

CONGESTION MANAGEMENT IN THE EU ELECTRICITY TRANSMISSION NETWORK – STATUS REPORT (September 2002)

1. Congestion pattern and the methods currently applied

Congestion is a common phenomenon in the European electricity market. As indicated in the annex 1, of 24 interconnectors¹ 12 are permanently or frequently congested, 5 are occasionally congested and only 7 are seldom or never congested. A considerable amount of the existing capacity is allocated to long term contracts, especially in the areas where the market price differences at the border are the highest (Borders of Italy, Netherlands and Spain).

In the EU, except the internal interconnections of the Nordel area, a contract path principle is applied for capacity allocation. A market party has to apply for capacity on all successive interconnectors between the countries of injection and withdrawal of electricity, and he can do it on any of the alternative paths.

In the UCTE area the allocation of capacities is very much dependent on network safety, reliability and co-operation agreements made in the UCTE. The calculation of available capacities is based on the application of a winter and a summer base case which is an estimation of a realistic network flow situation at specified times. Net transfer capacities are obtained by adding to these base case loads additional flows at each interconnector until the security limit is reached. The base case itself and several of the UCTE rules have a big influence in the capacity made available. In addition to UCTE rules, each TSO has its own rules regarding network planning and operation. Examples of differences which have a big influence on capacity made available are admissible line temperatures, application of n-1 rule (sometimes n-2) and operations presumed to be taken after faults.

At present the capacity allocation methods for cross-border trade of electricity vary considerably. The following list gives an overview of the methods, the annex 1 gives a more detailed view per interconnector.

- **Retention:** Capacity is reserved for vertically integrated utilities. This applies especially to Switzerland and to all old long term contracts.
- **First come, first serve:** The capacity is allocated according to the requests until all capacity is booked.
- **Pro-rata:** Market participants make requests for capacity and then the demand for capacity is curtailed on pro-rata basis to fit the available amount.
- **Explicit auctioning:** The capacity is auctioned for different time periods (for example year, month, week, hour). Bids are accepted starting from the highest, the

¹ Interconnector is the system of direct transmission lines between two countries.

price all accepted bids have to pay is usually at the level of the bid that makes to fill the interconnector (pay at lowest accepted bid).

- **Implicit auctioning/ market splitting:** Allocation of the cross-border capacity is based on generators' bids into the electricity spot markets. The interconnector capacity is allocated to bids which are competitive on the other side of the interconnector until it is full. The possibly remaining price difference between the bids over the interconnector and the bids from the local generators is retained by the TSO as the profit made from its "brokering" activities.

Explicit and implicit auctions/market splitting are market based options. Every method has several possible variations, they are not discussed here in detail.

2. Application of market based methods

The Congestion management guidelines agreed in the 6th Florence Forum² stipulate that the congestion management problems should be addressed with market based solutions. The conclusions of the 8th Florence forum stipulate that market based methods should be applied to all congested interconnectors by 1 January 2003. The annex 1 shows that only half of the interconnectors are applying at the moment market based methods.

The delay in implementing market based congestion management systems has created a very unclear situation at certain borders and has seriously prevented non-incumbent market parties to operate. Market parties have made several complaints against the practises at the interconnectors still using non-market based methods like first-come, first-serve. There seems to be multiple reasons why the implementation has been slow even if plans exist. Some parties claim that the difficulty to reach an agreement in a relatively large group of parties involved, (at least) two TSO's and two regulators, has been an important factor to delay the process.

One reason for delay has been the difficulty to agree on allocable capacities between interconnectors. Especially there has been a dispute about the capacity available from France to Italy and from Switzerland to Italy, as there is a strong interrelationship between these two interconnectors.

Two other important issues related to capacity allocation have been raised by market parties:

- Information on available capacity and factors influencing it (for example outages due to maintenance).
- Firmness of the allocated capacity (in some cases the TSO has cut capacity informing that the capacity allocated was non-firm).

It is also important to note that there seems to no progress at the moment in involving power exchanges more tightly to the congestion management systems, through

² Conclusions of the 6th Florence forum, "Guidelines on Congestion management", 9.-10.11.2000

implicit auctions or market splitting, and using the idea of “capacity slicing” presented in earlier Florence forum documents.

