the estimated peak demand for each year. This percentage will be different for each specified time period: peak, intermediate and low demand periods in winter, summer and the rest of the year. The regulatory commission would determine both the percentages and the effective production capacity of each plant. The percentages can be updated three years in advance or whenever there are significant changes in the main system conditions, such as the margin of firm installed generation capacity over the estimated peak demand. The effective production capacity of a plant for a given time period, and just for market power examination purposes, roughly indicates whether in this period the plant is expected to be either producing or close to it, and if so the expected level of production: average historical values for hydro units or wind generators and average available capacity for thermal units.

It is important to realize that the proposed rule is not one of “concentration”, but of “effective concentration in the short-run”, since it just limits the amount of effective production capacity that can be freely brought to the short-term markets, and not the total generation capacity that the company owns or that the firm can trade in the long-term –five or more years, for instance-. The agents may resort to several measures to comply with the rule (see next section): voluntary divestitures of generation assets, energy release programs (already contemplated in the Spanish legislation; the EU Commission imposed this type of measure to EDF in relation to the acquisition of control over EnBW in 2001), voluntary long-term contracts (but only if they meet some minimum conditions of transparency) and virtual energy contracts (financial contracts where the regulator specifies both the volume and the price, as in the vesting contracts during the initial phase of the electricity market in England & Wales).

Next we review briefly these four options.

### ***Divestitures***

Divestiture is one of the most classical and drastic procedures to face excessive horizontal concentration problems. This method has been applied in many occasions. One of the first ones was in the U.K., where the non nuclear generation capacity of the original state-owned company was split into two different companies –National Power y PowerGen- that were subsequently forced to sell some of their assets, see Thomas (2006) for further examples in the U.K. ENEL case in Italy is also well known.

Obviously, this procedure is the most traumatic one for companies. Moreover, if the companies are privately owned there is no possible legal action –at least, in principle- to force them to carry out the measure other than using it as a condition for authorising M&A processes. Although this method has the advantage of introducing new agents into the market it also reduces dramatically the presence of the incumbent companies, which traditionally have shown a deeper compromise with the system and in principle guarantee the continuity of investments<sup>13</sup>.

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<sup>13</sup> It is really paradoxical the purpose to hold the incumbents commitment to invest in new facilities to enhance security together with the search of measures to reduce their role in the market.



In addition, some considerations should be taken into account before trying to implement this measure. One of the key ones is to ensure that time margins allowed are flexible enough to guarantee that the divestiture is not carried out under unfavourable conditions. In addition, a stable regulatory framework and an established market are essential to attract possible bidders.

The reasons exposed are enough for us not to recommend using this method as a compulsory measure. Nevertheless, agents can freely adopt it to limit their effective capacity according to the proposed rule.

### ***Energy release auctions***

This method is based on auctioning not generation capacity but the right to manage production. The main idea is that a dominant company is forced to auction the commercial management of some of its capacity for a limited –and long enough- period of time, e. g. three or five years. This can be implemented as a call option on certain predetermined energy blocks at a certain price from a company or linking the contract to the performance of some specific plants.

It has been applied in a handful of occasions to limit the market power of dominant companies in markets such as Alberta (Canada) or The Netherlands. In other cases, it has been used as a condition for giving authorization to M&A processes with the aim of preventing competition levels from being significantly eroded, like in France.

This method is obviously less drastic than capacity divestiture, provided that the physical facilities keep their owner and that the process is completely reversible when the contract comes to an end. It has the advantage of attracting new agents to the market, which can help strengthen retail market. In addition, it reveals the market price of generation assets, which can be useful under certain circumstances.

Like in the divestiture process, energy release auctions should be sufficiently spaced out through time and limited in the maximum amount of energy auctioned in order to prevent prices from sinking. A stable regulatory framework and an established market are also a very advisable

prerequisite. Energy released auctions can be freely used by companies with the objective of keeping the effective concentration rule proposed. In a lower degree, this method keeps the inconvenient of discouraging the dominant companies to make new investments in the local market.

This instrument is already legally present in the Spanish market, but it has never been used. We recommend the use of this method in the case of Spain, to be used by both the regulator and the companies. However, it does not seem convenient to tackle the problem of excessive concentration in the Spanish market by this only instrument, as the threaten of price sinking or the lack of trust on market outcomes advise against it. The amounts that should be released to face efficiently this matter in Spain, Rodilla (2005), might too large to assure that in the short term it would not appear an oligopsony situation, the converse of an oligopoly.

