Coreso Operational Review 2012

Coreso key figures for 2012

Coreso performance

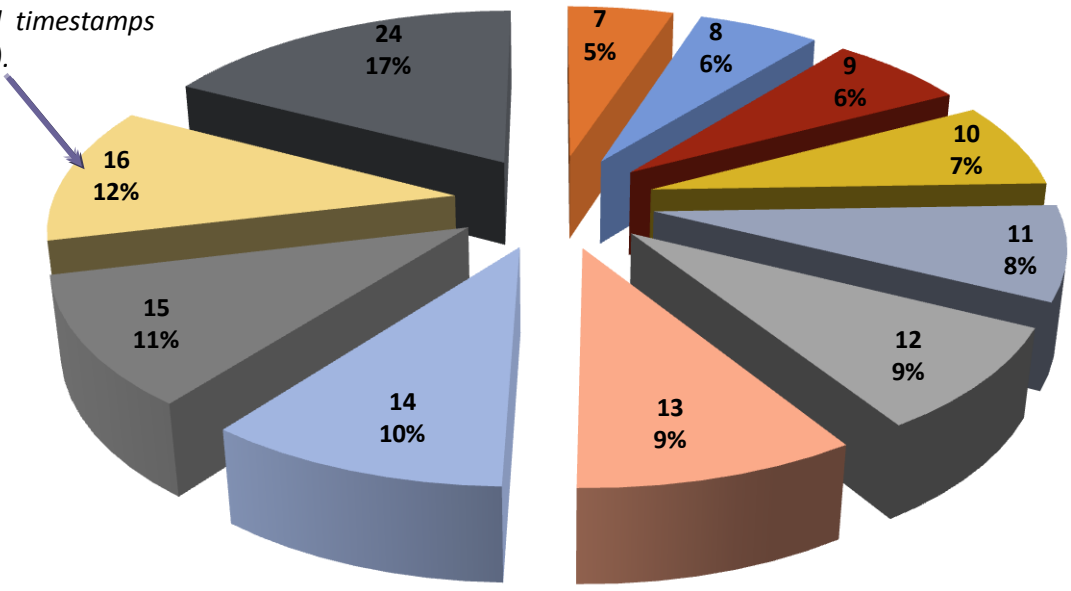
All data were available in 2012 for all our shareholders as 50HzT and Terna studies started from July 2012. So for 2012 all Coreso key figures are taking them into account.

MAIN PERFORMANCE FIGURES

Publication of 24 merged timestamps	366/366 days
Number of SMART* performed	44 (=2011)
Number of BALIT variants and Intraday studies	136
Number of other variants performed in day-ahead	155

Number of Security Analyses performed in D-1 in depth (Max 24 timestamps)

In 2012, 12% of the studies were done on 16 merged timestamps (16 on 24h).