3. Implementation of the guidelines

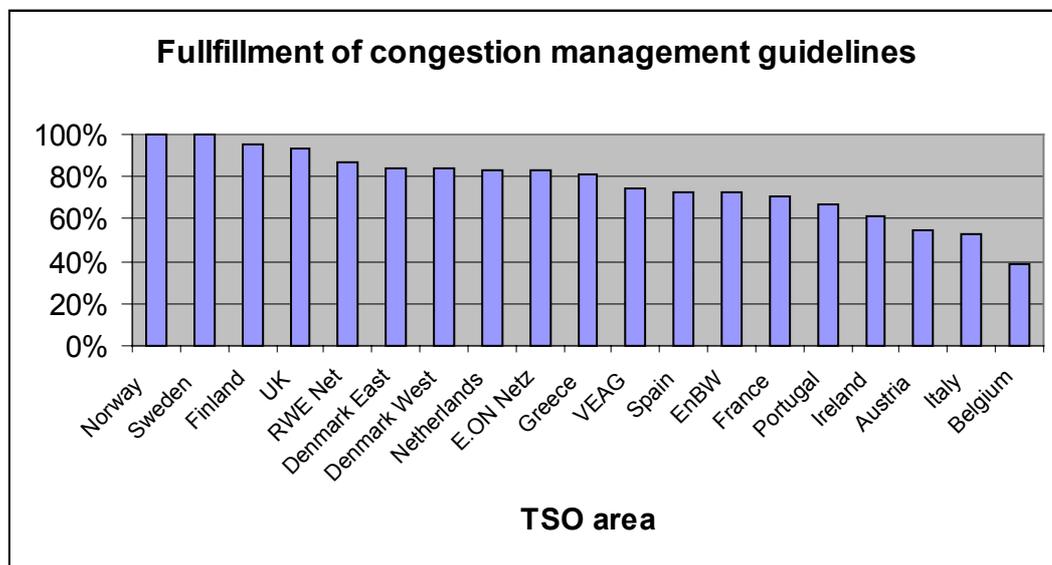
3.1 Overview

The Congestion management guidelines agreed in the 6th Florence Forum have 33 paragraphs, some of the paragraphs contain several guideline items. An inquiry made by the CEER congestion management working group analysis the implementation in each member state of the guidelines item by item³. The general conclusion of the implementation is the following:

- If market based methods are not applied, several other guidelines items are not fulfilled either
- Applying market based methods does not automatically imply compliance with the rest of the guidelines.

Annex 2 gives a statistical overview about the compliance with the congestion management guidelines. As a non weighted average the compliance is 77%⁴.

The following picture illustrates the level of compliance by TSO area. No weighting based on the importance of the rule has been applied.



In the following paragraphs some of the key items in the guidelines are discussed more in detail.

³ The German answers are from the TSOs co-ordinated by BMWi

⁴ The answers to the questionnaire are from spring 2002. Recent developments like the nomination of the Belgian TSO 13.9.2002 have not been taken into account in the statistics.

3.2 Netting and use-it-or-loose-it

Netting of opposite flows (item 7, 29 and 30) is not made to an extent it could be done. In auction systems capacity is normally sold as an option. After nomination, typically before the day auction, the capacity retained becomes an obligation, and flows in opposite directions can be netted. Depending on interconnector there are several variations on when the options become obligations and how the netting is finally made. On some interconnectors netting is refused on the basis of the uncertainty of exact locations of the generators and the loads, as in some cases the netting effect might be less than 100%.

As netting contains a risk element for the TSO, applying netting requires a further development of the products in order to define how this risk is shared.

Use-it-or-loose-it principle (item 8) is widely applied. In several cases, however, the information about the unused capacity is coming so late, that it's value to the market is diminished.

3.3 Congestion revenues

According to the inquiry the use of congestion management revenues is mostly compatible with the guidelines. The revenues are, however, seldom published. In case of auctions the revenues can be calculated from the published auction results. A further analysis on the revenues and on their use is necessary.