Current regulation limits the maximum energy fraction that a company can auction to 20%, and international experience refers only to reduced production percentages. Due to this practical reason, or due to the one just discussed, energy release auctions appear not to be enough to solve the problem of market concentration, so other instruments should also be put into practice with the same objective.

### ***Virtual contracts***

In principle, long-term contracts are a helpful tool to mitigate power market power. If a utility  $U$  (whose wholesale market share is large) contracts a fraction of its output, it reduces its incentive to raise prices, by for instance withholding part of its capacity. Driving the market price to a higher level would just benefit the firm for the amount not contracted (obviously for the contracted part it receives the previously agreed fixed price), so the larger the amount contracted in the long term, the less the incentive of the utility to exercise its market power.

However, this is only true if we assume that the contract price setting does not depend on the spot market price, i. e. if at the time of signing a forward contract, the spot market price is not a valuable driver of the forward prices. Unfortunately, actually this is not the case. In the case of utility  $U$ , once the contract expires, the main fundamental to determine the price of the

subsequent contract will be the estimated spot price for the forthcoming term, whose main estimator undoubtedly will be the spot price up to this point. Current spot prices are the main signal for forward prices, and therefore, unless certain market structure changes could be expected, there is no reason for us to think that the utility would lose its dominant position, Vázquez (2006).

The only way to mitigate market power through forward contracting is by fixing externally the contract price<sup>14</sup>, what takes us to the instrument we name “virtual contract”. By “virtual contract” we define a contract for differences (purely financial) between a generating agent (owning a large portfolio of plants, and having the ability to exercise its dominant position) and a buyer (which for the moment we do not specify, it could be anyone). The contract establishes a load profile<sup>15</sup> and a time term, as well as the corresponding price, in €/MWh, the three of them set up by the regulator. Some aspects of these contracts deserve particular discussion.

#### *The price administratively settled*

The question that remains is whether in real life the regulator can equitably set the price of these virtual contracts. Under normal circumstances, this has obvious practical difficulties, difficulties that can be overcome easier under special circumstances.

There are no few examples of these particular circumstances in the start of various power markets around the world. They were used for the first time in the U.K. in 1990, under the name of vesting contracts, to force coal plants to acquire their fuel from the English mines

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<sup>14</sup> Some recent works suggest the possibility that in very concentrated markets, retailers (if they would be independent from power producers, which is not the Spanish case) might be interested in forward contracting, even at higher levels than the competitive ones, to reduce the suppliers market power.

<sup>15</sup> It is necessary to determine a time profile of the energy under the contract. If this would not be the case, a generating agent who could manage significant amounts of water reserves could manage its hydro production to exercise its market power in the peak hours when prices are also higher

instead of from the cheaper international market and to oblige distribution companies to buy their energy from those coal plants at a price higher than the market. Also in the U.K., they were used to protect large industrial consumers in the transition to competition. Similar experiences took place in New South Wales and Victoria (Australia), see Wolak (1999). The Italian Energy Regulatory Commission has recently proposed this mechanism to mitigate ENEL's market power, see Creti (2005). Virtual contracts have also been proposed due to their intrinsic value as instruments to mitigate market power, see Wolak (2001) for the Californian power market and Arellano (2003) for the Chilean power market. In the Spanish case, this mechanism could be used as a tool for the future treatment of stranded costs, see Pérez-Arriaga (2006).

This price setting might be determined either by indexing it for instance to a portfolio of prices of various international power exchanges or directly by the regulator. In this latter case, this contract price should correspond to the expected market price in this future time term. In principle it could be indexed to some other fundamentals, such as the international natural gas market price or even the emissions trading or any other index not linked to the wholesale power market agents' behavior but which could ease the expected price calculation.

Additionally, according to the previous recommendation of exploiting as much as possible the energy releases mechanism, it could be possible to take advantage of the prices resulting from them to get to a more accurate and market-based price determination.

In order to avoid any market interference of this instrument with the market functioning, it is crucial that once these prices of the virtual contracts are determined, it should be clearly emphasized that not updating mechanism of any nature could be expected due to actual deviations of the wholesale market price from virtual contract price, no matter the sign of them.

### *The energy profile*

It should account for a predefined energy profile that was not linked to specific facilities but to the whole generation portfolio of the company. It is necessary to determine a time profile of the energy under the contract. If this would not be the case, a generating agent who could

manage significant amounts of water reserves could manage its hydro production to exercise its market power in the peak hours when prices are also higher.