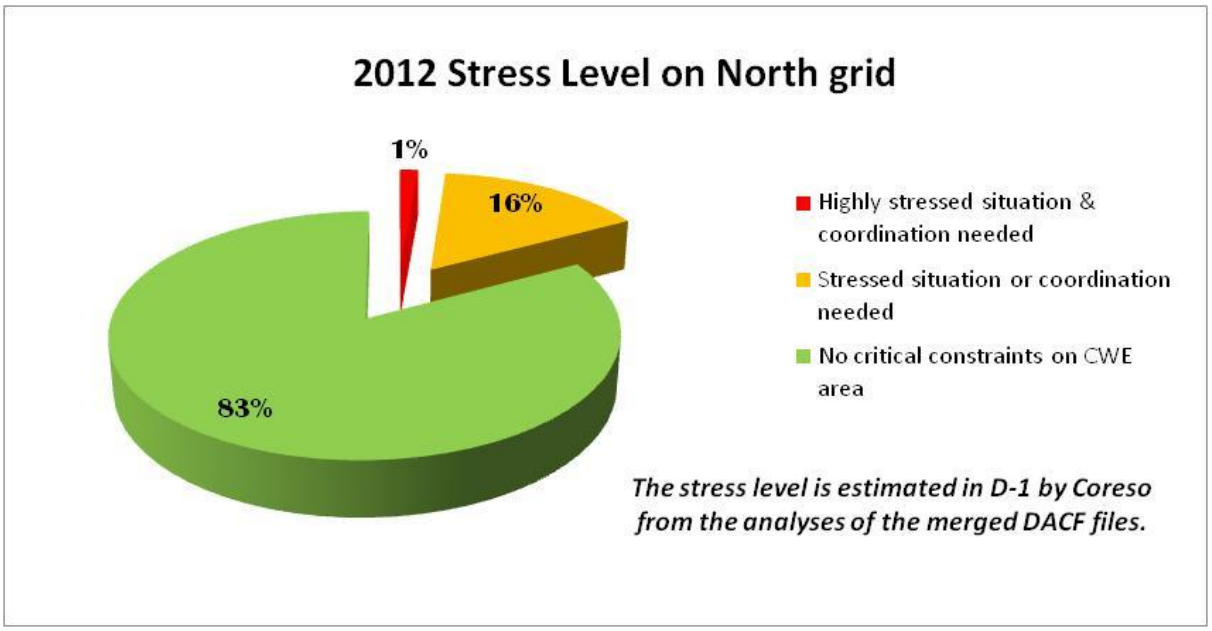


All 24 timestamps are merged and the N-1 security analysis runs on all of them. Security analysis in depth are made on the relevant timestamps to guaranty the feasibility of remedial actions across the 24 hours of the next day.

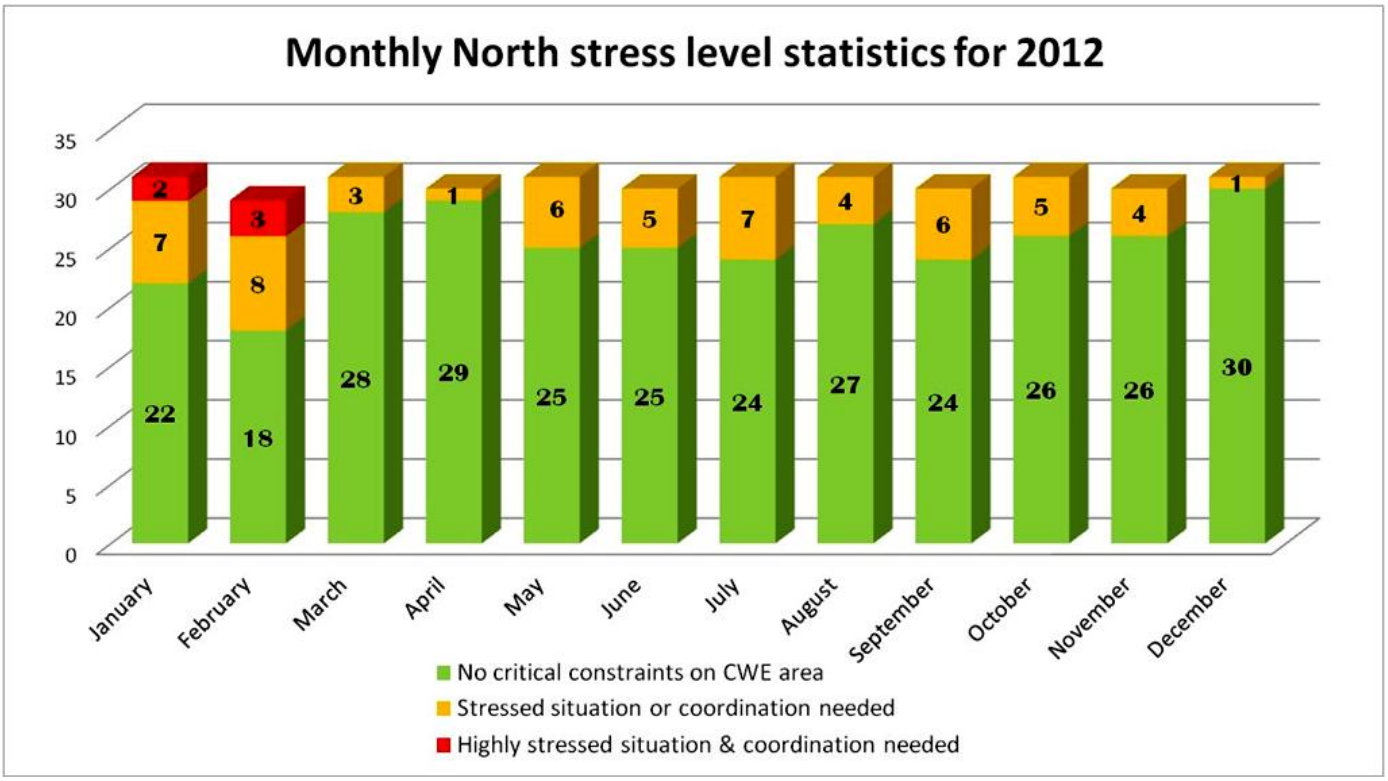
From December 2012, all 24 timestamps are studied in day ahead to guaranty an every hour security all day long.