Congestion revenues (item 9) for interconnectors which are not part of any national grid (for example the submarine cable between France and England, between Sweden and Germany and Between Denmark and Germany) form a special challenge regarding the guidelines.

3.4 Co-ordination

Co-ordination of the congestion management method (item 11) on both sides of the interconnector is supposed to be self-evident. However, on 4 interconnectors out of 24, the methods applied at each side of the interconnector are not co-ordinated. In several of these cases the market parties have to apply for capacity from both TSOs involved separately. Only in the case of Belgium-Netherlands-Germany and inside Nordel a single allocation procedure covers more than one interconnector.

3.5 Transparency

Transparency issues (items 17 – 18) are dealt with in detail in a CEER paper dedicated to transparency. The paper suggests publishing information on load, on transmission infrastructure and generation capacity development, on congestion management methods and on available capacity. The information should be in an easily understandable form and easily accessible.

3.6 Redispatching

According to the guidelines (item 22), in case of occasional congestion co-ordinated redispatching (or counter trading) should be used in order to accommodate the demand to the interconnector.

When redispatching is used as a **preventive measure**, then it is a part of the calculation of the available capacity. At the stage of **scheduling the flows** redispatching is used to better accommodate the overall demand to the network. Some member states apply redispatching to guarantee the firmness of the announced capacity in case of transmission constraints. Finally redispatching is used during the **operation of the network** when the actual flows differ from the scheduled ones, in order to keep the system within security limits.

Even if redispatching is used in several member states as the main congestion management method inside the control area, it is applied very little to the interconnectors. An example of this is the redispatching used on the French-Spanish border, where it is used as a preventive measure. There is, however, a discussion going on in France who should pay the congestion management costs which will benefit market actors on both sides of the interconnector.

It is assumed that redispatching at some critical interconnectors might increase considerably available capacity in the European network, even if there is little quantified evidence on this yet. To promote redispatching, it is important to develop rules and procedures for sharing the redispatching costs according to the benefits.

3.7 Transaction curtailment

Transaction curtailment (item 23) is done in several cases also in situations other than force majeure without compensation to market parties. Curtailment is closely linked to the firmness of the capacity sold. In some cases market parties prefer non-firm capacity if they have means to bear the risk of curtailment with less costs than the TSO.

3.8 Auctions

The congestion management guidelines for the explicit auction systems (items 26-33) have been implemented relatively well. On some interconnectors, however, the existing old long term contracts reduce the available capacity significantly. There is often no limitation of how much capacity one market player can buy (item 32). The capacity is mostly tradable (item 33).

4. Plans to implement market based congestion management systems

4.1 Borders of Italy

The implementing of market based methods for congestion management at the borders has been linked to the creation of an electricity market in Italy. A tentative date for a new market system is 1 January 2003, but there is no confirmation yet on the date and on the system to be applied.

4.2 France-Germany

No plans to move to market based mechanisms have been proposed. The TSOs in the Benelux area have agreed to study co-ordinated auctioning system in view of implementation 1 January 2004.

4.3 France-Belgium

From 1 July 2002 the TSO:s have agreed on a co-ordinated system of allocation of capacities, RTE being responsible for the monthly allocation and ELIA for the daily allocation. The method applied is a form of first come first serve allocation, with a rationing of the allocable capacities. First come first serve principle is applied when updating the order in which the capacity is allocated, the clients who have used more than 65% of the capacity allocated to them in the previous allocation will retain their position on the list in the next allocation. For certain transactions a transaction based fee, called “congestion fee” is applied.

The French and Belgium regulators have opposed introduction of an auction mechanism to this interconnector. The argument put forward is that as French and Belgian markets have both a dominant player, auctions would be too vulnerable to manipulation. Arguments why a non market based method would be a better solution than a market based one, have not yet been presented. No date for a more permanent congestion management system has been announced.

4.4 France-Spain

There is a proposal to implement an auction system on the French-Spanish border. No final approval of the system has been reached yet.

