

THE COMPETITION EFFECTS OF ENERGY MERGERS: ECONOMIC ANALYSIS IN EUROPE AND IN SPAIN

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THE COMPETITION EFFECTS OF ENERGY MERGERS: ECONOMIC ANALYSIS IN EUROPE AND IN SPAIN

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Abstract

This article surveys, from an economic perspective, the recent application of merger control in the European energy sector. It considers ten significant transactions in the energy sector: the eight largest energy transactions assessed by the European Commission since 2004, as well as two major gas-electricity mergers in Spain over roughly the same period. Merger decisions in the energy sector have been characterized by a significant concern for potential horizontal unilateral effects, even in situations where the merging parties accounted for limited combined shares of the market, or where one of the parties was only a small competitor. A variety of non-horizontal concerns have also been considered by the competition authorities, including effects flowing from the increasing use of gas for electricity generation or from limited ownership unbundling of network assets. Remedy packages have typically included extensive structural divestments to remove competition concerns. Given the nature of competition in energy markets, particularly effective remedies are those that involve the sale of price-setting generation plants, network assets, and controlling stakes in merging parties' competitors.

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THE COMPETITION EFFECTS OF ENERGY MERGERS: ECONOMIC ANALYSIS IN EUROPE AND IN SPAIN

Introduction

Since late 2004, several mergers in the energy sector have been examined by the European Commission for their potential adverse effects on competition, and a number of common trends can be observed by comparing their respective assessments. These include a significant concern for horizontal effects, even in cases involving fairly small competitors to incumbent suppliers, or where the combined market shares of the merging parties were relatively low; a willingness to consider (and remedy) various non-horizontal effects, including input and customer foreclosure, and additional vertical theories of harm that are specific to the energy sector; and the extensive reliance on structural remedies (e.g., generation asset divestments and unbundling of network assets) in order to mitigate competition concerns.

Two major transactions in the energy sector were also reviewed by the Spanish competition authorities in 2005-2006 and 2008-2009. The first was a proposed merger between the gas and electricity incumbents (Gas Natural and Endesa), which eventually did not go ahead for commercial reasons. The competitive assessment and remedies considered by the Spanish competition authorities in this case were broadly in line with the strict approach followed by the European Commission in the energy sector. A second smaller (but still substantial) transaction involving Gas Natural and Union Fenosa was cleared by the Spanish competition authorities in February 2009. This decision partially departed from established practice at the European level given its lack of concern for unilateral and input foreclosure effects in electricity generation, and the willingness to consider behavioral rather than structural remedies.

This article surveys the recent practice of merger control in the European and Spanish energy sector, highlighting the key elements of the decisions taken by the respective competition authorities from the perspective of economic analysis, and comparing their approaches.

High-level review of potential effects on competition of energy mergers

Mergers in the energy industry can give rise to several competition effects. These effects often reflect some of the specific characteristics of the gas and electricity sectors, and the complementarities which are present between the two markets. In particular, both the gas and the electricity markets have a vertical structure, where competitive activities (e.g., electricity generation and retail supply) coexist with monopolistic – and typically regulated – activities (such as transmission and distribution). Mergers that bring together assets in different parts of the vertical value chain may give rise to fairly well-established non-horizontal effects (e.g., theories of raising rivals' costs, and/or quality degradation). Additional non-horizontal effects can arise from the growing interaction between the gas and electricity markets, in particular flowing from the fact that gas has been an increasingly important input for electricity generation in many European markets over the past decade or so.

These non-horizontal effects often co-exist with more standard horizontal effects which can arise from a merger between direct competitors and the resulting loss of competition within each segment of the energy value chain.

Unilateral horizontal effects can be particularly prominent in the electricity generation sector, given the fairly specific features of this market (e.g., very inelastic and volatile demand, and the coexistence of several generation technologies with different marginal costs). These characteristics imply that transactions which involve high-cost (and price-setting) generation plants may give rise to incentives to withhold some output from the market, in order to drive up prices to benefit the rest of the generation portfolio of the merged entity (which may include other price-setting units, or infra-marginal generation). A portfolio generator may face incentives to withhold the output of high-cost assets (if technically feasible) since these plants earn relatively low profit margins when they produce.¹ A merger can create or strengthen these incentives by changing the nature of the generation portfolio of the merged entity.

Horizontal effects also often arise in retail supply of both gas and electricity which, in most European countries, still tends to be dominated by incumbent firms (meaning that even small losses of competition have been seen as a source of concern by competition authorities). Horizontal effects at the retail level have in some instances also resulted from the complementarities between gas and electricity supply, implying that, in a given local market, the incumbent gas supplier and the incumbent electricity supplier are the most credible rivals.

The recent competition review of energy mergers in Europe has covered a fairly full taxonomy of the merger effects which can arise in the energy market, as the next section of this paper reviews.

¹ This potential effect is explicitly recognized in the new U.S. *Horizontal Merger Guidelines* (August 2010), in their discussion of unilateral effects for the case of homogenous products. The Guidelines state that “a unilateral output suppression is more likely to be profitable when: [...] the margin on the suppressed output is relatively low” (p. 23).

Summary of the competition assessment of European energy mergers since 2004

The European Commission (the “Commission”) has examined eight significant energy mergers since late 2004, involving several national markets (notably Portugal, Hungary, Belgium, the UK and Germany). The first of these mergers (*EDP/ENI/GDP*²) was the only one to be prohibited, in late 2004 (a decision upheld by the European Court of First Instance in 2005). The next three cases in chronological order (*E.ON/MOL*³, *DONG/ELSAM/E2*⁴ and *GDF/Suez*⁵) were all approved, subject to remedies, after an in-depth Phase II investigation. The last four cases (*EDF/British Energy*⁶, *RWE/Essent*⁷, *Vattenfall/Nuon*⁸ and *EDF/Segebel*⁹) were approved with remedies after a Phase I investigation. The table included in Annex 1 of this article reviews some of the essential features of these 8 transactions.

The summary table below indicates the main theories of consumer harm which the Commission viewed as credible in each case. The remedy accepted to deal with each theory is also shown in the relevant box, for those mergers that were approved subject to commitments (all but the *EDP/ENI/GDP* transaction). The competitive effects and remedies considered in each of these mergers are reviewed in the rest of this section of the paper.

Table 1

European energy mergers 2004–2009: theories of harm, and remedies

Transaction (Year)	Theory of harm					
	Horizontal		Vertical			
	Wholesale	Retail	Lack of OU	Input Foreclosure	Customer Foreclosure	Loss of Liquidity
EDP/ENI/GDP (2004)						
E.ON/MOL (2005)			Divest gas TSO/storage	Gas release		
DONG/ELSAM/E2 (2006)	Gas release	Gas release	Divest gas storage		Gas release	
GDF/SUEZ (2006)	Divest Distrigaz + SPE stake	Divest SPE stake	Relinquish control over TSO	Divest Distrigaz		
EDF/BRITISH ENERGY (2008)	Divest generation assets					Electricity release
RWE/ESSENT (2009)	Divest stake in competitor	Divest stake in competitor			Divest stake in competitor	
VATTENFALL/NUON (2009)		Divest retail subsidiary				
EDF/SEGEBEL (2009)	Divest generation assets					

Source: European Commission; own analysis.

