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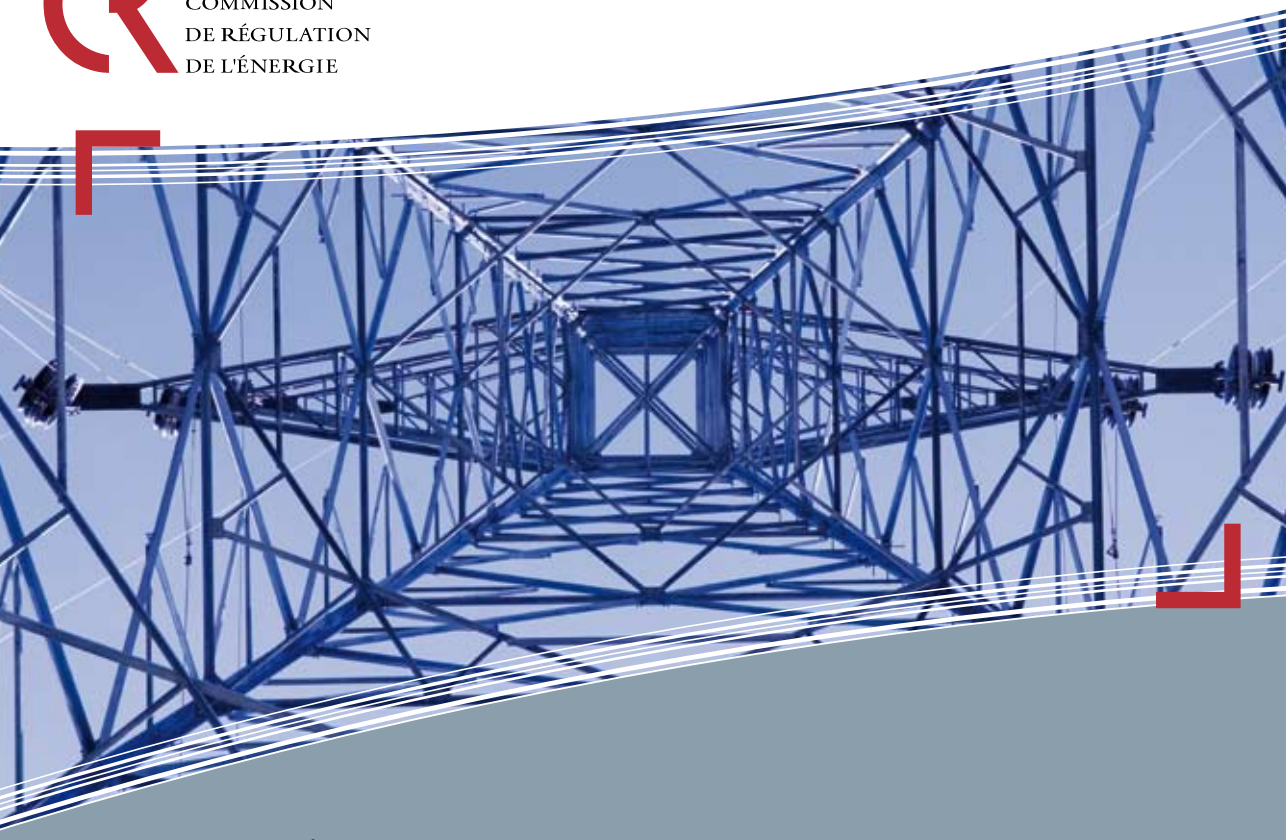

Networks

Management and use of electric interconnections in 2008

July 2009

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Contents

Foreword

by Philippe de Ladoucette

Chairman of the French Energy Regulatory Commission

CRE's third annual report on the management and use of interconnections at the French borders assesses the auditing and monitoring of the activity of RTE and market stakeholders in the interconnections. It provides an objective overwiew of both the progress made and the additional work required to integrate all the national markets. The key issue is how to best exploit the complementarities between generating facilities and electricity demands, while continuing to use the general feeling, within the European Union, of solidarity as regards energy.

The adoption of the third Energy Package for the internal gas and electricity market increases the regulators' authority on border exchanges, and thus broadens the scope of this work. As part of their expanded role, it is now their task to provide system operators with sufficient incentives to accelerate market integration. The regulators will also have the power to approve and modify the rules for congestion management. Such work requires highly-responsible regulators with impeccable expertise.

For several of the seven regional initiatives for energy, the regulators have followed CRE's lead and started to monitor activity at interconnections. Their results will appear in regional reports using a structure and methodology mainly based on CRE's reports.

The approach initiated by CRE at the French borders should, when rolled out across Europe, give regulators a common understanding of how interconnections are operating. It will also promote the emergence of a shared vision of what improvements should be made to methods used for managing congestion. The result will be closer cooperation between regulators.

This approach is clearly in line with one of the demands for correct operation of the internal-energy market, which requires that measures devised by some Members are quickly extended to all twenty-seven. Otherwise, the all-too-common regulatory gaps are impossible to avoid.

Of course, complementary efforts to educate and communicate the benefits of market integration are essential. Devising and monitoring clear and transparent indicators to reflect the degree of market integration is an important step in the right direction. Such indicators could subsequently be very helpful in designing market-integration mechanisms, as required by the electricity Directive implementing the third package, which has recently been adopted by the European Parliament.

Overview

Major progress was made throughout 2008 in border congestion management and market integration. A number of projects were carried out, including the creation of a single auction platform for the Central-West region (CASC-CWE) and the first centre for regional coordination (Coreso SA) to better control real-time flow, thus laying the foundations for future network management on a regional scale.

Such progress encourages more improvements still, which should take effect some time in 2009 and should constitute an important stage in creating an integrated European electricity market. The more significant expected advances notably include the implementation of a single, harmonised set of bidding rules covering the entire Central-West region, which would include introducing the principle of automatic resale of capacity (use-it-or-sell-it); the launch of the second phase of the BALIT project for reciprocal adjusting exchanges between France and England; the introduction of a compensation scheme for curtailments of capacity based on the differences in pricing at Power Exchanges over the France-Spain interconnection; and finally the elaboration of the very first regional reports by regulators on the management and use of interconnections.

The launch of the market coupling in the Central-West region, planned for March 2010, will unquestionably be a key event in market integration. In addition to substantially improving the use of the region's interconnections, it will offer significant new perspectives in market organisation (such as the future role and status of organised markets as regards day-ahead activity). The work of network operators on the flow-based aspect of the project will also enable improvements in transparency and coordination when calculating interconnection capacities, and could, in the long-run, open debates on changing the market design.

However, of the issues raised in CRE's second report on management and use of interconnections, several have not yet been solved. They include:

- the compatibility of the different market coupling projects;

- the lack of consensus on a target model to facilitate the development of intraday exchanges;

- the integration of the balancing markets;

- the governance model for regional auction platforms.

At the fifteenth Florence Forum in November 2008, a work group led by ERGEG was set up to address some of these issues. The purpose of the work group is to provide an inter-regional perspective, or more centralised "top-down" approach, as opposed to the regional approach that has, until now, been preferred for market integration. **This top-down approach will be particularly influential in determining how to extend market coupling which, as indicated in ERGEG's second report on coherence and convergence in the regional initiatives, published in September 2008, will require the establishment of a pan-European roadmap.**

Even if it is still too early to assess how likely it is that the work group should succeed, it seems probable that the **regional bottom-up approach, or, in some areas (such as intraday and balancing), the bilateral approach, still have some time to run.**

Introduction

1. BACKGROUND

1.1. Evolution of the role of interconnections

Originally, European countries were interconnected in view of improving the security of supply and networks by offering both mutual assistance and common frequency regulation on synchronised networks.

Today, interconnections are core to the establishment of the single electricity market. They allow complementary generation parks as well as complementary consumption profiles to be beneficial, whilst stimulating competition across Europe. However, bottlenecks at interconnections are a significant barrier to the development of competition and better market integration.

In this regard, the use of explicit auctions at the French borders in 2005 and 2006 has been an important first step towards managing congestion at interconnections in a both more efficient and more transparent way.

Box 1 – Regions France is part of, as defined by the European Commission and ERGEG when the Regional Electricity Initiatives were launched

In February 2006, ERGEG launched the Regional Electricity Initiatives, aiming to speed up market integration at a regional level and move towards a single internal electricity market at a European-Union level. France is part of four of the seven regions defined by the European Commission and ERGEG:

Central-West

Central-South

South-West

France - United Kingdom - Ireland

The changes this major turning point implied were definitively established firstly in February 2006, when ERGEG launched the Regional Electricity Initiatives (see Box 1), and later in December 2006, when the Congestion Management Guidelines were implemented, as an appendix to EU Regulation 1228/2003[1].

1.2. Emergence of target mechanisms in 2007

Besides bilateral and regional improvements (see Box 2), 2007 was also an important year as it saw the emergence of a European consensus on target mechanisms for interconnection management.

For long-term capacity allocation, the target mechanism is based on a system of explicit auctions, harmonised across Europe, with:

- a single set of rules;

- identical products at all interconnections;

- a single interface for all participants.

For day-ahead capacity allocation, implicit flow-based methods allow optimal use of capacity by taking into account the prices on different markets. Thus the target mechanism, which benefits from European consensus, consists of the coupling of day-ahead markets (market coupling), and the merging of these markets in the long run, with separate price zones corresponding to different levels of congestion (market splitting).

For intraday capacity allocation, many stakeholders would prefer a continuous and implicit capacity allocation mechanism. This would consist of a single platform, allocating capacity implicitly as soon as the energy offer in one Member State corresponds to the energy demand in another Member State.

[1] Commission decision of November 9th, 2006, amending the Appendix to the (EC) Regulation 1228/2003 on network access conditions for cross-border electricity exchanges.

The reference balancing mechanism is based on a "TSO-TSO" model where, as real-time approaches, TSOs could make reciprocal balancing exchanges, using remaining available capacities freely.

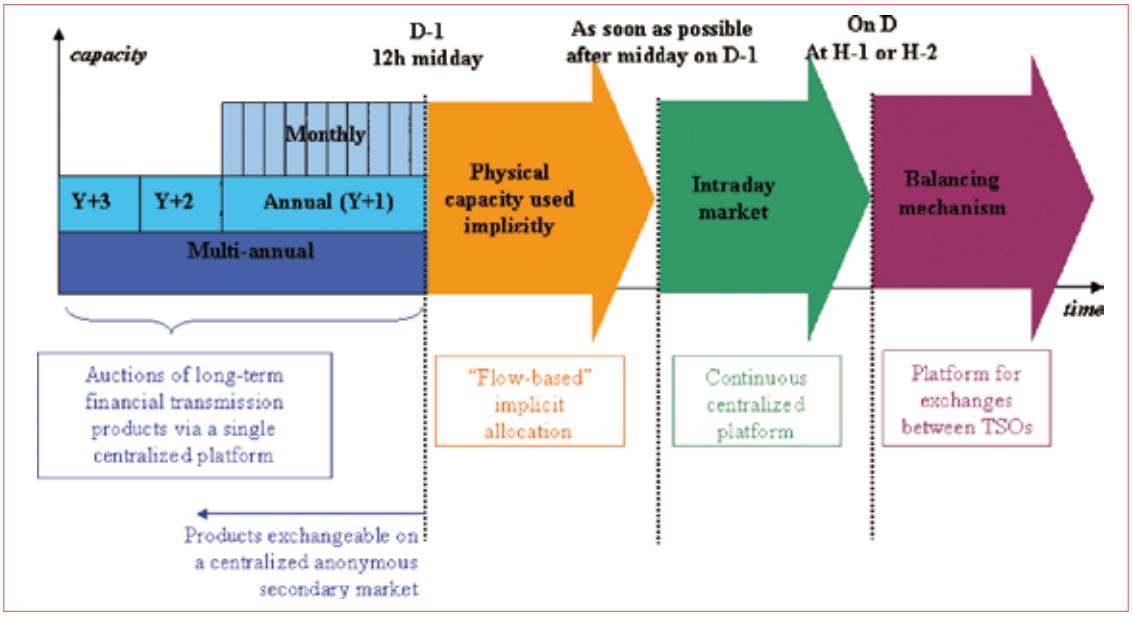
Figure 1 focusses particularly on the target model preferred by CRE.

Box 2 - The main developments in interconnection management in 2007

February 2007	Regulators of the Central-West region publish a regional action plan establishing which concrete measures are to be taken over the following two years to speed up the regional integration of electricity markets[2].
March 2007	Regulators of the Central-South region draw up an action plan for 2008.
May 2007	A procedure for pro-rata allocation of intraday capacities is implemented at the Belgian border.
July 2007	A secondary capacity market is established at the interconnection with Spain.
September 2007	The action plan presented by Regulators of the South-West region is approved by all stakeholders.
October 2007	Regulators of the France-United Kingdom-Ireland region give TSOs the go-ahead to start developing a new computer system to deal with allocating, managing and charging capacity at the France-England interconnection. This would ensure compliance with EU Regulation 1228/2003 and harmonisation with existing mechanisms at other European borders.
December 2007	The auction rules for the Central-South region are improved and a major effort is made towards harmonisation.

[2] See the document on the CRE website: http://tinyurl.com/m5rykb

Figure 1 - Summary of the target model for congestion management at interconnections



1.3. The first regional projects take shape in 2008

If 2007 saw the definition of the broad outlines of the target mechanisms; 2008, especially the second half, saw the realisation of major projects as well as important advances in transparency, firmness and coordination (see Box 3).

Box 3 - The main developments in interconnection management in 2008

April 2008	CRE and Ofgem approve the BALIT project for a mechanism for reciprocal balancing exchanges at the France-England interconnection.
June 2008	Regulators of the South-West region submit a new version of the rules[3] concerning the France-Spain interconnection for consultation. These include capped compensation in the event of capacity reduction, based on market price differential. The public consultation, whose results were published in September, favours the proposal, which is finally approved by the two regulators in December 2008.
July 2008	ERGEG publishes a position statement[4],common to all regulators, on firmness of capacities after the nomination stage.
August 2008	TSOs in the Central-West region publish their Implementation Study, reviewing the flow-based market coupling in the region.
September 2008	Regulators of the South-West region publish their report on transparency[5].
December 2008	Regulators of the Central-South region approve the new rules of capacity allocation, which introduce automatic resale of capacity (use-it-or-sell-it).
December 2008	The French and Belgian TSOs RTE and Elia establish a common coordination centre, Coreso SA,[6] to develop coordinated management of physical flows crossing the Central-West region.
January 2009	Regulators of the Central-South region publish their report on transparency[7].
March 2009	The interim phase of the inter-TSO balancing exchange mechanism (the BALIT project) between RTE and National Grid is launched.

[3] See the public consultation on the ERGEG website: http://tinyurl.com/kjgkwb

[4] See the document on the ERGEG website: http://tinyurl.com/lbhogt

[5] See the document on the ERGEG website: http://tinyurl.com/lpehxk

[6] Coordination of Regional System Operators

[7] See the report on the ERGEG website: http://tinyurl.com/muwygs

It is, however, regrettable that the coupling project in the Central-West region has been delayed, mainly due to technical difficulties encountered when using the flow-based approach.

The regional approach instigated by the Regional Electricity Initiatives has allowed significant development and consensus on the implementation of mechanisms, which would be difficult to obtain on a European scale. Indeed, the large number of stakeholders and the differences between regions would considerably slow the process down.

Nevertheless, some issues now need to be addressed using a more centralised approach and clear direction, defined at a European level. This applies to the coordination between market coupling projects, as these involve several regions.

2. THE REPORT'S OBJECTIVES

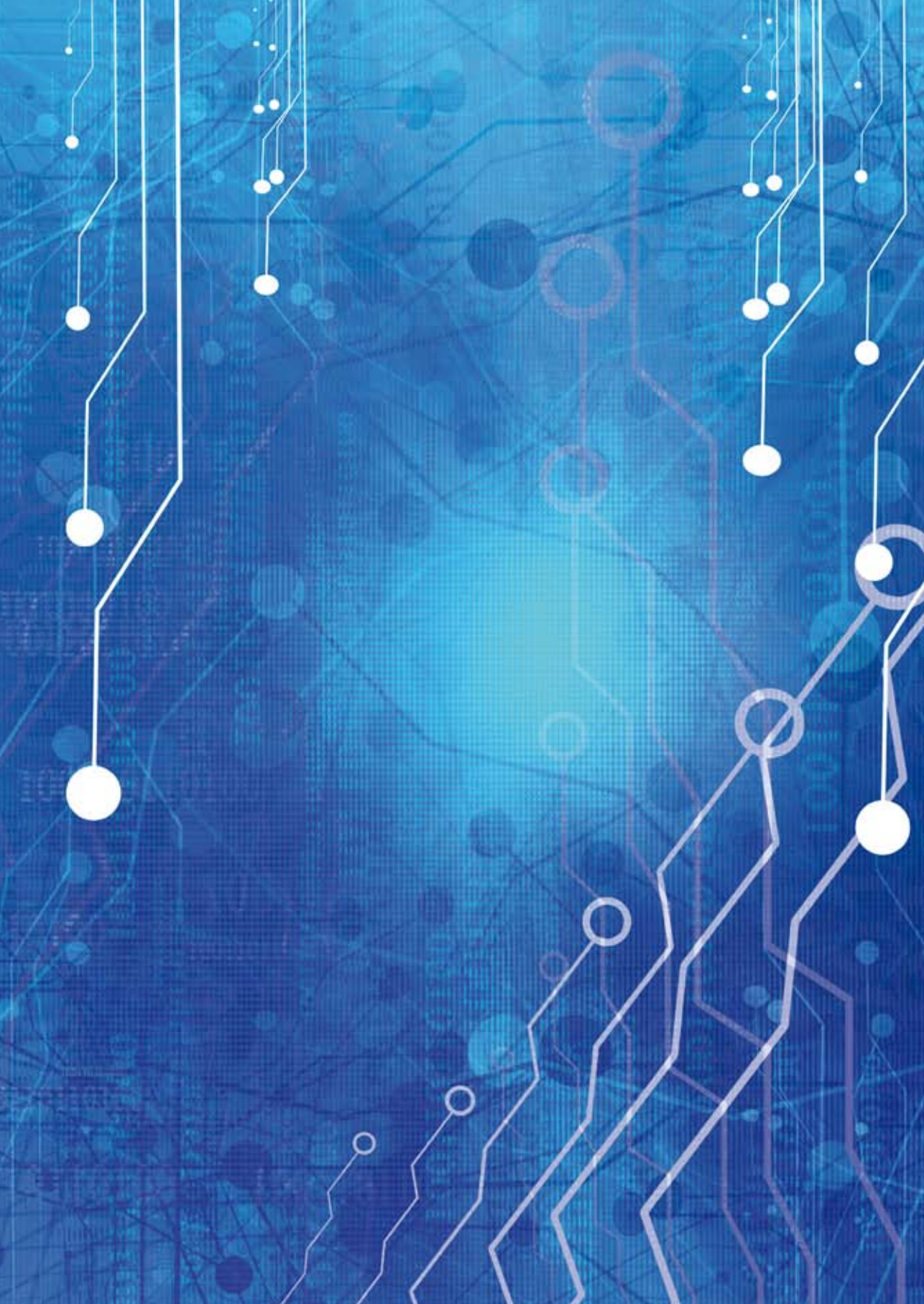
Under EU Regulation 1228/2003 national regulatory authorities are responsible for periodically evaluating congestion management methods.

This third report from CRE on interconnection management thereby has the following objectives:

- to assess how interconnections at the French borders have functioned during 2008, and to explain the major improvements and the difficulties encountered this year;

- to examine how discussions have and are evolving for each of the four regional initiatives in which CRE is involved;

- to present the perspectives and the issues at stake on a regional and European scale, so that participants are more aware of CRE's priorities as regards the Regional Electricity Initiatives and work relating to Europe.



PART 1
Review of interconnection management in 2008

1. OVERALL INDICATORS

1.1. Comparative values of interconnection capacities

Mechanisms for allocating capacity by auction, whether explicit or implicit, allow us to estimate the value the market assigns to interconnection capacities.

One way of comparing the different interconnections at the French borders is to use the average hourly price, revealed by bids for each megawatt of interconnection, for all timeframes taken together (Table 1). In particular, it may be used:

- when considering investment in new interconnection lines (n.b.: the cost of building an AC interconnection line is approximately 300 – 500 k€/MW and 600 - 800 k€/MW[8] for DC);

- to improve the method used by RTE for sharing out France's export capacity at its eastern borders (see Box 6, section 6.1).

Table 1 – Prices attributed to interconnection capacities in 2008

		Average prices 2008		**Total**	*2007 figures*	*2006 figures*
		€/MWh	€/MW	**€/MW**	*€/MW*	*€/MW*
Belgium	Export	1.04	9,137	**12,641**	*30,917*	*18,016*
	Import	0.40	3,504			
England	Export	10.41	91,484	**104,238**	*62,657*	*123,550*
	Import	1.45	12,754			
Germany	Export	1.16	10,156	**49,512**	*34,317*	*22,253*
	Import	4.48	39,356			
Italy	Export	13.11	115,201	**121,509**	*161,112*	*109,803*
	Import	0.72	6,308			
Spain	Export	4.61	40,499	**125,536**	*89,406*	*65,969*
	Import	9.68	85,037			

Source: RTE; Analysis: CRE

[8] CRE estimates based on the most recent construction projects. The total cost of an interconnection infrastructure can vary widely depending on the length of the link, the scope of the related work (on stations, to upgrade national links and remove existing links, etc.), the nature of the environment (plains, mountains, etc.), and on how difficult it is to meet the planning constraints (e.g. pylon architecture, buried lines and changes to the route, etc.). In addition, the commercial capacity available over the link may be less than the power technically deliverable, and it fluctuates as flows over the grid change.

As the table above shows, over the past three years, interconnections with Spain, Italy and England have been the most promoted by participants. The price per megawatt at the three interconnections appears to justify capacity developments by network operators. Note that apart from interconnections with Germany and Spain, export capacities are generally priced higher than import capacities.[9]

1.2. Level of interconnection capacity use

The first column of Table 2 below shows the percentage of hours throughout the year during which prices on the French market and on neighbouring markets were closed. The last column of this table shows the percentage of hours throughout the year during which the available capacities at the time of the daily allocation were used to their maximum in the direction of the price difference between the French market and the neighbouring markets.

Prices at French interconnections converge generally only about 10% of the time However, low convergence is not necessarily a consequence of insufficient interconnection capacity. In fact, it appears that French interconnections are rarely saturated, although there are opportunities for arbitrage (i.e. price differentials with neighbouring markets).

This applies to all interconnections apart from the one between France and Belgium, where prices are highly convergent (86% of the time), and the use of the available capacities is maximal. The reason for this particularity is that this interconnection is managed by market coupling, which mainly ensures optimal use of existing interconnection capacities, in itself promoting price convergence.

