Coreso Operational Review 2013

Leading coordination for enhanced reliability of supply

Coreso Operational Review 2013

Introduction

Participating to the operational exploitation of the European electricity transmission grid, Coreso accompanies the evolutions of the electricity domain with the running processes and develop new projects to fit with these evolutions and enhance the capabilities of the European grid.

The energy transition is a reality in all Europe with renewable energy infeed being each year more important, changing the energy mix and thus the power flows across Europe. These evolutions are challenging to all the stakeholders of the European system operation and Coreso is at the forefront along with the European Transmission System Operators (TSOs) to meet this challenge.

To enhance the capabilities of the grid to accept and deliver this new energy mix day after day, the energy markets are also mutating across Europe. The flow-based approach to give more flexibility to the CWE Market coupling has been tested last year and is planned to come in operation this year. This year also, the D-2 CSE Capacity Calculation will aim to enhance the power exchanges in the CSE area through an innovative and reliable approach. Coreso is present to develop, test and implement these processes, offering expertise and operational support throughout the project.

This annual overview of Coreso's activities presents these evolutions over the past year, some information about Coreso's processes and performances as well as data concerning the power exchanges in Europe.

We hope you will find useful information and wish you a good reading!

Coreso main events for 2013

28 May 2013

The different Regional Security Coordination Initiatives (TSC, EKC and Coreso) launch a data quality task force, under the umbrella of Entso-E. This first project bringing together the different regional initiatives offers the opportunity to develop further cooperation.

10 June 2013

Twenties closing General Assembly: Coreso participated to this European project, providing expertise on different topics, including Phase Shifter Transformer (PST) coordination. Twenties is a European project that aims to deal with the main questions related to the insertion of massive wind power in the European grid.

21 July 2013

Start of the IT Audit to enhance and secure Coreso's IT structure.

8 October 2013

IDCF process implemented at Coreso. This new process is developed and rolled out by Coreso and TSC (both of them regional security coordination platforms). In total, 17 TSOs cooperate by providing the necessary input data on an hourly basis. The intraday studies are now improved owing to the automatic hourly update of the Day Ahead files; Coreso provides two system studies for the morning and evening peaks as well as on demand.

30 October 2013

First implementation of the new renewable energy forecasts provided by Meteologica in the Coreso supervision tool (DADS).

1 November 2013

Implementation of the EAS system (ENTSO-E Awareness System) at Coreso is completed. Coreso can now also view the most important real-time parameters for the complete European electricity system.

Coreso key figures for 2013

Coreso performance

MAIN PERFORMANCE FIGURES

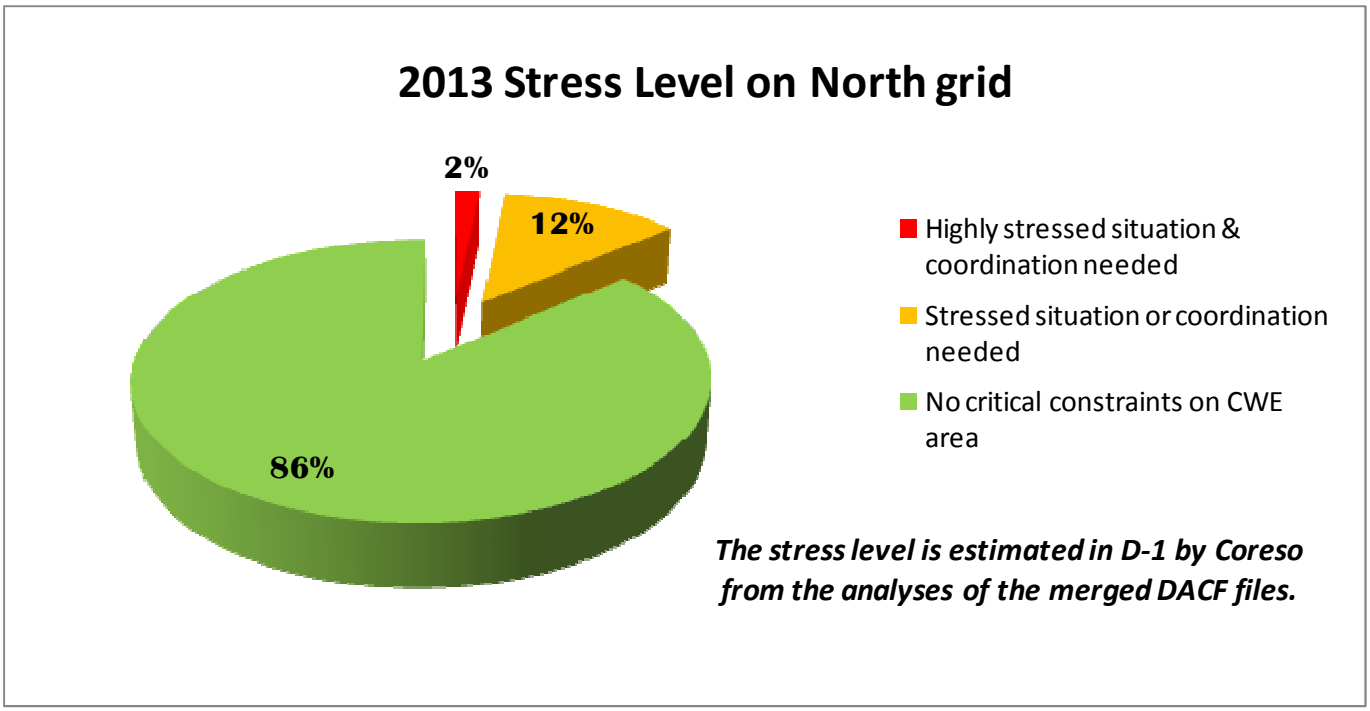
Publication of 24 merged timestamps	364/365 days
Number of SMART* performed	35 (2012 = 44)
Number of BALIT variants and Intraday studies	57 (2012 = 136)
Number of other variants performed in day-ahead	77 (2012 = 155)
Number of IDCF Studies (process started 10/2013)	145 (new)

**SMART : System Modification Advice RequesT*

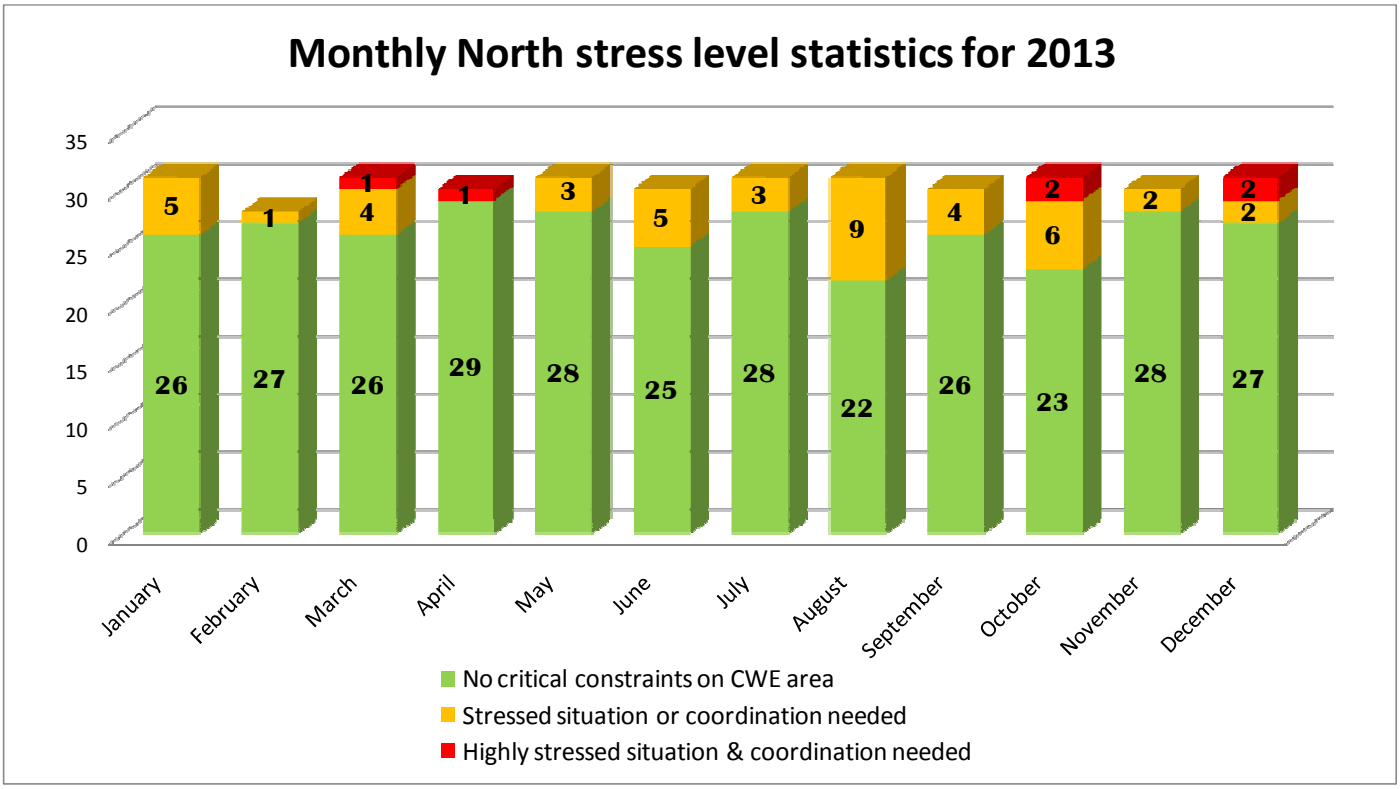
In 2013, 24 mergings were performed for all days except one (long clock change day).
In 2013, 24 security analyses were performed for all days except 3:

- 03/02/2013: no Vulcanus file for CSE Area. 7 security analyses performed.
- 10/04/2013: 7 security analyses performed.
- 27/10/2013: long clock change. 11 security analyses performed.

North Stress level



Occurences	2010	2011	2012	2013
Red situations	2	4	5	6
Orange situations	15	47	57	44



Stressed situation on the North grid in 2013

8 April 2013

Context:

IFA limited to 1500 MW.
Maasbracht Van Eyck 28 is in outage (including Van Ecyk 2 PST).
Tihange 2, North and South in outage.

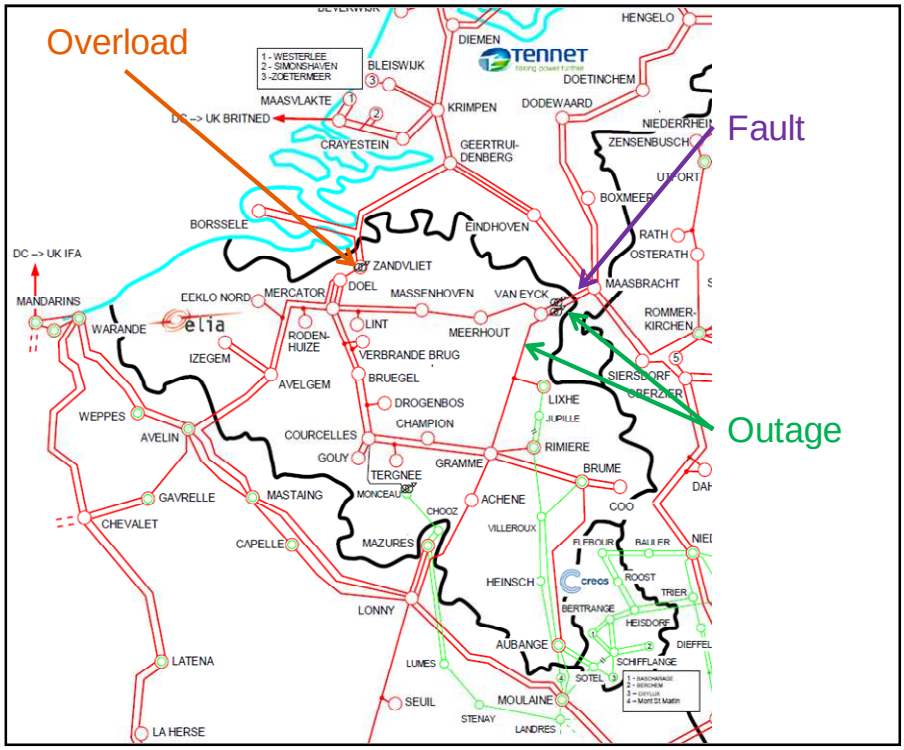
Day-ahead foreseen situation:

The tap set foreseen during the day-ahead studies was : Zandvliet on tap 6 and Van Eyck 1 on tap 14.