**SMART : System Modification Advice RequesT*

North Stress level



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



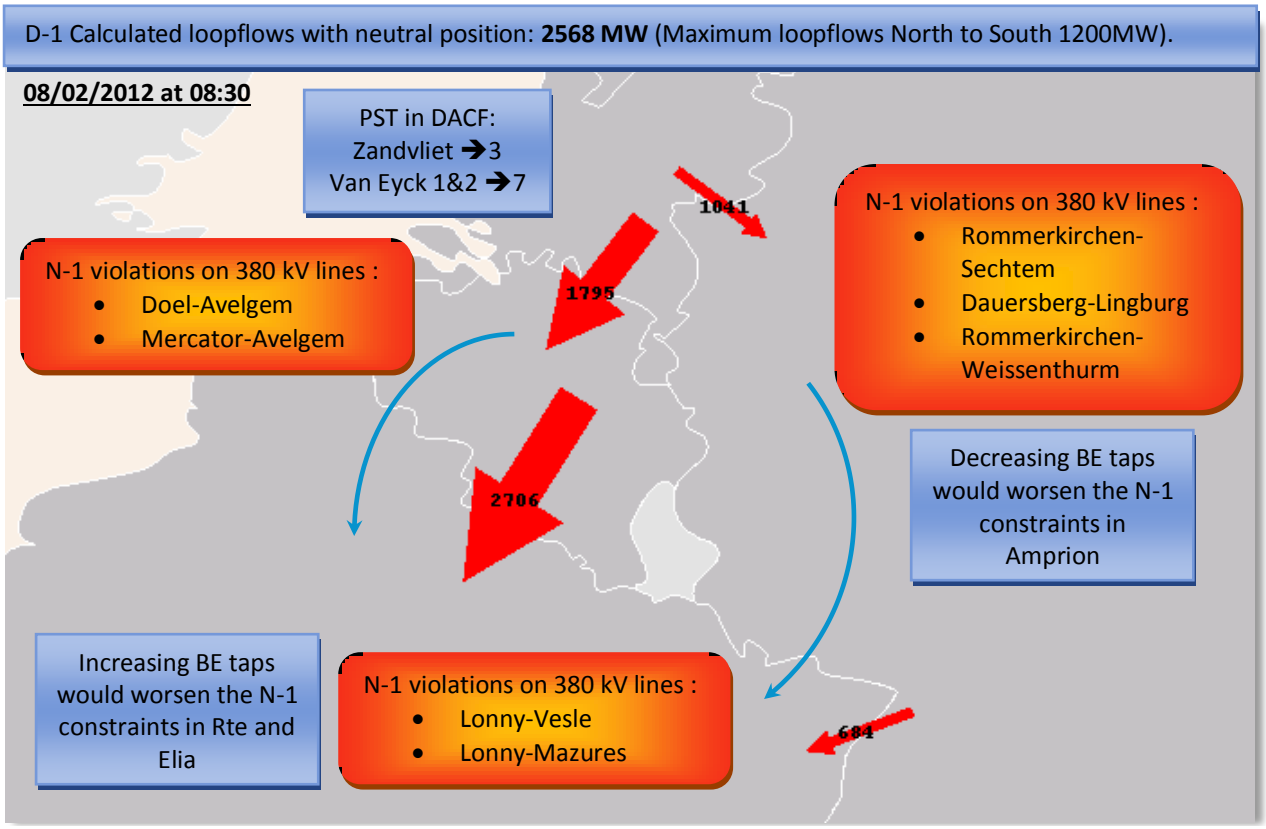
Most stressed situations on the North grid in 2012

8-12th February

Context: high demand from France (100GW) and maximum commercial cross border exchanges from North to South through Belgium. The line Creney – Revigny 380kV in France, was in forced outage.