Table 2 – Congestion level of French interconnections in 2008[10]

	Percentage of time for which the price differential is less than € 1/MWh	Percentage of time for which the price differential is greater than € 1/MWh, when the interconnection is	
		not used to its maximum	used to its maximum[11]
Belgium	86 %	0 %	14 %
Germany	10 %	76 %	14 %
Italy	9 %	68 %	23 %
Spain	6 %	69 %	25 %
Switzerland	12 %	79 %	10 %
England	(market prices not considered) [12]	60 %	40 %

Sources : RTE, Powernext, EEX, Belpex, OMEL, IPEX and SwissIX; Analysis: CRE

[9] Unless stated otherwise, export means exchanges made from France to abroad; import means from abroad to France.

[10] A margin of 1% of capacity is allowed: an interconnection is considered fully used when the net flow over the interconnection is over 99% of the net (import or export) capacity.

1.3. Economic signal for market failure

Table 1 (section 1.1) provides a way of comparing the market operators' inclination to pay for cross-border capacities at the different French interconnections. This section compares the actual income from congestion (i.e. the auction revenue), which reflects this inclination to pay, using an indicator of the theoretical congestion income, whose calculation is based on ex post hourly price differentials between the national markets[13] (Table 3).

Ideally, the actual congestion income should equal the theoretical congestion income. In practice, this is generally not the case because of:

- the difficulty for market players to accurately forecast day-ahead price differentials, particularly for a month or a year ahead;

- the market players' preference for trading longer-term products (such as base-load and peak-load products of a day), along with the difficulty, or even the impossibility, for the market operators to carry out arbitrage opportunities in hourly steps;

- the interconnected markets are imperfect (small number of operators, information asymmetry between operators, imbalance in size).

Nevertheless, monitoring the ratio between actual income (as indicated by market mechanisms) and theoretical congestion income over time is useful to reveal congestion management mechanism failures, incompatibility between interconnected electricity market designs, or lack of competition at the interconnection[14].

The ratio may also be used to determine the impact of modifications in interconnection access rules and changes in the organisation of national markets and to assess whether, and to what extent, the situation is moving towards the establishment of an internal electricity market.

At the Italian border, in the export direction, actual income appears to have greatly exceeded theoretical income. This could be explained by the unexpected convergence of Italian and French prices during 2008.

At the Belgian border, in the export direction, this ratio appears to, on the contrary, have dropped, as indeed the actual congestion rent greatly exceeded the theoretical congestion rent in 2007.

[11] The interconnection is considered fully used when the net flow is over 99% of the net capacity.

[12] England sets no hourly price at D-1, so it is not possible to compare the use of the interconnection (measured at half-hourly intervals) with the price differential, as can be done at other borders.

[13] For exports from market A to market B, the theoretical congestion income is the capacity at the interconnection multiplied by the price differential, summed for each hourly step during the year when the price was higher in market B than in market A.

[14] The results from this ratio are more accurate if the different timeframes for which the capacities are allocated are treated separately (see sections 2.1 and 3.1 below).

Table 3 – Real and theoretical congestion incomes in 2008[15]

		Total gross auction income[16] (€M)	Theoretical congestion income (€M)	**Ratio**	*2007 figures*
Belgium	Export	20.78	33.02	**63 %**	*147 %*
	Import	4.24	3.86	**110 %**	*61 %*
England	Export	180.73	-	**-**	-
	Import	24.76	-	**-**	-
Germany	Export	27.14	50.02	**54 %**	*62 %*
	Import	128.22	179.15	**72 %**	*35 %*
Italy	Export	293.06	154.49	**190 %**	*58 %*
	Import	13.60	41.67	**33 %**	*2 %*
Spain	Export	39.37	57.33	**69 %**	*82 %*
	Import	28.50	25.21	**113 %**	*101 %*
Switzerland	Export	-	186.73	**-**	-
	Import	-	28.94	**-**	-

Sources: RTE, Powernext, EEX, Belpex, OMEL and IPEX; Analysis: CRE

1.4. Congestion income

After splitting gross auction income between the neighbouring Member States, the French share in 2008 was 382.5 million euros[17]. The French share at each interconnection represents half of the total income, except at the interconnection between France and England where the sharing rules are more complex.

As indicated in last year's (2007) report on management and use of electricity interconnections, part of the income from the auctions gained over the next tariff period (TURPE 3) will be invested in developing interconnection capacities, in accordance with Article 6(6)c of EU Regulation 1228/2003. This will consolidate the growth in the amount of investment dedicated to interconnection infrastructure during 2009, as noted in CRE's decision of December 18th, 2008 relating to RTE's investment plan for 2009. The total value of auction income assigned to financing interconnections was set at 202.9 million euros for the tariff period, in CRE's February 26th, 2009 proposal relating to the tariffs for the use of public electricity networks (*Tarifs d'Utilisation des Réseaux Publics d'Électricité – TURPE*).

1.5. Competition at interconnections

Table 4 below shows the number of players involved in capacity allocations at each of the French interconnections.

[15] The empty cells in this table are explained as follows:
- in England, the lack of a fixed hourly price at D-1 makes it impossible to compute the theoretical congestion income that can be computed for the other borders;
- there is no auction on the French-Swiss interconnection.

[16] Income from intraday auctions at the French-Spanish interconnection is not included in this total: the price attributed to intraday capacities is not comparable with the price differential between the day-ahead markets.

[17] These are accounting values provided by RTE, which differ slightly from the economic calculations shown in Table 3.

Apart from the interconnection between France and Belgium, where the number of users in the import direction has significantly decreased in 2008, the competition indicators for the French interconnections do not present major changes in comparison to 2007. The interconnections with Germany and Italy involve the greatest number of players (around 40). A total of 89 companies were active at the French interconnections in 2008 (as opposed to 74 in 2007).

Table 4 - Competition indicators for the use of interconnections

		Number of users		Share of the largest user		HHI [18]	
		2008	*2007*	2008	*2007*	2008	*2007*
Belgium[19]	Export	13	*18*	34 %	*32 %*	2,010	*1,563*
	Import	3	*13*	84 %	*22 %*	7,299	*1,635*
England	Export	16	*24*	19 %	*25 %*	1,218	*1,224*
	Import	15	*21*	27 %	*28 %*	1,374	*1,211*
Germany	Export	44	*42*	35 %	*41 %*	1,461	*1,837*
	Import	48	*44*	20 %	*25 %*	748	*952*
Italy	Export	47	*35*	14 %	*14 %*	602	*754*
	Import	34	*18*	28 %	*35 %*	1,331	*1,785*
Spain	Export	16	*17*	46 %	*43 %*	2,464	*2,335*
	Import	19	*17*	15 %	*25 %*	883	*1,343*

Source: RTE; Analysis: CRE

2. ANALYSIS OF THE LONG-TERM CAPACITY ALLOCATION MECHANISMS

2.1. Long-term capacity valuation

At all interconnections between France and other Member States, capacities are allocated according to several different timeframes. The following long-term products are offered:

- annual: at the end of each calendar year, a capacity band is allocated for the whole of the following year;

- monthly: each month, a capacity band is allocated for the following month;

- seasonal, quarterly and annual products are also offered at the interconnection between France and England, based on the financial year (April to March).

[18] The HHI (Herfindahl-Hirschman Index) measures market concentration as the sum of the squares of the players' market shares (expressed as a percentage). A "low" concentration is less than 1000, a "moderate" concentration is between 1,000 and 1,800 and a "high" concentration is between 1,800 and 10,000.

[19] Flows nominated for market coupling at the France-Belgium interconnection are excluded from market-share calculations. The number of users of this interconnection has noticeably reduced, because the implicit method means there are no bids for daily capacity.

Holding long-term capacity is one of the main ways for market players to hold a lasting position on a foreign market. In this regard, both improving the quality of the products offered by TSOs and maximising interconnection capacities are important challenges for developing competition and building the European electricity market.

The price that market players are willing to pay to obtain capacity depends, as for any commodity, on the marketed product's intrinsic characteristics: the more reliable the product is (guaranteed firmness; compensation for curtailments, etc.) and the easier it is to use (secondary market, nomination procedure, financial/physical nature, etc), the higher it is valued.

A market player who wants to participate in long-term auctions can use two price references to determine how much he should pay for capacity. On one hand, if he is involved in long-term arbitrages, he may look at the price differential of forward products available on the day of the auction. On the other hand, if interested in shorter-term arbitrages, he could add to this initial value an estimate of the volatility in price differential for the considered period , based on an hourly, (or daily or weekly, etc.) time interval.

As these estimates, which differ for each market player, are not available to CRE, this report considers the theoretical value of capacities, calculated ex-post, based on volatility of hourly price differentials. When the players predict wrongly (for instance, if there is an unexpected heat wave, or cold spell, etc.), the theoretical value may be lower than the marginal auction price. Apart from this, the marginal price set by an annual (or monthly) auction is, in principle:

- at least of the same magnitude as the price differential of annual (or monthly) forward products, valued at the auction date;

- lower than the theoretical value for capacity, calculated ex post based on the hourly price differential between the organised markets throughout the year (or month)[20].

The difference between the marginal price set at auction and this theoretical value depends on many factors, including the risk premium as perceived by each player. However, this difference also indicates the efficiency of the allocation mechanism and the level of competition in the capacity market.

- **Annual auctions**

As discussed in the 2007 report, the value for 2008 yearly capacities at Continental borders increased noticeably in the import direction, while their value in the export direction remained stable (Table 5). At the English border, the import capacity value fell slightly, in line with the change in the forward price differential.

[20] For exports from market A to market B, the theoretical value for annual (or monthly) capacity is the average price differential between the two markets, summed for each hourly step during the year (or month) when the price was higher in market B than in market A.

Yearly capacity in 2009 has been valued noticeably lower than in the previous year (down 40%, or €155 million, from 2008), particularly at the Italian and German borders. The reasons for this may be:

- a reduction in the forward price differential, which has dropped across all French borders;

- lower daily price differentials, as recorded in 2008 (illustrated by the reduction in the theoretical value for capacity, which was particularly significant at the interconnection between France and Italy). Market players have used these differentials when calculating the value of yearly capacity for 2009. At the interconnection between France and Italy, the price assigned to annual export capacity for 2009 (around €7.5 /MWh) was just half the value of the previous year, and is exactly in line with the theoretical capacity value for 2008 (€7.15 /MWh). Note that because there is no reliable forward price reference in Italy, it is not possible to compare the yearly capacity estimate at the France-Italy interconnection and a forward price differential.

- the economic crisis, which may have led some market players to adopt a more prudent purchasing policy.

Table 5 – Results of annual auctions in 2007, 2008 and 2009[21]

		2007				2008				2009		
		Capacity sold (MW))	**Price (€/MWh)**	Forward differential (€/MWh)	Theoretical value (€/MWh)	Capacity sold (MW)	**Price (€/MWh)**	Forward differential (€/MWh)	Theoretical value (€/MWh)	Capacity sold (MW)	**Price (€/MWh)**	Forward differential (€/MWh)
Belgium	Export	1,300	**2.06**	2.73	1.23	1,300	**0.90**	1.75	1.99	1,300	**0.88**	1.25
	Import	400	**0.25**	-2.73	0.34	400	**0.56**	-1.75	0.52	400	**0.81**	-1.25
England	Export	500	**6.56**	4.62	-	550	**7.25**	6.43	-	550	**5.85**	-0.28
	Import	500	**1.95**	-4.62	-	550	**1.78**	-6.43	-	550	**2.95**	0.28
Germany	Export	800	**3.03**	0.65	3.21	700	**2.76**	-4.00	2.91	900	**1.24**	-3.18
	Import	1,200	**2.22**	-0.65	6.10	1,000	**6.22**	4.00	6.27	1,000	**4.02**	3.18
Italy	Export	1,550	**15.48**	-	32.28	1,730	**15.06**	-	7.15	1,708	**7.50**	~ 10
	Import	-	**-**	-	2.17	700	**1.93**	-	4.60	700	**0.37**	~ -10
Spain	Export	150	**5.17**	-3.40	6.38	150	**4.55**	-7.60	6.11	200	**4.77**	-5.50
	Import	100	**8.46**	3.40	7.92	100	**12.92**	7.60	8.04	100	**9.41**	5,50

Sources: RTE, Powernext, EEX, Belpex, OMEL, IPEX and Platts; Analysis: CRE

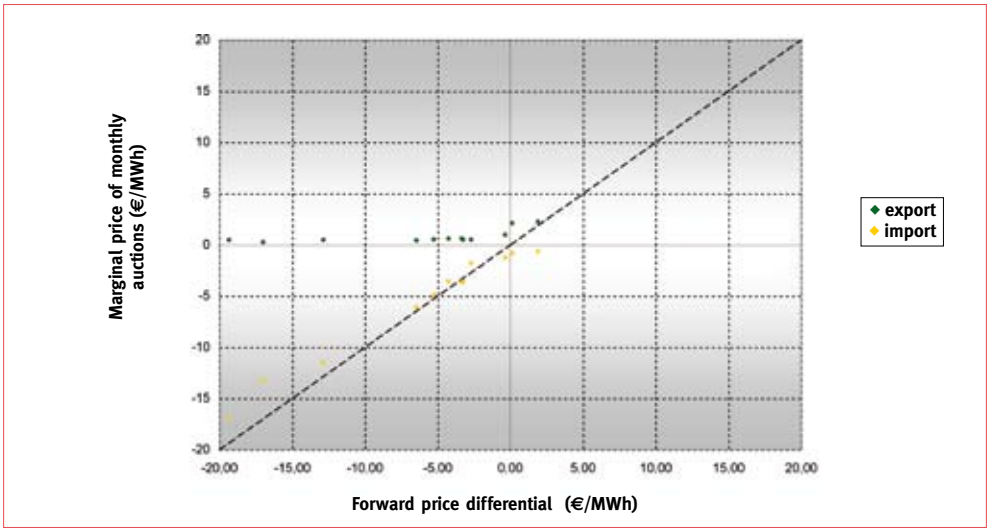
[21] There are empty cells in this table because:
- in Italy, there is no reliable forward- price reference, so it is not possible to compare the annual auction price with the forward price differential;
- in England, there is no reliable hourly price, so theoretical values for capacity cannot be calculated as they are for the other borders;
- in 2007, there were no annual auctions in the import direction at the Italian interconnection.

- **Monthly auctions**

In 2008, the monthly auction prices were generally consistent with the forward price differentials. When bidding for capacity, participants in the monthly auctions took into account the anticipated price volatility, since on all the borders the price attributed to monthly capacities is generally higher than the forward price differential. However, this volatility is difficult to estimate, even over a single month, and is therefore generally underestimated by players.

At the German border, the capacity prices did not follow the logic above (Figure 2), although they had in the previous year. In practice, the price assigned to monthly capacity flowing in the economically favourable direction was generally lower by around €0.50 /MWh than the forward price differential. Capacity in the opposite direction was consistently estimated at only just over €0.50 /MWh. It seems therefore that those participating in the capacity market have been very prudent at this interconnection; or were not able to anticipate the high degree of price volatility at this border.

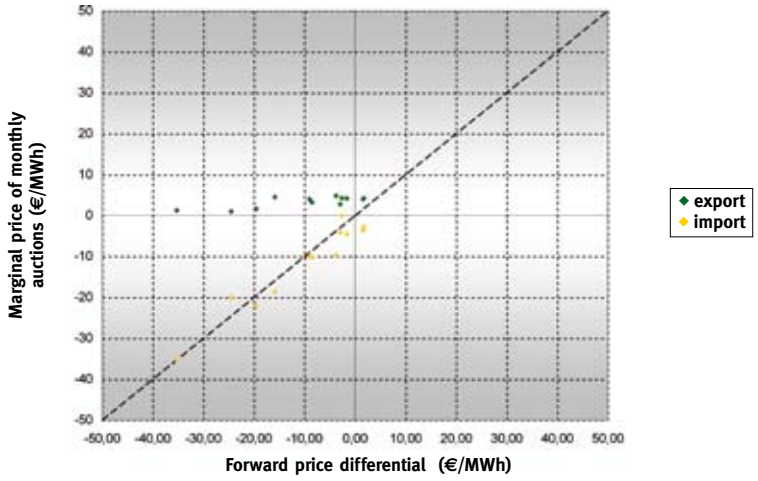
Figure 2 – Marginal price of monthly capacity at the interconnection between France and Germany, compared with the price differential for forward products in 2008



Sources: RTE, Powernext, EEX and Platts; Analysis: CRE

At the Spanish border, the above logic was followed (Figure 3). On average, the users' risk premium at the interconnection (the difference between the theoretical capacity value and the price in practice at auctions) was of €3 /MWh in the export direction. In the import direction, it appears that some months,the value of the interconnection capacity set by auction was significantly higher than the theoretical capacity value.

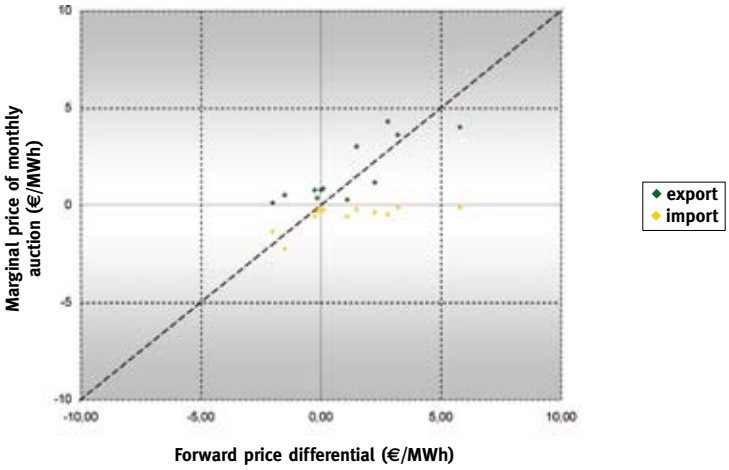
Figure 3 – Marginal price of monthly capacity at the interconnection between France and Spain, compared with the price differential for forward products in 2008



Sources: RTE, Powernext, OMEL and Platts; Analysis: CRE

We also noted that at the Belgian border, the monthly auction price was consistent with the price differential for forward products (Figure 4). On the other hand, the forward price differential and the monthly auction price were generally much higher than the actual value at the interconnection. In practice, the French and Belgian hourly prices were aligned 82% of the time in 2008, something that participants in the capacity market at the interconnection between France and Belgium had apparently not anticipated.

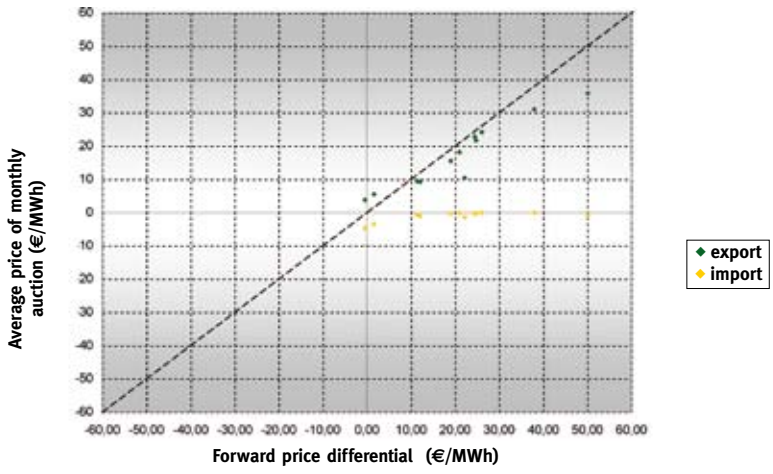
Figure 4 – Marginal price of monthly capacity at the interconnection between France and Belgium, compared with the price differential for forward products in 2008



Sources: RTE, Powernext, OMEL and Platts; Analysis: CRE

At the English border, in contrast to the previous year, there is a strong correlation between the price attributed to monthly capacity and the price differential for forward products, as shown in Figure 5.

Figure 5 – Average price of monthly capacity at the interconnection between France and England, compared with the price differential for forward products in 2008



Sources: RTE, Powernext and Platts; Analysis: CRE

Because there is no reliable forward-price reference in Italy, it is not possible to compare the monthly-capacity valuation at the Italian border to a forward price differential. However, it is clear that on average, the price of monthly capacity for export was higher than its theoretical value. Note that this trend was less significant than that observed for annual export capacity (the average theoretical value for monthly capacity was around €7.80 /MWh, while the average attributed price was €9.70 /MWh).

2.2. Long-term capacity use

Holders of long-term capacity must indicate on a daily basis how much capacity they plan to use during each hour of the following day (nomination). The use of long-term capacity is thus to be viewed in relation to the hourly price differential between the markets.

In this section, the interconnections with Germany, Belgium, Spain and Italy are analysed. At the interconnection between France and England, players do not nominate long-term capacity firmly, so the use of long-term and daily capacities cannot be distinguished in the analysis below (section 3.2).

Ideally, the use of long-term capacity for each hour during the year would correspond to:

- maximum use in the direction of the price differential;

- no use in the opposite direction;

Table 6, below, can be read as follows:

- the first column gives the average over the year of nominations made against the price differential;

- the second column gives the proportion of hours during which nominations were in the opposite direction of the price differential;

- the third column gives the average long-term capacity not nominated in the direction of the price differential;

- the fourth column gives the quotient of the number of hours during which capacity in one direction was not fully nominated[22], by the number of hours during which the price differential was in that same direction.

If capacity was used perfectly, as described above, then all the figures in Table 6 would be zeros. However, the actual use of long-term capacity is far from this ideal.

[22] A margin of 1% is applied, so that the interconnection is considered used to its maximum if nominated capacity exceeds 99% of available capacity.

Table 6 – Use in the opposite direction and under-use of long-term capacity in 2008

		Average capacity used in the opposite direction to the price differential (MW)	*Proportion of hours involved*	Average unused capacity in the price differential direction (MW)	*Proportion of hours involved*
Belgium	Export	123	*82 %*	208	*11 %*
	Import	51	*3 %*	18	*40 %*
Germany	Export	223	*44 %*	532	*95 %*
	Import	476	*91 %*	242	*55 %*
Italy	Export	1, 797	*100 %*	230	*51 %*
	Import	160	*34 %*	699	*100 %*
Spain	Export	122	*35 %*	165	*57 %*
	Import	54	*41 %*	121	*75 %*

Sources: RTE, Powernext, EEX, Belpex, OMEL and IPEX; Analysis: CRE

At the Italian border, and to a lower extent at the Belgian border, long-term capacity is used systematically for export, regardless of the direction of the price differential. In the import direction, the same behaviour is observed at the German border. On the contrary, at the Italian border, it appears that the import long-term capacity is systematically under-used.

The use of long-term capacity actually seems to be governed more by a "business-as-usual" policy, or by long-term arbitrage, than by hourly arbitrage. This pattern is perhaps explained by the nomination of long-term capacity stage, which occurs before day-ahead prices are fixed.

However, this inadequate use of long-term capacity has no impact on the overall use of the interconnection when TSOs use "netting" and "use-it-or-lose-it" correctly to manage capacity (that is, when the amount of long-term capacity either unused or used in the opposite direction is added to the available daily capacity). On the other hand, the use of daily capacity is crucial (see section 3.2).

