

# Congestion management interconnections

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# Foreword

This document is intended as a report in order to fulfill the provisions of EC Regulation 714/2009 article 5.1 and corresponding directives.

## 1. Cause of congestion

As long as there are energy cost-price difference in the various countries, there will be a need for interconnection capacity, both for the import and export of power. The interconnection capacity is limited because we do not deal with a so-called 'copper plate' but with a transmission grid with limited capacity. The ultimate interconnection capacity made available to the market is not just determined by the physical capacity of the interconnections themselves, but is also dependent on the places where production or consumption takes place in the transmission grid. Congestion occurs if the interconnection transmission capacity made securely available to the market is threatened or is exceeded by an expected or unanticipated transport.

## 2. Interconnectors

The following interconnectors are currently available:

- 1 x +/- 450 kV DC circuit between Eemshaven and ( Statnett )
- 1 x +/- 450 kV DC circuit between Maasvlakte and Isle of Grain ( National Grid )
- 2 x 380 kV AC circuits between station Meeden and Diele (TenneT DE)
- 2 x 380 kV AC circuits between station Hengelo and Gronau ( Amprion )
- 1 x 380 kV AC circuit between station Maasbracht and Siersdorf ( Amprion )
- 1 x 380 kV AC circuit between station Maasbracht and Rommerskirchen ( Amprion )
- 2 x 380 kV AC circuits between station Maasbracht and Van Eyck ( Elia )
- 1 x 380 kV AC circuit between station Geertruidenberg and Zandvliet ( Elia )
- 1 x 380 kV AC circuit between station Borssele and Zandvliet ( Elia )

## 3. Methods used in congestion management

By congestion management is meant the method – other than expansions in the transmission grid itself – which ensures that the market has a maximum transport options available to it, taking into account the restrictions which the electricity supply system imposes in order to ensure that a secure supply remains guaranteed.

The Netherlands is connected with foreign countries via alternating current (AC) connections and direct current (DC) connections.

The physical behaviour of a direct current connection differs strongly from an alternating current connection. There are above all differences in the area of European guidelines and that of ownership.

For these reasons, a distinction is made in determining the for the market available AC and DC interconnection capacity respectively.

TenneT only assesses whether the network security is guaranteed for the foreign connections as domestic congestion is assumed to be resolved by domestic management measures. In this way, maximum interconnection capacity is made available to the market.

The interconnection capacity is determined in consultation with the foreign TSOs and offered firm to the market. Deviations from this are only possible in the event of emergencies. The interconnection capacity is determined on the basis of international norms for network security, whereby the most current available information is taken into account such as:

- Anticipated or unanticipated works on the interconnections
- Public holidays (Which could have an impact on production and or consumption patterns in Europe).
- Expected wind production in Germany
- Disturbances on interconnections

The allocation of the interconnection capacity to the market is done by means of auctions. The proceeds from these auctions are then used to increase the interconnection capacity by means of network investments.

The above takes place chronologically as:

## **Determination of NTC interconnection capacity:**

1. Every two years, the so-called Net Transfer Capacity (NTC) is determined with the neighbouring countries in the context of ENTSO-E. TenneT also determines the composite NTC according to the ENTSO-E method in consultation with the neighbouring countries, whereby the mutual dependencies are dealt with (see also <http://www.entsoe.eu> menu-item Market, Net Transfer Capacity ).

The NTC is composed of the interconnection capacity of the Netherlands-Germany, Netherlands-Belgium and Netherlands-Norway for both the import and export of power. The so-called Transmission Reliability Margin for mutual help and assistance which is applied in this regard is 300 MW.

2. Monthly consultation takes place with the neighbouring TSOs in order to determine and possibly adjust the monthly NTCs.
3. Daily, 2 days prior to the intraday, the NTC for that intraday is determined.

4. Daily, 1 day prior to the intraday, the final NTC is determined as well as the capacity which is available for the spot market, the so-called ATC (Available Transfer Capacity).  
The ATC is equal to the NTC minus the monthly nominations and the annual nominations from the market. Account is taken of the direction of these nominations, as a result of which maximum capacity can be made available to the market, so called "netting".
5. On the day prior to the intraday or during the intraday itself, TenneT determines on the basis of the *de facto* expected international transport schedules as finally nominated by the market parties whether there is still a possibility for congestion in the network and whether extra management measures ( including the so-called international redispatch) need to be taken in order to relieve these bottlenecks.
6. On the borders with Germany and Belgium the remaining available transfer capacity will be made available on an intraday basis (during the day of execution), likewise on the basis of netting.