*The “virtual” counterparty: the access tariff*

The loss or benefit from the contract should be borne by the ensemble of consumers. Indeed, the counterparty of the contract has to be carefully specified. Since these contracts implementation has the aim of mitigating market power, on behalf of the ensemble of all consumers, the contract settlement has to affect all of them as well. This can be achieved by computing the net outcome of the contract (either positive or negative, depending on the actual market price with respect to the contract price) and passing it through as a component of the access tariff (network and any other regulated charges) that all consumers have to pay. Note that any desired modification in the conditions of these virtual contracts can be easily and immediately reflected as a change in the value of the access tariff.

These instruments would help the affected companies to keep the effective concentration rule and avoid other more unfavourable mechanisms such as divestiture or energy release auctions. The virtual energy contracts are a supplement to the energy release programs, if it is deemed that the volume of energy that has to be auctioned is too large to obtain a fair price for it.

Such a contract can be compared to a purely financial contract between agents, so it produces no market distortion other than, of course, reducing the incentive to manipulate prices. It is important to realize that the generation capacity that is committed in the long-term does not disappear from the market. In case of an energy release program, or a divestiture of generation assets, the energy is offered to the market by another agent. And, in case of a virtual energy contract, since this is a purely financial contract that only has an influence in the final economic settlement, the owner of the power plants should operate them independently of the existence of the contract. In fact, the virtual contract is an independent source of income (positive or negative), regardless of the physical output of the plants, and the plants have to be operated,

taking into account its variable costs and the market price, in order to maximize the income that can be obtained from them, regardless of the existence of the contract.

One of the main advantages of this instrument is its reversibility without any problems of volume or time. If the concentration situation changed – because of an increase in demand or new capacity installation, for example- the volume or price of the contract could be increased or decreased with the only effect of correcting its impact on the tariff to be paid by consumers.

### ***Voluntary long-term contracts***

Voluntary long-term contracts would in principle have the same mitigation effect on power markets than virtual contracts, as they make the revenues received by the company for the energy volume affected independent of market price. This mitigation effect increases with the contract duration, and vanishes with too short durations, being useless when it is less than three years long, for example. For such a contract to be accepted by the regulator as a reduction on effective capacity, it has to prove it is not accompanied by parallel compromises that imply non-competitive conditions. It seems difficult to establish a set of transparency guarantees that could be considered satisfactory.

Anyhow, it should also be noticed that these mitigation measures cannot fully eliminate market power. Depending of the type of instrument that is adopted, the capability to manipulate the market price may remain the same as before, although the economic incentive to do so will be reduced. Moreover, the manipulations that may be required to achieve a substantial economic benefit from the abuse of market power will be now much more manifest for the supervision of the regulator.

The rigour of the market power mitigation measures should be reduced as the concentration level diminishes or other regulatory instruments are also introduced, such as improved supervision mechanisms, more active demand response, elimination of barriers for new entrants, a broader margin of available generation capacity over demand, reinforcement of the interconnection capacity with France, an adequate level of market information for all agents and an improvement of the competition conditions in the markets for operating reserves.

## 5 CONCLUSIONS

The Spanish electricity power act was aimed to liberalise the sector and create an electricity market which price would be passed-through to consumers. However, this price is not actually an important input for the electricity tariff calculation, due to the regulator's lack of trust on market results. The main reason for this mistrust is the lack of competition resulting from an excessive horizontal concentration. In this paper we have developed the main proposal of the "White Paper for the reform of the regulatory scheme of the power generation in Spain", which has the aim of providing the Spanish government with a set of reasoned measures to modify the regulatory framework so that it can correct this situation.

The peculiar characteristics of electricity markets imply that crude indexes are too simple to offer a valid diagnostic of market concentration. Simulation tools are much more suitable to this kind of job, particularly oligopolistic models. We recommend the use of this kind of instrument and actually resorts to it when trying to get a quantitative approximation of the order of magnitude that the proposed rules should have in order to reduce market power to reasonable levels.

The central proposal is setting a limit to effective concentration. Dominant companies should not be allowed to freely have more capacity than a percentage of the estimated peak demand at their disposal to bring it to the short-term markets. They can choose among a range of options to keep the rule: divestiture, energy release auctions and virtual contracts.

Because they are more respectful to the ownership of facilities, energy release auctions are primarily recommended. However, since the quantities to be auctioned might be too large in the Spanish case, we propose to complement with the instrument we have defined as virtual contracts.

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