Day-ahead foreseen situation:

- The day-ahead studies showed lots of constraints in the CWE area, in Belgium, France and Germany. Flows were going to France through Belgium, Great Britain and Germany. The preventive actions proposed were:
  - Average Belgium PST taps put at 6, which increase flows to France though Germany.
  - No efficient topological actions seemed to be possible. Proposed solutions were internal redispatching or opening the transformer in Rommerkirchen.



- **Coordination was applied in day-ahead: "Amprion national control centre has been informed about the results of our study concerning their grid. They agreed that internal redispatching in Germany was necessary to cope with the constraints and that it was not possible to use Belgian PSTs."**

Next days situation:

- In intraday, on the 08/02/2012 Elia applied tap 6 in average on their PST to reduce flows through Belgium like planned in day-ahead. Then coordination between Belgium, France and Germany has been done to balance more flows through Germany to France to limit constraint in Belgium. More capacity was sold: ≈1050MW DE➔FR at 19:00 as Germans were able to manage the N-1 criteria on their side.
- Zandvliet PST in forced outage (Buchholz alarm) on Friday 10/02/2012. Coreso & the dispatching **well anticipated the possible outage** at the first alarm by assessing the situation without the PST. A few hours later, the PST was out of service. Hopefully this happened on Friday evening. Elia was able to stay at 1 node in Zandvliet using the busbar coupler

all the week-end. The following weeks, as the weather was warmer, less energy was imported to France. So constraints through Belgium were lower. As the Zandvliet PST was not available for few weeks, Elia was sometime obliged to disconnect Zandvliet substation from The Netherlands.

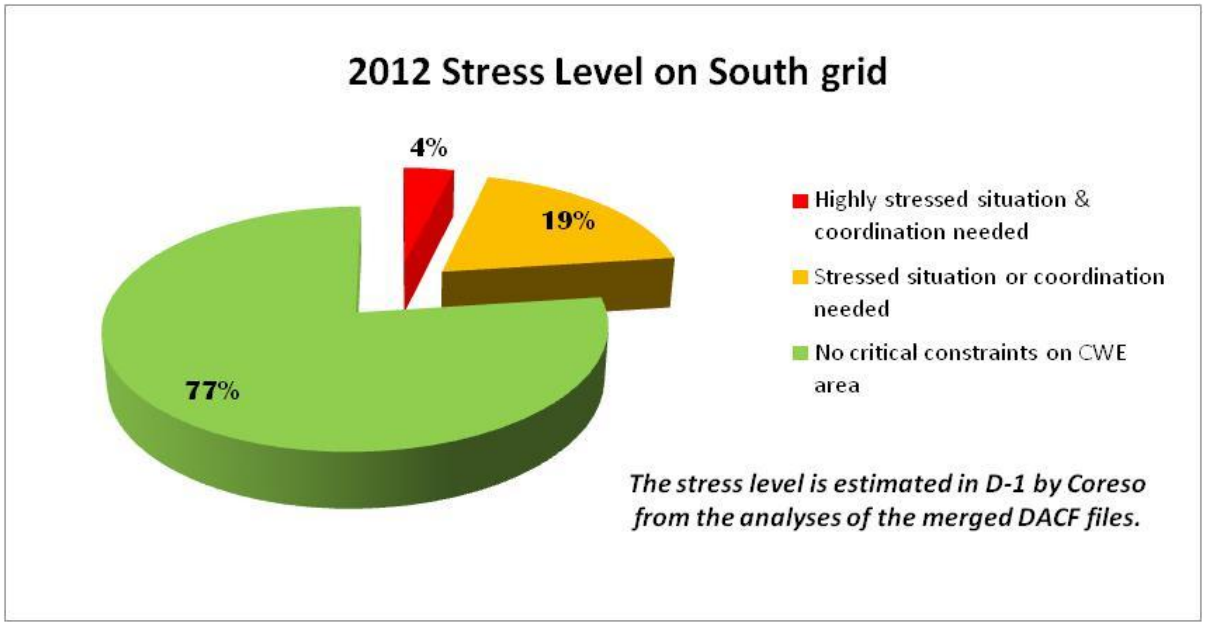
Conclusion:

Everyday, Coreso and Amprion have opportunities to discuss together during the DOPT conference. This situation was pointed out during the teleconference and further contacts were planned to study the details of the situation.