Note: Shaded box indicates the presence of a competition concern. Remedies (if accepted) are indicated in the relevant text box. OU stands for Ownership Unbundling; TSO stands for Transmission/Transportation System Operator.

² Case COMP/M.3440, European Commission decision of 9 December 2004.

³ Case COMP/M.3696, European Commission decision of 21 December 2005.

⁴ Case COMP/M.3868, European Commission decision of 14 March 2006.

⁵ Case COMP/M.4180, European Commission decision of 14 November 2006.

⁶ Case COMP/M.5224, European Commission decision of 22 December 2008.

⁷ Case COMP/M.5467, European Commission decision of 23 June 2009.

⁸ Case COMP/M.5496, European Commission decision of 22 June 2009.

⁹ Case COMP/M.5549, European Commission decision of 12 November 2009.

1 Horizontal effects

Wholesale energy markets

Six of the European transactions summarized in this article raised horizontal concerns in the relevant wholesale energy markets (gas and/or electricity). These effects were fairly straightforward in the first three mergers where such concerns were identified (*EDP/ENI/GDP*, *DONG/ELSAM/E2* and *GDF/SUEZ*), as listed in Table 1.

- In *EDP/ENI/GDP*, one source of horizontal harm was due to the loss of potential competition by the electricity incumbent EDP in the wholesale gas market (against the incumbent GDP).¹⁰ Similarly, the disappearance of GDP as a potential competitor to EDP in the generation market (through the construction of new gas-fired plants) was considered to be detrimental to competition.
- The risk of loss of competition between gas and electricity firms was also identified in *DONG/ELSAM/E2*. In this case, the Commission considered that the two largest electricity generators in Denmark (ELSAM and E2) were effective actual and/or potential competitors to DONG in the wholesale gas market and that their disappearance as independent rivals would thus reduce competition.
- In *GDF/SUEZ*, the horizontal effects at the wholesale level were even more clear-cut since GDF had successfully entered both the wholesale gas market and – through its stake in SPE – the electricity generation market in Belgium. SUEZ was the incumbent in both markets.

Dynamic competition effects similar to those identified in the earlier Portuguese and Danish cases were also raised in *EDF/Segebel*, due to an alleged reduction in EDF's incentive to build new power plants in Belgium in order not to reduce wholesale prices at the expense of Segebel (i.e., SPE). Effects were identified in this case in spite of the presence of low combined market share for the parties (less than 20%), and the existence of a much larger competitor (i.e., GDF-SUEZ). In this transaction the Commission effectively rejected the notion that creating a larger rival to the main incumbent firm would have actually intensified competition. Given the nature of competition in wholesale electricity markets, the stance taken by the Commission is sound from an economic perspective (I return to this issue when discussing the Spanish energy merger in the next section of this article).

By contrast, in both *EDF/British Energy* and *RWE/Essent*, actual (as opposed to potential) horizontal effects were considered likely, again in spite of the fairly limited overlap between the parties. In *EDF/British Energy*, the Commission was concerned about the scope for unilateral horizontal effects in the British generation market due to the combination of British Energy's largely baseload generation portfolio (mostly nuclear) with EDF's more flexible assets (coal- and gas-fired).¹¹ Simulation modeling was employed to demonstrate the presence of potential incentives by the merged entity to withhold flexible generation units in order to raise prices to the benefit of infra-marginal capacity. These effects were found to be material in spite of the fairly low combined share of the overall generation market in Britain (less than 25%), the low

¹⁰ In its subsequent judgment on this merger in September 2005 (Case T-87/05), the European Court of First Instance did not uphold this element of the Commission's decision, given that the Portuguese gas market had not yet been liberalized at the time of the transaction (under a derogation from the Commission's Gas Directive). The Court did, however, uphold the other main elements of the Commission's decision, and therefore confirmed the prohibition of the merger.

¹¹ An additional merger effect in the generation market (the loss of access to nuclear sites) is not discussed in this paper.

levels of market concentration (with a Herfindahl-Hirschman Index (HHI) of less than 1,000), and the fact that the parties did not have a strong position in the price-setting segment of the market. The prediction from the Commission's modeling of unilateral effects in this case effectively resulted from the assumption of low elasticity of demand (which is realistic in the power market) and absence of forward contract cover on the parties (which might be unduly conservative).

In *RWE/Essent*, the Commission focused on horizontal effects in the German generation market, arising from Essent's stake in a German municipality (SWB) with some generation assets, and RWE's allegedly collectively dominant position (together with E.ON) in the wholesale market, with a share of 30-40% of capacity (excluding co-generation facilities).¹² Whilst the theory of harm in this case was also described as primarily a unilateral effect (i.e., the concern was based on the risk of capacity withholding by the merged entity¹³), the reference to collective dominance in the German market also suggested an implicit concern for coordinated effects (even though these were not analyzed).

Another notable feature common to the latest three electricity mergers analyzed by the Commission (*RWE/Essent*, *Vattenfall/Nuon* and *EDF/Segebel*) is that the relevant wholesale electricity markets did not have an obviously national dimension, given the significant amount of interconnection capacity and cross-border trading between the countries most affected by the transactions (Germany and the Netherlands in the first two mergers, and France and Belgium in the third). In all three cases, a broad geographic definition of the market would have heightened competition concerns, given that the merging parties were primarily active on different sides of the relevant borders. In *RWE/Essent*, the Commission considered the market to be potentially wide (i.e., to include both Germany and Netherlands) only in off-peak hours (when demand is low, and competitive concerns are weaker). The market was seen as national for peak hours, notwithstanding the increasing convergence between the German and Dutch markets.¹⁴ A similar approach was adopted in *EDF/Segebel*, where the Belgian wholesale electricity market was treated as national in spite of the fact that hourly spot prices in France and Belgium were the same during 85% of hours in 2008 (following the 2006 introduction of a market arrangement designed to facilitate cross-border trading between France, Belgium and the Netherlands). Given the evidence on price convergence across the relevant market, the Commission's approach to geographical market definition is surprising (especially in the *EDF/Segebel* case). In these particular cases, the adoption of a narrow geographic market definition actually led to a more permissive merger assessment and therefore a more conservative approach from the Commission's perspective. In future mergers in the energy sector the same might not be true.

As a broad summary, the wholesale horizontal effects identified by the Commission in recent energy mergers reveal a concern about potential adverse effects on consumers, even in situations with low combined shares for the merging parties or where the loss of competition is potential as opposed to actual. The focus to date has been overwhelmingly on potential unilateral effects arising in the national market, with no substantial analysis of potential coordinated effects or of cross-border effects. Empirical modeling of unilateral effects was undertaken by the Commission only in the two cases involving EDF (*EDF/British Energy* and *EDF/Segebel*), to measure the strength of the competition concern. In other cases, the extent of

¹² See paragraph 240 of the *RWE/Essent* decision.

¹³ See paragraph 257 of the *RWE/Essent* decision.

¹⁴ A national definition of the market was also adopted in *Vattenfall/Nuon*.

the unilateral effect was either more straightforward to assess (e.g., *GDF/Suez*), or mainly based on potential rather than actual competition to a clear incumbent firm (e.g., *EDP/ENI/GDP* and *DONG/ELSAM/E2*). In *RWE/Essent*, no modeling was employed in spite of the small increment in generation capacity caused by the transaction.