2.3. Feedback from experience on secondary markets

There are secondary capacity markets at all French interconnections (excluding the one with Switzerland), allowing holders of long-term capacity to resell or transfer their products.

Two mechanisms coexist:

- *capacity resale:* long-term capacity may be resold at daily auctions (in hourly steps) at the capacity holder's request at least 2 days before day D. The original capacity holder is then paid the daily auction price. Similarly, annual capacity may be resold in bands, at monthly auctions[23] ;

- *capacity transfer:* actors may exchange long-term capacity bilaterally over a period of their choice (hourly steps).

[23] At the interconnection between France and England, other types of long-term capacity (seasonal and quarterly) may also be resold each month.

These secondary markets have been established:

- at the interconnection between France and England (IFA), on April 1st, 2001 for capacity resale (first version of the rules) and on September 3rd, 2001 for capacity transfer (second version of the rules). The transfer rule has been made more flexible in the sixth version of the rules (October 31st, 2006);

- on January 1st, 2007 at the interconnections with Germany, Belgium and Italy;

- on July 1st, 2007 at the interconnection with Spain.

- **Resale of capacity**

At continental interconnections, the use of the long-term capacity resale mechanism at daily auctions increased significantly in 2008 (Table 7). In particular, 80% of the long-term capacity allocated to imports from Belgium was resold by the end of the day through the market coupling. This reflects the tendency of market operators to use their long-term capacity as rights to financial transport.

The automatic resale of the day's unused long-term capacity has already been implemented in the Central-South and South-West regions (see part 2, sections 3.1 and 4.1) and should be introduced with the implementation of the common set of rules discussed in the Central-West region (see part 2, section 1.1). The spread of this service should consolidate the observed trend.

Table 7 - Resale of long-term capacity as daily capacity (2008)[24]

		Number of players using the service	*Proportion of players using the service compared with the number of long-term capacity holders*	Average capacity resold in year (MW)	*Average share of long-term capacity*
Belgium	Export	7	*44 %*	768	*52 %*
	Import	6	*60 %*	509	*88 %*
England	Export	1	*3 %*	50	*3 %*
	Import	2	*6 %*	76	*4 %*
Germany	Export	14	*41 %*	783	*54 %*
	Import	10	*27 %*	925	*59 %*
Italy	Export	20	*61 %*	331	*14 %*
	Import	-	-	163	*17 %*
Spain	Export	4	*36 %*	174	*50 %*
	Import	8	*53 %*	34	*21 %*

Source: RTE; Analysis: CRE

The interconnection with England is the only one where this does not apply, since only two players used the resale mechanism in 2008. At the France-England interconnection, the secondary market as currently configured allows players to resell or transfer capacity only in 24-hour bands (in accordance with the products sold on the primary capacity market). Since capacity cannot be resold or transferred in hourly steps, the product's lack of flexibility could possibly explain why players at this interconnection show little interest in the resale mechanism. In addition, products allocated at the interconnection between France and England are mainly optional (players may change their nominations up till 3 hours before the real time) and this significantly decreases the interest market players have in the secondary markets. Discussions are currently under way in the France-United Kingdom-Ireland region to possibly change this characteristic. (Part 2, Section 2.2).

On the other hand, the mechanism for reselling annual capacity on a monthly basis has continued to be used only very marginally (see Table 8) on the French borders.

[24] The empty cells of the table are due to the impossibility to receive the data on time.

Table 8 - Resale of annual capacity by the month (2008)[25]

		Number of players using the service	*Proportion of players using the service compared with the number of yearly capacity holders*	Average capacity resold in year (MW)	*Average share of yearly capacity*
Belgium	Export	0	*0 %*	0	*0 %*
	Import	0	*0 %*	0	*0 %*
England	Export	0	*0 %*	0	*0 %*
	Import	0	*0 %*	0	*0 %*
Germany	Export	1	*3 %*	8	*1 %*
	Import	0	*0 %*	0	*0 %*
Italy	Export	6	*21 %*	131	*8 %*
	Import	-	-	13	*2 %*
Spain	Export	2	*40 %*	10	*7 %*
	Import	2	*33 %*	5	*5 %*

Source: RTE; Analysis: CRE

- **Transfers of capacity**

Mechanisms for transferring capacity between market players are still very little used at the French interconnections. There have been no bilateral capacity transfers at the interconnections with England and Spain, and very few at the interconnections with Belgium and Germany (Table 9). Only at the Italian border, where the names of capacity holders have been published since 2007, have there been a slightly higher number of bilateral transfers: six long-term capacity holders (out of 33) have used this service to sell capacity in the export direction.

Table 9 – Long-term capacity transfers (2008)[26]

		Number of players having sold capacity	*Proportion of players having sold capacity compared with the number of long-term capacity holders*	Average capacity transferred in the year (MW)	*Average share of long-term capacity*
Belgium	Export	1	6 %	10	*1 %*
	Import	1	10 %	25	*4 %*
England	Export	0	0 %	0	*0 %*
	Import	0	0 %	0	*0 %*
Germany	Export	1	3 %	36	*2 %*
	Import	0	0 %	0	*0 %*
Italy	Export	6	18 %	201	*9 %*
	Import	-	-	-	-
Spain	Export	0	0 %	0	*0 %*
	Import	0	0 %	0	*0 %*

Source: RTE; Analysis: CRE

CRE suggested the same sort of publication in the Central-West region, as part of the project for harmonised rules (see Part 2, Section 1.1). The proposal met opposition from some network operators and regulators and was not adopted.

3. ANALYSIS OF DAILY CAPACITY ALLOCATION MECHANISMS

3.1. Valuation of daily capacity sold by explicit auction

The value of the daily capacities, hour by hour, should be viewed in relation to the hourly price differential between the markets.

In theory, the price of daily capacity should be equal to the price differential of the day-ahead markets. In Figures 6 to 9 below, this theoretical use would be shown by:

- a value of zero for capacity when the price differential is in the opposite direction (a cluster of points aligned to the right of the line y=0);

- a value equal to the price differential when it is in the correct direction (a cluster of points aligned to the right of the line y=x).

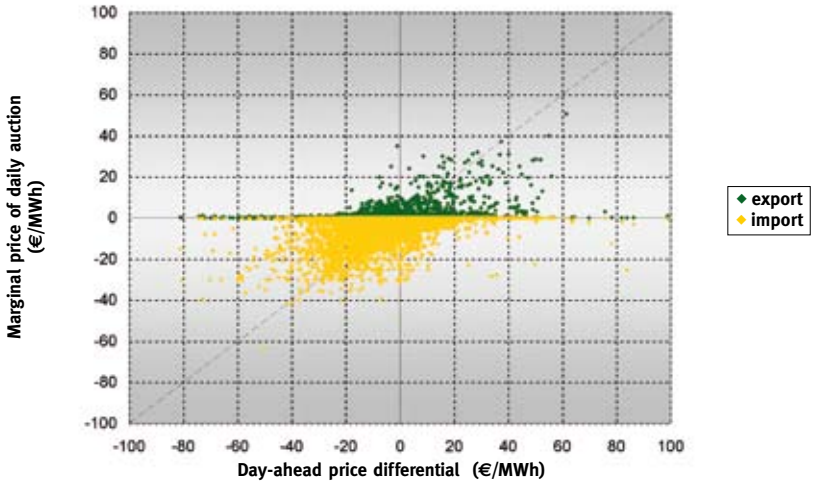
The daily explicit auctions actually take place before prices are fixed on the organised markets. Thus auction bidders can only use estimated price differences, which might partly explain the difference between the results from the auctions and the price differential. This is a feature of the separation of the energy and transmission markets (allocation at explicit auctions).

[25] The empty cells of the table are due to the impossibility to receive the data on time.

[26] The empty cells of the table are due to the impossibility to receive the data on time.

At the German border (Figure 6), the price attributed to daily capacity in 2008 had little to do with the price differential between the organised markets. This suggests that anticipating the very volatile price differential, even just a few hours before the prices are fixed on power exchanges, is still difficult for stakeholders. However, we note that the players have a tendency to keep a margin in their valuation in order to take into account the risk factor associated with the volatility in hourly prices.

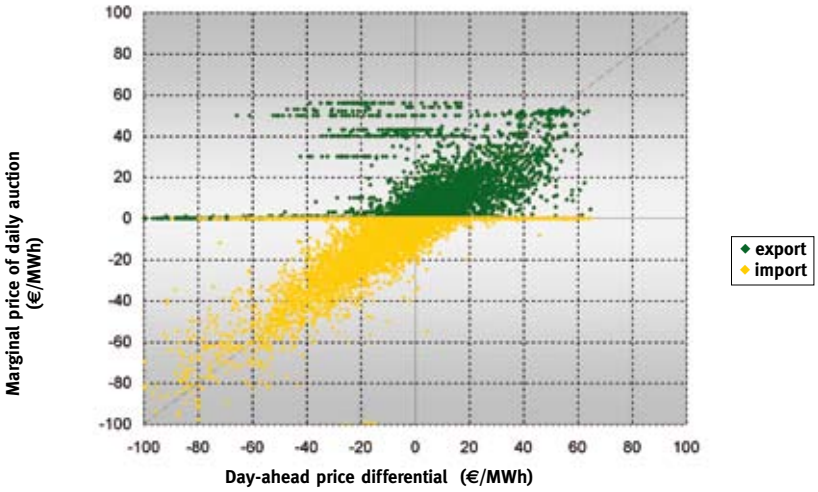
Figure 6 – Marginal price of daily capacity at the France-Germany interconnection compared with the hourly price differential between EEX and Powernext, in 2008



Sources: RTE, Powernext and EEX; Analysis: CRE

We noted the same lack of correlation between the price at daily auctions and the price differential at the Spanish border in the export direction (Figure 7).

Figure 7 – Marginal price of daily capacities at the interconnection between France and Spain, compared with the hourly price differential between OMEL and Powernext, in 2008

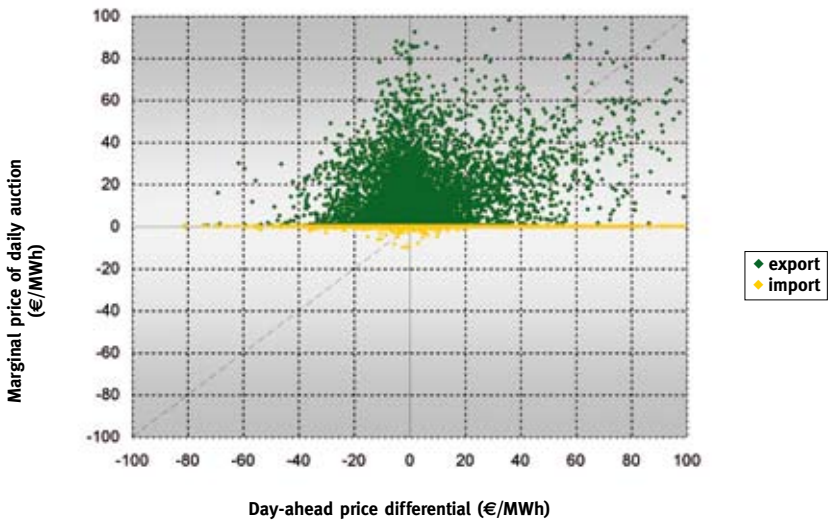


Sources: RTE, Powernext and OMEL; Analysis: CRE

However, we note that the effect is amplified by one market operator's behaviour who systematicaly buys daily capacity at a very high price (between € 30 and € 60/MWh) that is not correlated to the price differential that was favourable in the export direction only 42% of the year. This behaviour will be further examined by CRE in collaboration with its Spanish counterpart, CNE. In contrast, in the import direction, the price of daily capacity is well correlated with the day-ahead price differential.

At the Italian border (Figure 8), the valuation of daily export capacity to Italy was very far from its theoretical value, contrary to last year. The price differential seems to have been less predictable in 2008 than it was in 2007. Although from January 1st, 2008, import capacity has been allocated as options to nominate in D-1 (as at the other borders)[27], we did not observe a better correlation between the price differential and the price of daily capacity (which remained low throughout the year).

Figure 8 – Marginal price of daily capacity at the interconnection between France and Italy, compared with the hourly price differential between IPEX and Powernext, in 2008

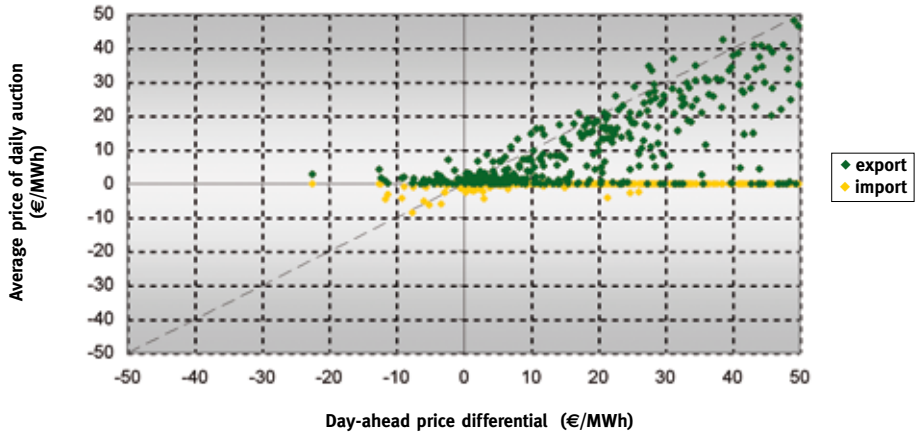


Sources: RTE, Powernext and IPEX; Analysis: CRE

At the English border, the daily auctions offer products in 24-hour bands, unlike those at the Continental borders that offer 24 separate blocks. Therefore, at this border, the price of daily capacity is to be compared with the basic daily price differential; the absence of day-ahead price fixing in England means that an OTC price index is used. Nevertheless, the figure shows a relatively good correlation between the average price of daily capacity and the daily price differential (the correlation coefficient being 0.65) even though there is still high inefficiency due to the explicit allocation mechanism.

[27] In 2007, daily import capacities were allocated on D-2, in the form of bonds.

Figure 9 – Average price of daily capacity at the interconnection between France and England, compared with the price differential between the two markets, in 2008



Sources: RTE and Platts; Analysis: CRE

3.2. Use of daily capacity sold by explicit auction

Ideal use of daily capacities would correspond for each hour in the year to:

- maximum use in the direction of the price differential: the rate of use of capacity (quotient of nominated capacities by available capacities) should be equal to 1;

- no use in the opposite direction to the price differential: the rate of use of capacity should then be zero.

In Table 10 below (which is similar to Table 6 on long-term capacity use), such ideal use would give figures that would all be zeros; Figures 10 to 14 below would show two S -shaped clusters of points (see Figure 15 later for a graphical illustration of ideal use).

Tableau 10 – Use in the opposite direction and under-use of daily capacities in 2008

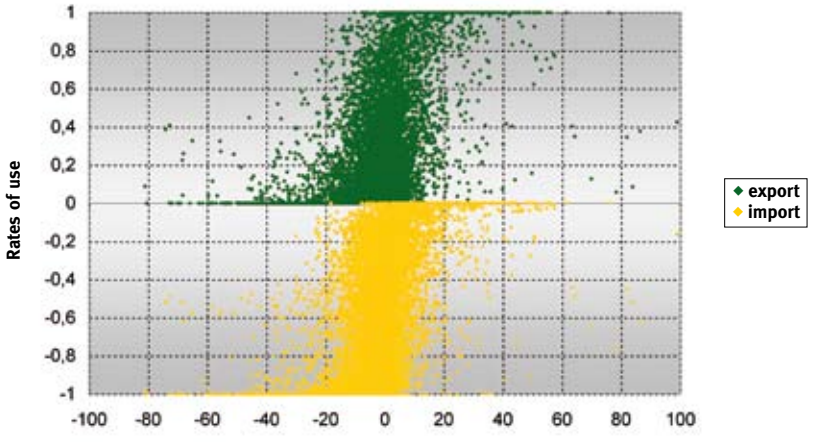
		Capacity used in opposite direction to the price differential (MW)	*Proportion of hours concerned*	Unused capacity in the price differential direction (MW)	*Proportion of hours concerned*
England	Export	653	*75 %*	402	*98 %*
	Import	288	*16 %*	1,559	*100 %*
Germany	Export	458	*68 %*	1,532	*94 %*
	Import	1,178	*96 %*	1,387	*76 %*
Italy	Export	418	*95 %*	455	*44 %*
	Import	337	*31 %*	2,495	*99 %*
Spain	Export	361	*98 %*	416	*37 %*
	Import	90	*22 %*	212	*34 %*
Switzerland	Export	1,797	*100 %*	230	*51 %*
	Import	160	*34 %*	699	*100 %*

Sources: RTE, Powernext, EEX, OMEL, IPEX, SwissIX and Platts; Analysis: CRE

As shown in Table 10, the levels of both capacity used in the opposite direction to the price differential and under-used capacity remain high in 2008.

At the interconnection between France and Germany, daily capacities were almost always used simultaneously in both directions, regardless of the price differential, this even when the differentials were very high (Figure 10).

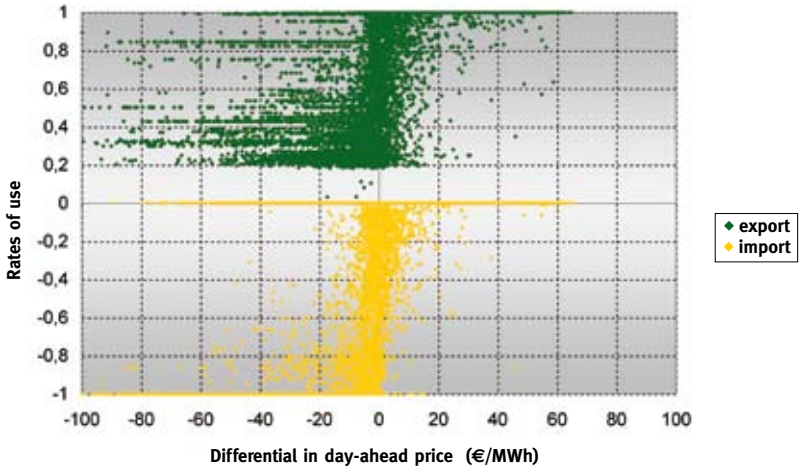
Figure 10 – Rate of use of daily netted capacities at the interconnection between France and Germany, compared with the hourly price differential between EEX and Powernext, in 2008



Sources: RTE, Powernext and EEX; Analysis: CRE

At the interconnection between France and Spain, at least 300 MW of export capacity was used systematically, regardless of the price differential. This corresponded exactly to the capacity that was systematically over-valuated with no connection to the price differential (see Section 3.1). The use of import capacity, on the other hand, responded more accurately to the price differential (Figure 11).

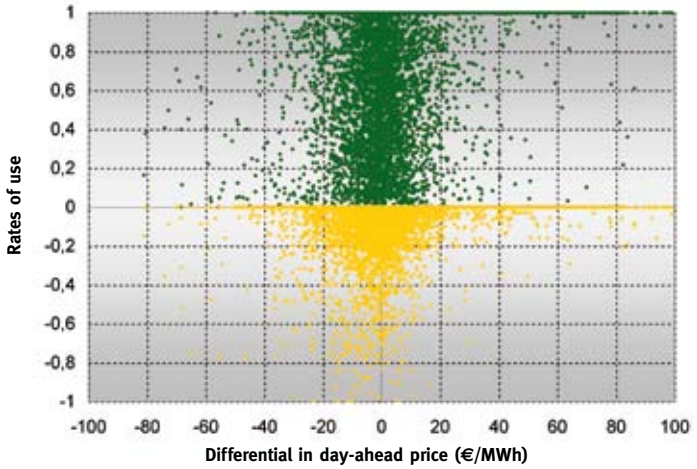
Figure 11 – Rate of use of daily netted capacities at the interconnection between France and Spain, compared with the hourly price differential between OMEL and Powernext, in 2008



Sources: RTE, Powernext and OMEL; Analysis: CRE

At the interconnection between France and Italy, export capacity was almost systematically nominated regardless of the price differential. By contrast, daily import capacity was used very little, irrespective of whether or not the price differential favoured import (Figure 12).

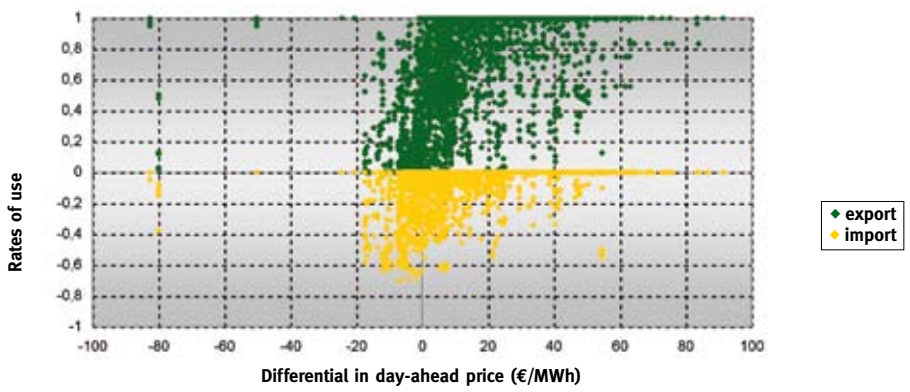
Figure 12 – Rate of use of daily netted capacities at the interconnection between France and Italy, compared with the hourly price differential between IPEX and Powernext, in 2008



Sources: RTE, Powernext and IPEX; Analysis: CRE

Analysis of capacity use at the France-England interconnection differs from analysis of use at Continental interconnections, for two reasons. Firstly, as discussed above, long-term capacity is not firmly nominated before daily capacity is allocated. Thus capacity use can be analysed only based on the total interconnection capacity, and not just on capacities allocated on a daily basis. Secondly, and this is what makes it difficult to produce a reliable analysis, on the British market, there are no hourly prices fixed on D-1 as there are on the continental organised markets. So the hourly use of the interconnection capacities can only be compared with the average prices over 12 hours (peak and off-peak), which strikes out the price differential. Figure 13 should thus be considered with caution. Despite these approximations, it is clear that the same inefficiencies apply to the use of this interconnection as to that of the French continental interconnections.