4.5 Sweden-Germany

The Baltic cable between Sweden and Germany is selling one a day before basis the remaining capacity at a transmission tariff. As the tariff is relative high (8-15€/MWh), a part of the capacity of the cable remains unused. No plan to implement a market based allocation system has been announced.

4.6 Portugal-Spain

The Iberian Electricity Market is planned to start 1 January 2003. There is, however, no confirmation of this date and of the congestion management system to be applied in the integrated market.

4.7 Interconnections with accession countries and third countries

In the accession countries and in third countries the interconnectors are mainly still in the hands of vertically integrated companies who are often in a monopoly position to sell electricity through the interconnector. The methods applied at outer borders of the EU vary considerably. For example Vattenfall and EoN Netz organise unilateral auctions for electricity coming from Poland and Czechia, the SwePol cable between Sweden and Poland is mainly reserved for the shareholders owning the link. With the

accession a review of all the methods applied between old and new member states and with third countries is necessary.

5. Conclusions

According to the analysis presented in the annexes 1 and 2, it is fair to say that the congestion management guidelines agreed in the 6th Florence forum are only half way implemented. Market based methods are in use on 12 of the 24 interconnectors. However, most of the interconnectors with the highest economic value, especially those at the borders of Italy, do not have yet market based methods in place. As a statistical average without weighting the guidelines are followed up to 77%.

As the implementation of market based methods is fundamental regarding compliance with the congestion management guidelines, the most important action is to move to market based methods on all interconnectors in the EU as soon as possible. This applies to the Italian borders, to the borders of France with Germany, Belgium and Spain, to the cable between Sweden and Germany and to the Spanish Portuguese interconnector.

To reach a compliance with the guidelines, making guidelines binding seems to be necessary.

Several points of the non compliance with the guidelines are closely related to the lack of coherence and co-ordination of the capacity allocation products. There is a need to harmonise a minimum set of capacity allocation products specifications across Europe especially regarding the time frames and the firmness of the allocation in order to make key principles like netting, use-it-or-lose-it and capacity trading work efficiently. Co-ordination of the allocation procedure at both sides of the same interconnector is a self-evident part of this harmonisation.

Transparency of the capacity calculation and allocation procedure has to be improved, the CEER guideline shows clearly what is the relevant information to be published.

No progress is made in involving power exchanges in the congestion management systems through implicit auctions or market splitting. The Association of European Power Exchanges is proposed to analyse and suggest a plan how to implement congestion management through power exchanges in the next Florence forum.

Redispatching over some critical interconnectors is assumed to increase interconnection capacity in an economic way. It is suggested that CEER will launch a study in order to identify the most interesting interconnectors regarding redispatching and netting, to estimate the benefits of it and to propose rules how the costs are shared among the parties who benefit of it. The results are to be presented in the next Florence forum.

The European Commission is proposed to analyse the status of the congestion management and to discuss introduction of congestion management systems which fulfil the congestion management guidelines on interconnectors with accession countries and with third countries. The results are to be presented in the next Florence forum.

Annex 1: Status of the Congestion Management in the EU (September 2002)