## **Making the NTC values available to the market**

This information is made available via the TenneT website:

<http://energieinfo.tennet.org/>

- The expected NTC values are made available annually.
- TenneT also publishes the capacity for the spot market for the coming 30 days. This is the monthly NTC minus annual/monthly capacity which has been allocated in the meantime.
- TenneT publishes the NTC for the coming day on a daily basis.

## **Making the interconnection capacity available to the market**

### **AC capacity**

The AC capacity is made available via an auction mechanism.

- 1300 MW is made available annually via CASC-CWE by means of an explicit auction capacity.
- On a monthly basis a minimum of 400 MW and a maximum of 850 MW of capacity is made available via CASC-CWE.

- The ATC is made available daily with a minimum capacity of 100 MW.  
On the Dutch-Belgian and Dutch-German border this is done via an implicit auction within the France, Belgium, Luxembourg and German market coupling.
- During the intraday, the capacity still available is offered via two separate explicit auctions for the Dutch-Belgian and Dutch-German border respectively, whereby account is taken of the already nominated capacity (netting) in order to allow the market to make maximum use of the available capacity.

#### **DC capacity**

The DC capacity is also made available via an auction mechanism. The NorNed capacity (nominally 700 MW in both directions) is offered daily and is fully available to the spot market. Therefore, no annual, monthly or intraday market is organised for this.

The BritNed capacity (nominally 1000 MW in both directions) is daily auctioned via an implicit auction and quarterly, monthly auctioned via an explicit auction.

The intraday auctions for both NorNed and BritNed will soon be realized.

## **4. Plannen voor congestiemanagement**

Over the course of time the demand for capacity with other countries has increased. The EU is therefore pleading for sufficient interconnection capacity between countries in order to advance the European energy market. In the light of this, TenneT carries out thorough analyses before large investments are made in the expansion of the interconnection capacity. TenneT first focuses on the better use of the capacity within the current connections through more intensive collaboration with the relevant TSOs, both operationally and with regard to network development. In the meantime, there are plans for a DC cable connection to Denmark. Furthermore, there are concrete plans in cooperation with Amprion for a 380kV AC connection between Doetinchem and Wesel. In addition to these planned network investments, the following plans in relation to congestion management are also on the agenda:

#### Flow based market coupling after 2012.

Following the implementation of the ATC market coupling, the principle of flow-based market coupling will be introduced.

This will see the physical capacity flows which arise through commercial transactions derived on the basis of the sensitivity factors of all relevant connections. In fact, the market will therefore directly determine the available interconnection capacity, taking into account all relevant connections.

#### Expansion of redispatch

In relation to TSO Security Cooperation (TSC), the facilitation of international redispatch is currently being further looked into together with the regulators. Any congestion which occurs during the

preparation phase prior to or during the intraday can then be quickly and efficiently eliminated in full which will allow the allocated transport capacity to remain unchanged and the network security to be guaranteed.

#### Domestic congestionmanagement

Congestionmanagement is a mechanism to determine the scarce transmission capacity in a congestion area and allocate it to the connected customers in that area. Due to an increasing demand for transmission capacity, a lack of transmission capacity can occur in an area where more electricity is produced as consumed and this surplus should be transported via the transmission grid. In some situations this transport exceeds the maximum value that can be transported within the safety standards of the transmission and thus create a shortage in transmission capacity - congestion.

The increasing electricity supply is primarily concentrated in three areas: Zuid-Holland, Northern part of the Netherlands and Zeeland/West Brabant.

Congestionmanagement is a temporarily solution to operate the grid within the safety standards. The eventually grid designs and investments will result in a grid that can transport the additional electricity supplies within the safety standards.

In order to facilitate the increased demand for transmission capacity several measures are to be taken. The structural solutions are grid reinforcements. Temporary solutions can be achieved in the short term, this relates mainly to technical (short-term realizable) solutions – such as maintenance, upgrading or more dynamic use of the transmission grid – and operational solutions such as implementing a congestionmanagement method.