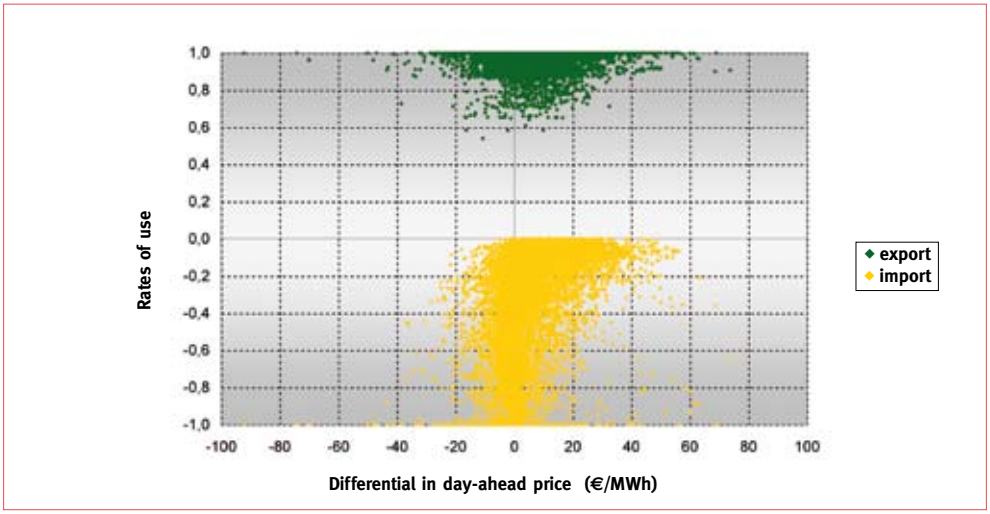
Figure 13 – Rate of capacity use at the interconnection between France and England, compared with the difference in peak/off-peak price between the two markets, in 2008



Sources: RTE and Platts; Analysis: CRE

At the France-Switzerland interconnection, it is not possible to make the same calculations because export capacities are not allocated, since long-term contracts still have priority there and account for nearly all of the export capacity. Since there is no import congestion, the daily allocation mechanism is pro-rata. However, it is possible to compare the nominations at the interconnection with net import and export capacity, and to view the rate of capacity use calculated in this way in relation to the price differential between the two organised markets (Figure 14).

Figure 14 – Rate of use of daily netted capacities at the interconnection between France and Switzerland, compared with hourly price differential between SwissIX and Powernext, in 2008



Sources: RTE, Powernext and SwissIX; Analysis: CRE

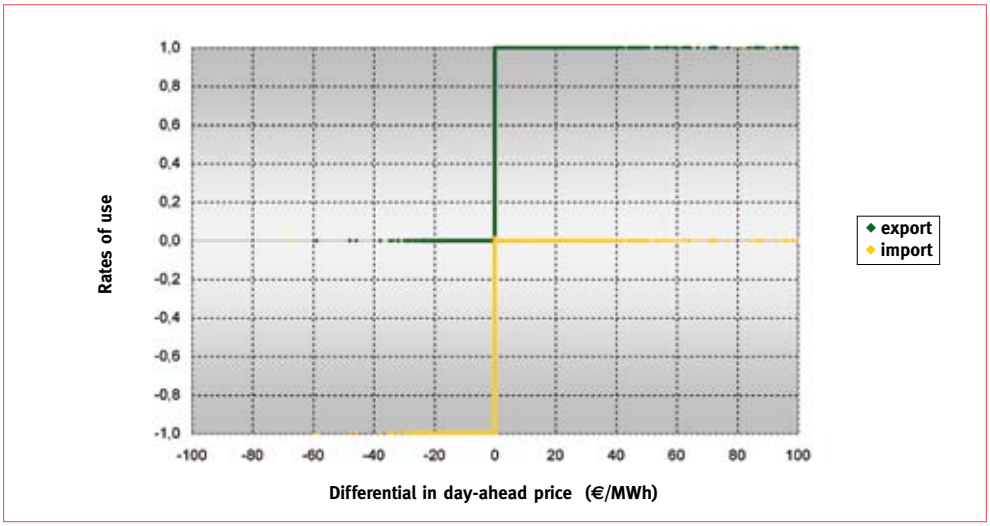
3.3. Use of daily capacity allocated by trilateral market coupling

Trilateral market coupling (TLC) allows for the allocation and use of daily capacities between France, Belgium and the Netherlands. In 2008, coupling was possible throughout the year, as shown in Figure 15. No technical problem disrupted the mechanism, as it did the previous year[28].

Thus throughout the year, the daily flows were perfectly consistent with the prices (by definition of the coupling algorithm), which allowed optimal economic merit order for offers made on the three power exchanges (Figure 15).

[28] The TLC did not function for two consecutive days in 2007. The fall-back mechanism (explicit auctions) was used instead.

Figure 15 – Rate of use of daily netted capacities at the interconnection between France and Belgium, compared with hourly price differential between Belpex and Powernext, in 2008



Sources: RTE, Powernext and Belpex; Analysis: CRE

Coupling the markets produces strong convergence in prices on the three organised markets. As can be seen in Table 11, French and Belgian prices were the same for 82% of the year. All three markets even had identical prices for 66% of the year, as opposed to 63% the previous year.

Table 11 – Convergence in hourly prices on Powernext, Belpex and APX in 2008

	Proportion of hours in 2008	*2007 figures*
All three prices the same	66 %	*63 %*
Only Powernext and Belpex prices the same	15 %	*27 %*
Only APX and Belpex prices the same	17 %	*9 %*
No prices the same	2 %	*1 %*

Sources: Powernext, Belpex and APX; Analysis: CRE

3.4. Valuation of the "loss in social welfare" due to absence of implicit methods

The "loss in social welfare"[29] due to the absence of market coupling at the German, English, Spanish, Italian and Swiss borders is estimated as follows: for each hour, it is the positive part of the price differential between the power exchanges and the daily capacity that remains unused (if part of the capacity is not used, no exchange in favour of social welfare will be made) or used in the opposite direction (if part of the capacity is used in the opposite direction, its exchange is detrimental to social welfare). This estimate should be considered with caution (Box 4). Nevertheless, it does at least give us a general idea of the scale of the loss in social welfare on each border (Table 12).

Table 12 – Loss in social welfare associated with the absence of market coupling in 2008

		Loss in social welfare estimated (€M)	Total (€M)	*2007 figures*
England	Export	21	44	*57*
	Import	23		
Germany	Export	49	96	*110*
	Import	47		
Italy	Export	12	128	*47*
	Import	116		
Spain	Export	3	33	*21*
	Import	30		
Switzerland	Export	36	95	*97*
	Import	59		
Total :			**396**	***332***

Sources: RTE, Powernext, EEX, OMEL, IPEX, SwissIX and Platts; Analysis: CRE

The "loss in social welfare" due to the absence of market coupling at French interconnections is rising as it is estimated at 396 million euros for 2008 as opposed to 332 million euros for 2007. Particularly note the significant increase in loss in social welfare due to the absence of coupling at the interconnection between France and Italy (128 million euros in 2008 as opposed to 47 million in 2007). The main reason for this is the relatively low use of import capacity in spite of the convergence observed between prices on the two markets during 2008.

[29] Or loss of collective surplus

Box 4 – Limitation of the loss in social welfare associated with the absence of market coupling in 2008

The estimate follows the "all else being equal" principle and in particular, it does not take into account the possible changes in market operators' behaviour in the organised markets, following the introduction of market coupling. It is indeed difficult to make an ex ante assessment of the impact of the introduction of market coupling on the market operators buying and selling offer strategies in the organised markets.

The estimate does not take market resilience into account, i.e. the impact altering the volumes exchanged has on prices. Better use of daily capacities would lead to price convergence; the figures given in Table 12 are therefore the upper bounds of actual loss in social welfare, which could only be precisely valuated using aggregated curves of supply and demand on each market, or net export curves (see Part 3, Section 5).

As regards England, because no hourly price is fixed on D-1 on this market, the peak and off-peak prices are used to obtain this estimate.

For Switzerland, the estimate is based on net transfer capacity and on the flows in 2008 including those under long-term contracts (thereby assuming that by coupling, all capacity would be allocated on a daily basis). The price reference used for the Swiss market (SwissIX) should also be considered with caution, on account of the low volumes traded on this power exchange.

4. INTRADAY CAPACITY

4.1. Assessment of intraday exchanges in 2008

Access to cross-border intraday trades offers operators greater flexibility for balancing their position when dealing with an unexpected event, and also enables them to engage in short-term arbitrages.

In 2008, three intraday allocation mechanisms co-existed at French interconnections:

- allocation of options through an "improved pro rata" type mechanism, used by RTE at the Swiss border for exports, at the German border for exports, and both ways on the Belgian border;

- allocation of options for nomination, allocated through the explicit auctions mechanism at the Spanish border (in both directions);

- allocation of obligations for nomination through a "first-come, first served" type mechanism, managed by the German TSOs RWE netz and EnBW netz at the German border, in the import direction.

There are no mechanisms for allocation of intraday capacity at the other borders, for various reasons:

- there has been no congestion problem (imports from Switzerland);

- daily-capacity nominations can be changed up to an hour before delivery (interconnection with England);

- the neighbouring country (Italy) has no intraday market.

Except at the Spanish border, intraday capacities at French interconnections have been used very little (Table 13).

Table 13 – Use of intraday capacities in 2008

		Average number of users	Available capacity (MW)	Used capacity (MW)	*Usage rate*
Belgium[30]	Export	1	1,419	25	*2 %*
	Import	2	1,918	41	*2 %*
Germany	Export	3	1,857	85	*5 %*
	Import	3	1,884	88	*5 %*
Spain	Export	2	524	204	*39 %*
	Import	6	692	175	*25 %*
Switzerland	Export	1	939	34	*4 %*

Source: RTE; Analysis: CRE

4.2. Case study: the France-Spain interconnection

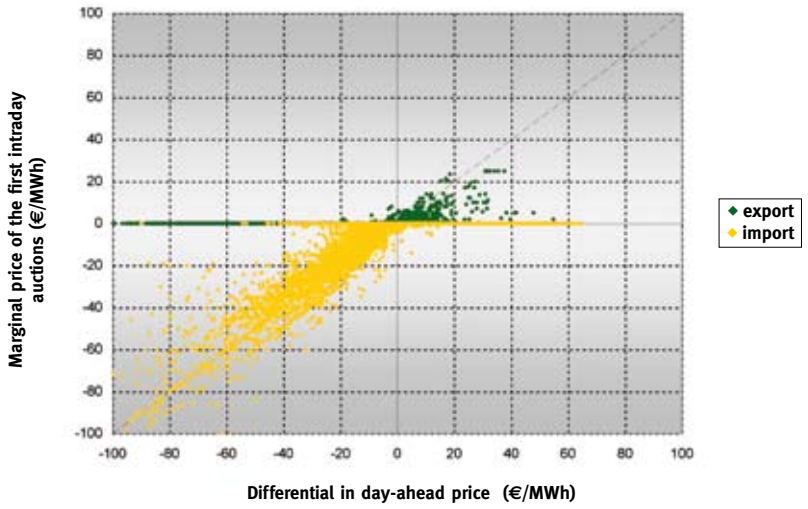
At this interconnection, the daily capacities are systematically used in the export direction, at a level of 300 MW minimum (over 90% of all nominations in hourly steps are for over 300 MW), regardless of the price difference between OMEL and Powernext (see Section 3.2). Through the netting of daily capacities, this capacity is automatically offered as intraday capacity in the import direction. The fact that this minimum capacity of 300 MW is offered systematically enables the market operators to use intraday capacity for arbitrages between markets organised on a day-ahead basis, as the first intraday auctions take place at the end of the day and cover the whole of the following day. However, this was not the initial purpose of intraday exchanges since intraday capacity, which is allocated after the organised markets have closed, can be nil (no reservations can be made on intraday capacity).

In the case of imports from Spain, the possibility of using intraday capacity for arbitrages on the day-ahead markets is very useful for market operators, since the net import capacity, as proposed at long-term and daily auctions, is very low (about 314 MW). The capacity offered at daily auctions at times when the price differential on day-ahead markets was favourable to imports was of 230 MW on average, whilst the capacity offered for these same times at the first intraday auction was of 350 MW on average.

[30] Since 22 May 2007

As shown in Figure 16, there is a clear correlation between the price at intraday auctions for imports and the day-ahead price differential between OMEL and Powernext. The income from these auctions during 2008 amounted to 16.7 M€ for imports, which represents 36% of total auction income for imports. For exports, the same income only amounted to 385,000 €.

Figure 16 – Marginal price of intraday auction on the interconnection between France and Spain, compared with the difference in hourly price between OMEL and Powernext, in 2008



Sources: RTE, Powernext and OMEL; Analysis: CRE

5. BALANCING EXCHANGES

Cross-border balancing exchanges help to secure supply and reduce the cost of imbalance settlement, as they provide cheaper offers to network operators, and hence increase competition on the balancing market.

5.1. Review of balancing exchanges in 2008

Balancing exchanges between France and neighbouring countries may now take place in the context of:

- *The balancing mechanism.* Offers from abroad are filed with French offers and are appealed to when they are in order of economic precedence.

- *Contracts between RTE and its neighbouring TSOs to exchange emergency reserves.* Offers from abroad are considered only as a last resort, when available offers from the balancing mechanism have been exhausted.

Generally, only Swiss and German players make offers on the French system, which is the case when the balancing mechanism works normally. In theory, access to the balancing mechanism is also open to British, Spanish and Italian players, but in practice, the organisation of the intraday market in these Member States, together with the obligation for those involved in balancing to acquire interconnection capacity in order to supply balancing offers, makes it impossible for them to participate in the French balancing mechanism.

As in the previous year, foreign participation in the French balancing mechanism was limited to the Swiss and German players' balancing offers which were selected by RTE. These two countries thus still remain the main competition for the historically dominant player in the French balancing mechanism.

Table 14 shows that the market share of foreign players (Swiss and German) remained stable in 2008 in comparison to 2007. They contributed 13% of the volumes traded via the French balancing mechanism (upwards and downwards offers taken together). However, we note that their market share for upward balancing offers fell from 20 to 13 %, whereas downward balancing offers rose from 7 to 12 %. German players increased their market share for downward offers, whereas Swiss players reduced their market share for upward offers.

Table 14 – Participation of foreign operators in the French balancing mechanism in 2008

	Upward offers in 2008	*2007 figures*	Downward offers in 2008	*2007 figures*
Average power [31] bought by RTE in the balancing mechanism	335 MW *(+7 % /2007)*	*312 MW*	461 MW *(+16 % /2007)*	*398 MW*
Average activity by foreign operators [32]	43 MW *(13 %)*	*62 MW (20 %)*	57 MW *(12 %)*	*27 MW (7 %)*
Average activity by Swiss operators	30 MW *(9 %)*	*50 MW (16 %)*	27 MW *(6 %)*	*18 MW (4.5 %)*
Average activity by German operators	13 MW *(4 %)*	*12 MW (4 %)*	30 MW *(6 %)*	*9 MW (2.5 %)*

Sources: RTE; Analysis: CRE

In addition, French market players cannot currently participate in the balancing mechanisms of neighbouring Member States. The main reasons for this are that:

- a legal obstacle exists in Spain: only sites directly connected to the Spanish grid are authorised to submit balancing offers;

- in Germany and Belgium, the balance between supply and demand is managed almost entirely based on reserve capacity as stipulated by contract. If capacity is reserved contractually, the supplier is required to guarantee its availability at all times. This availability requirement automatically excludes cross-border balancing, because it is dependent on capacity availability at the interconnection,

[31] Whatever the reason for activating the offers, apart from reconstructing system services

[32] An accepted upward offer means that a foreign operator imports into France; an accepted downward offer is an export from France.

and this is something that cannot be guaranteed. Indeed, reserving such interconnection capacity for balancing purposes would jeopardise efficient capacity management at interconnections. It would also be in conflict with Article 6 of the EU Regulation 1228/2003, which requires any unused capacity to be put back on the market;

- there is no intraday market in Italy, which means that players cannot change their offers close to delivery time in order to meet the requirements for balancing their portfolios.

However, French balancing offers may be activated by RTE on request from the operator of the British National Grid, to meet the needs of the power system in Great Britain[33] (Table 15). Yet, the price of offers, proposed by RTE to National Grid, is unrelated to the price of available offers on the French balancing mechanism. These arrangements evolved in March 2009 when the first stage of the BALIT project was implemented (see Part 2, Section 2.1).

Table 15 – Requests by National Grid under the BASA (GWh)[34]

	2007	2008
France to England	307	235
England to France	134	60

Source: RTE; Analysis: CRE

Under contracts between TSOs for emergency reserves, balancing exchanges may only be made as a last resort, once all available offers have been used. RTE therefore seeks such reserves outside the normal balancing mechanism, just before resorting to exceptional means[35]. The TSOs exchange offers at prices set the previous day based on prices on the organised markets, using a method predefined in the contract. The availability of these reserves is not guaranteed: the TSOs may at any time withdraw their reserves if facing tension in their own system. When they are available, these emergency reserves can be activated in ten minutes.

RTE has contracts to exchange emergency reserves with all neighbouring countries except Spain, as such operations are not currently allowed under Spanish legislation.

The energy exchanged under emergency contracts in 2008 is shown in Table 16. The price of the energy RTE exchanged under emergency contracts varied in 2008 between €113 and €234 /MWh (it varied between €90 and €340 /MWh in 2007). The volumes requested by RTE in 2008 to maintain the supply-demand balance in France increased in comparison to those in 2007 (3,866 MWh as against 2,852 MWh in 2007), while requests to RTE decreased (4,700 MWh as against 11,200 MWh in 2007).

[33] These offers are directed according to the BASA (Balancing and Ancillary Services Agreement) between RTE and the National Grid to provide ancillary commercial services.

[34] These figures include the National Grid's use of the BASA both in the normal course of running the British balancing mechanism, and also when not enough offers were available (the contract's emergency section). Most exchanges applied the contract in the context of normal operation of the British balancing mechanism.

[35] These are either resources that are available, but limited in use by restrictions imposed on both the balancing player and RTE, or emergency resources (such as voltage reduction, or load shedding).

Table 16 – Calls on emergency reserves (MWh)[36]

	Calls on RTE		Calls by RTE	
	Upwards	Downwards	Upwards	Upwards
Belgium	800	1,500	750	678
Germany	0	0	0	600
Italy	2,400	0	300	0
Switzerland	0	0	1,538	0

Source: RTE; Analysis: CRE

5.2. Development potential for balancing exchanges

As discussed above, only Swiss and German players can currently participate in the French balancing mechanism, and arrangements are not reciprocal. It will therefore require a significant amount of work to develop the access of other foreign players to the French balancing mechanism, and conversely, the access of French players to balancing mechanisms in neighbouring countries.

An appraisal of the use of interconnection capacity shows that a large proportion of the surplus capacity that remains unused by market players could be used for balancing exchanges (see Table 17).

Table 17 – Unused interconnection capacity, available for balancing exchanges in 2008[37]

	Average capacity available for export (MW)	Percentage of hourly steps when capacity available for balancing exports is above 500 MW	Average capacity available for import (MW)	Percentage of hourly steps when capacity available for balancing imports is above 500 MW
Belgium	1,122	67 %	2,130	95 %
England	647	40 %	3,282	100 %
Germany	1,878	89 %	1,882	71 %
Italy	378	26 %	2,953	99 %
Spain	505	43 %	790	53 %

Source: RTE; Analysis: CRE

[36] Excluding England, where no data on the use of the BASA's emergency section is yet available.

[37] Capacity available for balancing exchanges is the difference between net interconnection capacity and cross-border commercial flows (resulting from long-term, day-ahead and intraday nominations).

6. CAPACITY MANAGEMENT BY THE TSOs

6.1. Evolution in capacities

Capacity levels are a complex issue, and a major challenge for the development of the European energy market.

The short-term priority is to optimise the use of existing infrastructure by providing market participants with "*The maximum capacity of the interconnections and/or the transmission networks affecting cross-border flows [...] complying with safety standards for secure network operation*" (Paragraph 3 of Article 6 of EU Regulation 1228/2003). At present, there is clearly a great disparity between the information available to regulators and that available to TSOs on the margins TSOs have at any time to manipulate interconnection capacity and thereby increase the amount available to market players.

In the longer term, the key issue is to develop new transmission infrastructures. This requires firstly close coordination between TSOs to define the real investment needs, secondly simpler authorisation procedures for constructing new lines, and lastly, coordination between the regulators when financing investment.

Several options are being discussed within the context of either the current regulatory requirements or those of the third legislative package, to meet these substantial challenges. They include, for instance:

- an obligation for TSOs to transparently calculate capacity they place on the market;

- an obligation to improve coordination between TSOs, both in calculating capacities and in drawing up regional investment plans;

- the introduction of a regulatory context facilitating coordinated redispatching between TSOs (see Box 5);

- the introduction of appropriate incentives, aimed ultimately at accelerating market integration (see Part 3, Section 5).

Box 5 – Moving towards a regulatory framework better suited to methods of coordinated redispatching[38]

Calculating interconnection capacity is a complex problem: TSOs need to find a balance between capacity offered on the market and the level of risk that a commitment to this capacity represents. According to EU Regulation 1228/2003, coordinated redispatching may enable TSOs to maximise the offered interconnection capacity, while guaranteeing capacity firmness and network security, at the best cost.

Nevertheless, the second ERGEG report assessing the compliance of congestion management methods at European interconnections with EU Regulation 1228/2003[39] highlighted how little this mechanism was used in Europe. Reasons for this could include the lack of any suitable regulatory framework, and a lack of compatibility in European market designs.

For instance, discussions on sharing the costs of coordinated redispatching are continuing at the border between France and Spain, without reaching any agreement. Some TSOs have even questioned the principle of physical firmness of capacity at interconnections; German TSOs in particular consider that they do not have all the necessary tools to set up coordinated redispatching actions.

CRE would like to see more coordinated redispatching, in order to encourage more firmness of capacities, to maximise the offered interconnection capacity and to improve economic efficiency while guaranteeing better network security.

The main objectives to work on have been identified as:

- *Better coordination between TSOs*. Exchanging current information and jointly analysing critical network situations would enable TSOs to, together, find ways to effectively reduce congestion. CRE strongly supports the recent moves towards greater cooperation between TSOs. Since the Coreso coordination centre was established, joint actions to relieve network constraints have already been devised and implemented successfully, demonstrating the interest in developing coordinated redispatching.

- *Drawing up a common regulatory framework*. CRE would like to see regulators agreeing on common principles covering both cost sharing and recovery, as well as control and regulation of these redispatching practices. Implementing incentive mechanisms would also promote an efficient use of redispatching on a regional level.

- *Harmonised mechanisms for relieving constraints*. All TSOs must have the necessary tools and power to redispatch generation if there are constraints on the network.

[38] Coordinated redispatching is sometimes known as counter-trading. TSOs do not use D-1 allocation mechanisms, but trade exchanges after the D-1 stage.

[39] See the document on the ERGEG website : http://tinyurl.com/nhddyu

- **Evolution in net transfer capacities**

TSOs estimate each day the total capacity they will be in a position to allocate two days later. The estimate is based on:

- consumption and production forecast;

- expected network configuration, especially lines under maintenance.

Table 18 shows the average, first and last deciles for the Net Transfer Capacity estimated at D-2 (D-2 NTC), calculated for hourly steps for an entire year, for the interconnections with Germany, Belgium and Spain. This calculation is not given for the other French borders, for the following reasons:

- Export capacity offered at the interconnection between France and Italy is a target capacity which is fixed each year for the following by the five TSOs who are present at the northern Italian borders. Since 2003, RTE and TERNA have offered 2,650 MW in winter and 2,400 MW in summer, except in August when the capacity is lower due to maintenance. Since January 2007, the offered import capacity (995 MW in winter and 870 MW in summer) has also been a target capacity. Before 2007, TSOs did not calculate capacity at the interconnection in this direction.