Retail energy markets

Turning now to retail markets, horizontal effects were identified in the five of the eight reviewed mergers since 2004. In *EDP/ENI/GDP*, *DONG/ELSAM/E2* and *GDF/Suez*, the actual or expected loss of competition was due to the greater convergence between gas and electricity retail offers, for both residential and industrial consumers. The effect was once again more obvious in the case of *GDF/Suez*, since GDF was an existing competitor to Suez in the Belgian retail energy market through its participation in SPE. In the two cases involving the German energy markets (*RWE/Essent* and *Vattenfall/Nuon*), horizontal effects arose in local retail markets, due to the respective activities of Essent and Nuon in specific areas of Germany.

These horizontal retail effects were, in most cases, more straightforward to analyze than the wholesale effects reviewed above, given the quite strong incumbency positions of one of the two merging parties in each relevant market. On the other hand, in order to identify some of these effects, the Commission has departed from a national definition of the relevant retail market (accepting the presence of localized competition), and has also considered the potential strength of gas-electricity ‘conglomerate’ effects (e.g., in the *EDP/ENI/GDP* case), which go beyond the notion of a pure horizontal effect.

2 Vertical effects

Given the vertical structure of energy markets, and the growing links between wholesale gas and electricity markets, mergers in the energy sector can give rise to a variety of non-horizontal effects. These are typically more complex to analyze than horizontal effects, since the combination of complementary assets or activities has ambiguous effects on consumers. As Table 1 summarizes, the vertical theories of harm identified by the Commission in recent energy transactions can be broadly classified into four groups.

Input foreclosure due to lack of Ownership Unbundling

The first category of vertical effects can be attributed to the lack of full Ownership Unbundling (OU) of some network assets (e.g., transmission in electricity; transportation and storage in gas). This implies that if a merger brings together network assets that have not been unbundled with activities in the liberalized parts of the market (e.g., electricity generation; and gas and electricity retail), adverse non-horizontal effects may arise. In the presence of price regulation of the network inputs, these could take the form of quality-degradation of the network input to rivals of the merging parties. Economic theory indicates that the integrated firm may face incentives to engage in such a strategy precisely because it is price-regulated, meaning that the standard argument that there is only “one monopoly profit” to be obtained from the ownership of a bottleneck facility would not hold. Concerns about the lack of full OU of network assets and the potential for adverse vertical effects were part of the Commission’s review of all of the cases where one of the merging parties owned infrastructure assets (i.e., the first four cases listed in Table 1).

Input foreclosure in relation to non-network inputs

The second type of non-horizontal effect may arise from the integration of a competitively-supplied input (e.g., wholesale gas) with assets in related downstream markets (e.g., electricity generation). The concern here is that the vertically integrated merging party may face incentives to increase the price of the input to a rival downstream supplier, in order to benefit its own downstream subsidiary. This input foreclosure concern was raised in three of the first four transactions reviewed by the European Commission (i.e., *EDP/ENI/GDP*, *E.ON/MOL* and *GDF/Suez*), due to the vertical integration between wholesale gas activities and downstream markets (including electricity generation, and gas and electricity retail) brought about by the transactions.

In analyzing these alleged foreclosure effects in these cases, the Commission did not explicitly undertake the three-step analysis of incentives, ability and effects that is now recommended in its Non-Horizontal Merger Guidelines¹⁵ of 2008 (partially because these guidelines were issued after these transactions were assessed). It also did not undertake any empirical assessment of the scope and possible effects of input foreclosure. It is likely that the analysis of the effects of potential foreclosure strategies would have had to be more elaborate had the Commission explicitly followed a framework similar to the one contained in the current Guidelines.

In particular, adopting an explicit economic approach would in principle have recognized the fact that the presence of input foreclosure incentives in energy markets is not self-evident, since the merged entity may not have incentives to give up wholesale profits in the gas market in order to benefit its downstream business. The potential impact on consumers is also ambiguous, due to the potential countervailing pricing efficiencies brought about by vertical integration. An input foreclosure concern is also harder to maintain in situations where the merged entity has a limited share of the downstream market and would therefore face weaker incentives to foreclose (as was the case in the *E.ON/MOL* transaction).

On the other hand, anti-competitive input foreclosure in gas-electricity mergers is more likely if the parties are already vertically-integrated pre-merger, if the acquired downstream assets do not depend on gas as an input but benefit from the fact that higher gas prices would lead to an increase in the electricity price, or if input contracts can prevent pricing inefficiencies also in the absence of vertical integration (e.g., through two-part tariff structures).

There is also a potentially complex relationship between the foreclosure of non-network inputs and potential horizontal unilateral effects in generation markets. Raising the input cost of rival price-setting generation units (thereby foregoing profits in the wholesale gas market) in order to benefit other generation plants owned by the merged entity is analytically similar to withholding price-setting plants that belong to the merging parties in order to benefit their infra-marginal capacity. This is because input foreclosure also involves giving up profits made on marginal price-generation units with infra-marginal gains on other plants. The two strategies are therefore substitutes to some extent, and the related horizontal and vertical effects should not be seen as cumulative. However, this type of interaction has not been explicitly recognized in the European assessment of energy mergers to-date.

¹⁵ European Commission, *Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings*, Official Journal C 265, 18 October 2008.

Customer foreclosure

Customer foreclosure theories relate to the concern that a vertical merger may deprive upstream entrants from a source of contestable downstream demand, thus raising entry barriers and potentially discouraging new competitors. This theory of harm was raised in the Portuguese case, due to the alleged loss of contestable gas demand by EDP, since, post-merger, such demand would have been sourced from GDP. A similar effect was identified in the Danish case, as a result of the internalization of the gas demand of ELSAM and E2. In *RWE/Essent*, a customer foreclosure concern was identified in relation to low-calorific gas in RWE's gas network area, due to Essent's stake in a municipality which supplied gas in the area. A similar theory of harm was raised in relation to retail electricity markets, but no firm conclusion was reached.

As with the case of input foreclosure, this vertical theory of harm needs to be assessed in connection to any alleged horizontal effects, and care must be taken not to inappropriately cumulate horizontal and non-horizontal effects. For example, if an incumbent electricity firm is identified as a potential entrant in the wholesale gas market (thus creating a direct loss of competition in wholesale gas), that same firm cannot be seen a source of contestable gas demand for an alternative wholesale gas entrant. This is because the electricity incumbent would face incentives to self-supply its gas requirements if it were to enter the wholesale gas market, rather than procuring them from a third party. This potential issue was particularly relevant to *EDP/ENI/GDP* and *DONG/ELSAM/E2* mergers, since in these two cases the risk of a direct loss of wholesale competition in the gas market was identified at the same time as a concern for downstream customer foreclosure.

Loss of market liquidity

Finally, a fairly novel vertical theory of harm was raised in one of the latest energy mergers considered by the Commission, *EDF/British Energy*. This theory predicated that a merger which leads to the internalization of wholesale electricity trading between the merging parties may significantly reduce market liquidity and thereby harm consumers. In the specific instance of EDF and British Energy, the former was 'short' of wholesale electricity pre-transaction and the latter was 'long', thus raising the potential for internalization of fairly significant volumes of electricity post-transaction.