Country 1	Country 2	Capacity ETSO Winter 01-02/MW	Allocation method	Allocation frequency ¹	Capacity tradability	Redispatching to increase:	Netting	Use-it-or-lose-it	Coordination of both sides	Long term contracts exist	Congested	Date of introduction of a market based system
CH	IT	2800 ²	Retention/Pro rata	y,d	no		no	no	no	29%	always	
FR	IT	2600 ²	Pro rata	y,d	yes	Firmness	no	yes	yes	69%	always	
AT	IT	220	First come-fs/Pro rata	d	no		no	no	no	50%	always	
FR	DE	2850	First come-first serve	d	no	Firmness	no	yes	no	13% ³	frequently	
DE	NL	2800	Auction	y,m,d	yes		no	yes	yes	46% ⁴	frequently	nov-00
FR	BE	2200	First come-fs/Pro rata	m,d	no		yes	yes	yes	72% ⁵	frequently	
FR	UK	2000	Auction	3y,y,d	yes		no	yes	yes		frequently	mar-01
DK-W	DE	1200	Auction	y,m,d	yes	Firmness	yes	yes	yes		frequently	sep-00
FR	ES	1100	First come-fs/Pro rata	d	no	Capacity	no	yes	no	45%	frequently	
DK-W	NO	950	Market splitting	d	n.a.		yes	n.a.	yes		frequently	jul-99
DK-E	DE	550	Auction	m,d	no		yes	yes	yes	100% ⁶	frequently	jan-02
SE	DE	460	Retention/Fixed price	d	no		no	yes	yes	100%	frequently	
UK	IE	120	Auction	y,d	yes		no	yes	yes		frequently	apr-00
NO	SE	2400	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	jan-96
SE	NO	2400	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	jan-96
SE	FI	2050	Market splitting	d	n.a.	Firmness	yes	n.a.	yes		occasionally	jul-99
DK-E	SE	1700	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	oct-00
FI	SE	1650	Market splitting	d	n.a.	Firmness	yes	n.a.	yes		occasionally	jul-99
SE	DK-E	1300	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	oct-00
NO	DK-W	1000	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	jul-99
ES	PT	850	Pro rata	d	no	Firmness	no	n.a.	yes		occasionally	jan-03
DE	DK-W	800	Auction	y,m,d	yes	Firmness	yes	yes	yes		occasionally	sep-00
PT	ES	725	Pro rata	d	n.a.	Firmness	no	n.a.	no		occasionally	jan-03
DK-W	SE	610	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	jul-99
SE	DK-W	580	Market splitting	d	n.a.		yes	n.a.	yes		occasionally	jul-99
DE	DK-E	550	Auction	m,d	no		yes	yes	yes	36%	occasionally	jan-02
DE	SE	370	Retention	d	no		yes	yes	yes	100%	occasionally	
FR	CH	3000	First come-first serve	d	no		no	yes	yes	?	seldom	
UK	FR	2000	Auction	3y,y,d	yes		no	yes	yes		seldom	mar-01
BE	NL	1700	Auction	y,m,d	yes		no	yes	yes	18%	seldom	nov-00
NL	BE	1700	Auction	y,m,d	yes		no	yes	yes		seldom	nov-00
NL	DE	1350	Auction	y,m,d	yes		no	yes	yes		seldom	nov-00
ES	FR	1000	First come-fs/Pro rata	d	no		no	no	no		seldom	
BE	FR	3100	First come-fs/Pro rata	m,d	no		no	yes	yes	16% ⁷	never	
IT	CH	3100	First come-first serve	d	no		no	no	no		never	
CH	FR	3000	Retention	d	no		no	no	yes		never	
DE	FR	2250	First come-first serve	d	no	Firmness	no	no	no		never	
IT	FR	2200	First come-first serve	d	no		no	no	yes		never	
AT	CH	2000	First come-first serve	d	no		yes	no	yes		never	
CH	AT	2000	Retention	d	no		yes	no	yes		never	
CH	DE	2000	Retention	d	no		yes	no	yes		never	
DE	CH	2000	First come-first serve	d	no		no	no	yes		never	
DE	AT	1650	First come-first serve	d	no		no	no	yes		never	
AT	DE	1150	First come-first serve	d	no		yes	no	yes		never	
GR	IT	500	Pro rata	m,w,d	no		yes	yes	yes		never	may-02
IT	GR	500	Auction	m,w,d	no		yes	yes	yes		never	may-02
IT	AT	220	First come-first serve	d	no		no	no	no		never	
IE	UK	50	Auction	y,d	yes		no	no	yes		never	apr-00

Grey cells: Conflict with the Congestion management guidelines of the 6th Florence Forum

- 1 Allocation frequency: yearly, monthly, weekly, daily
- 2 Value by the Italian regulator
- 3 750MW long term contract FR-NL, half of the capacity is assumed to this interconnector.
- 4 Long term contracts: 600MW DE-NL up to 2003, 300MW DE-NL up to 2005 and 750MW FR-NL up to 2009 (half of the capacity of which is assumed to this interconnector).
- 5 Assumption based on participation of Belgian companies outside Belgium (~1200MW) and on taking half of the long term contract FR-NL (750MW) to this interconnector.
- 6 Kontek-cable long term capacity reservations: 350MW up to 2006, 200MW for the lifetime of the cable, 50MW for system services.
- 7 Assumption based on 481MW of French ownership of production capacity in Belgium.