- At the interconnection between France and Switzerland, capacity is calculated in order to cover long-term contracts between historical operators in the two countries.

- At the interconnection between France and England, which consists of cables carrying direct current, the total interconnection capacity (2,000 MW) is offered on the market except in the case of damaged cables.

As a reminder, the deciles are the nine values that divide a set of sorted (here in ascending order) data items into ten equal groups, so that each group represents one tenth of the population sample. Thus the first decile separates from the rest the 10% of data items with the lowest values; the ninth decile separates the 10% with the highest values from the other 90%.

Table 18 – Changes in net capacity offered at D-2 (MW)

		2008			2007			2006		
		Average NTC D-2	First decile	Ninth decile	Average NTC D-2	First decile	Ninth decile	Average NTC D-2	First decile	Ninth decile
Belgium[40]	Export	2,532	1,800	3,400	2,575	1,900	3,300	2,639	2,000	3,400
	Import	898	650	1,100	1,001	700	1,300	1,130	1,100	1,200
Germany	Export	1,965	1,600	2,300	1,568	1,300	2,100	1,477	1,330	1,700
	Import	3,340	2,243	4,500	4,373	3,760	4,904	4,565	4,500	4,800
Spain	Export	977	300	1,300	1,058	400	1,400	1,138	800	1,400
	Import	278	200	300	289	300	300	386	300	450

At the German border, we note that the level of available export capacity was stable for two years, then grew strongly in 2008 (+25%). Moreover, the downward trend in the available import capacity observed over the last two years was more marked in 2008, when the average level of available capacity was 1000 MW down from the previous year.

At the Belgian border, the average capacity decreased in both directions but especially for imports (10% down from 2007). This is explained by the large amount of scheduled work at the interconnection (a total of 193 days). In the import direction, capacity was equal or inferior to 800 MW during 86 days.

In 2008, the average annual export NTC at D-2 at the interconnection between France and Spain was 977 MW, continuing the downward trend observed since 2006. The import average dropped slightly to 278 MW. It is, however, important to note that for more than 10% of the time; the NTC at D-2 was no more than 200 MW, whereas in 2007 it did not fall below 300 MW for more than 10% of the time.

- **Evolution in capacities offered at long-term auctions**

As regards maximising offered long term capacity, as firmly requested by many market players[41]:

- the allocated yearly capacity should correspond to the minimum (hourly) level of the NTC observed during the year;

- the sum of allocated yearly and monthly capacities should correspond to the minimum (hourly) level of the NTC observed during the month.

To eliminate extremely low NTC values, which correspond to situations where TSOs could take special measures (such as capacity reduction or redispatching), the lowest eight NTC values (observed during 1% of each month[42]) are ignored in the calculation. The value then obtained corresponds to the first percentile of the NTC.

[40] Data on the export NTC at D-2 is only dated from October 26th,2006.

[41] See for instance the publication from the EFET, http://www.efet.org/Download.asp?File=6342

[42] The 1% value is set arbitrarily.

Capacity calculations are currently not always based on the assumption that capacity offered over the long term must be maximised. For instance, some capacity is retained at the Belgian border for the daily market coupling.

In Table 19, the first two columns compare the yearly allocated capacity with the available capacity, that could have been offered to players if account had been taken of the measures specific to TSOs (such as coordinated redispatch, capacity resale, etc). The capacity that could have been offered is taken to be the minimum available capacity observed, excluding eight hours in the most constrained month.

The last two columns compare the average capacity allocated for the year and month with the average available capacity which could have been offered to players at this time scale if account had been taken of the special measures (such as coordinated balancing, capacity repurchase, etc.). The capacity that could have been offered is taken to be the minimum available capacity observed, excluding the most restricted eight hours in each month.

Table 19 – Offered long term capacity and theoretical capacity

		Annual capacity offered (MW)	First percentile for the minimum month	Average of the sum of LT capacities offered each month	Average of the first monthly percentiles
Belgium	Export	1,300	1,700	1,467	2,125
	Import	400	600	579	733
Germany	Export	700	1,400	1,460	1,679
	Import	1,000	1,251	1,575	2,223
Italy (excluding August)	Export	1,800	1,482	2,446	2,316
	Import	700	870	949	984
Italy (August)	Export	1,000	1,050	1,100	1,050
	Import	700	870	870	870
Spain[43]	Export	150	50	430	396
	Import	100	0	207	83

At the interconnection between France and Germany, there is clearly a big difference between the offered yearly capacity and the base capacity available all year, assuming that special measures are taken for less than 8 hours in each month. The difference between the average long-term capacity and the average capacity available (assuming that special measures are taken for fewer than 8 hours in each month) is also significant, especially in the import direction.

The situation at the Belgian border is similar, although the differences are less marked. The gap is also larger in the export direction.

[43] Products allocated at this border allow for periods of scheduled unavailability.

The Italian border is particular for three main reasons:

- Different types of products may be offered for the same time scale: for example, base and peak products may be bought at monthly auctions in the direction of export to Italy.

- Annual maintenance is systematically scheduled for August, hence the distincton drawn in the Table.

- A target capacity is fixed yearly by the TSOs present at the northern Italian borders.

This last feature allows TSOs to allocate long-term capacity at levels close to those of the NTC at D-2. However, this benefit comes at a price: the TSOs' commitment obliges them to do all they can to provide the capacity, and this may disadvantage the other borders (Box 6) and may as well present a considerable financial cost.

In the first two columns of the row excluding August, the annual capacity in the export direction is higher than the first percentile for the most restricted month. This is because there were floods in the south-east of France at the end of May, the impact of which lasted into June.

Box 6 - Method for distributing physical margins at the French eastern borders

RTE uses a reference base case to determine for each facility in the transmission network the physical margin still available after meeting the "N-1" criterion, which requires the structure considered to be able to support the additional flows caused by the accidental loss of any other part of the network.

RTE splits the physical margin obtained at each of the considered facilities using the following rule:

- for long-term or daily capacity, RTE allocates half the physical margin at the border between France and Belgium and half at the border between France and Germany. (Capacities at the French borders with Switzerland and Italy are fixed);

- for intra-day capacity, RTE allocates one third of the physical margin at each of the three French borders with Belgium, Germany and Switzerland (Capacity at the interconnection between France and Italy is fixed).

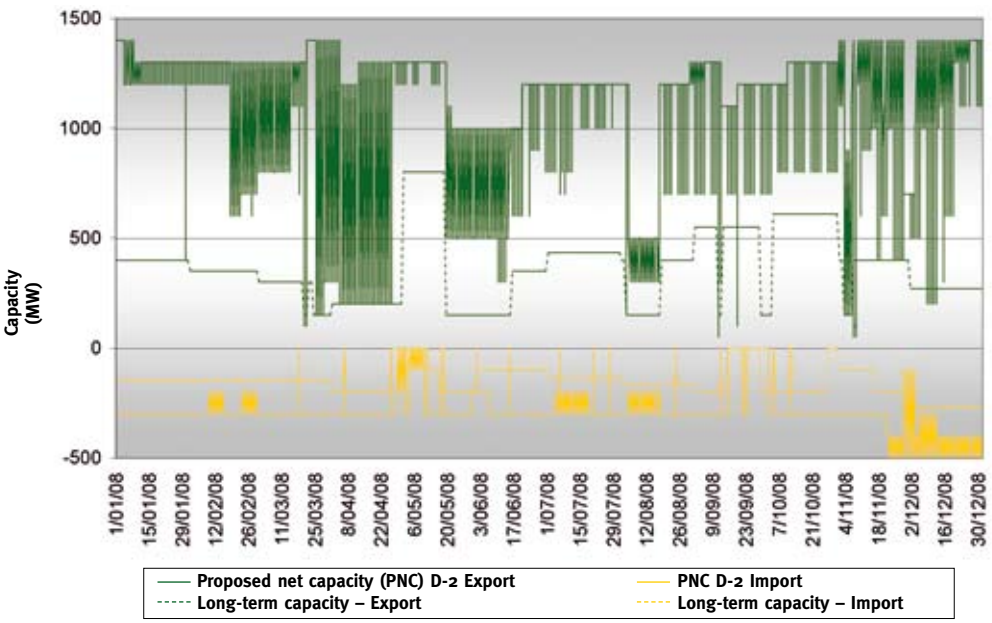
The Available Transfer Capacities (ATCs) that may be used simultaneously are calculated by dividing the physical margin allocated at each border by the Power Transmission Distribution Factor (PTDF) of an exchange on the facility under stress.

The minimum ATC calculated for each facility is the one used.

Sharing the physical margin in this way is not the best way to attribute capacity to the borders that need it most. A flow-based method of capacity allocation would correct this lack of optimisation.

The situation at the Spanish border is particularly complex to analyse: some products include periods of unavailability, and power cuts at this interconnection are relatively frequent because of constraints on the Spanish grid (see Box 7). Figure 17 provides a better route to understanding the match between long-term capacity and the level of the NTC at D-2.

Figure 17 – Net capacity and long term capacity at the interconnection between France and Spain in 2008



Source: RTE; Analysis: CRE

It is evident that the average capacity allocated in some months was greater than the capacity for the eight most restricted hours. However, it was also very much lower in other months. Thus even if more than eight hours of special measures were required in some months, this was not so for others, where the level of long-term capacity was lower than the level of the NTC at D-2.

Box 7 – Analysis of the capacity calculated by each TSO at the border between France and Spain

When TSOs share the results of their capacity calculations at a given border, they choose the smallest calculated capacity, so that each TSO can guarantee the safety of its network. The limiting TSO (the one that offers the lowest capacity) is most often the TSO for the exporting country. Thus German TSOs do not calculate capacity for the French-German border in the France to Germany direction. When exporting electricity from France to Germany, the French network is the more restricted. Similarly, RTE does not calculate capacity in the France to Germany direction.

An analysis of the data on monthly capacities that REE (the Spanish TSO) and RTE offer each day of the month at the border between France and Spain (during the period from May 2007 to June 2008) confirms that in the Spain to France direction, REE nearly always offers less capacity than RTE. Flows from Spain to France are particularly constrained by the Spanish network, so that the differences in offered capacity are on average of 1,000 MW, and can even reach 1,300 MW.

Nevertheless, RTE does not necessarily offer a lower capacity than REE does in the France to Spain direction. Over the same period as before, REE is the limiting TSO for between 35 and 41% of the time (depending on whether considering peak hours or not). The gap between capacities can be significant and is generally caused by malfunctioning facilities on the Spanish network. When RTE is the limiting supplier, the gap between offered capacities is on average of around 560 MW. There are two reasons for the differences:

- a significant facility failure constrains the French network;

- high consumption levels are forecasted, in particular during cold spells in winter and heat waves in summer.

6.2. Capacity curtailments and redispatching costs

TSOs often face situations where the long-term capacity they have allocated cannot be used in practice, because it would jeopardise network safety. Several methods are potentially available to them to manage these constraints (see Part 3, Section 1.2). RTE currently uses the following methods to manage network security:

- *Reducing allocated capacity:* holders of long-term capacity may be deprived of some of their transfer rights in exchange for compensation.

- *Reorganising production schedules or redispatching:* TSOs can relieve constraints by using the balancing mechanisms to make offers at either side of the border.

- *Changing the network topology:* some lines have phase-shifting transformers that TSOs can use to redirect network energy flows over the network in real-time.

These methods are neither equivalent nor equally efficient for managing constraints. For instance, reducing capacity is pointless unless the decision to use it as a preventive measure to ensure network security is taken sufficiently far ahead - and in any case before the long-term capacity nominations. It has only an indirect impact on physical energy flows, with no guarantee that the resulting

change to those flows will actually relieve the constraint, so the method cannot be considered in any way as a last resort corrective measure to guarantee network security.

On the other hand, given as redispatching and changing network topology directly affects physical flows and constraints, these are the only effective corrective measures that can secure the network more or less immediately.

Using these methods can be costly for the TSOs. For instance, installing phase-shifting transformers to change the network topology incurs a substantial fixed cost. Redispatching also has a cost, that of the offers taken up using the balancing mechanism (Table 20). These offers must be taken up in increasing price order and with regard to their impact on the constraint: under Article 1.3 of the Congestion Management Guidelines, the actions that TSOs take must be economically efficient. The method used by RTE to determine the costs of international congestion and congestion internal to the French network is currently under discussion (Box 8).

Table 20 – Costs, as presented by RTE, of redispatching to guarantee interconnection capacity levels in 2008

	Costs declared by RTE (€k)
Belgium	68
England	0
Germany	362
Italy	417
Spain	255
Switzerland	96
Total :	**1,198**

Source : CRE

It is clear that the total cost of redispatching fell significantly in 2008 (1.2 million euros as opposed to 6.72 million euros in 2007). This difference is due to the commissioning of the new Lyon-Chambéry line on October 19th,2007, which has cleared network congestion in South-East France and considerably reduced the need for redispatching at the Swiss and Italian interconnections.

Box 8 - Method used by RTE to spread the cost of redispatching

For its calculations, RTE divides its network into seven electricity regions. The network is linked to the rest of Europe by six interconnections.

RTE estimates the cost of alleviating congestion due to national exchanges on the one side and due to cross-border exchanges on the other side in proportion to the sum of the Power Transmission Distribution Factors (PTDF)[44] it has calculated for the seven regions and the six interconnections. RTE only considers PTDFs higher than 3% in its calculations, as these are aggravating the constraint.

Similarly, capacity reductions involve a cost for the TSOs, since under Paragraph 2 Article 6.2 of EU Regulation 1228/2003, they must compensate players who lose their rights. The current compensation scheme for Continental interconnections is based on the "110% rule", where the loss of an allocated transfer right is compensated at 10% of its initial value, in addition to its refunding (Table 21).

Regulators in the South-West region have decided to devise a compensation scheme based on the price differential on the day-ahead markets, with caps limiting the financial risk borne by network users. It was implemented at the border between France and Spain in June 2009 (see Part 2, Section 4.1).

Table 21 – Capacity curtailments in 2008 at the Continental borders and the compensation cost

		Average amount of reduction (MW)	Average share of long-term capacity	Number of hours affected in the year	Compensation cost using the 110% rule (€k)	Compensation cost using the price differential (€k)
Belgium	Export	0	0 %	0	0	0
	Import	0	0 %	0	0	0
Germany	Export	0	0 %	0	0	0
	Import	0	0 %	0	0	0
Italy	Export	644	28 %	151	1,668	389
	Import	0	0 %	0	0	0
Spain	Export	205	57 %	98	70	51
	Import	155	76 %	207	474	609
Total :					**2,210**	**1,049**

Sources: RTE, Powernext, OMEL and IPEX; Analysis: CRE

At the Spanish border, in addition to capacity reductions in the import direction, the yearly product was interrupted for 2,904 hours in 2008 (as opposed to 456 hours in 2007). These interruptions did not trigger compensation, because they were planned ahead and their details included in the auction specifications. They were generally caused by work on the interconnection lines.

[44] The Power Transmission Distribution Factor in an exchange between x and y at a facility z is the additional power flowing through facility z because the volume of the exchange has been increased. The factor is expressed as a percentage.

Unscheduled reductions that triggered compensation were generally caused by work on RTE's or REE's internal networks, or by a low generation margin in Spain.

The total cost of compensation at the border was reduced by half between 2007 and 2008, from around 1.1 million euros to around 550,000 euros. Both a price and a volume effect appear to contribute to the drop in reduction costs between 2007 and 2008. As regards volume, the decrease (by a factor of 2.7) in the duration of the reductions more than offset the increase (+45%) in their average magnitude in the export direction, so that the overall volume of reductions eligible for repayment fell by 34%. As regards price, the value of the yearly export capacity fell by 12%, and in months when reductions occurred, the average price of monthly capacity was not much higher than that of the previous year. The average magnitude of reductions and the number of hours eligible for repayment slightly increased in the import direction, but the average price of long-term capacity was noticeably lower than in the previous year (€15 /MWh in 2008 as against €32 /MWh in 2007).

At the Italian border, some long-term products were also unavailable for periods accurately defined in the auction specifications. However, there were also some reductions triggering compensation at this border, for 644 hours in the direction of export to Italy. These reductions were mainly caused by a contingency at the end of May which extended into June. In the import direction, no reductions triggered compensation.

At the English border, the mechanism differs radically from the simple 110% rule applied at other French borders. In addition, the particular features of congestion management at the France-England interconnection (listed below) preclude the type of analysis applied at other French borders:

- *Products are not guaranteed to be firm:* capacities allocated for different periods of time have a target availability rate defined in the auction specifications.

- *Long-term and daily capacity is not nominated firmly:* actors tell TSOs on D-1 if they intend to nominate acquired capacity. They can change their nominations at any of the six intraday gate closures, within the intraday transfer limits defined by the interconnection managers (RTE on the French side and National Grid Interconnector Licence or NGIL on the English side).

- *Capacity reductions can take place in real-time.*

On this basis, RTE and NGIL calculate, ex-post, the actual availability of each type of capacity for each market player. The impact of a reduction in long- or short-term capacity thus varies from player to player, depending on the types of capacity he holds and the nominations he has made.

The TSOs then compare the rate of actual availability of capacity each player holds with the rate of target availability defined for every type of acquired capacity.

If the actual availability proves to be below target, holders are reimbursed by TSOs for the capacity shortfall, based on the price they had paid for the capacity. Conversely, when actual availability proves to be above target, capacity holders must repay the TSOs for the additional capacity used.

Each interconnection operator calculates the reconciliation invoice in one interconnection direction. During 2008 € 1,654k was paid to players for export flows to England (Table 22). The estimated amount of compensation paid to players for import flows was € 626k.

Table 22 - Capacity reductions in 2008 at the interconnection between France and England and the compensation cost

	Average amount of reduction (MW)	Number of hours affected in the year
Export	591	1,780
Import	689	207

Source: RTE; Analysis: CRE

6.3. Auction cancellations

Table 23 shows the cancelled daily auctions[45].

Note that at the Spanish border, the first round of intraday auctions on October 14th and the second round of intraday auctions on June 9th were cancelled at REE's request.

Table 23 – Daily explicit auctions cancelled in 2008

		Number of daily auctions cancelled
England	Export	0
	Import	0
Germany	Export	2
	Import	0
Italy	Export	4
	Import	2
Spain	Export	6
	Import	6
Total :		**20**

Source: RTE; Analysis: CRE

[45] Table 23 shows the cancellations caused by defaults in the auction system. Auction cancellations caused by lack of day-ahead capacity is not taken into account here.

7. GENERAL OVERVIEW OF THE MANAGEMENT AND USE OF FRENCH INTERCONNECTIONS IN 2008

French interconnections are still too rarely saturated and are often used in the opposite direction from the market price differential (see Tables 2 and 13). During three quarters of the time, capacities available to the market throughout the year are not used to their maximum, even when the price differences between the markets would justify exchanges. Consequently, prices on the French market and on neighbouring markets generally converge for less than 10% of the time.

This applies to all interconnections apart from the one between France and Belgium, where prices are highly convergent (for 82% of the time), and capacities are used efficiently to their maximum. Prices on the French, Belgian and Dutch markets have continued to converge since the three markets were coupled in 2006, reaching 66% of full convergence in 2008.

Better use of existing capacities requires the following main improvement initiatives:

- *Extending market coupling to all French interconnections.* Such coupling would allow available capacity at D-1 to be used with maximum efficiency.

- *Improving the intraday allocation mechanisms.* We note that in practice, less than 5% of available capacity is generally used.

- *Developing balancing exchanges between TSOs.* Although foreign players are already the main source of competition for the French balancing mechanism, their participation could be extended.

At the continental interconnections, the use of capacity resale mechanisms increased significantly in 2008. For all interconnections taken together, half the holders of long-term capacity used this service (Table 10). This indicates that long-term transmission rights allocated by the TSOs are increasingly being used as pure financial instruments for arbitrage.

As in 2007, capacity transfer mechanisms at all French interconnections are still very little used. This means that the current mechanisms are failing to meet the needs of market players, who have made this a priority.

Auction income for 2008 has reached 383 million euros. However, prices on the Italian and French markets converged significantly during 2008 (in 2007, the Italian market prices were above the French market prices for 93% of the time, whereas in 2008, they were lower only for 50% of the time). This, together with lower differences in long-term prices on the French and most neighbouring markets, noticeably reduced auction income from yearly products in 2009 (down 40%, or 155 million euros on 2008).

Given the disparity of information available to regulators and to TSOs, it is difficult to assess the significance of the amount of capacity allocated at the long-term timeframe. However, particularly on the Belgian and German interconnections, where capacity has not been reduced over the past few years[46] , the results of analysis in this part indicate some room for improvement as regards the distribution between different types of capacity, in favour of the long-term horizons. Such improvements should be achieved by a closer coordination between TSOs, fostered by the new technical coordination centre, Coreso.

It appears that the total cost of redispatching fell significantly in 2008 (1.2 million euros as opposed to 6.72 million euros in 2007). This difference was due to the commissioning of the new Lyon-Chambéry line on October 19th,2007, which has cleared network congestion in South-East France and considerably reduced the need for redispatching on the Swiss and Italian interconnections.

[46] At the interconnection between France and Germany, capacity was last reduced in 2004, even before there were any means of allocating capacities in the import direction.

PART 2
Regional initiatives: state of progress and priorities

1. THE CENTRAL-WEST REGION

1.1. Key events in 2008

- **Implementation of a single regional platform for long-term explicit auctions**

The process of harmonising and improving the rules at a regional level started in 2007, but no concrete results were delivered until 2008, when CASC-CWE, the subsidiary common to the region's seven TSOs, was created. Its role is to allocate long-term interconnection capacity within the region by explicit auctions[47].

CASC-CWE held its first auctions in November 2008, using the current auction rules (there were three different sets in the region). Not all the CASC functionalities were operational for the first auctions: for instance, exchanges on the secondary market were still managed by pre-existing auction platforms.

This first stage will be followed by a complete harmonisation of the auction rules at a regional level and the launch of all CASC functionalities in autumn 2009.

The harmonised rules have been heatedly debated by the TSOs and regulators, and have been submitted for public consultation. From the initial draft of the rules, the TSOs proposed that unused long-term capacity should automatically be resold as daily capacity (use-it-or-sell-it mechanism). Apart from the improvements it brings, the regional harmonisation of these rules is a very important step towards the intergration of Central-West markets.

In addition, CRE continues to monitor closely how ERGEG's position on firmness of capacities after the nomination stage is applied at the border between France and Germany (see Part 3, Section 1.1).

[47] CASC-CWE will also hold daily auctions at the German borders, until regional market coupling is launched.

- **Important work carried out in 2008 on the regional market coupling project**

The regional coupling project extends the trilateral coupling (TLC) between France, Belgium and the Netherlands to Germany. The project partners (TSOs and Power Exchanges) worked extensively on this project in 2008. The project is included within the regulators' action plan, and is also the subject of a Memorandum of Understanding signed by all the stakeholders of the five countries in the region (project partners, regulators, governments and representatives of market players). The project is monitored as part of both the regional Central-West Initiative, and the Pentalateral Energy Forum (PLEF), steered by the governments of the five countries in the region.