Even if such internalization were to occur post-merger, it is not clear how that would lead to consumer harm. In particular, internalization does not in itself raise wholesale electricity prices or foreclose contestable demand since, under this theory, an equal amount of power is removed from the sales and purchases in the market. The theory of consumer harm is therefore more indirect, and relates to the greater price volatility that a reduction in liquidity may lead to, and possible barriers to entry (either upstream and/or downstream) that would arise as a result. However, this mechanism was only sketched in the *EDF/British Energy* decision, with no definitive conclusion reached (partially because the transaction was approved in Phase I, after the parties offered a satisfactory set of commitments which also addressed the potential liquidity concern).¹⁶

¹⁶ For a discussion and critique of the liquidity effects considered in the *EDF/British Energy* decision, see G. Federico and D. Jackson, "Draining liquidity: a novel vertical effect in electricity mergers?", *European Competition Law Review*, 5, May 2010.

Subsequent to the acquisition of British Energy, EDF sold a 20% stake in the nuclear generation assets to Centrica, a United Kingdom energy firm with electricity generation and retail activities. This second transaction was assessed by the Office of Fair Trading, and cleared unconditionally (primarily because it resulted in lower concentration in the generation market, and was not associated with the possibility of significant adverse effects on wholesale market liquidity).¹⁷

3 Remedy design

Except for the first merger reviewed in this paper (*EDP/ENI/GDP*), all subsequent energy transactions were approved by the Commission with remedies. The key remedies applied in each case are also summarized in Table 1. In line with standard Commission practice in merger control, the Commission has relied almost exclusively on structural divestments in order to address competition concerns.

The most extensive and demanding structural remedy was implemented in the case of *GDF/Suez*, where the parties divested the larger element of the overlap brought by transaction (i.e., the incumbent's wholesale gas subsidiary, *Distrigaz*) in order to address both horizontal concerns in wholesale gas market, and related input foreclosure effects in electricity.

Whilst the scale of horizontal effects in *EDF/British Energy* and *EDF/Segebel* was clearly much more limited than in *GDF/Suez*, the divestments required in these two cases can also be considered as strict (in relation to the competition issues raised by the transactions).

In *EDF/British Energy*, EDF divested 2.8GW of price-setting generation capacity (out of 5GW total pre-merger capacity for EDF, and roughly 11GW for British Energy), in spite of the relatively low combined post-merger shares (as reviewed above). These divestments were assessed by the Commission using the same merger simulation technique used to identify horizontal effects. The simulations suggested that the remedy substantially reduced the price effects from the merger. Economic theory indicates that divesting price-setting assets can indeed be substantially more effective than the sale of baseload electricity plants, and can undo the price effects of a transaction that involves significant baseload volumes. This is because the sale of marginal assets makes the demand faced by the merged entity more elastic, and does not necessarily increase its cost of production. Both of these effects tend to magnify the price reduction associated with a divestment (relative to other types of asset sales).¹⁸

In *EDF/Segebel*, EDF committed to divest one of its new generation projects in Belgium and continue or divest another one, again in spite of the presence of a limited horizontal overlap.

Structural remedies were also employed to address horizontal effects at the retail level. This was the case in *GDF/Suez* and *RWE/Essent*, where one of the merging parties' stakes in a competitor to the other party (*SPE* in Belgium, and *SWB* in Germany) was divested to remove the overlap in the relevant retail markets (and also in electricity generation). In *Vattenfall/Nuon*, on the other hand, the commitment included carving out one of the parties' retail businesses (i.e., *Nuon's* German subsidiary). This is a more complex intervention than simply divesting stand-

¹⁷ ME/4133/09-*Anticipated acquisition by Centrica of 20 per cent of Lake Acquisitions*, OFT Decision of 7 August 2009.

¹⁸ For a formal exposition of this point see G. Federico and A. Lopez, 'Divesting Power', IESE Business School Working Paper, 812, August 2009.

alone generation plants or a controlling stake in an existing competitor, illustrating the fact that – where necessary – complex horizontal remedies may need to be considered.

DONG/ELSAM/E2 is arguably the only case where a semi-structural remedy (i.e., a commitment to sell gas to the market for a fixed time period, in the form of a gas release program) was utilized to address horizontal concerns, namely the loss of competition in several retail gas markets (in addition to customer foreclosure concerns). A remedy of this type is likely to be less effective than the outright divestment of assets and/or of a competitor, since simply releasing wholesale gas to the market may not substitute for the presence of an actual or potential competitor. It is also the case however that sufficiently large gas auctions can put downwards pressure on wholesale prices and, at least to some extent, offset a loss of horizontal competition.

In terms of vertical effects, structural divestments via OU have been part of the remedy packages where relevant (i.e., in circumstances where the merging parties owned some network assets, and input foreclosure effects due to limited OU were identified). The reliance on this type of remedy is in line with the Commission's overall preference for OU, as put forward in the Third Energy Directives of July 2009 (and partially achieved through the various Article 102 proceedings that have characterized the European energy sector since 2007). OU was a key part of the remedy package in *E.ON/MOL*, *DONG/ELSAM/E2* and *GDF/Suez*, in all three cases in relation to gas (as opposed to electricity) infrastructure assets. A similar measure was also part of the remedy package offered by the parties in *EDP/ENI/GDP*.

The other key ingredient of the remedy packages used to address vertical effects has been the introduction of energy release programs (whereby parties commit to sell gas and/or electricity to the market on a periodic basis). Gas release programs were used in both *E.ON/MOL* and *DONG/ELSAM/E2* to complement the effects of OU, in order to further address issues of input foreclosure and customer foreclosure, respectively. A de facto electricity release was also used to offset alleged vertical liquidity effects in *EDF/British Energy*, even though the terms of this release are less restrictive than those in the gas release programs implemented in previous cases (since no formal auction procedure was specified for the sale of the electricity). In the final merger where vertical effects were identified and addressed (*RWE/Essent*), the horizontal divestiture in the downstream gas market was considered sufficient to offset the customer foreclosure concern.

4 Overall conclusion on European energy mergers

In summary, the review of the recent energy mergers considered by the Commission presented here illustrates the fact that transactions in the gas and electricity sectors can give rise to multiple and complex competition effects. The Commission has tended to adopt a strict approach to the evaluation of these effects, and consideration of the relevant remedies, in light of the incipient nature of deregulation in some of the national markets affected by the mergers, and specific features of energy markets which may exacerbate market power and merger effects. The Commission has also identified a variety of non-horizontal theories of harm in energy markets, despite the fact that these are inherently harder to evaluate and substantiate than horizontal effects. Remedies have also been required to address these non-horizontal effects.

Energy transactions in Spain: Gas Natural/Endesa and Gas Natural/Union Fenosa.

Two major energy transactions were reviewed by the Spanish competition authorities during roughly the same period as the energy mergers summarized in the previous section of this article: *Gas Natural/Endesa* (reviewed in late 2005, with a final decision in early 2006), and *Gas Natural/Union Fenosa* (reviewed in late 2008, with a final decision taken in early 2009). The first merger did not go ahead despite getting clearance from the Spanish Council of Ministers (which at the time was the administrative body with final say on merger control decisions), since Gas Natural was eventually outbid for the control of Endesa first by E.On and ultimately by ENEL. The second merger was also cleared by the competition authorities (the *Comisión Nacional de Competencia* (CNC) in this case) and has now been implemented.