The day-ahead studies showed constraints for the loss of the remaining PST of Van Eyck (128% overload at 19:30 on Zandvliet PST).

Opening the Geertruidenberg – Zandvliet axis as a preventive remedial action was agreed during day-ahead process, as well as setting ATC to zero for France to Belgium.

Redispatching between Tennet NL and Elia was also helping on this constraint.



Real Time situation:

The PST tap positions were adapted in real-time to: Zandvliet on tap 3 and Van Eyck 1 on tap 11.
With the 19:30 timestamp Snapshot, the overload on Zandvliet PST was 121%.
The preventive remedial action of opening the Geertruidenberg – Zandvliet axis was implemented reducing the overload to 104%.
The following curative remedial actions were required to handle this situation:

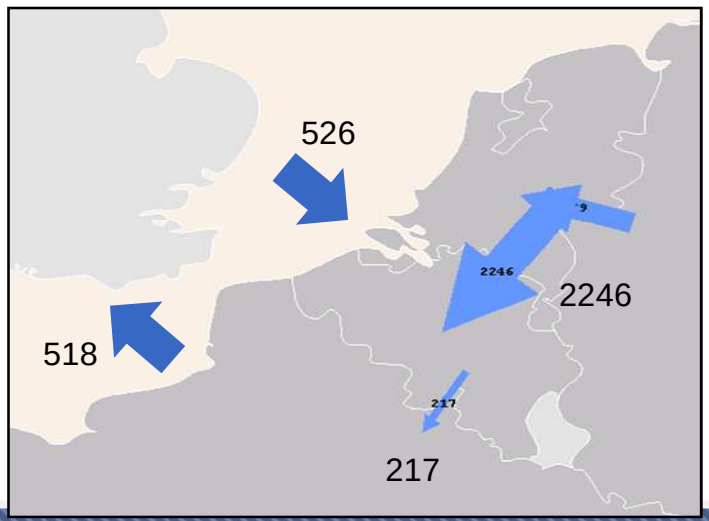
- Go to tap 1 in Zandvliet
- Open FR-BE tie-line Doel Avelgem.

Introducing the HVDC Redirection – Redirecting Flows over Interconnectors (RFIs) project :

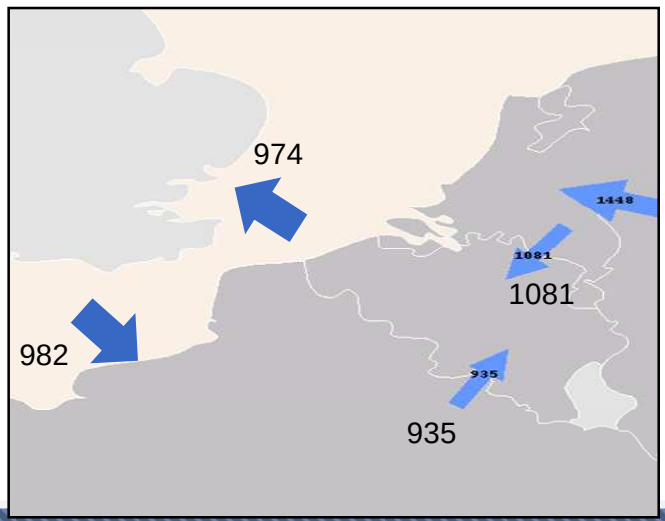
If the PST at Zandvliet tripped then NL and BE transmission systems would have been separated.

At the time of the overload a HVDC redirection of up to 1500MW would have been possible due to favourable flows on IFA and BRITNED (post gate closure). If a redirection of 1500MW was carried out then the overload would have reduced from 121% to 73% on Zandvliet PST (105% for 500MW redirection).
The HVDC redirection in this scenario is 48% effective on the overload at Zandvliet and 52% effective on the flows on the NL-BE border (see flows below).

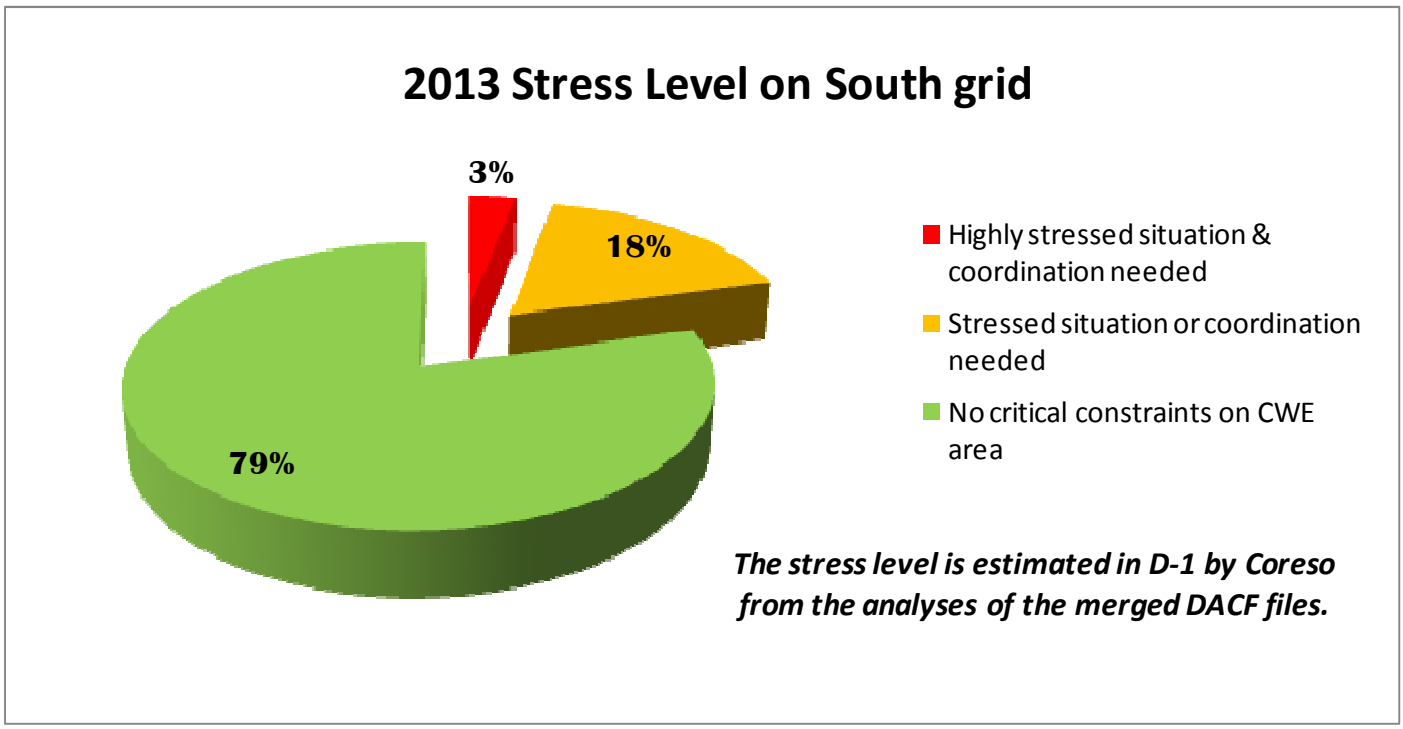
Real Time situation



With 1500 MW of HVDC redirection

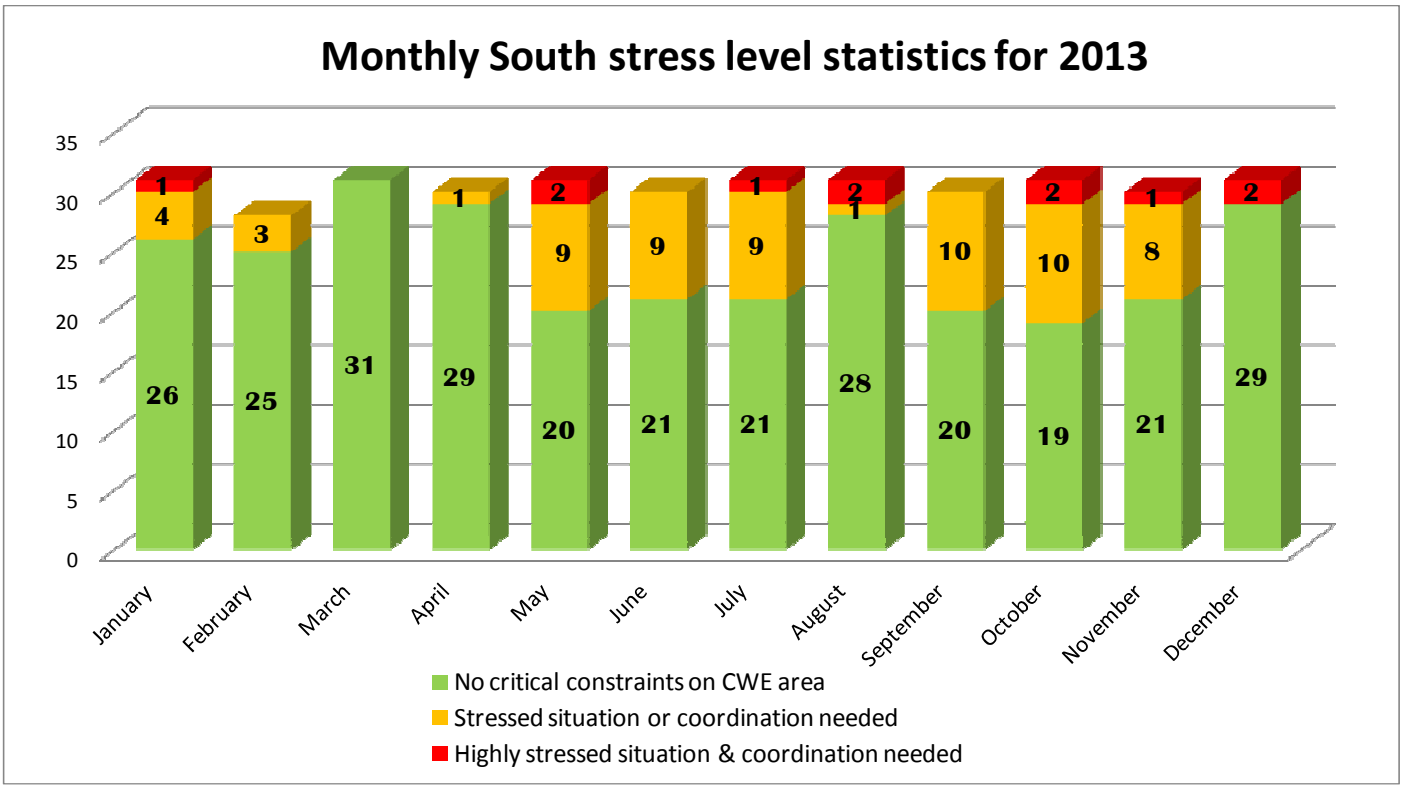


South Stress level



Occurences	2010	2011*	2012	2013
Red situations	-	4	14	11
Orange situations	-	39	69	64