This project has two different parts:

- defining the coupling algorithm and the way it interacts with features of the national markets (work carried out by the electricity Exchanges);

- defining a flow-based approach (work carried out by the TSOs) that represents the existing network constraints more effectively and transparently than the standard ATC-based method of calculating capacity.

TSOs and Power Exchanges have provided detailed studies that cover the key stages in the project:

Orientation Study (February 2008), supplemented by a Progress Report (April 2008)

This study defined the criteria that the algorithm should satisfy. The COSMOS algorithm was selected from among a number of different options, mainly because of its efficiency and ability to be extended to other markets. The project has also chosen price coupling, rather than volume coupling, which can be inefficient and does not prohibit flows against the price differential. Volume coupling had initially been selected by the project partners for the German borders, in spite of the reluctance of some regulators, including CRE, because of legal and technical obstacles to implementing price coupling in Germany. Collaboration between Powernext and EEX, which led to the transfer of all EEX day-ahead activity in France within EPEX Spot, has removed these obstacles.

Work on network modelling has delivered the initial results of tests of the flow-based method. Instances of "pre-congestion" figured with a significant frequency. In such situations, the modelling identified lines that were already under stress, even before the coupling process.

In the context of the flow-based method, the study has also highlighted some counter-intuitive results, with, for instance, commercial flows directed towards the least expensive market. However, these results do not represent an economic inefficiency; they in fact arise because of the regional scale of the optimisation. The target objective (social welfare) has a regional optimum that is not simply the sum of the local optima. For instance, to lift a particular constraint and hence gain significant benefit at a regional level, a particular flow can be operated at one border against the price differential.

Implementation Study (August 2008), supplemented by an Addendum (November 2008)[48]

The publication of this study marked the end of the project's elaboration phase. A detailed implementation schedule has been drafted, with two main phases. Regional coupling will start in March 2010, using ATC-based network modelling. Since the test results for the flow-based method were not conclusive, in particular because of instances of "pre-congestion", the method requires more testing, which will be carried out in parallel with ATC-based coupling. If the new simulations, based on real-time data, give satisfactory results, flow-based coupling will be implemented in December 2010.

For the first phase of the project, TSOs have elaborated a new method for calculating capacity; as the current method makes a bilateral calculation at each border and cannot deal, in every situation, with the cross-border flows resulting from the coupling process. These flows could behave very differently from the way they are seen to do now, since the flows will react immediately in response to market prices. TSOs therefore plan to validate capacities calculated on both sides using a grid model common to the entire region, whilst allowing the capacities to be adjusted downwards if one of the TSOs of the region anticipates a constraint on its network. TSOs still have to carry out simulations using this method, in order to measure the impact of potential adjustments on the coupling results.

- **Implementing interim intraday mechanisms at all borders within the region**

Mechanisms for allocating intraday capacity at Dutch borders were elaborated during 2008, supplementing the existing mechanisms at other borders within the region. Thus two types of intraday mechanisms coexist within the Central-West region:

- an explicit allocation of options based on a prorata mechanism, with gate closures for allocation and nomination (at the French-German border in the export direction, at the French-Belgian border since May 2007; and at the Belgian-Dutch border since May 2009);

- an explicit and continuous allocation of obligations on a first come, first served basis (at the French-German border in the import direction, and at the German-Dutch border since the end of 2008).

These mechanisms are considered transitional, until a harmonised and more effective regional solution is found (see Section 1.2 below).

- **New perspectives for managing physical flows and calculating capacity**

TSOs in the region follow a common procedure to calculate capacity for long-term timeframes (yearly and monthly). However, using this procedure, each TSO makes its own assumptions as to what situations are critical for its own network, and based on its assessment, it calculates the long-term capacities at its borders. At each border, the lower of the two capacities calculated by each TSO is used. The way capacity is calculated thus remains specific to each TSO and there is no common view of the network shared by all the TSOs in the region.

[48] Both documents are available on the ERGEG website : http://tinyurl.com/npvrxn

In December 2008, RTE and its Belgian counterpart Elia created a joint subsidiary called Coreso SA, which has been active since February 2009. The main role of this entity is to develop coordinated management of the physical flows crossing the Central-West region (France, Germany and Benelux). National Grid, the British network operator, joined Coreso SA in May 2009. Vattenfall Europe Transmission, one of the German network operators, is also to collaborate with Coreso SA.

Coreso SA will ultimately promote the emergence of a single vision of network operation, shared among all the TSOs participating in the project. It will make it easier to accommodate recent changes to the European electricity system, such as the development of decentralised generation (like wind farms). Coreso SA will therefore help TSOs improve the reliability and efficiency of capacity calculation. It may also be a useful tool to develop coordinated redispatching between TSOs.

To this end, it would be useful if the other TSOs in the region were to join Coreso SA.

1.2. Priorities identified by CRE for 2009 and 2010

- **Harmonising and improving explicit long-term auctions**

A new version of the harmonised rules for explicit auctions should be submitted to the regulators for approval at the beginning of 2010. Indeed, once the regional markets are coupled (which is planned for March 2010), the explicit auction rules will no longer apply to daily capacity allocations at the German borders.

The next version should incorporate a significant improvement to the compensation scheme for capacity reductions at the border between France and Belgium, based on the price differential between the markets.

More improvements are expected as regards the operation of the secondary capacity market, enabling players to transfer capacities acquired at the initial allocation to one another.

Lastly, CRE would like to open an active debate in the region on the implementation of financial transmission rights (FTRs).

- **Launching regional market coupling**

Market coupling in the Central-West region should, as soon as the first phase of the ATC-based coupling is launched, generate a collective profit of 42 million euros per year, in comparison to the current situation, with explicit auctions at the German borders[49]. This is why, despite the many difficulties generated by the project, CRE fully supports the efforts of TSOs and Power Exchanges to succeed in launching ATC-based coupling in March 2010.

Numerous issues relating to the first phase of the project have not yet been fully addressed, and must be monitored closely by regulators. They include, for instance:

- *Capacity calculation.* Regulators are waiting on the results of the analyses currently being carried out by the TSOs on the new method for capacity calculation, which will be used for the first phase of the project. This method should guarantee the minimum capacities required by regulators at Belgian and Dutch borders. The results of TSOs' analyses will determine whether or not the development of coordinated redispatching, which would guarantee minimum capacities, is considered.

- *Managing negative prices*. In Germany, producers have the possibility to offer negative prices since 2008. This allows generation by thermal units even when there is substantial wind generation: thermal producers pay to produce, but they avoid the fixed costs of shutting down and restarting power units. Producers in the region's other countries have not expressed any need for negative prices. Thus the coupling algorithm must be capable of managing different price boundaries on each national market (from - 3,000 €/MWh to + 3,000 €/MWh in Germany, and from 0 €/MWh to + 3,000 €/MWh in the other countries in the region), although full harmonisation would have been preferable.

- *Determining commercial flows*. The results of the coupling algorithm determine a net position for each market, and not the commercial flows across each border. The Central-West region constitutes a loop, so that flows traded between the different countries cannot be deduced simply from the net positions of each market place, when there is no congestion (in contrast to the TLC, where the three countries are in a line). As required in the Congestion Management Guidelines, project partners must devise a method to determine the commercial flows, based on results from the coupling algorithm.

- *The firmness of exchange programmes*. Financial firmness of exchange programmes, which German TSOs might prefer to physical firmness, is not compatible with implicit capacity allocation (see Part 3, Section 1.1). If exchange programmes are not physically firm, then prices calculated by Power Exchanges cannot be guaranteed. Neither Exchanges nor market players would find this acceptable. CRE will therefore pay close attention to how firmness of exchange programmes is managed in the context of market coupling.

- *Compatibility with adjacent coupling projects*. The Central-West coupling project is running in parallel with the EMCC (Germany-Denmark) and NorNed (Netherlands-Norway) projects. Making these three projects compatible is a challenge that the regulators, TSOs and Exchanges must meet in a coordinated way (see Part 3, Section 2).

Turning to the second phase of the project, the robustness and general feasibility of the flow-based method is as yet unproven. There are other questions that the project partners and regulators must still address:

- *Sharing congestion rent*. Sharing income from implicit auctions is straightforward in the ATC-based environment: at each border and for each hour, the congestion income is the product of the commercial flow and the price differential between the two markets. Half of this income is collected by the TSO(s) in each of the two countries concerned. The flow-based environment offers no natural way of sharing congestion rent, since commercial flows may be restricted at one border, or even go against the price differential, to the benefit of flows at other borders (optimisation is at a regional level). A method for sharing congestion rent (net of the costs of exchanges against the price differential at some interconnections) must therefore be devised by TSOs and validated by regulators.

- *Modelling generation*. The flow-based method to be used in the Central-West region considers each country as a copperplate: offers on each national market will be input into the coupling algorithm according to economic merit order, no matter where the site of generation is. However, generation produced in the north

[49] Source: Implementation Study Addendum

of France, for instance, will not have the same impact on critical branches as the same quantity produced in the south of France. This means using a rule (the generation shift key, or GSK) for distributing generation in each country, which is to be considered when calculating flow-based parameters (*Power Transfer Distribution Factors - PTDF*). A pro rata distribution key may be used as default, but TSOs are currently researching more sophisticated distribution keys. Flow-based simulations running in parallel with ATC-based coupling will be crucial in determining the most effective GSKs.

• **Experimenting with continuous intraday trades at one or more of the region's interconnections**

For a long time, the elaboration of a harmonised model for intraday exchanges at a regional level has been suspended. It was initially postponed due to the delays in implementing interim mechanisms at the Dutch borders (see Section 1.1). From the second half of 2008, debate on the choice of a regional intraday model has been much more active.

In April 2008, ETSO published a document proposing various options, all based on continuous intraday exchanges,[50] where capacities at interconnections are allocated implicitly.[51]

In June 2008, Exchanges in the Central-West region (APX, Belpex, EEX and Powernext) also put forward proposals, again for an implicit and continuous intraday mechanism.[52]

These two publications satisfy the requirements of market players[53], whose reference model is that proposed by the ELBAS platform (Nordpool).

This model may also be considered as an extension of the national intraday platforms, which operate following a continuous trading principle. In France, for instance, Powernext has been offering this service since July 2007.

CRE is pressing for the rapid implementation of this model in the Central-West region, immediately after the regional day-ahead market coupling is launched. The model is not unanimously accepted by regulators, mainly because continuous allocation implies capacity is free of charge.

In addition, implementing this model prompts a number of questions:

- *Calculating and pricing capacity*. As discussed above, a relevant non nil price for capacity cannot be determined when using continuous capacity allocation: there is no allocation at gate closures that focus liquidity. However, when daily capacities are allocated using market coupling, and if only residual capacity after coupling is offered on the intraday market, there is no risk of the interaction between the two timeframes producing an adverse effect.

[50] No gate closures; allocation based on "first come, first served" in the form of obligations to use capacity

[51] See *Reference Model for Cross-border Intraday Markets* on the ENTSOE website: http://tinyurl.com/m6jug4

[52] See *Cross-Border Intraday Markets - White Paper on a possible market model proposed by APX, Belpex, EEX and Powernext:* http://tinyurl.com/nwkj3w

[53] See for instance the publications by EFET (http://www.efet.org/Download.asp?File=7822) and EURELECTRIC (http://tinyurl.com/m9k3bx)

• On the other hand, there is a risk if daily capacities are allocated by explicit auctions, because the residual capacity may not be nil, even when the prices differ on the two adjacent markets. [54]

• Similarly, if TSOs may potentially offer additional capacity at the intraday timeframe, in addition to the capacity remaining after the daily allocation, the fact that capacity is free of charge may prompt strategic behaviour that could hinder market efficiency and competitiveness, particularly by players who have a good understanding of the network

- *Explicit access to cross-border capacity*. When working on the project to couple France, Belgium and the Netherlands (TLC), some market players asked that part of the cross-border capacity should be allocated at explicit daily auctions, in order to promote bilateral exchanges. However, to keep the mechanism simple and efficient, regulators decided to have all daily interconnection capacity allocated by market coupling. The problem arises again for intraday capacity: although market players favour implementing an implicit mechanism, they also want explicit access to capacity. Their demands are more justified for intraday than daily capacity, because it is a non-liquid market segment: a player with a significant energy requirement may not find enough liquidity on the trading platforms. However, there are a number of arguments against explicit access to interconnection capacity in these circumstances:

• *Simplicity:* a fully implicit model would be simpler and thus less expensive. Bilateral exchanges could still be made, via offers including prearranged prices.

• *Economic efficiency:* a purely implicit model ensures that the least expensive offers are taken up first, to satisfy the most expensive demands. By contrast, bilateral exchanges made alongside the implicit mechanism would not necessarily reflect the economic merit order.

• *Compliance with EU Regulation:* explicit capacity allocation, based on the "first come, first served" principle, is not based on the market, and hence does not comply with EU Regulation 1228/2003.

- *The organisation of trading platforms*. Various types of organisation are possible:

• As market splitting is organised in day-ahead, implicit cross-border exchanges may be made via a single trading platform. This organisation would challenge the existing national platforms.

• As market coupling is organised in day-ahead, the liquidity in the national trading platforms may be concentrated in a single order book.

• An alternative model would have a number of coexisting order books, each dealing with the liquidity of particular trading platforms. The advantage of this model is that it promotes competition between platforms, instead of assigning the management of cross-border exchanges to a single entity. However, its disadvantage is that it does not centralise intraday liquidity, which is already low in this market segment.

[54] In the Central-West region, the risk is limited because the regional market will shortly be coupled.

Regulators of the Central-West region submitted these issues for public consultation in May 2009.[55]

One pragmatic way to make progress in the management of intraday exchanges in the Central-West region would be to experiment with the implicit and continuous model at some interconnections of the region, pending broader consensus.

- **Increasing TSO's transparency**

At the end of 2007, Regulators of the Central-West region published a report on transparency, based on their common interpretation of the requirements for transparency in the region. The report drew on the provisions in Article 5 of the Congestion Management Guidelines and on Guidelines of good practice from ERGEG, published in 2006. During 2008, regulators and TSOs discussed ways of effectively applying the elements required in the report in practice.

This transparency report, unlike its counterparts for the Central-South and South-West regions (see Sections 3 and 4 below), did not require the publication of the exact location of network constraints limiting access to cross-border capacities.

However, the development of the flow-based method in the context of the regional market coupling project will enable greater transparency on limiting constraints, since such constraints will appear explicitly in the network calculations.

The publication of precise information relating to the flow-based method is still under discussion with the TSOs.

2. THE FRANCE-UNITED KINGDOM-IRELAND REGION

2.1. Key events in 2008

- **Launch of the BALIT project for balancing exchanges between France and Great Britain**

A firm project to develop balancing exchanges within the France-United Kingdom-Ireland region has been under review since 2007. Operators from the French (RTE) and British (National Grid) systems have proposed a model for balancing exchanges at the interconnection between France and England, known as the BALIT (BALancing Inter TSO) project. This proposal was submitted for public consultation in November 2007.

After reviewing the proposal and the results of the public consultation, CRE and the British regulator (Ofgem) approved the proposal in April 2008, considering that it would allow reciprocal access to the national balancing markets and promote economic efficiency and competition on each market. Indeed, implementing the BALIT project will increase resources available to the TSOs, as they will be able to accept and use balancing offers from foreign market players via the TSO of the neighbouring country. TSOs will exchange reserves available beyond the ones needed to maintain system security in each country.

[55] See the public consultation on the ERGEG website : http://tinyurl.com/mvtssn

The BALIT project is structured in two stages:

- the first will set up a hybrid arrangement, interposing between the current emergency assistance contract between TSOs (in place since 2003), and the final arrangement.

- the second stage, planned for November 2009, will implement the arrangement initially proposed by the TSOs.

The first stage started on March 3rd, 2009 after CRE approved a new version of the "Rules for programming, for the balancing mechanism and for recovery of balancing charges". The first exchanges took place on the first day of implementation.

2.2. Priorities identified by CRE for 2009 and 2010

- **Implementing stage two of the BALIT project**

CRE's priority within the France-United Kingdom-Ireland region "balancing" work group is to resolve the issue of the fee that NGIL, the English operator of the interconnection, wishes to impose to TSOs for using the interconnection infrastructures between France and England.

In their joint communication of September 11th, 2008, CRE and Ofgem asked the two TSOs to suggest, before the start of the first stage, the level of the fee, the way the level was determined (reflecting the costs) and the invoicing method. CRE also indicated several times that it wished to make this information transparent and to monitor the impact of this fee on balancing exchanges within the region.

RTE has replied that it could not see the justification for charging use of interconnection infrastructures (firstly, RTE was not convinced that there were additional costs associated with balancing exchanges and secondly, any such costs were anyway covered in France by the tariff for using the public networks), but it nevertheless said that it would apply the fee symmetrically, to avoid any discrimination against market players.

On the other hand, CRE and Ofgem are still waiting for information from NGIL in order to validate the fee level for the final solution.

CRE will pay particular attention to assessing and reviewing both BALIT balancing exchanges, and also the impact on the French balancing mechanism of developing these exchanges.

- **Implementing new capacity allocation rules between France and Great Britain**

Operators at the interconnection between France and England (NGIL on the English side and RTE on the French side) have spent almost two years designing a new platform for allocating cross-border capacities.

The new allocation rules are scheduled to apply after summer 2009. They should in the most part be harmonised with the rules in force at other French interconnections and comply with EU Regulation 1228/2003. The main changes are:

- implementation of hourly products during daily allocation;

- a firm nomination stage, enabling the use of netting;

- a mechanism for automatic resale of long-term capacities at the daily auction;

- introduction of two intraday auctions.

One issue with the new set of rules is the firmness of nominations (see Part 3, Section 1.1). Although ERGEG published its common position in July 2008, stipulating that "as a minimum requirement, transmission rights must be firm after they have been nominated by market participants", NGIL says that it is not in a position to guarantee such firmness, because its licence as an interconnector operator prevents it from buying the energy needed to ensure the physical firmness of capacities on the markets.

- **The development of new interconnections with Great Britain**

Several projects to develop new interconnections are currently under discussion within the region, in particular between Great Britain and the Continent.

CRE and Ofgem have recently received a request for an exemption for a new interconnection line between France and Great Britain. Since the concept of a new exempted interconnection derives from EU Regulation, and has not been transposed into French law, CRE launched a public consultation on April 2nd, 2009, on exemption for new interconnections and the conditions under which they can access the French public electricity transmission network [56] . Such a public consultation will help it set up a legal framework for such structures allowing the provisions in the regulation to be effective.

[56] See the public consultation on the ERGEG website : http://tinyurl.com/kruug6

In parallel with this project, in September 2008, RTE, in collaboration with ELIA and National Grid, launched a public consultation on the need for additional interconnection capacities between Great Britain and the Continent. This public consultation revealed a significant need for new interconnection capacity between Great Britain and France, Belgium and the Netherlands. In the context of the exemption request mentioned above, technical and economic studies are required to assess the impact of the new interconnections between Great Britain and the Continent, and in particular between Great Britain and France.

3. THE CENTRAL-SOUTH REGION

3.1. Key events in 2008

- **Improvement of the common allocation rules**

The first set of allocation rules common to all Italian interconnections came into force in 2008. A second set was drawn up at the end of 2008. It is more rigorous in its harmonisation of the parts that relate to each border, and also establishes the principle of automatic resale of un-nominated long-term capacity at all the frontiers concerned.

- **Publication of a regional report on transparency**

The region's regulators published a report on transparency on January 26th, 2009. This report and that published in the Central-West region both had the same objective. Their content converged strongly. However, the report published for the Central-South region is more ambitious, asking TSOs to publish the network constraint that limits the capacity offered year-ahead.

3.2. Priorities identified by CRE for 2009 and 2010

- **Implementing a single allocation platform for all Italian and Swiss borders**

As required in EU Regulation 1228/2003, and with the objective of integrating the region's markets, regulators and TSOs in the region (including Swiss) have all agreed to create a regional platform to allocate interconnection capacities. During 2008, the platform's governance (creating an ad-hoc entity similar to CASC-CWE, or delegating the service to one of the region's TSOs), and the geographical perimeter over which it should operate (whether or not all the Swiss borders should be included), has been heatedly debated by the region's TSOs and regulators.

Since there was no agreement on the geographical perimeter over which the platform should operate[57], RTE and Terna proposed giving Terna the task of running capacity auctions, for exchanges in both senses, at all the Italian interconnections in the region. This solution, in addition to meeting the needs of market players (limiting the number of platforms used to acquire interconnection capacity) and the requirements in EU Regulation 1228/2003 (need for regional coordination) will have the advantage of using a platform that is known[58] and valued by market players. Unfortunately, this solution is not currently favoured by Swiss and Austrian TSOs, who stress the lack of transparency and loss of independence this solution would imply.

Faced with an impasse, the region's regulators have adopted a common position, with progress in two stages:

- Firstly, and for a period of around two years, management of capacity at Italian borders will be assigned to Terna, the only TSO already present at all the borders concerned.

- Secondly, the project will be extended to all of the region's borders, and hence to the Swiss borders. Several possible forms of governance have been proposed for this stage, but only two have been accepted by all regulators: creating an ad-hoc independent entity, following the CASC-CWE model; or integrating TSOs from the Central-South region into the capital of one of the existing ad-hoc entities (for instance CASC-CWE).

This two-stage approach will allow a single auction contact point to be offered at the region's five interconnections within a very short time (as soon as 2010), thus considerably simplifying cross-border electricity exchanges. Although several regulators see a governance structure, balanced between the TSOs involved, as important in the long term, the simplicity with which the first stage may be implemented will enable rapid market integration that will certainly be less costly than creating a dedicated independent entity. In the longer term, market integration will be further improved by including all the Swiss borders within the geographical boundary, particularly if the option of integrating into CASC-CWE is chosen, thus creating the first inter-regional platform for explicit auctions.

[57] The Swiss regulator, Elcom, is not at the moment willing to extend this boundary to all the Swiss borders, while RTE sees this as a preliminary to creating an ad-hoc entity.

[58] The platform already holds auctions in the export direction from Italy.

4. THE SOUTH-WEST REGION

4.1. Key events in 2008

- **Harmonisation and improvement of explicit auctions**

During the first half of the year, discussions were held between regulators and TSOs to draw up a new set of rules for allocating capacity at the interconnection between France and Spain. A public consultation was launched in June 2008[59]. The received contributions validated the proposals by the region's regulators, which aimed to introduce innovative measures into the new set of rules such as implementing the automatic resale of unused long-term capacity at daily auctions and the compensation at the price differential for reductions in capacity allocated over the long term[60].

The latter measure presents an alternative to the current practice. At most European interconnections, when capacity allocated over the long term is reduced before the nomination stage, capacity holders receive either the amount they paid for the reduced capacity at the corresponding auction (the "100%" rule), or this amount plus 10% of its value as compensation (the "110%" rule).