Annex 2:

Statistics of compliance with congestion management guidelines (Situation July 2002, 19 control areas)¹.

Guideline item	
1. Is the managerial independence and the confidentiality of sensitive business information in the congestion management system of your country guaranteed?	95%
3. Is the current network used at the maximum capacity that complies with the safety standards of secure network operation?	95%
4. Are non-discriminatory and transparent standards for which congestion management methods are applied described in open and publicly available documents?	89%
5. Is discrimination between the different types of cross-border transactions kept to a minimum?	89%
6. Are price signals that result from your congestion management system directional?	72%
7a. Is every effort made to net the capacity requirements of any power flows in opposite direction over the congested tie line in order to use the congested tie line to its maximum capacity?	67%
7b. Are transactions that relieve the congestion never denied?	84%
8. Is any unused capacity available to other agents (the use-it-or-lose-it principle)?	94%
9. Are congestion rents used in accordance with guideline #9?	89%
10a. Is the TSO offering transmission capacity to the market as 'firm' as possible?	95%
10b. Are the exact conditions for all transport over cross-border lines made known to any market party that applies for the capacity?	100%
11. Are congestion management procedures on both sides of the interconnection lines co-ordinated?	79%
15. Are long-term transmission commitments treated in the same way as other contracts?	21%
17a. Does the TSO publish all relevant data concerning the cross-border total transfer capacities?	89%
17b. Does the TSO publish estimates of the transfer capacity for each day at several time intervals before the day of transport?	68%
17c. Does the TSO provide a description of the firmness of the transfer capacity data?	68%
18a. Does the TSO publish a general scheme for calculation of the total transfer capacity and the transmission reliability margin based upon the electrical and physical realities of the network?	47%
18b. Do the safety standards, the operational and planning standards form an integral part of the information the TSO publishes in an open and public document?	63%
19. Are network congestion problems addressed with market based solutions?	63%
20. Are network congestion problems solved with non-transaction based methods, i.e. methods that do not involve a selection between the contracts of individual market parties?	78%
22. Is cross-border co-ordinated redispatching or counter trading used jointly by the concerned TSOs in the cases where the lack of a systematic congestion pattern and the network topology make it difficult to use auctions?	40%
23. Is transaction curtailment, following pre-established priority rules, left only for emergency situations where the TSOs must act in an expeditious manner and redispatching is not possible?	82%

Grey < 50%

¹ Numbering refers to the "Guidelines on Congestion management". Some numbers in the guidelines do not contain a detailed guideline item.

Please answer the following questions only if a system of explicit auctions is applied in your country:	
26. Is the auction system designed in such a way that all available capacity is being offered to the market?	82%
27a. Is the total interconnection capacity offered in a series of auctions?	45%
28. Is the auction system designed in such a way that bidders are allowed to participate also in the daily sessions of any organised market (e.g. a power exchange) in the countries involved?	100%
29a. Are the power flows in both directions over congested tie lines netted in order to maximise the transport capacity in the direction of the congestion?	45%
29b. Does the TSO propose a workable scheme for offering as much capacity to the market as possible?	91%
30. Is a penalty system implemented for parties that deviate from their notified transports, in order to provide the TSO with the financial means to guarantee the firmness of auctioned capacity by taking operational measures (e.g. counter trading, redispatching)?	73%
31. Is the auction procedure adopted capable of sending directional price signals to market participants (e.g. through a system in which transports in a direction opposite the dominant power flow that relieve the congestion result in additional transport capacity over the congested tie line)?	82%
32. Is the amount of capacity that can be bought/possessed/used by any single market player in an auction bound to a maximum (cap)?	27%
33. Is the capacity bought at the auction freely tradeable before the moment of notification?	82%
Average 1-33	77%

Grey < 50%