*South studies started on july, 1st 2011



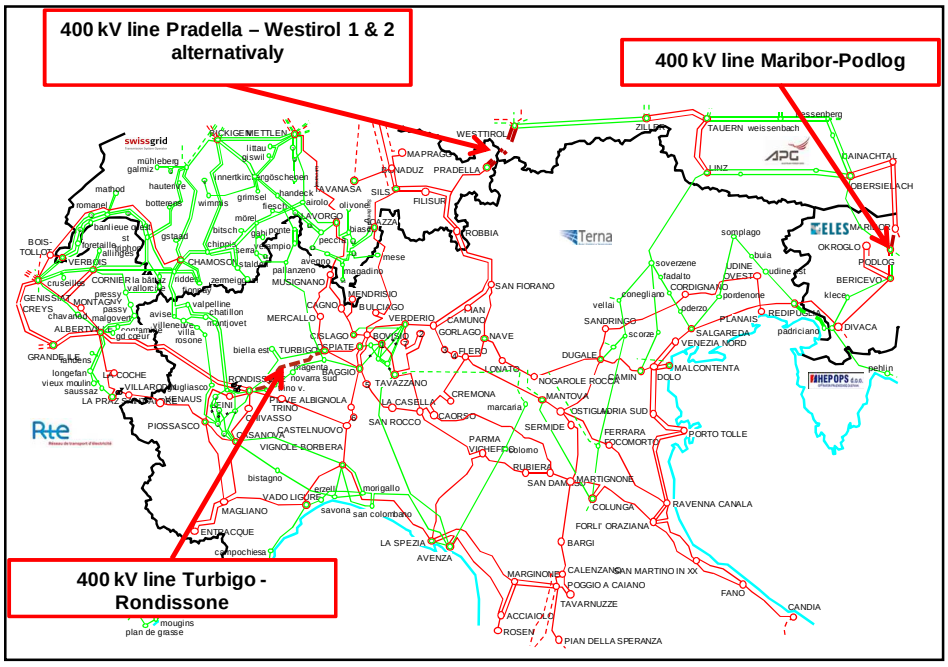
Stressed situations on the South grid in 2013

1st and 2nd August 2013 : "Stressed situation on the CSE area"

Context: **3 significant outages on IT border were planned:**

- Turbigo Rondissone 380 kV
- Pradella Westtirol 380kV (alternating)
- Maribor Podlog 380 kV

No NTC reduction is implemented for these outages.



The classical coordinated remedial actions (2 nodes operation in Sils and increasing the flow from Slovenia) are not sufficient.

A 700MW Pentalateral is foreseen for the 1st and 1000 MW for the 2nd.

Day-ahead foreseen situation:

1st and 2nd of August 2013: High flows in N-State on the Swiss/Italian border. The day-ahead peak study (13:30 timestamp) revealed a highly stressed situation and the N-2 between Swiss and Italy were leading to high constraint.

Intraday situation:

01/08: little intraday exchanges from France to Switzerland (around 200 MW).

02/08: some intraday exchange from Switzerland to France (around 500 MW).

Real-time :

Due to the outages on the Slovenian grid, Eles was not able to increase the target flow and the constraints on the Swiss/Italian border remain high.

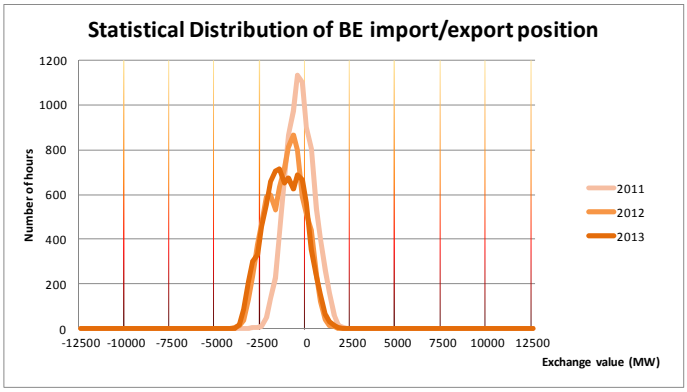
On the 2nd of August, a 500 MW pentalateral is requested from 13:00 to 17:00.

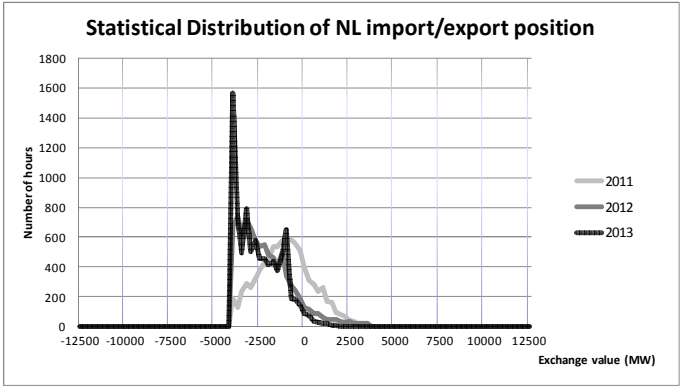
At 15:00, the line Rondissone-Turbigo is back in operation and the pentalateral is thus shorted (13:00 to 16:00).

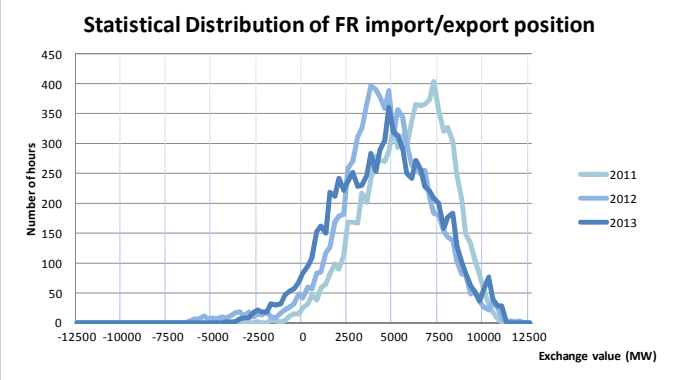
Flows & exchanges statistics for 2013

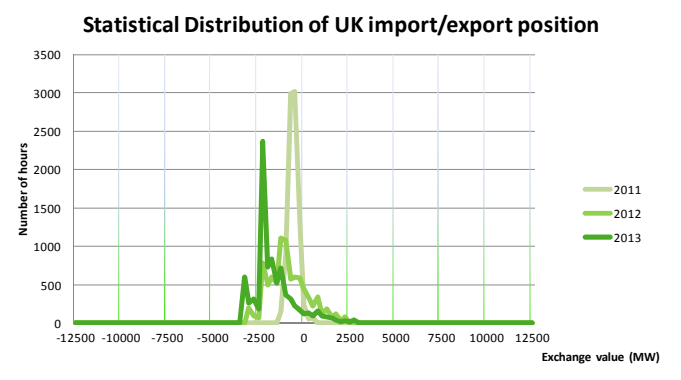
Countries Physical Exchanges

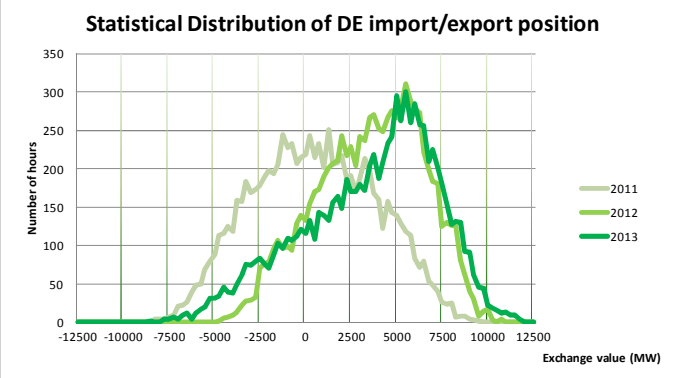
Exchanges data are extracted from Vulcanus website and UK Exchanges are provided by ENSTSOE.net website.