A compensation scheme based on the price difference between the markets better reflects the loss suffered by an interconnection user who is deprived of part or all of his rights to make cross-border exchanges. However, in order to limit the financial risk that such a compensation scheme could impose on the tariff for using the transmission network, the new set of rules (in force since June 2009) introduces two limits:

- the first one is intended to prevent the monthly compensation amount exceeding the income made via auctions of long- and medium-term products;

- the second one sets a limit, based on prices on the wholesale electricity markets, for the price differential used for the compensation.

The impact of this new compensation scheme will be monitored closely. If shown to be effective, it could reconcile the conflicting positions currently held by TSOs at one extreme, and market players at the other. If this compensation scheme spreads across Europe, it would be another important step towards the integration of the electricity markets (see Part 3, Section 1.2).

- **Publication of a regional report on transparency**

In July 2008, the regulators published a first draft of the transparency report for public consultation. It concluded that the level of transparency was not entirely uniform across the region. The regulators considered that at the time the report was written, there were many points on which the information available to the French market did not comply either with the requirements in the Congestion Management Guidelines, or with the recommendations for transparency defined by the regulators (*the Guidelines of Good Practice on Information Management*

[59] See the public consultation on the ERGEG website : http://tinyurl.com/kjgkwb

[60] See the public consultation conclusions on the ERGEG website : http://tinyurl.com/nh9f7q

and Transparency in Electricity Market[61]). In particular, there was insufficient information on the availability of interconnection capacity over the long term, and on the network constraints limiting the interconnection capacity.

The responses to the consultation confirmed this view. Following the consultation, the final version of the report was published on September 15th, 2008[62]. One should note that this report is more ambitious than that for the Central-South region, in that it asks TSOs to publish the network constraint that limits offered capacity for all time horizons.

Since the report was issued, Spanish and French TSOs have announced that as of 2009 they will comply fully with the requirements defined by the regulators.

4.2. Priorities identified by CRE for 2009 and 2010

- **Implementing a single regional platform**

The priority for long-term capacity is to implement an allocation platform common to the region's three TSOs. Such a platform would provide players with a single entry point and a single set of rules governing the conditions for accessing and using the two interconnections. Given that the access rules at the region's interconnections are already very similar, the main obstacle to implementing this single entry point is the publication of the auction rules for long-term products at the interconnection between Spain and Portugal. These rules were approved by the Portuguese regulator (ERSE) in December 2007 and have received clearance from the Spanish regulator (CNE), who has sent them to his supervising ministry[63]. The region's regulators have been waiting since then for ministerial agreement[64].

The form of governance for this regional platform has not yet been agreed, but, as in the Central-South region, CRE would prefer the solution in which capacity allocation by explicit auction is managed by one of the existing platforms.

- **The regional coupling project**

In order to demonstrate their willingness to work together in the near future, OMEL and EPEX power exchanges have decided to carry out a study on the feasibility of establishing market coupling between the Iberian peninsula and the Central-West region. OMEL and EPEX Spot consider that the appropriate solution would be price coupling, and annouce that studies will be carried out in two stages[65]:

- the first stage will consist of simulations of the coupling algorithm to identify the harmonisation requirements;

- the second stage will deal with implementing and testing the selected solution, particularly measuring the effect it has on welfare gains.

- **Developing balancing exchanges**

In January 2009, the TSOs published a document analysing both the barriers to developing cross-border balancing exchanges, and the most appropriate models for those exchanges for the South-West region. The analysis is relatively brief, but favours balancing exchanges under the TSO-TSO model (see Part 3, Section 3), as for the BALIT project between France and Great Britain (see Section 2). It also identifies the main potential problems that require further study.

CRE supports the development of balancing exchanges on the interconnection between France and Spain, following the BALIT model, which could provide reciprocal access to the national balancing markets, whilst promoting economic efficiency and encouraging competition on each market.

[61] See the document on the ERGEG website: http://tinyurl.com/kpq8hy

[62] See the report on the ERGEG website: http://tinyurl.com/lpehxk

[63] See the *3rd Implementation Group meeting for the SW Electricity REM* conclusions on the ERGEG website: http://tinyurl.com/lp6wnm

[64] See the *4th Implementation Group meeting for the SW Electricity REM* conclusions on the ERGEG website: http://tinyurl.com/lznyx2

[65] See the *4th Implementation Group meeting for the SW Electricity REM* conclusions on the ERGEG website: http://tinyurl.com/lznyx2

PART 3
Appraisal of work carried out at a European level

In parallel with and as a complement to regional initiatives, CRE is strongly involved in several important projects carried out at ERGEG level, whose purpose is to facilitate the development of cross-border trades. In this third and final part, we report on the current status of the work under way and give some indication as to what stages will follow.

1. FIRMNESS OF CAPACITY: A NECESSARY CONDITION FOR DEVELOPING CROSS-BORDER TRADES

1.1. Firmness of capacity after the nomination stage (exchange programmes)

In December 2007, CRE publicly alerted the European Commission to management of the interconnection between France and Germany. The German TSOs (RWE netz and EnBW netz) had published new allocation rules at the interconnection between France and Germany, without consulting CRE. The implementation of these rules would cause deterioration of the quality of the service offered to market players at this interconnection.

This unilateral revision again raised the issue of the principle of firmness of exchange programmes, as applied at interconnections between France and all other continental countries, and also at most European interconnections. Following the revision, TSOs could, even in the absence of a Force Majeure event, revise downwards the exchange programmes that interconnection users notify in day ahead, as being the amount of energy they plan to transmit on the interconnection.

Following CRE's alert, the European Commission requested ERGEG to take charge of things and find a solution that could be applied at all European interconnections.

In its position paper published in July 2008, ERGEG concluded that exchange programmes should be firm. Apart from cases of Force Majeure, TSOs should not reduce exchange programmes: this is "physical firmness", and was identified by ERGEG as the preferred solution. In the absence of physical firmness, the financial firmness of exchange programmes must be guaranteed. This means that TSOs may reduce exchange programmes, but must compensate interconnection users in return so that they incur no financial loss. The compensation is based on the price differential between the energy markets across which the players deprived of the planned cross-border exchange must balance their positions.

However, it is important to note that this second solution can not be used for implicit auctions. Reducing the exchange programmes would challenge the prices calculated by the organised markets, it is therefore obligatory for the exchange programmes to remain physically firm.

1.2. Firmness of allocated capacities before the nomination stage

Firmness of capacity before the nomination stage is a subject heatedly debated by market players and TSOs. Regulators have been asked to make a decision on this issue, and to this end, a working group has been established within ERGEG.

When TSOs allocate interconnection capacity with a monthly or yearly horizon, there is a risk that the capacity will not physically be available. Network operators use a number of mechanisms to manage this risk, but they work differently in each country. They include, for instance:

- *Redispatching generation plans.* TSOs could relieve the constraints by activating offers on the balancing mechanisms. In France, all producers are required to put all their technically available unused capacity at the disposal of the balancing mechanism. RTE thus has considerable room for manoeuvre when faced with physical constraints. This is not the case for all European network operators.

- *Buying-back capacities*. A TSO may buy back excess capacity allocated to market players by trading on the secondary market, just as any other player. RTE cannot currently use this method.

- *Counter-trading*. TSOs could use the existing allocation mechanisms to operate exchanges that would relieve the constraints. RTE has not implemented such measures at any French border.

  • For explicit auctions in day-ahead, the method assumes that participants can make offers for cross-border capacity at negative prices. When such offers are taken up, market players are paid to use the interconnection in the direction that relieves the constraint, even when that direction is against the price differential.

  • The measure would be easier to implement for coupled markets, since market players would not be explicitly involved. Negative values for capacity would have to be included in the coupling algorithm in order to force the cross-border flow against the direction of the price differential, and thus relieve the constraint.

Thus, as network operators have no sufficient effective and coordinated measures to ensure the physical firmness of capacities, network security can only be guaranteed by reducing allocated capacity.

The key issue is that of compensation for such reduction. CRE supports the principle of compensation based on the price differential between the organised markets:

- Firstly, this type of compensation reflects the actual cost of reducing capacity, in the sense that the price differential between the markets is comparable to the cost of the measures TSOs may take to avoid reductions (redispatching, buying-back capacity and counter trading in day-ahead).

- Secondly, financial firmness is essential for developing competition on the interconnection capacity market (and hence the national markets), because it makes it easier for the smallest players to access interconnections.

- Lastly, financially-firm capacity also has a positive impact on auction income. Compensation at the price differential provides market players with financial security, which means they apply a lower risk premium when buying interconnection capacity at auctions.

Network operators, who are generally opposed in principle to financial firmness, recognise that the issue is essentially financial, and should be decided by the regulators. In practice, when the regulators demand a certain level of firmness of capacity, and guarantee to TSOs that the cost of compensation will be fully covered in the grid access tariffs, the chosen level of firmness no longer affects TSOs financially.

It is therefore the regulators that should be responsible for mediating between a compensation model for capacity reductions that promotes the development of cross-border exchanges, and the financial risk borne by network users in covering the cost of that compensation.

ERGEG is working on this issue, and has set up a dedicated working group, of which CRE is a member. Discussions within the group have not yet reached a conclusion, since the regulators do not all share the same view of the compensation scheme for capacity curtailments. In addition, there is no clear consensus on how the cost of compensation should be reflected in grid access tariffs.

CRE is proposing a compromise in which compensation is at the price differential, capped by different means, so that the risk to network users is limited. The caps would no longer apply once greater confidence in prices on the organised markets is gained.

At the request of CNE and CRE, this rationale has been used at the interconnection between France and Spain since June 2009 (see Part 2, Section 4.1). CREG and CRE similarly made a joint request at the interconnection between France and Belgium.

Another possible way to improve firmness of capacity, before the nomination stage, would be to allow TSOs to buy back already allocated capacity via the secondary market. This would avoid systematically resorting to capacity curtailments, and would even better reflect the actual market price of capacity. In its decision dated April 9th, 2009 approving the implementation of a new set of capacity allocation rules for the interconnection between France and Spain, CRE invited RTE to review this option in more detail[66].

These discussions on firmness interact significantly with those on incentives to foster market integration (see Section 5). A well-designed incentive mechanism should allow TSOs both to maximise the level of capacity and to optimise its firmness, at the best possible cost.

[66] See the deliberation on the CRE website : http://tinyurl.com/m76exg

2. EXTENDING MARKET COUPLING: AN URGENT NEED TO DEFINE A PAN-EUROPEAN ROADMAP

2.1. Current status of the implementation of the target mechanism for the day-ahead timeframe

Capacity use may be optimised in accordance with the market prices, if daily capacity is allocated implicitly at the same time that electricity is traded. Thus the target mechanism with European consensus is national market coupling for day-ahead markets, or even market merging, with separate price zones depending on congestion (market splitting).

Several local initiatives have already successfully implemented such implicit mechanisms for allocating daily capacity. Market splitting is in place throughout the North region, between Spain and Portugal, as well as in Italy; and the markets between France, Belgium and the Netherlands (TLC) are coupled. Several projects are currently under development (for instance in the Central-West region and between Germany and Denmark) or are under review (for instance between the Netherlands and Norway, and between France and Spain).

In its second report on the coherence and convergence of regional electricity initiatives[67], ERGEG concluded that there was a need to review how the various coupling projects were coordinated. Setting up implicit mechanisms between regions is challenging from both technical (how can regions be involved in more than one coupling project?) and organisational (how should projects be prioritised?) perspectives.

The difficulties faced by the EMCC project to couple Germany and Denmark[68], and its relaunch planned for the third quarter of 2009, have also highlighted the need to solve the issue of compatibility for coupling algorithms. This question is particularly pertinent for the EMCC and Central-West projects, which involve Germany.

In this context, a working group steered by ERGEG (the Project Coordination Group or PCG) was set up at the last Florence forum, with the main tasks of ensuring the coordination of projects to couple daily capacities, and defining a timetable for implementing such projects.

2.2. Options for market-coupling

There are two ways to implement market coupling: by price (price coupling) and by volume (volume coupling).

In the first case, both the prices and volumes exchanged are determined by the coupling algorithm. This implies the Exchanges involved use the same algorithm.

For volume coupling, flows between the two markets are defined first, and then the prices are calculated by the local Exchanges, making it is possible for them to use different algorithms. This series of algorithms is clearly a source of errors and imperfections in determining the prices and volumes exchanged. The magnitude of these errors depends heavily on the level of information on supply and demand on each market, and on the matching rules implemented in the coupling system.

Apart from the coupling between Germany and Denmark (EMCC), which has been temporarily suspended because of inconsistencies in the results it generated, all markets that have chosen implicit mechanisms operate using price coupling.

2.3. Options for inter-regional coupling

One of the key challenges to be addressed by the Project Coordination Group is the coupling of two entire regions, each of which is already made up of coupled markets. A typical issue is that of defining how best to couple the Central-West region (where the TLC is already in operation, and will as of March 2010 be extended to Germany – see Part 2, Section 1.2) with Nordpool (market splitting).

The ETSO and EuropEX report on the development and implementation of a coordinated model for congestion management at a regional and inter-regional level highlighted two possible solutions for coupling different regions: extended price coupling and dome coupling.

According to ETSO and EuropEX, the first solution gives the better result, because, since a single algorithm is used to calculate prices and volumes exchanged between coupled zones, they all respect economic merit order. Extended price coupling is a solution that requires some harmonisation (yet to be defined) between the zones to be coupled, but that enables the geographical area coupled to be extended progressively, ultimately coupling markets across the whole of Europe.

Dome coupling, which is based on volume coupling, offers some flexibility in the algorithms used by the Exchanges and reduces the need for harmonisation. Its disadvantage is that it may lead to erroneous results (such as prices that differ between the markets even when there is no network congestion) and can even generate negative congestion rents, according to ETSO and EuropEX.

In terms of efficiency, price coupling would seem to be the better solution, even though its requirements are more demanding in terms of coordination, harmonisation and the exchange of information on supply and demand on the Exchanges and the price setting system.

Consequently, the basis on which the decision to extend price coupling to one market rather than another is made remains to be defined. CRE suggests the following two options:

- A “beauty contest” where selection is based on qualitative criteria to identify the candidates most committed and willing to adopt price coupling. One criterion might be the speed at which the project could be implemented over the largest zone.

[67] See the report on the ERGEG website : http://tinyurl.com/lwrey2

[68] The calculated flows and volumes used to fix prices between Germany and Denmark gave prices that did not reflect the direction of flow. These variations were not predicted and caused market coupling to be suspended one week after its launch.

[69] This report was ordered by the Florence Forum. The definitive version has been published in February 2009.

- Selection according to qualitative and quantitative criteria based on cost-benefit analysis. The analysis would assess firstly the quantitative benefits that market coupling would bring (as the gain for each hourly step, calculated as the product of the positive part of the price difference between the Exchanges, and the amount of daily capacity either unused, or used against the price differential), and secondly, the qualitative difficulties in implementing coupling at each interconnection caused by differences in market design.

3. CREATING A EUROPEAN FRAMEWORK FOR INTEGRATING BALANCING MARKETS

3.1. Current status of projects

The objectives of market integration are to stimulate competition within the different national markets and improve the security of supply by sharing available resources. The lack of integration on these markets is an obstacle to developing a single electricity market in Europe[70]. Many players have expressed interest in developing balancing exchanges, particularly during the public consultations held by ERGEG on the Guidelines of Good Practice for Electricity Balancing Markets Integration.

However, apart from the launch of the balancing exchange project between France and Great Britain (the BALIT project), the process of integrating balancing markets at the French borders is making very slow progress. The subject is not really being addressed within the six other regional initiatives, and there is no other project currently underway at the French borders, because of the priority given to the work on long-term, daily and intraday timeframes.

3.2. Need for a European dynamic

A dynamic and a framework are also needed for integrating balancing markets. ERGEG is currently preparing guidelines on balancing markets integration. An initial version of these guidelines was submitted for public consultation in mid-2006[71]. At the time of the public consultation, many players emphasised the need to allow interaction between balancing markets, intraday exchanges and automatic reserves. A new version of the guidelines for integrating balancing markets was drafted by a working group dedicated to the project and steered by CRE. This new version also incorporated the results of a study[72] that the European Commission commissioned from consultants, and was submitted for public consultation in 2009[73].

The main areas ERGEG is defining its position in are as follows:

- access to interconnection capacity;

- contracted reserves;

- a model for balancing exchanges;

- the architecture of balancing markets;

- transparency and monitoring.

These Guidelines are likely inputs for:

- the Project Coordination Group (on drafting the roadmap for developing balancing exchanges, in parallel with the development of exchanges and the integration of daily and intraday markets);

- the future ACER (on the exchange and balancing rules).

3.3. Interactions and complementarities with intraday markets

The intraday mechanisms must be improved bearing in mind that the choice of intraday market design affects both the balance of the system and balancing markets. Part of the process must therefore ensure that changes of intraday markets do not affect either the visibility and resources available to TSOs when balancing the system, or the competition in the balancing mechanisms. In particular, CRE recommends choosing a solution that still enables the cross-border balancing exchanges that are currently made. In the case of France, in addition to the exchanges with Great Britain made possible by the BALIT project, foreign players (mainly from Germany and Switzerland) are an important factor in balancing the system, and are the principal source of competition to the historical operator as regards the balancing mechanism (see Part 1, Section 5).

Various ways of retaining, or even expanding, these current possibilities for balancing exchanges are feasible, and require more detailed research. For instance:

- balancing exchanges could be made simultaneously with intraday exchanges, either via the intraday platform, or via a parallel circuit;

- TSOs could set up balancing exchanges on the TSO-TSO model;

- the gate closure for the intraday market could be fixed sufficiently far in advance of the delivery time so as to not limit the resources available for balancing and hence enable cross-border balancing exchanges.

These measures were stated by the regulators during the public consultation carried out in the Central-West region on the model for intraday exchanges that were to be developed (see Part 2, Section 1.2).

4. TRANSPARENCY: MOVING TOWARDS A BINDING MULTI-REGIONAL REPORT?

The European Commission, the national regulators and the market players all consider that transparency is a priority in guaranteeing efficient market operation. Prompted by the regulators, the Commission took a decision by Comitology on November 9th, 2006, to make the Congestion Management Guidelines binding. From that time onwards, the guidelines became part of EU Regulation 1228/2003 and applied directly to all Member States of the European Union.

[70] COM(2006)851, January 10th 2007, http://ec.europa.eu/competition/sectors/energy/inquiry/index.html

[71] See the public consultation on the ERGEG website: http://tinyurl.com/lwj77b

[72] See the study on the European Union website: http://tinyurl.com/no9ede

[73] See the public consultation on the ERGEG website: http://tinyurl.com/ms5czc

Article 5 of the Congestion Management Guidelines[74] defines the information that TSOs must publish (information *ex ante* and *ex post* on the demand, the network, the production and the balancing adjustment). This article is binding, and TSOs must comply with its provisions.

However, Congestion Management Guidelines provide only a general outline of the transparency requirements. It supplies no details on the format, medium, language or publication time. There are also some ambiguities as to the nature of the information requested.

National regulators have thus decided that as part of the Regional Initiatives process, they will draft transparency reports that define and harmonise their interpretation of Article 5 of the Congestion Management Guidelines. To date, five of the seven existing regions (North, Central-West, Central-South, South-West and Central-East) have written, submitted for public consultation and published Transparency Reports.

Although as such they are not binding, these reports provide a firm basis for harmonising and implementing transparency rules on wholesale markets within the regions. They define the information that the TSOs and Exchanges must publish (and state when, where and how they do so).

The reports prepared for the Central-South and the South-West regions are clearly the most advanced, in that they include, for the first time, transparency requirements related to the network constraints that limit capacity at the interconnections (see Box 9).

One important point to note is that apart from the publication of the constraints that restrict interconnection capacity, the structure and content selected for these reports is to a very large extent identical.

Regulators are monitoring, as part of regional initiatives, how effectively these reports are being implemented. Thus in August 2008, Regulators of the North region published a report assessing the TSOs' current position as regards implementing their report. Regulators of the Central-West region have also started monitoring and will shortly publish a report on the progress made in implementing the Transparency Report.

Box 9 – Publishing limiting constraints

The periodic publication of constraints limiting capacities at interconnections is a requirement defined in the Congestion Management Guidelines. Article 5.1 stipulates that *"TSOs shall publish all relevant data related to network availability, network access and network use, including a report on where and why congestion occurs, the methods applied for managing the congestion and the plans for its future management"*. In addition, Article 1.7 states that *"TSOs may not limit interconnection capacity in order to solve congestion inside their own control area, except for the above mentioned reasons and for reasons of operational security. If such a situation occurs, it should be described and transparently presented to all the users by the TSOs [...]"*.

Unfortunately, no transmission system operator has to date published this type of information. Although it is understandable that TSOs show some reluctance to publish detailed information on the line that limits the interconnection capacity[75], it is nevertheless the case that TSOs could easily publish such information in an aggregated form, thus avoiding any pointless risks while complying with the Community Regulation.

It would appear essential that the regulators can at least access this detailed information, which is crucial not only to developing the current transmission networks but also to designing future markets (defining price zones based on the physical constraints arising in the networks, and hedging instruments for volatility in the price differentials, etc.).

5. IMPLEMENTING INDICATORS REFLECTING THE DEGREE OF MARKET INTEGRATION AND INCENTIVE MECHANISMS

5.1. The need for incentive mechanisms

Incentive mechanisms are one method available to regulators to ensure that network operators reach their defined targets. They define the target performance of TSOs, penalise them if that target is not reached and reward them if it is exceeded.

The draft third Energy Package proposes for the first time to use this method to increase the rate of market integration. It means that the regulating authority must take all reasonable measures to ensure *"that network operators and users are granted sufficient incentives, in both the short and the long term, to increase efficiency in network performance and foster market integration [...]"*.[76]

[74] Decision of the European Commission amending the Annexe to EC Regulation 1228/2003 on conditions for access to the network for cross-border exchanges in electricity.

[75] Some TSOs consider that publishing such information could compromise proper market operation (the risk of price manipulation), or even network security (the risk of targeted attacks on network lines under constraint).

[76] Article 3522(3) of the Electricity Directive

Although regulators now frequently apply incentive regulation in Europe to attain national performance objectives (to reduce the cost of losses, improve quality of supply and lower the network access tariff, etc.), there are in fact currently no equivalent incentive mechanisms aimed at accelerating the development of cross-border trades, and more generally the integration of electricity markets in Europe.

Nevertheless, such mechanisms are needed all the time, particularly for the regional initiatives, since stakeholder goodwill is not always enough to drive market-integration projects forward. For instance, several market[77] players are asking for incentive mechanisms to maximise the level of capacity offered to the market. The regulators themselves are fully aware of how difficult it is, in the absence of incentive mechanisms, to ensure that network operators maximise capacities, even though this is a provision of EU Regulation 1228/2003[78].

European regulators have thus decided to devise incentive mechanisms that will accelerate market integration, while maintaining network security. CRE steers the ERGEG work group dedicated to this subject.