1 Gas Natural/Endesa¹⁹

Gas Natural/Endesa would have brought together the largest gas and electricity firms in Spain. The evaluation by the Spanish *Tribunal de Defensa de la Competencia* (TDC) raised several significant competition concerns, horizontal and vertical, similar to those raised in several of the European transactions reviewed above.

The horizontal theories centered on the fact that Gas Natural had been a particularly effective entrant in the electricity market (both at the generation and retail level), and that Endesa too had been expanding in the gas market (at wholesale and retail level). Neither party was particularly large in the markets which they had recently entered (with market shares typically below 10%) but, given the strong incumbency position of the other merging party, the horizontal overlaps were considered to be problematic.

The TDC also identified an input foreclosure concern, due to the fact that Gas Natural supplied several competing gas-fired generation plants with gas and may have faced incentives to worsen their commercial terms (where possible) in order to benefit Endesa's generation assets. The presence of effective OU in Spain (in both gas and electricity) however meant that vertical foreclosure concerns due to the ownership of network assets were only marginal in this case.

The remedies that were initially proposed by Gas Natural, and those that were finally imposed by the Spanish Council of Ministers in order to clear the transaction²⁰, are summarized in Table 2 below, together with the associated theories of harm.

¹⁹ This sub-section is partially based on the review of the *Gas Natural/Endesa* merger contained in G. Federico, and X. Vives (with N. Fabra), *Competition and Regulation in the Spanish Gas and Electricity Markets*, Reports of the Public-Private Sector Research Center 1, IESE Business School, 2008.

²⁰ The conditions imposed by the Spanish government were similar in several aspects to those recommended by the minority opinion of the TDC and the energy regulator (which performs an advisory role on mergers in the energy market). The majority opinion of the TDC had recommended prohibiting the merger given the extensive nature of the remedies required to mitigate the competition effects of the transaction.

Table 2Competition effects and remedies in the proposed *Gas Natural/Endesa* merger

Competition Issue	Remedies initially proposed by Gas Natural	Remedies imposed by Spanish government
Horizontal effects in wholesale gas	Divestment of Endesa's participation in Liquefied Natural Gas plants.	Same as Gas Natural proposal, plus gas release (see below).
Horizontal effects in wholesale electricity	Divestment of 3.1GW of existing plants (largely coal) to Iberdrola. Divestment of 1.2GW of CCGT projects (0.8GW to Iberdrola).	Divestments of 4.3GW of existing plants, including at least 1.2GW of price-setting generation (gas-fired or hydroelectric). Acquisition by Iberdrola to be subject to separate competition assessment.
Horizontal effects in retail gas and electricity	Divestment of Endesa's portfolio of liberalized gas customers, and Gas Natural's portfolio of liberalized electricity customers.	Same as Gas Natural proposal.
Horizontal effects in gas distribution	Divestment of gas distribution network in Valencia, Murcia and Madrid (1.2m points) to Iberdrola.	Divestment of gas distribution networks with at least 1.5m points, creating at least two new operators.
Vertical foreclosure effects	None.	Gas release auctions (including the sale of Endesa's gas import contracts).

Gas Natural had proposed relatively extensive remedies in order to gain regulatory approval, with one of their key features being that several of the assets to be divested would have been purchased by Iberdrola (Endesa's largest competitor in the electricity market). This feature of the remedy offer would have been likely to reduce the pro-competitive impact of the proposed remedy package, since it would have led to higher concentration and weaker competition relative to an alternative scenario where the assets would have been purchased instead by a new entrant or a smaller buyer.

The most notable features of the remedies ultimately imposed by the Spanish government are summarized in Table 2 above. These included:

- (a) the rejection of Iberdrola as the up-front buyer of the divested assets. Iberdrola would have had to purchase these assets through a separate competition procedure, which would probably have resulted in additional remedies (or a prohibition of Iberdrola as a suitable buyer) in order to preserve the effectiveness of the original remedy package;
- (b) the increase in the size of the divestment package in the generation market (from 3.1GW to 4.3GW of existing plants), and the additional condition that 1.2GW of these divestments would have to be flexible (or price-setting) generation, in order to offset the loss of competition from Gas Natural's generation portfolio at the margin.²¹ This divestment was well above the size of Gas Natural's generation portfolio at the time of the bid (roughly 1.6GW as of end-2004), due to the realistic prospect for growth by Gas

²¹ The condition that some of the divested assets had to be price-setting is similar to (and pre-dates) the approach that the European Commission took in its assessment of *EDF/British Energy*.

Natural in the generation market absent the deal (indeed, by end-2008, Gas Natural had 4GW of generation capacity in Spain);

- (c) the inclusion of a significant gas release program (up to roughly 10% of the domestic market at the time) in order to mitigate potential foreclosure effects flowing from the gas to the electricity market;
- (d) the divestment of the respective gas and electricity retail businesses of Endesa and Gas Natural, which would have required carving these divisions out of the merged entity and re-creating viable retail competitors (in a way similar to the remedy required by the Commission in *Vattenfall/Nuon*, but on a much larger scale); and
- (e) the absence of a structural measure which would have prevented the creation of double incumbency situations in the gas and electricity retail markets, in those regions where Gas Natural owned the gas network and Endesa the electricity network (this affected most notably Andalucía and Catalunya). The only measure that was put forward to address the barriers to entry created by the double incumbency situation was the establishment of an independent entity to facilitate customer switching in areas where the merged entity would have owned both the gas and the electricity networks.

The fairly strict approach to the horizontal overlaps which would have been brought about by the transaction is in line with the approach adopted by the Commission in other European energy mergers. This was particularly the case in the wholesale electricity market, given the role of Gas Natural as a growing competitive force. Selling assets to Iberdrola was also not considered as an adequate up-front remedy, implicitly rejecting the notion that creating a stronger competitor to the merged entity would have enhanced competition. As mentioned above, there are good economic reasons to support the position taken by the Spanish competition authority on this issue (as is discussed in some detail below, in relation to *Gas Natural/Union Fenosa*).

In the wholesale gas market, the Spanish authorities relied on a significant gas release program, like the Commission did in the *EON/MOL* and *DONG/ELSAM/E2* cases, thus attempting to recreate a virtual competitor to the merged entity. The Spanish authorities also took gas input foreclosure concerns seriously, providing further justification for the proposed gas release remedy.

Gas Natural/Endesa departed from a strict policy towards horizontal concentration in energy markets primarily in relation to the overlap of the electricity and gas distribution networks of the merging parties. The absence of a specific structural remedy to address this issue created the potential for situations of 'double incumbency' in several regions in Spain, accounting for 35-40% of national gas and electricity demand. This network overlap may have lessened competitive pressures in these regions had the merger gone ahead.

2 Gas Natural/Union Fenosa

Gas Natural bid for the control of Union Fenosa in 2008, having failed in its earlier attempt to purchase Endesa. The merger was approved by the CNC in February 2009, under the new Spanish competition law (15/2007) which gives the CNC a final say on merger control decisions.²²

The transaction brought together Gas Natural (the gas incumbent and fourth largest electricity generator at the time) with Union Fenosa, which at the time of the operation was (by some measures) the second largest supplier of gas to liberalized customers in Spain, and the third largest electricity generator and supplier. Union Fenosa was vertically integrated into the upstream gas supply chain, through its 50% stake in Union Fenosa Gas (UFG), which in turn owned gas infrastructure and Liquefied Natural Gas (LNG) production assets.