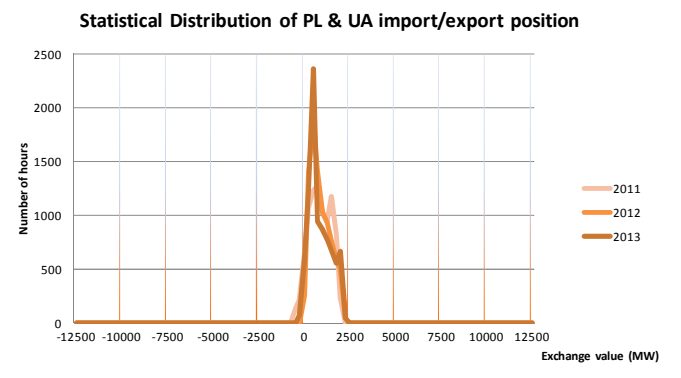


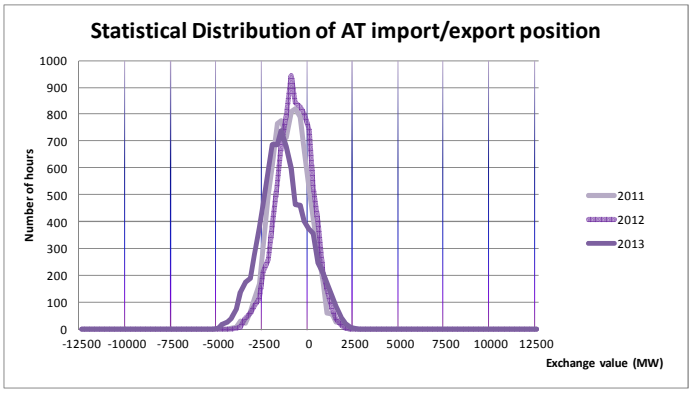


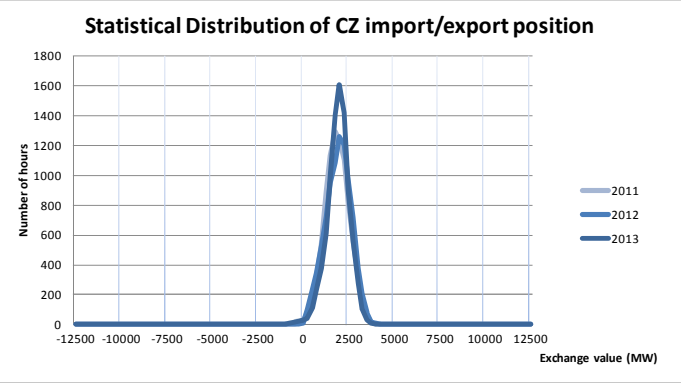


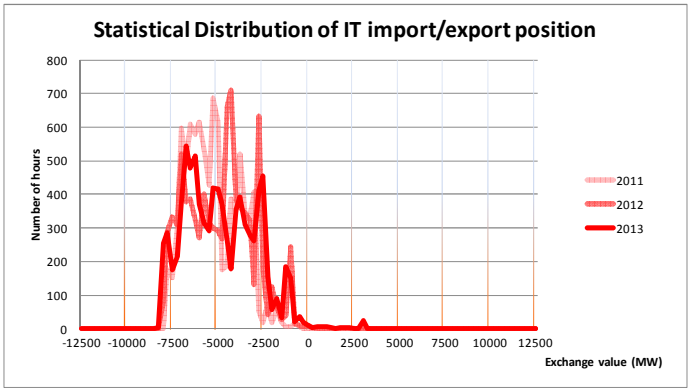


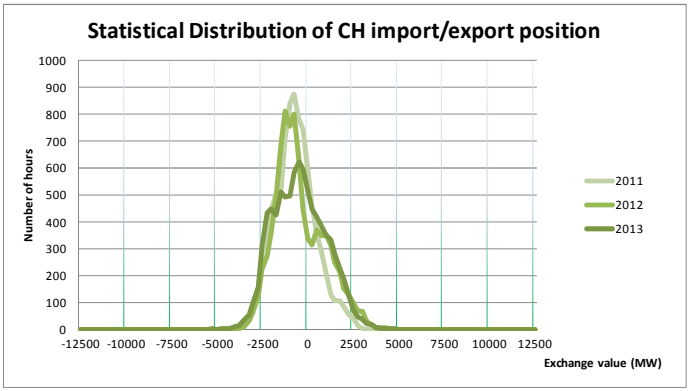


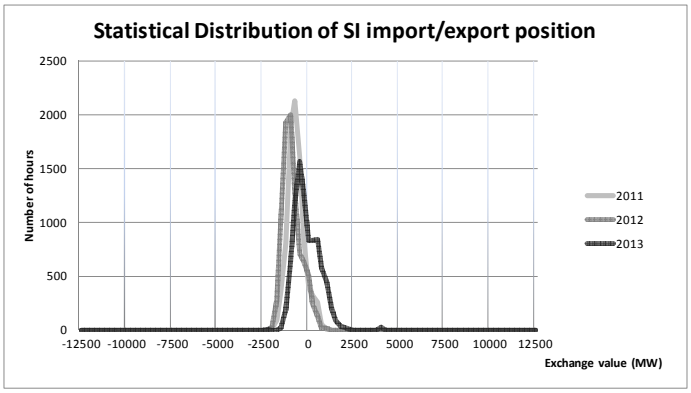






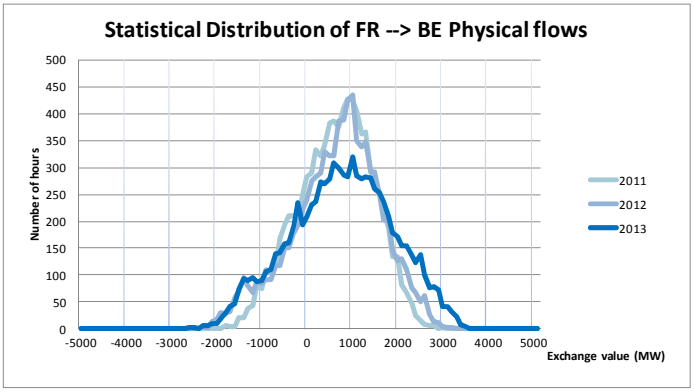


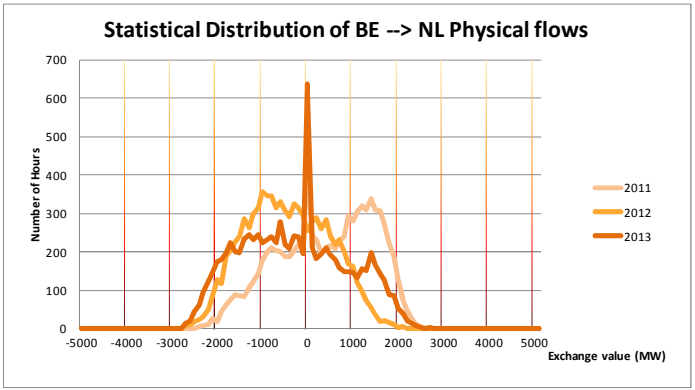


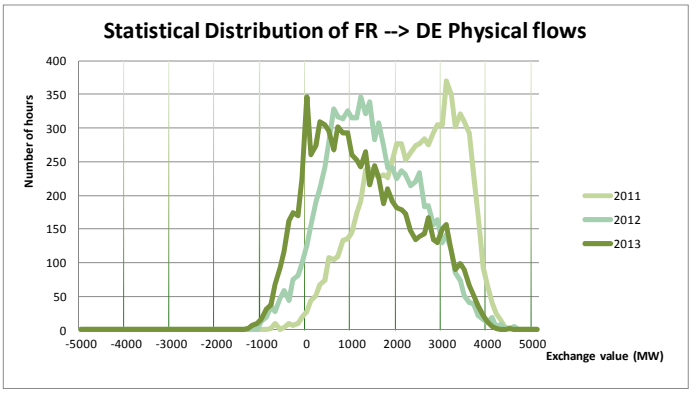


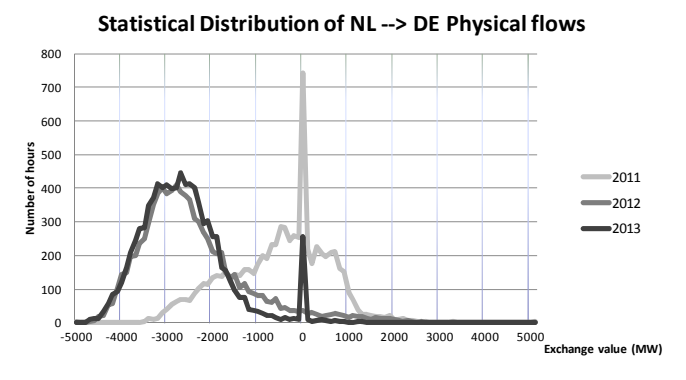
Traditional positions are still valid this year, with France and Germany as "exporting countries" (along with Czech Republic and Poland) and Italy, the Netherlands and UK as "importing countries". The other countries played both positions.

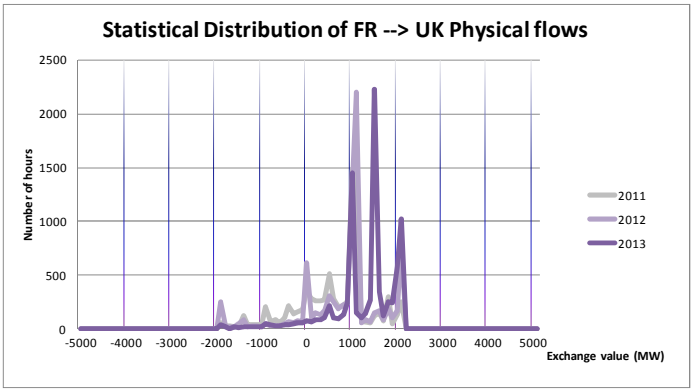
Main Physical flows on borders

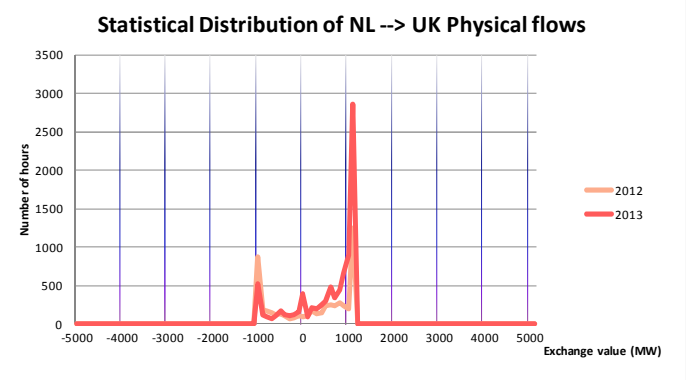


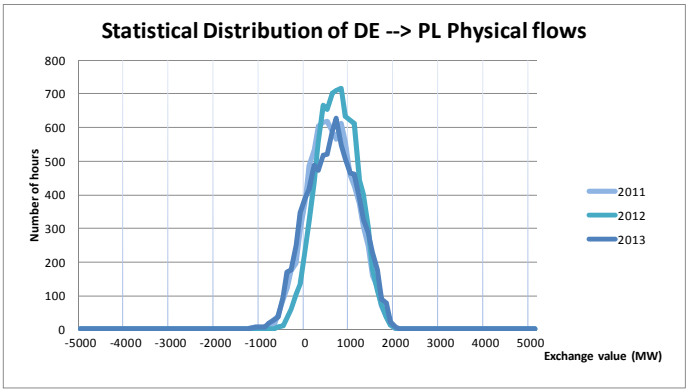


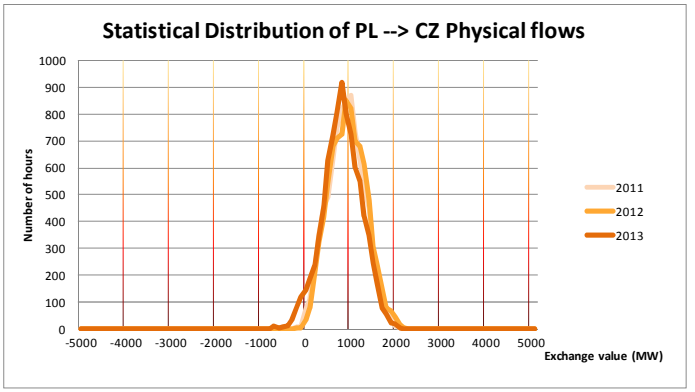




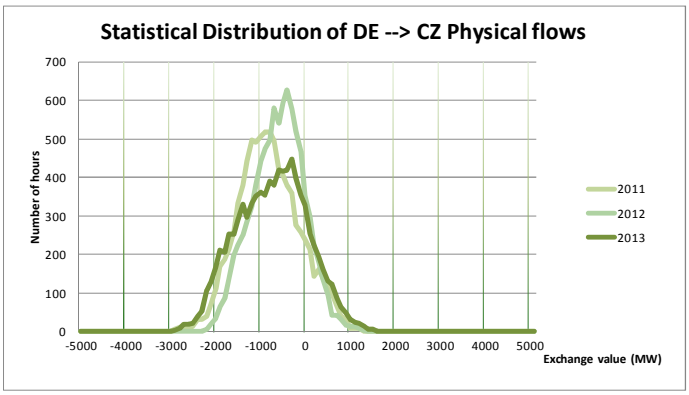


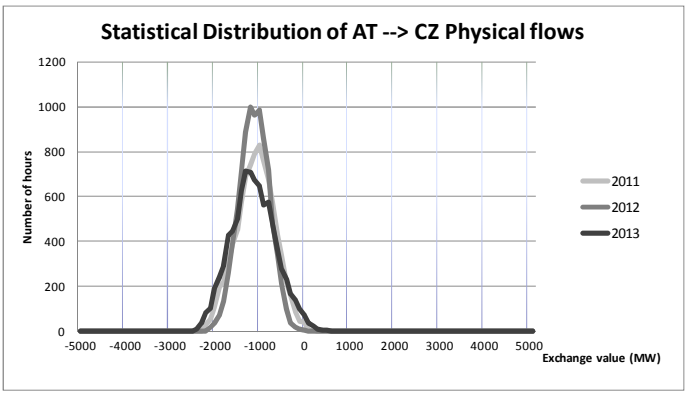


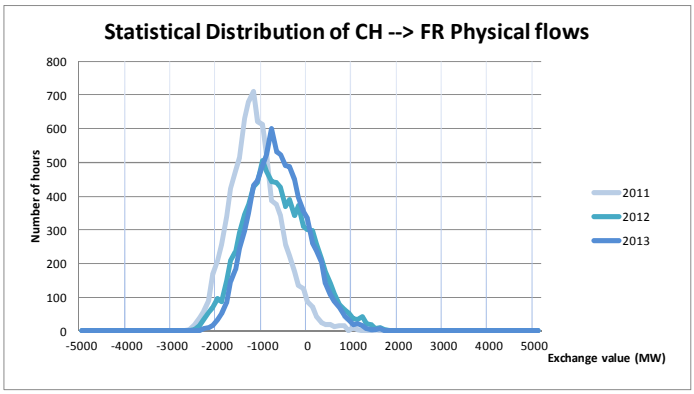


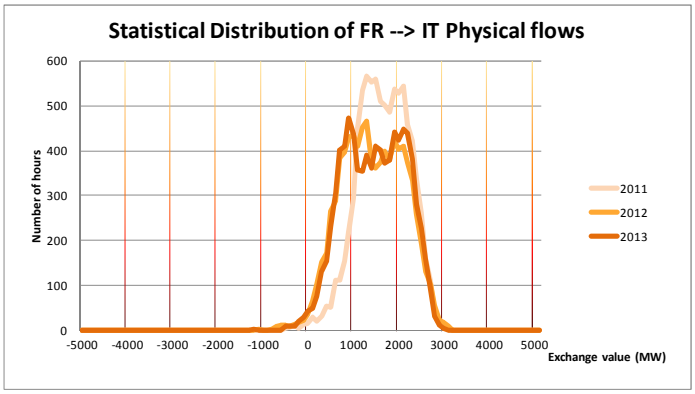


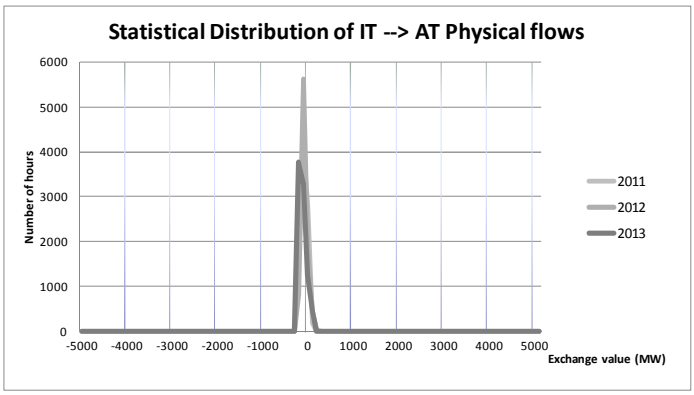
Year after year, thanks to massive renewable infeed, Germany is reinforcing its position of exporting country as the FR/DE position seems to go in the direction of Germany exporting and NL/DE is stabilized in the same direction.