The work group has highlighted how very complex it is to implement such mechanisms. Firstly, when devising an incentive mechanism, the regulators must leave TSOs with some room to manoeuvre, so as they can reach the targets they have been set. The whole point of an incentive mechanism is that it bypasses, without trying to solve, the problem of the information asymmetry intrinsic to the relationship between TSOs and regulators. Secondly, setting the targeted performance objective is difficult: regulators lack information on the instruments TSOs have at their disposal to foster market integration whilst guaranteeing network security. Lastly, the current legal framework is poorly adapted to implementing incentive mechanisms to foster market integration, since the powers of regulators and the tariff arrangements are not well harmonised across Europe.

Thus it is fairly obvious that several conditions must be fulfilled before such incentive mechanisms are implemented, the most important of which are TSO independence and fewer stakeholders (meaning the number of TSOs, of Power Exchanges and of regulators).

In the meantime, until all the preconditions necessary for implementing a market-integration incentive mechanism are met, CRE is already pressing for indicators that could reflect the level of market integration. Such indicators would better convey both the benefits of market integration and the impact of specific changes on congestion management. Ultimately, they would serve to measure the performance of actions taken by the TSOs to foster market integration and to determine the incentives that would best increase the effectiveness of those actions.

In practical terms, the indicators proposed by CRE to measure the level of market integration are the social welfare (or total surplus) resulting from cross-border flows, and the congestion costs when cross-border flows have taken place. The design of both indicators follows the same logic.

5.2. A potential indicator for the degree of market integration: the social welfare generated by cross-border flows

The social welfare generated by cross-border flows is the natural indicator to measure the gains from market integration: for one thing, it is very similar to the objective function of market coupling algorithms.

It is the sum of three factors:

- the surplus of the consumers who benefit, via the cross-border exchanges, from complementary generation parks;

- the surplus of the producers who benefit, via the cross-border exchanges, from complementary consumer profiles;

- the surplus of network users, via the income from capacity auctions.

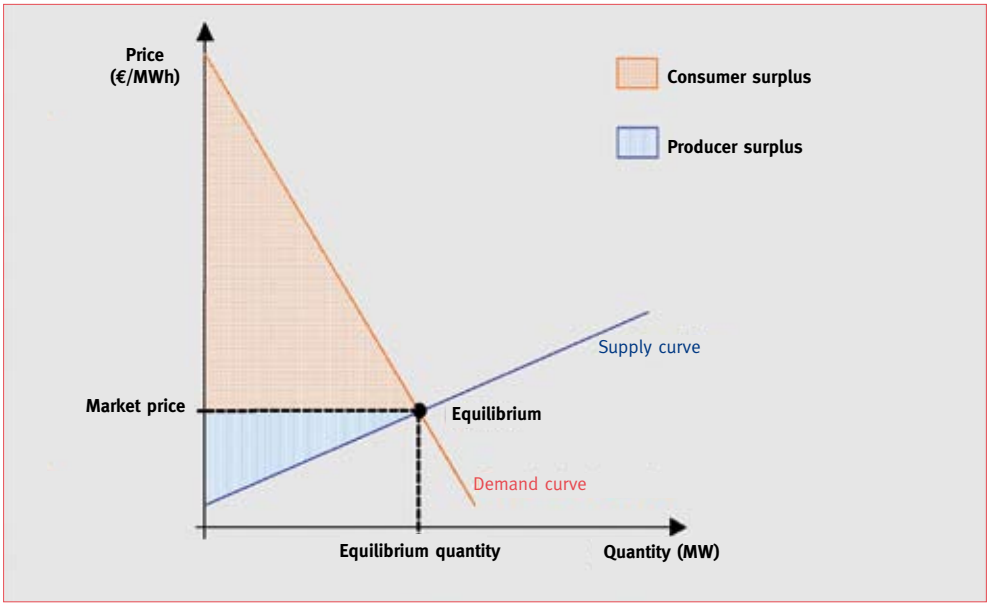
Such profits can be measured very accurately, using the concept of the net export curve, or NEC.

[77] See for instance the EFET publication, "More transmission capacity for European cross border electricity transactions without building new infrastructure: Improving firmness of capacity rights and maximising capacity allocation using new Regulatory incentives for transmission system operators", available at http://www.efet.org.

[78] See more on the ERGEG website : http://tinyurl.com/nhddyu

For a particular market, note that the purpose of the price-setting mechanism is to maximise social welfare or total surplus from the market, defined as the surplus of both consumers and producers (Figure 18).[79]

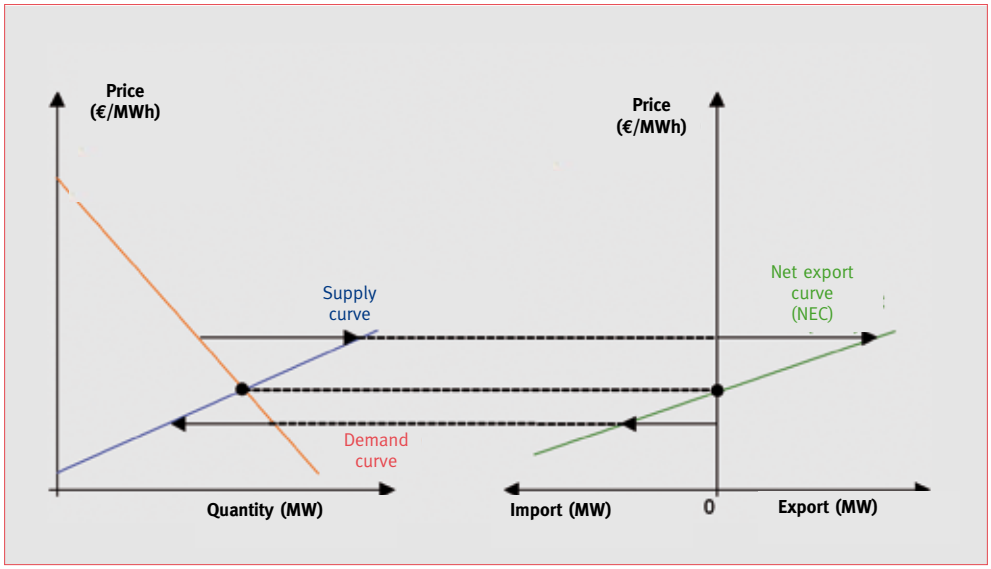
Figure 18 – Social welfare: sum of the surplus of consumers and producers



[79] The values that can actually be measured in practice are the profits of buyers and sellers on a market, and in practice, the buyers trading are not necessarily synonymous with the consumers of the electricity. Thus the concepts of consumer profits and producer profits, as presented here, must be considered with caution.

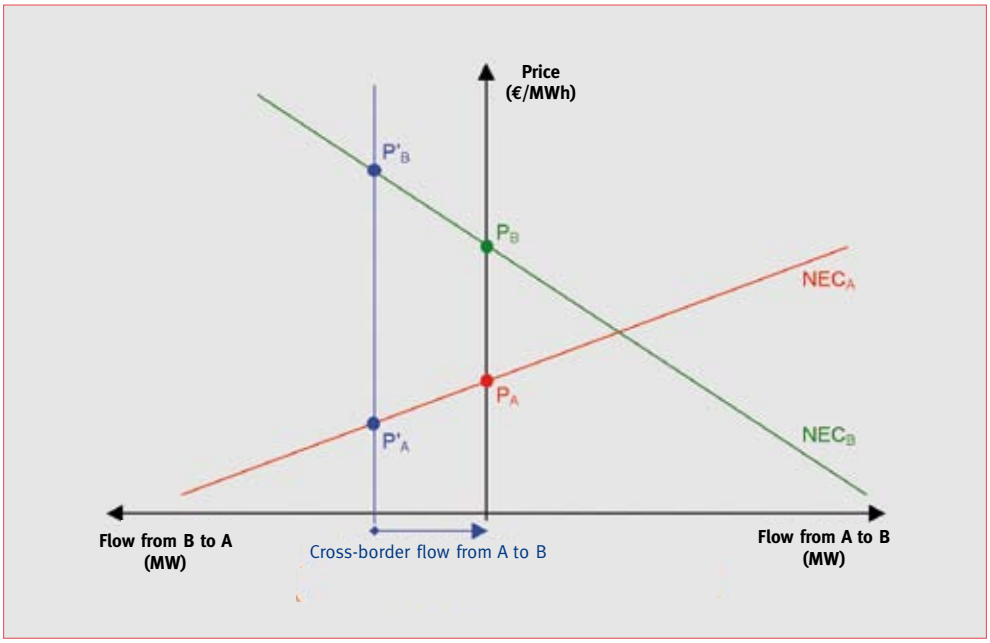
To apply this concept to two interconnected markets, we use the net export curve (NEC) for each market. In order to deduce this curve from the market's supply and demand curves, the change in the equilibrium market price is calculated for each amount exported or imported. The construction of a NEC is illustrated in Figure 19.

Figure 19 – Net export curve (NEC)



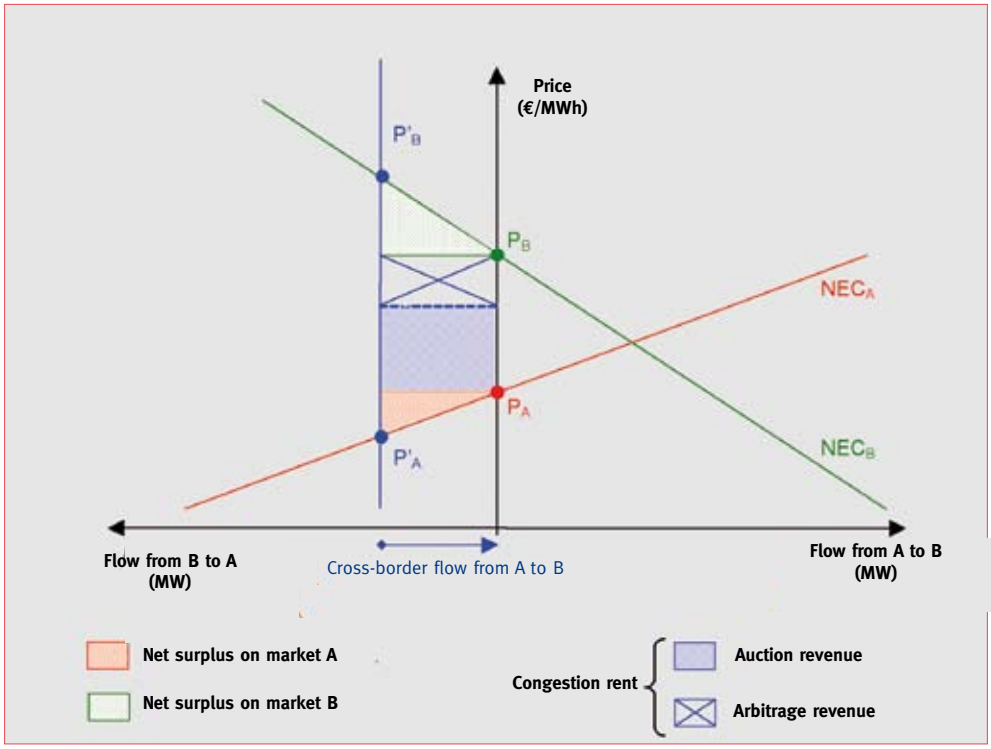
The NEC for both the interconnected markets A and B may be shown on the same diagram; imports as seen by one are put into relation with exports as seen by the other (Figure 20). The prices on each market, PA and PB, as shown in Figure 20, take account of any cross-border flow there has been between the two markets. If this flow took place in the "economic" direction, i.e. from the cheaper market (A) towards the more expensive market (B), then it has helped prices converge. Had there been no cross-border flow between A and B, the difference in the two market prices, P'A and P'B, would have been greater. This is shown in Figure 20.

Figure 20 – NEC for the two markets A and B on the same diagram, and virtual prices as if there were no cross-border flow



The cross-border flow from A to B has thus caused a more efficient economic merit order across both zones, compared with the virtual situation in which the two markets would have been isolated. The flow thus directly generates a net economic surplus in each of the two markets. It also generates a profit for network users, via the income from auctions at the interconnections. Lastly, it generates income for users of the interconnection, since such users generally assign a lower price to interconnection capacity than the price differential between the two markets: the difference is the arbitrage revenue. The sum of these two factors is the total congestion rent. All these factors are shown in Figure 21.

Figure 21 – The different profits generated by the cross-border flow



On the graphs shown here, in which A is the exporting market, the net surplus generated for market A by the cross-border flow is in practice a profit for producers on market A. Similarly, B is the importing market, so the net surplus generated by the cross-border for market B is a surplus for the consumers on that market. However, over an entire year, for instance, the situation can reverse, so that the consumers on market A, as the producers on market B, can also benefit from energy exchanges between the two markets.

One indicator representing the benefits of market integration could be the sum of the following three factors, which might be called the social welfare generated by cross-border flows:

- the net surplus for market A generated by the cross-border flow;

- the net surplus for market B generated by the cross-border flow;

- the income from auctions at the interconnection.

To determine the collective benefit net of the costs associated with interconnection management, the following must be deducted from the gross amount:

- the cost of implementing and operating congestion management methods (auctions, secondary market, nominations, etc.);

- the cost of actions taken to ensure the physical firmness of capacity (re-dispatching);

- the cost of compensation for reduced capacity, etc.

Maximising the value of this indicator could be the objective for an incentive mechanism to foster market integration.

5.3. Another potential indicator of the degree of market integration: congestion costs

Congestion costs represent the loss in social welfare resulting from congestion. These costs can also be represented using the NECs for two interconnected markets (Figure 22).

The following elements must be added to the congestion costs measured using NECs in order to take into account the total cost of congestion for all those involved:

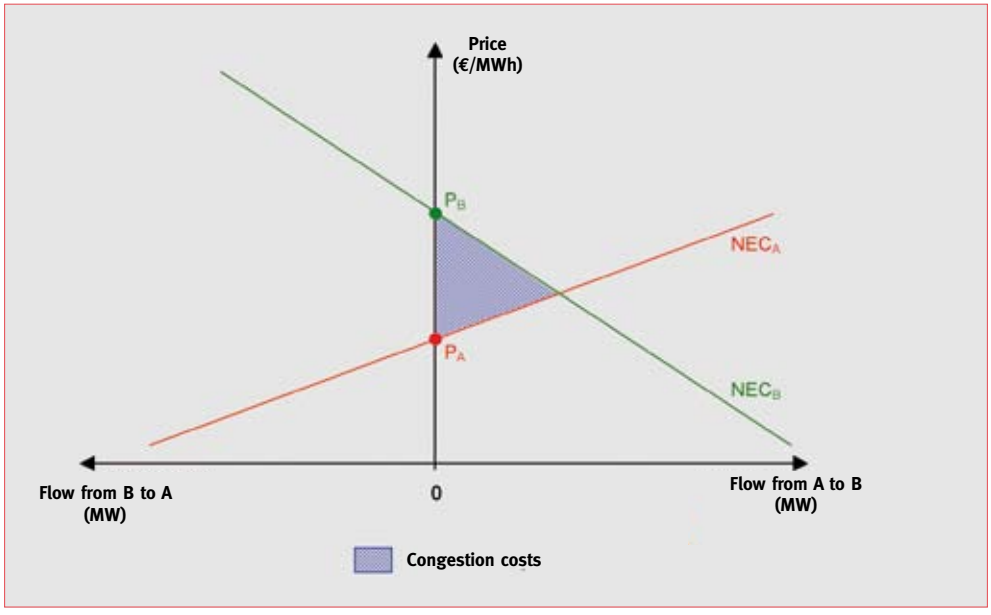
- the cost of implementing and operating congestion management methods (auctions, secondary market, nominations, etc.);

- the cost of actions taken to ensure the physical firmness of capacity (re-dispatching);

- the cost of compensation when capacity is reduced, etc.

Minimising the value of this indicator could be the objective for an incentive mechanism to foster market integration.

Figure 22 – Congestion costs



5.4. Common points in both indicators

If these indicators can be shown to be sufficiently robust, they could be used to measure the performance of TSOs as part of an incentive mechanism to foster market integration. Thus for instance, if TSOs increase the level of available capacity, or if they implement market coupling, then the effect of their actions will have a direct impact on the indicators. In addition, the fact that the two indicators take account of the cost of those actions ensures that TSOs choose the actions with the best cost/benefit ratio.

CRE is arguing that before considering designing an incentive mechanism based on one of these indicators, they should be calculated and published regularly, so that their behaviour over time may be assessed. This will also inform all players of the tangible benefits of market integration. On borders where market coupling is implemented, calculating the indicators would be very easy, since the objective function of a coupling algorithm is the social benefit generated by sharing order books on coupled Exchanges[80] :

- The social welfare generated by cross-border flows is the difference between the value of the coupling algorithm's objective function, calculated with the existing capacity at the interconnection, and its virtual value when there is no capacity at the interconnection.

- The congestion costs are the difference between the virtual value of the coupling algorithm's objective function, if capacity was infinite, and its real value with the existing capacity at the interconnection.

Regulators of the Central-West region have asked partners of the market coupling project to publish these two indicators for the region's four borders.

In addition, the application of these two indicators on a wider scale across Europe is currently being discussed within ERGEG.

[80] For more details, see the Implementation Study from the Central-West coupling project and its addendum : http://tinyurl.com/npvrxn

Conclusion

The development of the European electricity market hinges on the issue of interconnection. This being the case, its inefficient use, highlighted in Part 1 of the report, shows that the work undertaken in 2006 by the stakeholders (TSOs, regulators, electricity exchanges and market players, etc.) is by no means complete.

A number of improvements have been made since the previous report. This is demonstrated by the number of questions raised in the report for 2007 that have been resolved in the course of 2008:

- Efforts to harmonise sets of rules within each region and between different regions are underway, as demonstrated by the new versions that have been already approved or that are in the final stages of completion under the four Regional Initiatives in which France is involved.

- Regional capacity auction platforms are being developed (CASC in the Central-West region, and under discussion in the Central-South and South-West regions), without compromising the ultimate goal of a single pan-European platform. The projects under discussion are in fact meant to be provisional and the plan is to merge them with other platforms as soon as possible[81].

- At the 15th Florence Forum, on November 24th, 2008, it was decided that a work group would be set up to coordinate day-ahead market coupling projects («Project Coordination Group»), which CRE wanted dealt with at a European level. The aim will be to define the target model and the order in which the different projects will be integrated.

- Improvements in network use are continuing, with studies on the «flow-based» approach.

- Intra-day capacity allocation is being discussed in more concrete terms, especially in the Central-West region.

Nonetheless, it has not been possible to finalise all the discussions and studies and there are still obstacles to market integration:

- Harmonising market design is a long and complicated process, and the targeted market design for all the EU Member States still needs to be examined in greater depth at a European level. Among other things, the status and regulatory framework for the power exchanges requires particular attention insofar as the power exchanges play a central role in market coupling projects.

- The lack of unity as regards the authority and powers conferred upon the national regulatory authorities with the transposition of Directive 2003/54/EC into national law slows down cooperation between regulators as well as market integration. Adopting the third Energy Package provides clear guidelines as regards the regula-

[81] See the 4th Implementation Group meeting for the SW Electricity REM conclusions on the ERGEG website : http://tinyurl.com/lznyx2 and the Central South Region 14th RCC meeting conclusions on the ERGEG website : http://tinyurl.com/nhqkay

tors' powers; for example, the Electricity Directive gives them the power to request changes and approve congestion management rules applicable to interconnections, and to provide any incentives they see fit to encourage system operators to speed up market integration. Transposing the third Energy Package into national law should give the regulators the powers that they need to effectively encourage market integration.

- There may be a great many different stakeholders involved, all with diverging positions and interests. Such a context makes progress on the projects difficult. Setting up the Agency for the Cooperation of Energy Regulators (ACER), whose studies will be preceded by those of the Project Coordination Group, should, if necessary, make it possible to push ahead with the required improvements, as well as promote convergence and the rapid implementation of the projects within the Regional Initiatives.

CRE and its partners are thus pursuing their efforts to promote the harmonisation of market design and the development of efficient congestion management mechanisms to encourage market integration within the Regional Initiatives.

The limits caused by the regional approach and the national regulatory authorities' lack of powers should be solved, at least partially, with the development and improvement of regulation at a European level. A great deal is expected from the harmonisation of the regulators' powers, as well as from European-level discussions on market design and integration, and on the optimisation of coordination of regional and multi-regional projects.

List of abbreviations

ACER	*Agency for Cooperation of Energy Regulators* – Agency created by the third Energy Package, adopted by the European Parliament
ATC	*Available Transfer Capacity* – Commercial capacity, calculated for each allocation timeframe
BALIT	*Balancing Inter TSO* – Mechanism for balancing exchanges between RTE and National Grid
BASA	*Balancing and Ancillary Services Agreement for the provision of commercial ancillary services* – Contract between RTE and National Grid
CASC-CWE	*Capacity Allocation Service Company for Central West-Europe* – Auction office for the allocation of interconnection capacities within Central-West region
CNE	*Comisión Nacional de Energía* – Spanish regulatory authority
CORESO	*Coordination of Regional System Operators* – Technical coordination centre created by RTE and Elia
CREG	*Commission de Régulation de l'Electricité et du Gaz* – Belgian federal regulatory authority
D-1	*Day ahead the day of delivery*
D-2	*Two days ahead the day of delivery*
EMCC	*European Market Coupling Company* – Company in charge of operating implicit auctions at the interconnection between Germany and Denmark
EFET	*European Federation of Energy Traders*
EnBW netz	*Energie Baden-Württemberg netz* – One of the four German TSOs
ERGEG	*European Regulators Group for Electricity and Gas*
ERSE	*Entidade Reguladora dos Serviços Energéticos* – Portuguese regulatory authority
ETSO	*European Transmission System Operators*
FTR	*Financial Transmission Right*

GSK	*Generation Shift Key* – Distribution key of generation used in the flow-based method
IFA	*Interconnexion France-Angleterre* – Interconnection between France and England
NEC	*Net Export Curve* – Curve calculated with the supply and demand curves of a market
NGIL	*National Grid Interconnector License* – British operator of the IFA
NTC	*Net Transfer Capacity* – Maximum exchange programme between two areas
OFGEM	*Office of the Gas and Electricity Markets* – Great Britain regulatory authority
OTC	*Over The Counter* – Bilateral energy trades
PCG	*Project Coordination Group* – Working group steered by ERGEG, whose main objective is the coordination between market coupling projects
PTDF	*Power Transmission Distribution factor*
REE	*Red Electrica de España* – Spanish TSO
RTE	*Réseau de Transport d'Electricité* – French TSO
RWE netz	*Rheinisch Westfälisches Elektrizitätswerk netz* – One of the four German TSOs
TLC	*TriLateral Coupling* – Market coupling between France, Belgium and The Netherlands
TSO	*Transmission System Operator*

Index of boxes, figures and tables

1. BOXES

2. FIGURES

3. TABLES

Contents

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