The main competition effects identified by the CNC, and related remedies, are summarized in Table 3 below.

Table 3

Competition effects and remedies in the Gas Natural/Union Fenosa merger

Competition Issue	CNC Assessment	Remedy
Horizontal effects in wholesale gas	Loss of UFG as effective vertically-integrated competitor (in particular for the provision of gas flexibility).	No specific remedy. Contestable gas demand created by downstream remedies to facilitate upstream entry.
Horizontal effects in wholesale electricity	Risk of coordinated effects in generation market (due to creation of more symmetric competitor to Endesa and Iberdrola). Unilateral effects not seen as problematic.	Divestment of 2GW of CCGT assets.
Horizontal effects in retail gas and electricity	Loss of UFG and Union Fenosa as effective vertically-integrated competitor for industrial and residential gas clients; creation of double incumbency positions in areas of network overlap risks reducing competition for residential gas and electricity.	Functional separation of retail arm of UFG from the rest of the group for a two-year period. Elimination of non-compete clause between ENI and UFG. Divestment of 600,000 gas distribution points, with associated residential clients (9% of national total), preferably in network overlap regions.
Vertical foreclosure effects	None, due to possibility of self-supply by rival CCGTs and contractual constraints on input foreclosure strategy.	None

Source: decisions of the CNC and of the *Audiencia Nacional*.

²² The CNC's decision was subsequently confirmed by a higher court (the *Audiencia Nacional*) – see judgment of September 20, 2010.

*Competitive assessment of Gas Natural/Union Fenosa*²³

The CNC in its review was mainly concerned about horizontal effects, both in the gas and electricity markets. In the wholesale and industrial gas markets, the clear concern was due to the disappearance of UFG as a credible independent competitor to Gas Natural, which had grown rapidly in recent years, partially due to its effective vertical integration policy. For example, during the 2007-2008 period, UFG accounted for roughly 12-13% of wholesale gas procured into Spain (with Gas Natural's share standing at 50-60%). UFG had focused its gas retail activities on the supply to Union Fenosa's gas-fired plants and on supply to industrial customers.²⁴

The CNC also identified potential competition effects in relation to residential gas clients, due to the higher barriers to entry and perceived switching costs in this market and in spite of Union Fenosa's relatively limited position in this market segment (accounting for less than 3% of the national market in 2008, but with substantially higher shares in those regions where it was the incumbent electricity supplier). The creation of a double incumbency position in the regions where the parties' gas and electricity distribution networks overlapped was a specific area of concern raised by the CNC.

Whilst these horizontal effects are fairly standard, there were two notable departures from previous energy cases in the competitive assessment of *Gas Natural/Union Fenosa* put forward by the CNC.

The first relates to effects in the generation market. The CNC in this case considered that the unilateral effects due to the direct loss of competition between Union Fenosa and Gas Natural would not be material. This was so in spite of the fairly significant share of price-setting generation accounted for by the parties (relative to the other horizontal mergers in the European energy sector reviewed above). The merged entity accounted for roughly 25% of price-setting capacity in 2008 (according to the calculations performed by the CNC in its decision), and closer to 30% in output terms using data for 2007.²⁵

One of the main reasons given by the CNC for the low risk of unilateral effects was the presence of two other large competitors in price-setting generation (Endesa and Iberdrola). However, economic theory suggests that the presence of two other large competitors may actually *worsen* the unilateral effects of the transaction, by inducing strategic competitors to Gas Natural/Union Fenosa to be less aggressive in their market offers of electricity (i.e., effectively increasing their price-cost mark-ups) when faced by less aggressive behavior by the merging parties. This unilateral effect would lead to higher spot prices and is therefore harmful to consumers (even though it may reduce total costs and thus increase efficiency, by making the structure of the industry more symmetric).

The effect described above holds if one posits that firms compete in the electricity market by submitting supply functions (i.e., price-quantity schedules across their portfolio of generation

²³ Unless otherwise specified, the market share data reported in this section is based on G. Federico, *The Spanish gas and electricity sector: regulation, markets and environmental policies*, Reports of the Public-Private Sector Research Center 5, IESE Business School, 2010.

²⁴ The CNC estimated that Gas Natural's share of customers would increase from 50-60% pre-transaction to 60-70% post-transaction, based on 2007 data.

²⁵ Price-setting generation was defined in this case as thermal generation and reservoir hydroelectric generation.

plants). This is an assumption that is often made in economic studies on electricity markets.²⁶ The predicted price effect is unilateral, since the strategic interaction present between the conduct of the merging parties and that of other competing firms when firms compete in supply functions does not mean that firms are tacitly coordinating in the market. Each firm's supply function in equilibrium represents the best response to the behavior of its rivals, with no scope for profitable output expansion in the short term (contrary to the equilibria which would result if players were to coordinate their conduct).

As noted above, in its review of energy mergers, the European Commission did not consider that the presence of large competitors to the merging parties in generation markets would reduce the risk of unilateral effects. For example, in *EDF/British Energy*, significant unilateral effects were identified despite the fact that several portfolio generators would continue to compete with the parties. Similarly, in *EDF/Segebel*, the presence of a much larger generator in the Belgian market (Electrabel) was not taken to imply that merger effects would be mitigated.

An additional reason why a transaction like *Gas Natural/Union Fenosa* may lead to unilateral effects is that a merger between two firms with a particularly strong presence in price-setting generation can be expected to result in larger unilateral effects than a merger between parties with both price-setting and infra-marginal generation. This effect is illustrated in the numerical example presented in Box 1. This example shows that a hypothetical merger between firms with a relatively high share of price-setting generation increases prices significantly more than a transaction where the merging parties have both baseload and price setting assets (and the same overall share of the market).

Even though the CNC did not identify the risk of unilateral effects, it was concerned about possible coordinated effects between the three main firms in the generation market (Endesa, Iberdrola and the merged entity), due to the greater symmetry resulting from the transaction. A concern for coordinated effects also contrasts with recent European practice in merger control in the energy sector. This concern is potentially valid in wholesale electricity markets due to the frequently repeated nature of interaction between generators. It is not clear however that the electricity wholesale spot markets are sufficiently transparent to permit effective coordination (due to the presence of significant bilateral contracting ahead of spot market competition), nor that the cost structure of the Spanish market in particular would have been sufficiently symmetric post-merger (in particular, Iberdrola has a much greater share of hydroelectric generation, and Endesa a significantly higher share of coal-fired generation, than the merged entity).

However, the approach taken by the CNC in the evaluation of horizontal effects in the generation market had limited practical implications in the case of *Gas Natural/Union Fenosa*, since the remedies demanded to solve coordinated effects in generation (i.e., the sale of 2GW of capacity) were probably sufficiently large to also offset possible unilateral effects (as explored below).

The second main departure of the competitive assessment of *Gas Natural/Union Fenosa* from recent European practice has been the lack of concern for input foreclosure effects, notwithstanding the significant increase in Gas Natural's generation capacity following the merger, combined with its incumbency position in the Spanish wholesale gas market and the

²⁶ See, in particular, U. Akgun, "Mergers with supply functions", *Journal of Industrial Economics*, 52, 2004, pp. 535-546. This paper shows that competition in linear supply functions is of the "strategic complements" type, i.e., if a firm chooses to bid less aggressively by reducing the slope of its supply function, then its rivals' optimal responses also involve a reduction in the slope of their supply functions. This increases the expected unilateral price effects of mergers.

lack of clear merger-specific pricing efficiencies (since Union Fenosa, pre-merger, was already vertically integrated in the gas and electricity markets). According to the standard theory of input foreclosure, the greater degree of vertical integration between gas and electricity activities might distort Gas Natural's incentives to supply rival CCGTs on competitive terms.