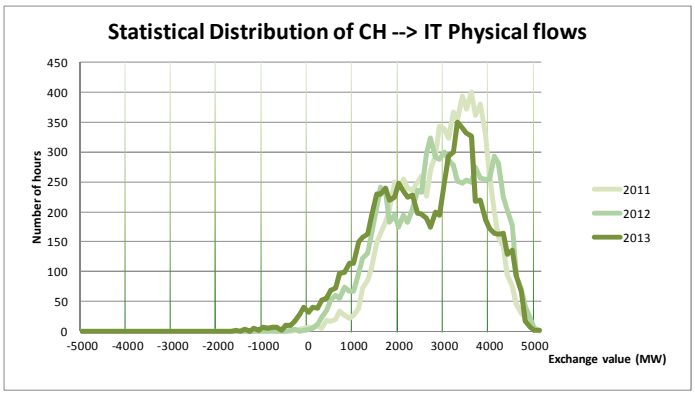

Statistical Distribution of DE --> CZ Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013

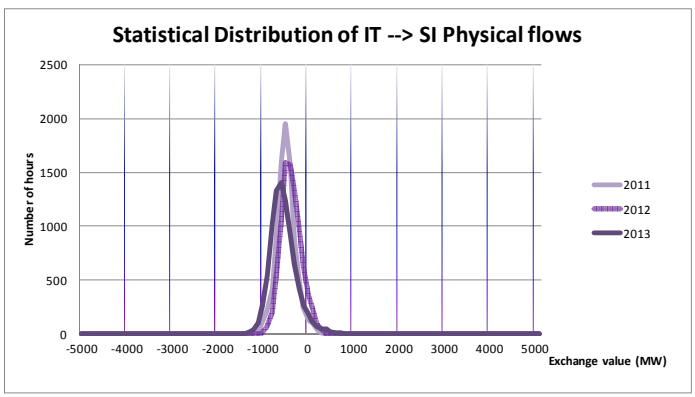

Statistical Distribution of AT --> CZ Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013


Statistical Distribution of CH --> FR Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013

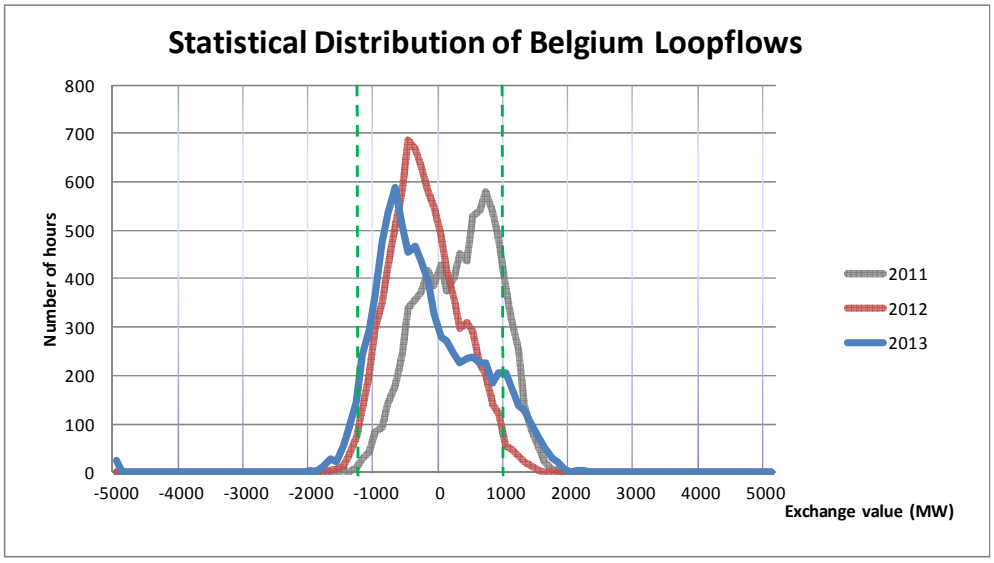

Statistical Distribution of FR --> IT Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013


Statistical Distribution of IT --> AT Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013


Statistical Distribution of CH --> IT Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013


Statistical Distribution of IT --> SI Physical flows
Number of hours
Exchange value (MW)
2011
2012
2013

Belgian Loopflow



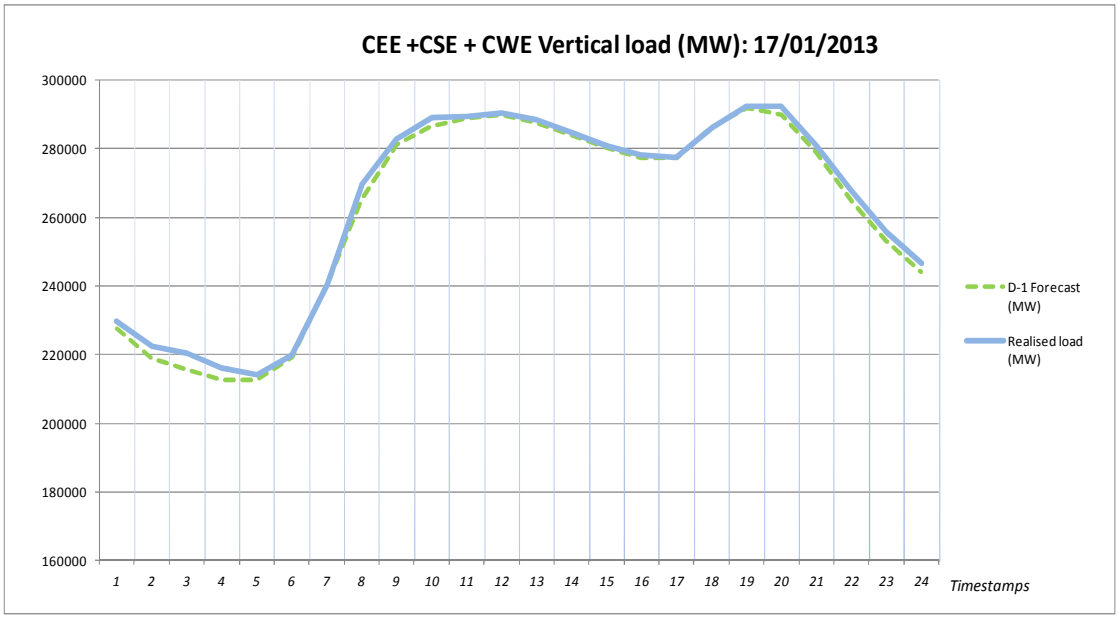
In 2013, with the PST regulation, loopflows were within the normal range [-1200 MW; +1000 MW] 87.9% of the time (95.5% in 2012 and 93% in 2011).

Definition :
(+) = South to North flows
(-) = North to South flows

Year after year, BE loopflows tends to be oriented North to South, in line with the development of the German Renewable Energy.

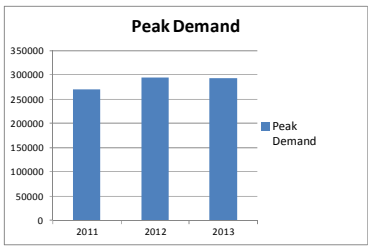
Vertical load peak

Vertical load is the sum of all flows out of the transmission grid via directly connected transformers to distribution grids or other consumers.

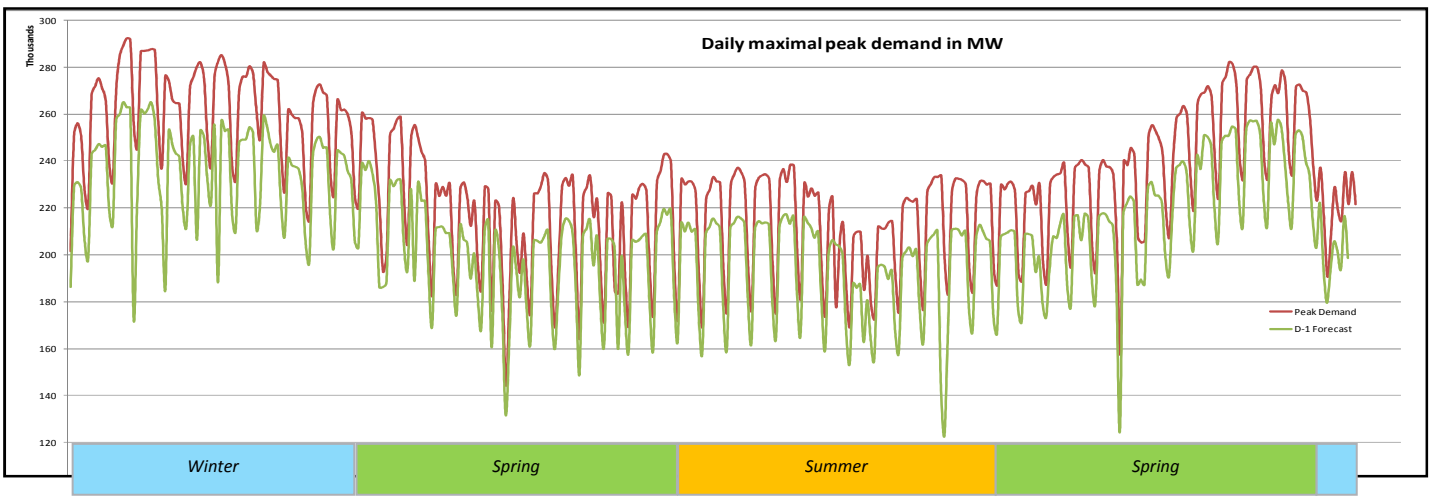


Vertical load peak of 292 445 MW on the 17/01/2013 at 19:30.

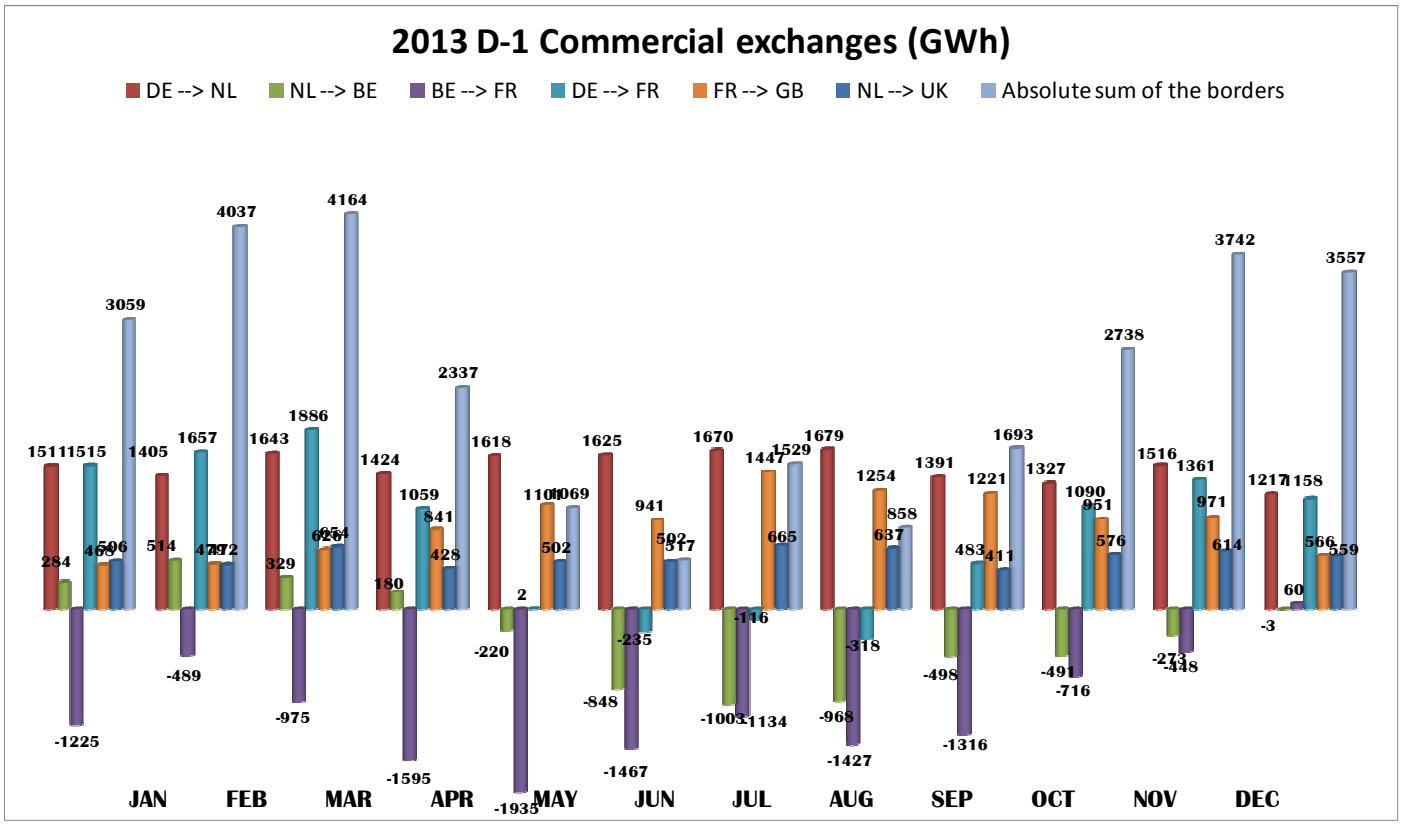
Load peak very stable compared to previous year value : -0.7%.



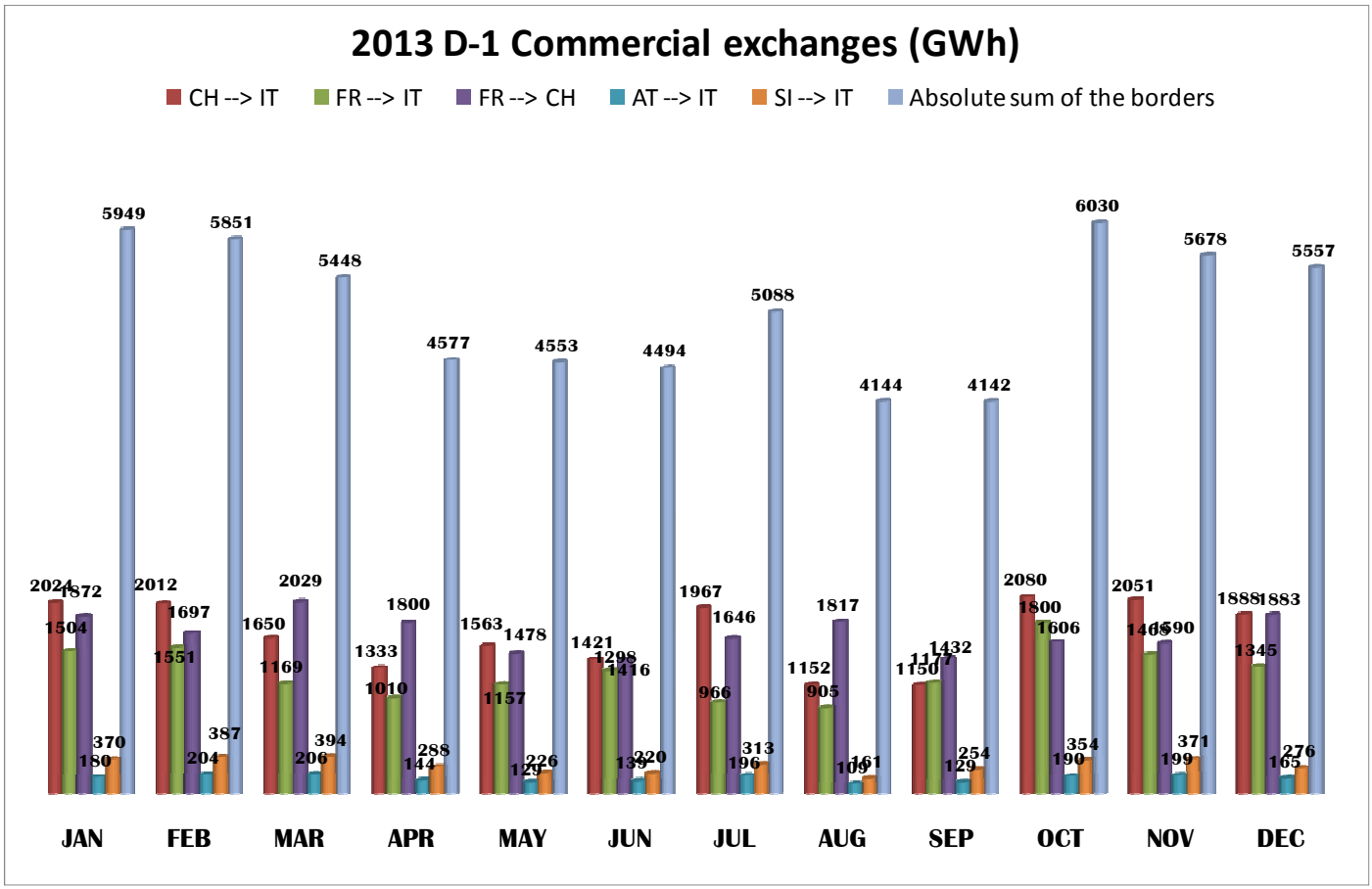
Aggregation of Belgian, Dutch, French, German, Luxembourg (included in BE and DE), Poland, Czech Republic, Austria, Hungary, Slovakia, Slovenia, Switzerland and Italy vertical loads.



North D-1 Commercial exchanges



South D-1 Commercial exchanges

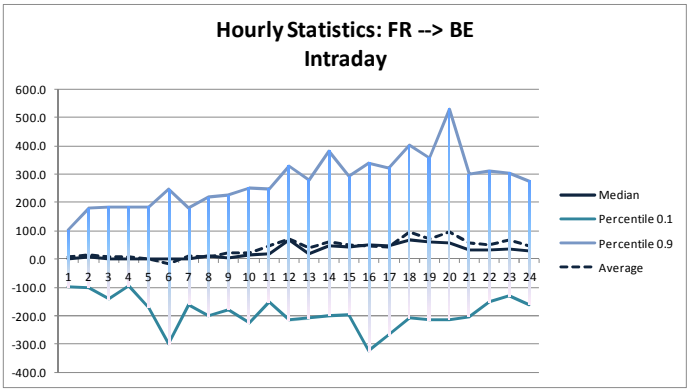


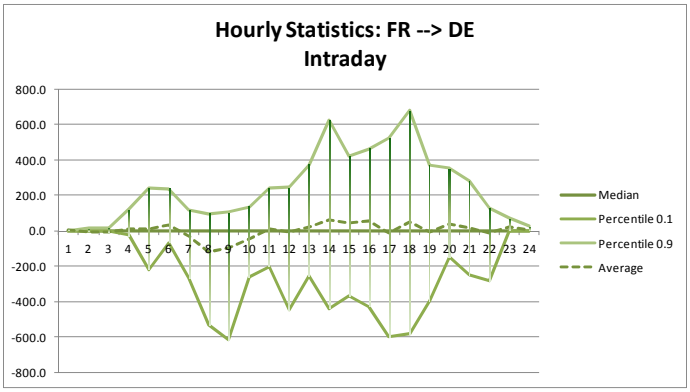
North Intraday exchanges

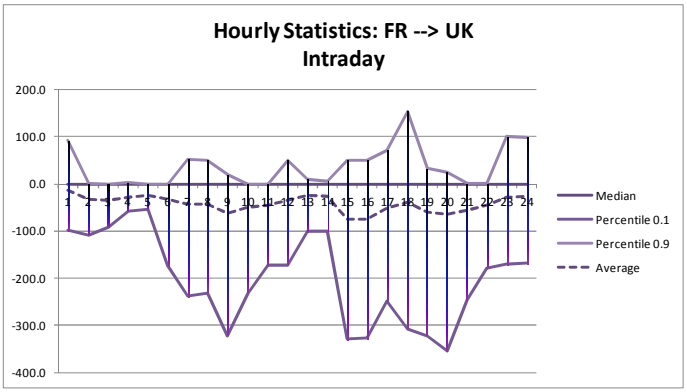
These charts represent the most frequent values of intraday exchanges (in MW). For each timestamp, the intraday volume was included between the 2 percentile curves, 80% of the days.

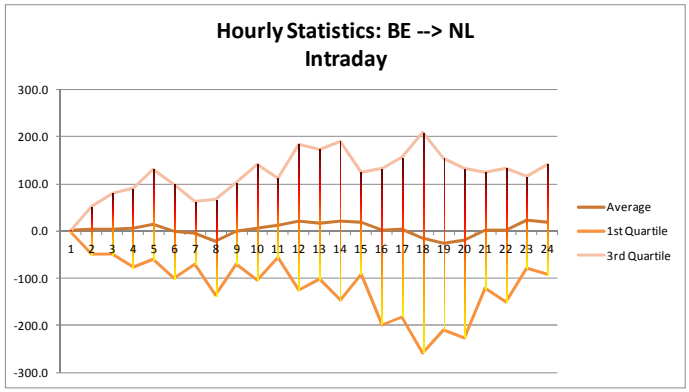
January – March 2013

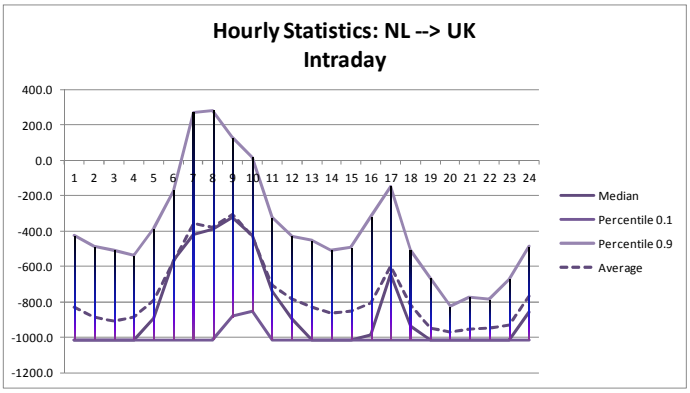
This period correspond to the winter time, when the peak demand in the North area is in the evening.