Whilst the horizontal remedy in the electricity generation market accepted by the CNC partially addresses the merged entity's incremental incentives to raise its rivals' costs, the possibility cannot be ruled out that some residual input foreclosure effects are present, due to the net addition of more than 7GW to Gas Natural's generation portfolio (including Union Fenosa's coal and hydroelectric assets). These potential foreclosure effects are mitigated in Spain by the availability of significant LNG import capacity, and the impending entry of new pipeline gas through Medgaz (scheduled for 2011). Nonetheless, the absence of a specific remedy to address the risk of vertical effects represents a departure from the approach taken by the European Commission in other energy merger cases, and in part by the Spanish authorities in the earlier *Gas Natural/Endesa* case.

Remedies in Gas Natural/Union Fenosa

The remedies adopted in the *Gas Natural/Union Fenosa* decision are also summarized in Table 3. The key remedies are two structural divestments²⁷ (the sale of 2GW of CCGT capacity, and of at least 600,000 gas distribution points and associated residential customer portfolios) and a behavioral one with respect to UFG's retail arm. The behavioral remedy consists of the functional separation of UFG's retail activities from the rest of the merged group for a two-year period, allowing it to pursue an autonomous commercial policy and continue competing against Gas Natural.²⁸

In terms of the generation remedy, the divestment of 2GW represents more than 50% of the overlap created by the merger in the electricity generation market (given that the smaller of the two players in the merger, Gas Natural, had 3.6GW of capacity at the time of the transaction). It can therefore be considered a strict remedy, especially in light of the limited combined market share of the parties (just below 20%) in terms of total generation output. On the other hand, this remedy can be justified as proportional to the possible merger effects, given the strong position of the parties in price-setting output, and the prospects for further growth of Gas Natural's gas-fired generation capacity absent the merger (possibly by up to a further 3GW by 2010, according to the projections available at the time of the merger). Whilst the remedy accepted by the CNC can therefore be justified in terms of possible unilateral effects, the same is not necessarily the case with respect to coordinated effects, partially because the theory of harm is less robust in this case (for the reasons given above), and also because it is harder to quantify the size of the remedy required to offset possible coordinated effects.

The second structural remedy accepted in the *Gas Natural/Union Fenosa* decision (i.e., the sale of 600,000 gas distribution points) is also extensive, as it affects close to 10% of residential gas customers in Spain, and more than three times the number of residential gas customers served by Union Fenosa before the transaction. The remedy therefore more than offsets the horizontal overlap

²⁷ These divestments were subsequently amended by the CNC in February 2011. The generation divestments were scaled down from 2GW to 1.2GW, and the sale of gas distribution points was increased by 300,000 points. These amendments are not assessed in this article.

²⁸ See paragraphs 774, 781 and 846 of the CNC Decision; and p. 14 of the judgment of the *Audiencia Nacional*.

created by the merger in residential gas, if the market is defined nationally.²⁹ However, this remedy does not actually address merger effects in the gas markets where UFG was stronger, as only 5% of the total gas supplied by UFG was sold in the residential market before the transaction.

Indeed, probably the most notable element of the remedy package accepted by the CNC to clear *Gas Natural/Union Fenosa* is the absence of a structural remedy explicitly directed at the loss of competition in the gas markets where UFG was most active, namely wholesale gas procurement (including the provision of gas flexibility), and the retail market for industrial gas. To address effects in the relevant gas downstream markets, the CNC accepted instead a behavioral remedy on UFG's retail arm, which notionally allows it to compete against its new shareholder (Gas Natural) and pursue an independent commercial policy, for a two-year period. No specific remedy was directed at the wholesale gas market, on the basis that the contestable demand created by the structural remedies (i.e., the sale of CCGT capacity and gas networks) would also facilitate entry upstream.

This remedy design differs from the policy adopted by the European Commission in relation to horizontal effects in other energy mergers, where horizontal overlaps of a type and size similar to the one created by *Gas Natural/Union Fenosa* have been addressed through structural remedies. In some cases, where possible, these have taken the form of the divestment of a stake in a competitor (e.g., in *GDF/Suez* and *RWE/Essent*). This was also an option available in the case of *Gas Natural/Union Fenosa*, since Union Fenosa held a 50% stake in UFG, which could have been divested as part of the commitments.

Moreover, even if the behavioral remedy accepted by the CNC were fully effective in allowing UFG to compete independently in the gas market (notwithstanding its limited duration), the loss of competition from Gas Natural against UFG could in itself lead to anti-competitive effects. This can be seen by considering the concentration indicators associated with the transaction under the hypothesis that Gas Natural has a "silent" 50% stake in UFG's retail arm (i.e., it does not exercise any control on it, but internalizes the fact that it benefits from 50% of its profits). A less conservative approach would be to consider the case of "one-way control". This assumes that UFG aims to maximize its profits and those of the acquiring party (i.e., Gas Natural), whilst the latter maximizes its profits and those associated with its stake in the acquired party.³⁰ Under either control structure, the concentration effects of the merger remain in excess of the standard European Commission thresholds for competition concerns (150 points in this case), in both the overall retail market and in the industrial gas markets.³¹ Concentration measures are,

²⁹ This intervention did not, however, fully resolve the issue of network overlap in regions where Gas Natural owned the gas network and Union Fenosa the electricity one, as it did not contain an obligation to divest the gas network in those regions. Indeed, while one of the gas networks sold by Gas Natural during 2009 affects a network overlap area (Madrid), the others (Murcia and Cantabria) are not areas where Union Fenosa owned the electricity network and where it was therefore strong in retail gas.

³⁰ The increases in the HHI under alternative control assumptions can be computed using the formulae contained in S. Salop and O'Brien, "Competitive effects of partial ownership: financial interest and corporate control", *Antitrust Law Journal*, 67 (2000), pp. 559-614. The standard increase in the HHI is given by the product of the parties' market shares, times 2. In the case of an existing firm's 50% interest in a competitor, the increase in the HHI if the 50% stake is silent is given by the product of the parties' market share, times 1/2. For the case of one-way control, the increase in the adjusted HHI is given by the product of the market shares, times 1.5.

³¹ Using available data for 2008 and 2009, the increase in the adjusted HHI in the overall retail gas market ranges between roughly 210 and 620 points (depending on the control assumptions on UFG). The equivalent levels for the industrial gas market are between approximately 180 and 540 points.

of course, simply indicators of possible competition concerns. Nonetheless they suggest that, by relying on a behavioral remedy, the CNC adopted a relatively lenient approach to the evaluation of horizontal effects in the Spanish gas market (at least relative to European merger control practice in this area).

Conclusion

This paper has reviewed the recent practice of merger control in the European and Spanish energy markets. Transactions in the energy sector provide an interesting example of the application of merger control, since they can give rise to a variety of complex horizontal and non-horizontal issues, and the need for carefully designed remedy packages.

The analysis of the European Commission's decisions since late 2004 shows that, overall, the Commission has taken a strict approach to horizontal concentration in the energy industry, especially in markets where strong legacy positions are still present. In electricity generation markets in particular, fairly demanding remedies have also been required in circumstances where the merging parties have had limited combined market share. Moreover, a number of non-horizontal theories of harm have been considered as a source of concern by the Commission, which had to be addressed through specific remedies (including the unbundling of network assets where relevant).

The energy sector has also been an active area for the application of merger control in Spain. Two major transactions have been reviewed by the Spanish competition authorities since 2006. In the first case (the proposed but then abandoned *Gas Natural/Endesa* deal), the authorities demanded an ambitious set of remedies that was broadly in line with the approach taken by the European Commission in previous mergers. The more recent competition review of *Gas Natural/Union Fenosa* (approved in 2009) instead departed from standard European practice in some aspects of the competitive assessment and remedy design.

Box 1

Unilateral Effects in Electricity Generation

Competition in electricity generation markets can be modeled in several ways. One of the more frequently-employed modeling approaches assumes that firms compete in supply functions. This means that portfolio generators offer price-output schedules to the market, which determine how much output they are willing to supply at each level of the spot price. Supply functions can also be used to model possible unilateral effects of a merger, and to get a sense of how these effects may change depending on the portfolio composition of the merging parties.

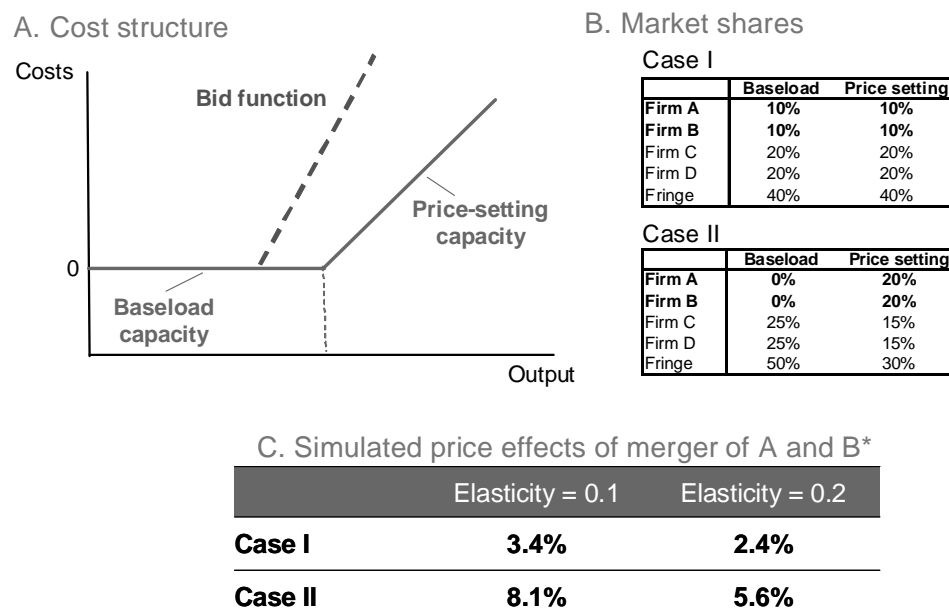
Consider the following stylized example (illustrated in Figure 1 below), with two firms (A and B) with 10% market share each, two other firms (C and D) with 20% market share each, and the remaining 40% supplied by a competitive fringe (which is assumed to offer its output at variable cost). Assume also that the cost function of each firm consists of a baseload part (with constant costs, set to 0 for simplicity, and a fixed level of installed capacity), and a price-setting part (with increasing costs at higher level of output). Total output is assumed to be equally split between baseload plants and price-setting plants, both pre- and post-merger.

If firms A and B were to merge, one would expect unilateral effects to result, since the parties would find it profitable to offer steeper supply functions (i.e., withhold some of the price-setting capacity from the market), in order to increase prices. Firms C and D would respond to this strategy by also offering steeper supply functions, which would further increase the price (even in the absence of any coordination between firms). If parties are assumed to compete in piece-wise linear supply functions (i.e., with a flat part offered at 0, and an upward-sloping segment), it is then possible to numerically simulate the price effects of the merger, at different levels of price elasticity of demand and for different composition of the generation assets of the merging parties.

For example, if the output of the merging parties A and B is equally split between baseload and price-setting output (so that they have a combined share of 20% of each type of generation), then the price effect of the merger lies between roughly 2% and 3% (at price elasticities of demand of 0.2 and 0.1 respectively), as shown for *Case I* below. However, if the parties' output is entirely price-setting (so that they have 40% of price-setting generation, and no baseload generation), then merger effects are considerably larger. In this case, the estimated price effects of the transaction lie between approximately 6% and 8% (i.e., they are more than twice as large) – see *Case II*. The larger merger effects arise because the parties in this case control more strategic capacity, with a lower opportunity cost of withholding.

Figure 1

Numerical illustration of mergers with piece-wise linear supply functions



* % increase, simulated using a Linear Supply Function model. Assumes baseload cost = 0

Annex Table

European Energy Merger Review 2004–2009

Case / Year	Description and alleged merger effects	Remedies
EDP/ENI/GDP (2004/ 2005)	Acquisition of Portuguese gas incumbent GDP by EDP and ENI. Loss of potential competition in gas and electricity markets, and vertical effects due to gas-electricity integration.	Prohibited by the Commission (and later confirmed by CFI). Remedy offer included vertical unbundling in gas, a gas release programme and a lease of generation capacity.
E.ON/MOL (2005)	Acquisition by E.On of Hungarian gas incumbent. Main effects relate to potential for vertical foreclosure.	Remedies include ownership unbundling of gas transportation and storage, and a gas release programme (up to 14% of demand).
DONG/ELSAM/E2 (2006)	Merger in the Danish energy market. Main effects are non horizontal, even though some horizontal effects also identified.	Remedies include ownership unbundling of gas storage, and gas release (10% of demand).
GDF/Suez (2006)	Acquisition by GDF of the energy incumbent in Belgium. Raised significant horizontal and non-horizontal effects.	Commitments include sale of the largest wholesale gas firm in Belgium (Distrigaz), the sale of 50% stake in main generation and retail competitor (SPE), and reduction of control in gas infrastructure.
EDF/British Energy (2008)	Acquisition by EDF of nuclear assets and industrial customer portfolio in UK. Main effects are horizontal effects in generation, vertical effects due to loss of merchant output and lack of access to nuclear sites.	Divestment of two price-setting plants (accounting for more than 50% of EDF's capacity pre-merger), electricity release for four years (2012-2015), and the sale of a nuclear site.
RWE/Essent (2009)	Merger between German incumbent with one of main electricity firms in Holland, with retail and generation activities also in Germany. Main issue is horizontal overlap in the German gas and electricity market.	Divestment of Essent's stake in German competitor.
Vattenfall/Nuon (2009)	Merger between German incumbent with one of main electricity firms in Holland, with retail gas activities also in Germany. Main issue is horizontal overlap in Germany.	Divestment of Nuon's German subsidiary.
EDF/Segebel (2009)	Purchase by EDF of 51% stake in second largest energy firm in Belgium. Main issue is loss of EDF as potential new entrant.	Sale of one of EDF's new CCGT project, and commitment to go ahead with another project or divest it as well.

Source: European Commission; own analysis.