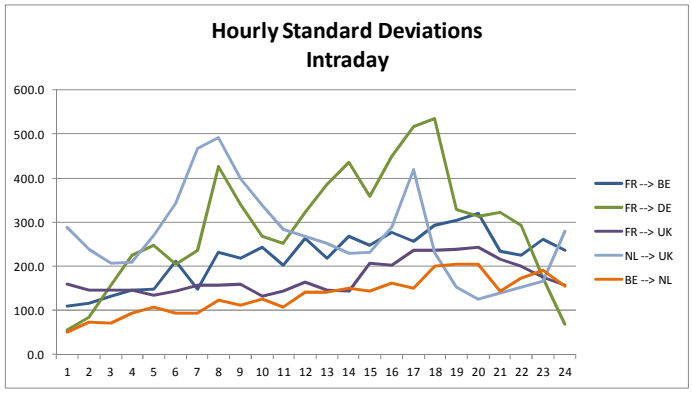










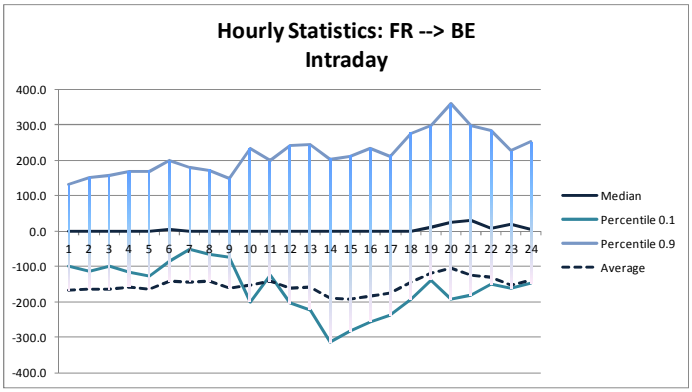


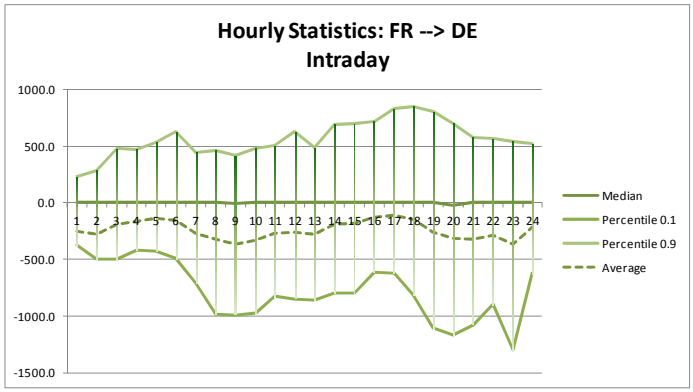
During winter, french/german and french/belgian borders are very versatile with high values of max and intraday exchanges realized with a rather low average value.

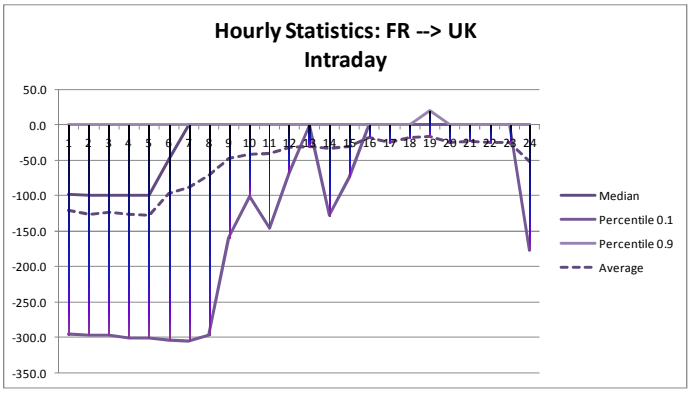
The highest intraday exchanges are realized during peak periods (morning peak, noon peak and evening peak).

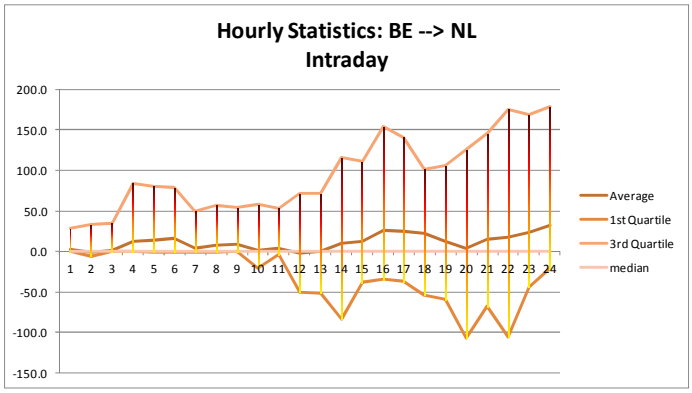
April – October 2013

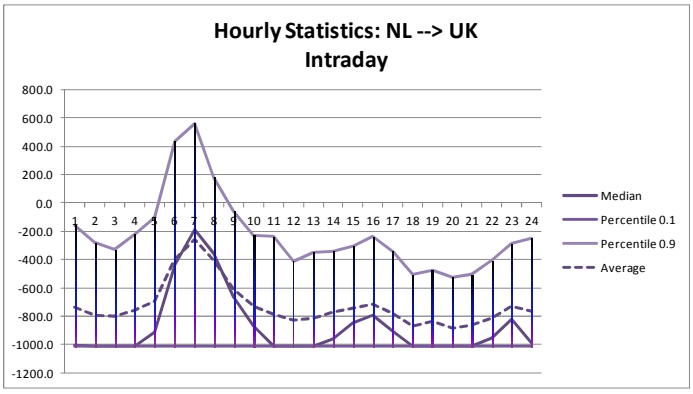
This period corresponds to the summer time, when the peak demand in the north area is at noon.

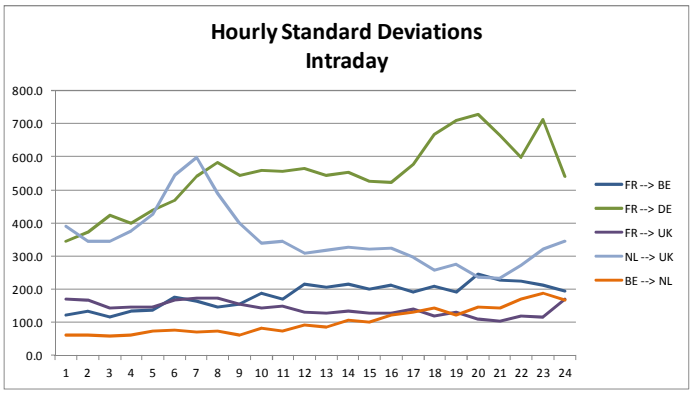












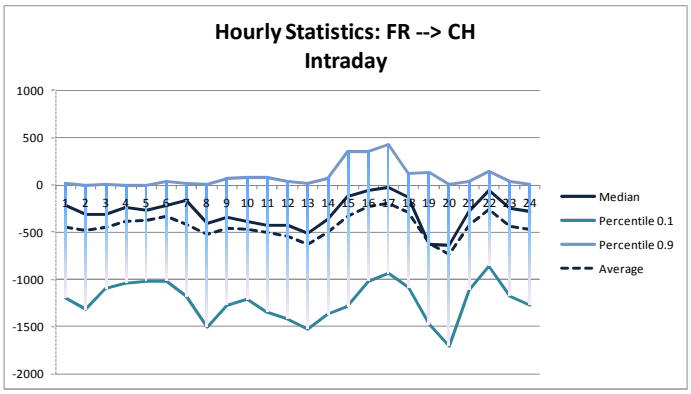
During summer, french/german and french/belgian borders are mainly oriented like the Day-ahead exchanges.

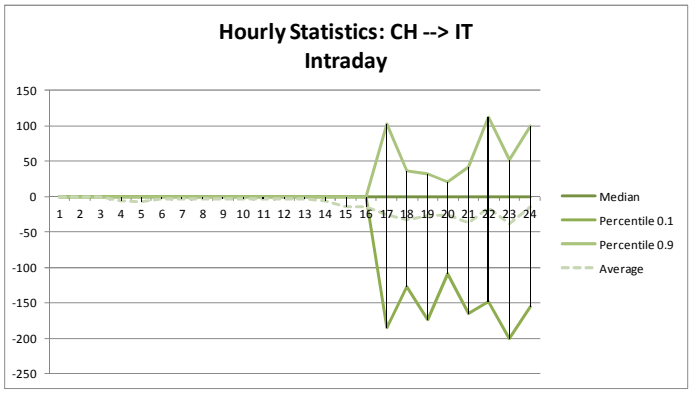
South Intraday exchanges

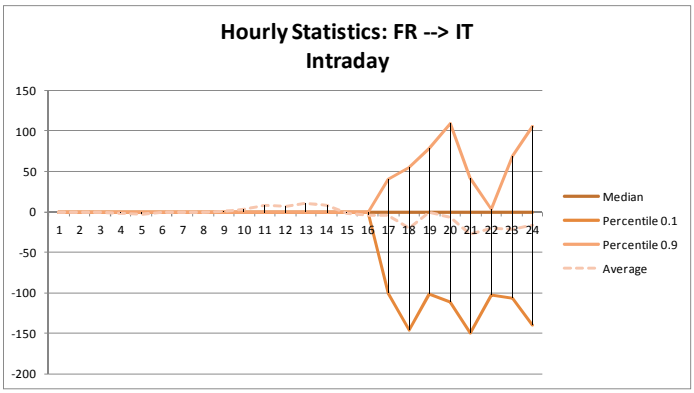
These charts represent the most frequent values of intraday exchanges (in MW). For each timestamp, the intraday volume was included between the 2 percentile curves, 80% of the days.

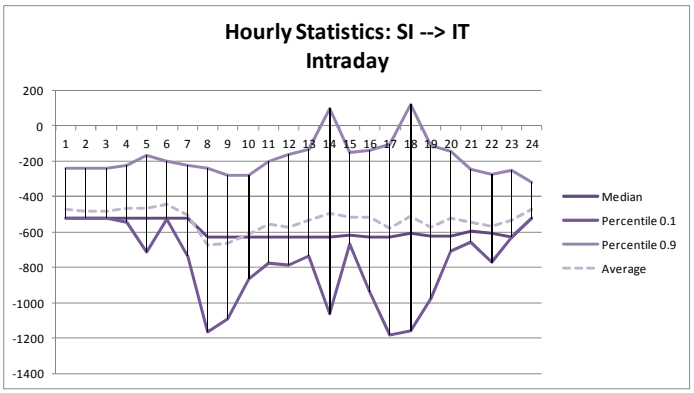
January – March 2013

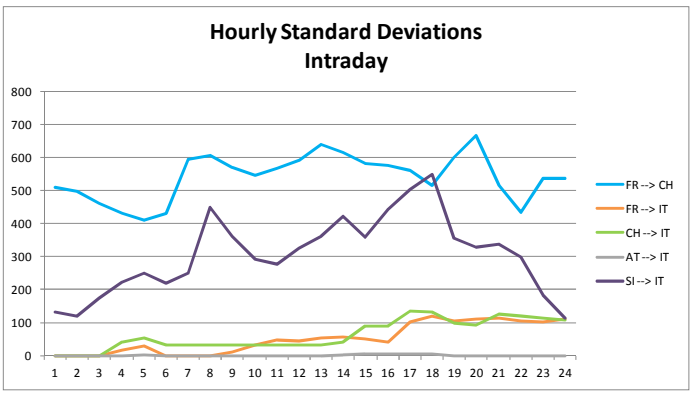
This period corresponds to the winter time, when the peak demand in the South area is in the evening.





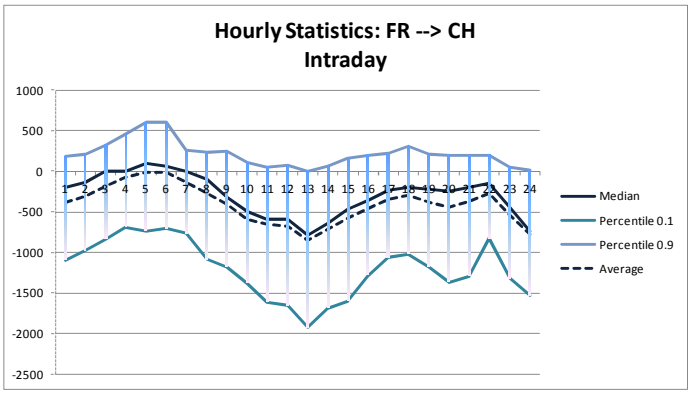


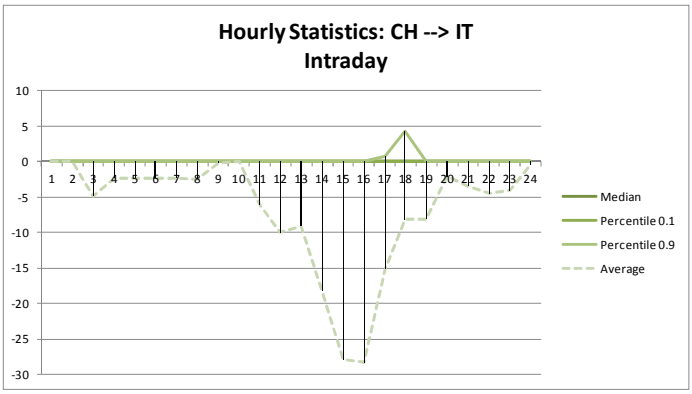


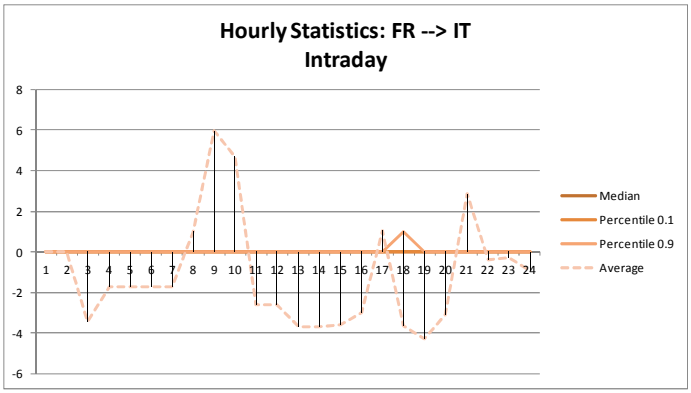


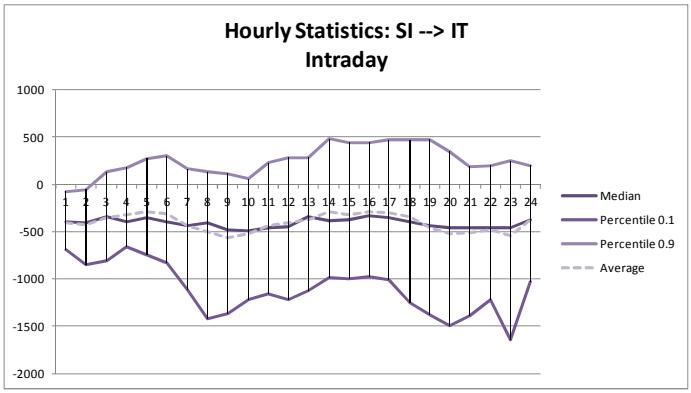
April – October 2013

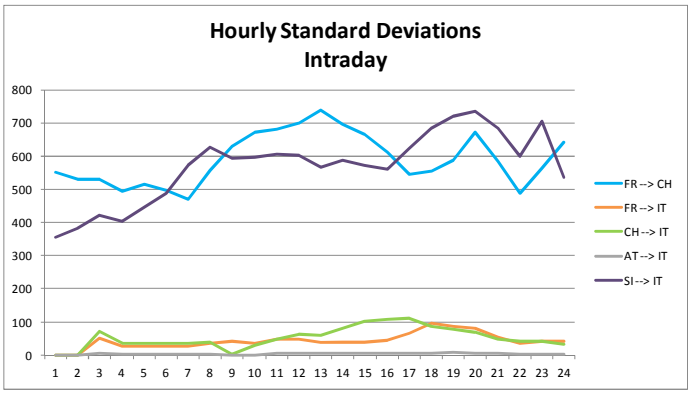
This period correspond to the summer time, when the peak demand in the south area is at noon.











These charts are highlighting the fact that the only significant intraday market are FR <-> CH and SL <-> IT.

German Renewable Energy

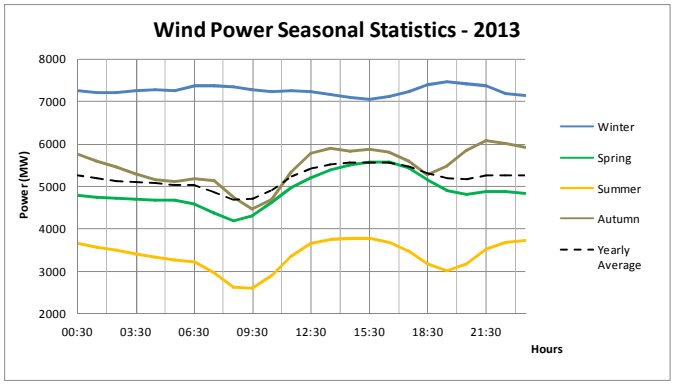
Data are coming from EEX website. Only Germany renewable energy is described in the report.

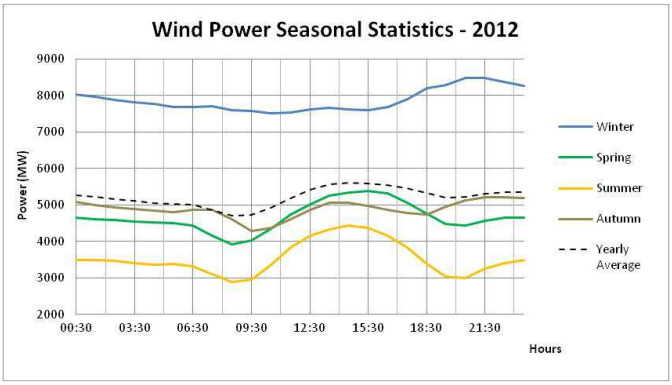
MAIN **WINDPOWER** 2013 FIGURES

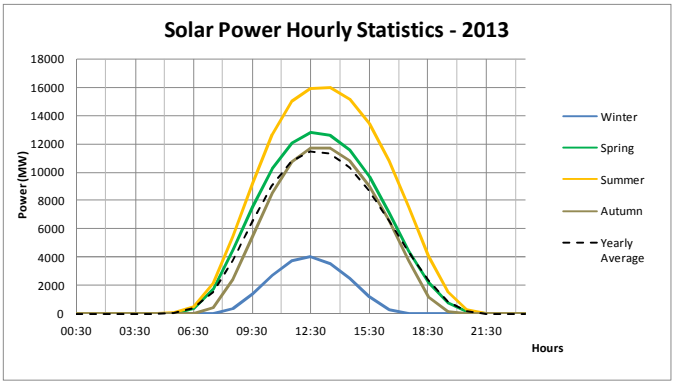
	2012 (GW)	**2013 (GW)**
Maximum generated	24,1	**26,3**
Average generated	5,2	**5,4**
3rd quartile (75% data amont < X)	7,1	**7,4**
Maximum deviation in 15 minutes	2,4	**1,7**

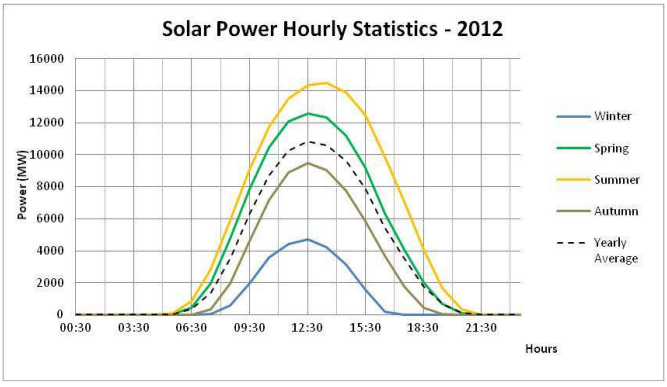
MAIN **SOLARPOWER** 2013 FIGURES

	2012 (GW)	**2013 (GW)**
Maximum solarpower generated	22,4	**24**
Average solarpower generated	3,1	**3,4**
3rd quartile (75% data amont < X)	5	**5**
Maximum deviation in 15 minutes	1,9	**2,4**

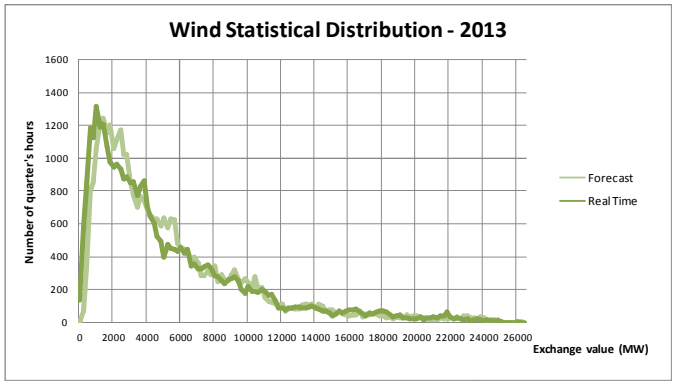


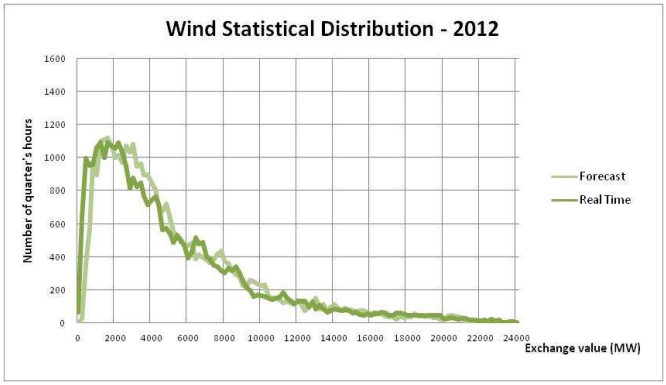


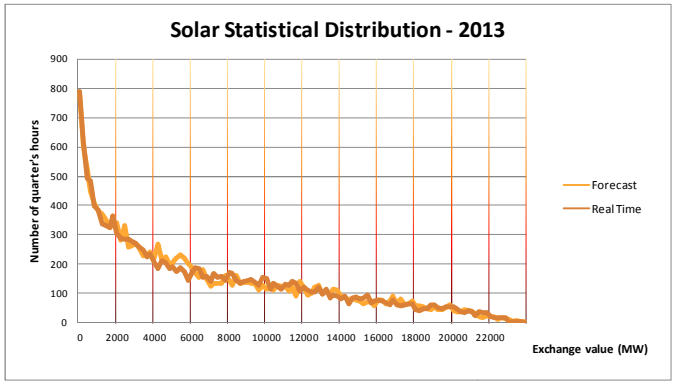


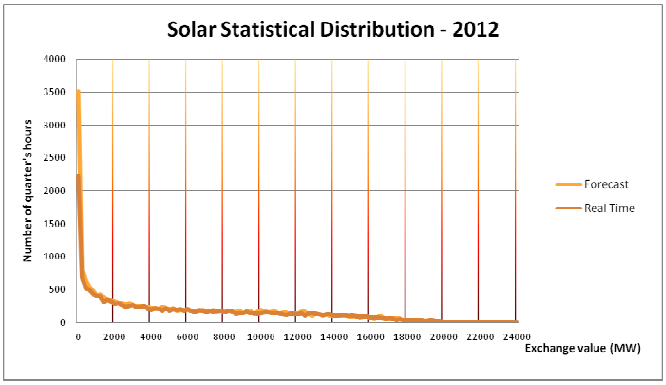


As the wind infeed is mainly located on the distribution network, we see the impact of the morning and evening peaks on the wind infeed seen from the transmission network.









Note: This graph doesn't take into account the night infeed of solar (0MW).