In intraday, Coreso studies allowed to manage the situation by simulating different solutions. That leads to better coordination between Belgium, France and Germany.

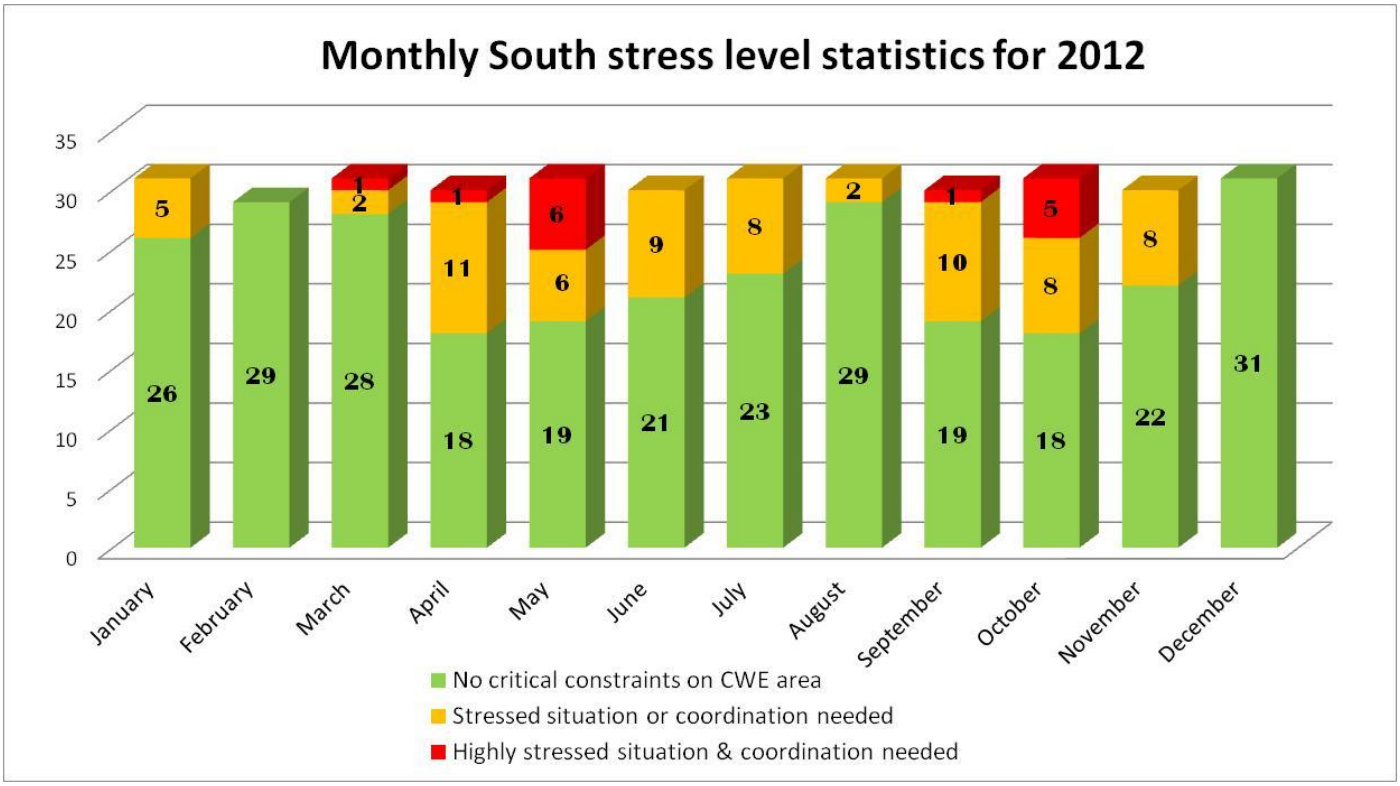
However, coordination processes between D-1 and ID/real-time were well applied. Also thanks to the low level of wind and solar infeed in Germany, constraints appeared lower and were manageable by internal redispatching in Germany.

South Stress level



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

*South studies started on july, 1st 2011



Most stressed situations on the South grid in 2012

14th May 2012 : "Stressed situation and forced outage on Bulciago – Soazza tie line"

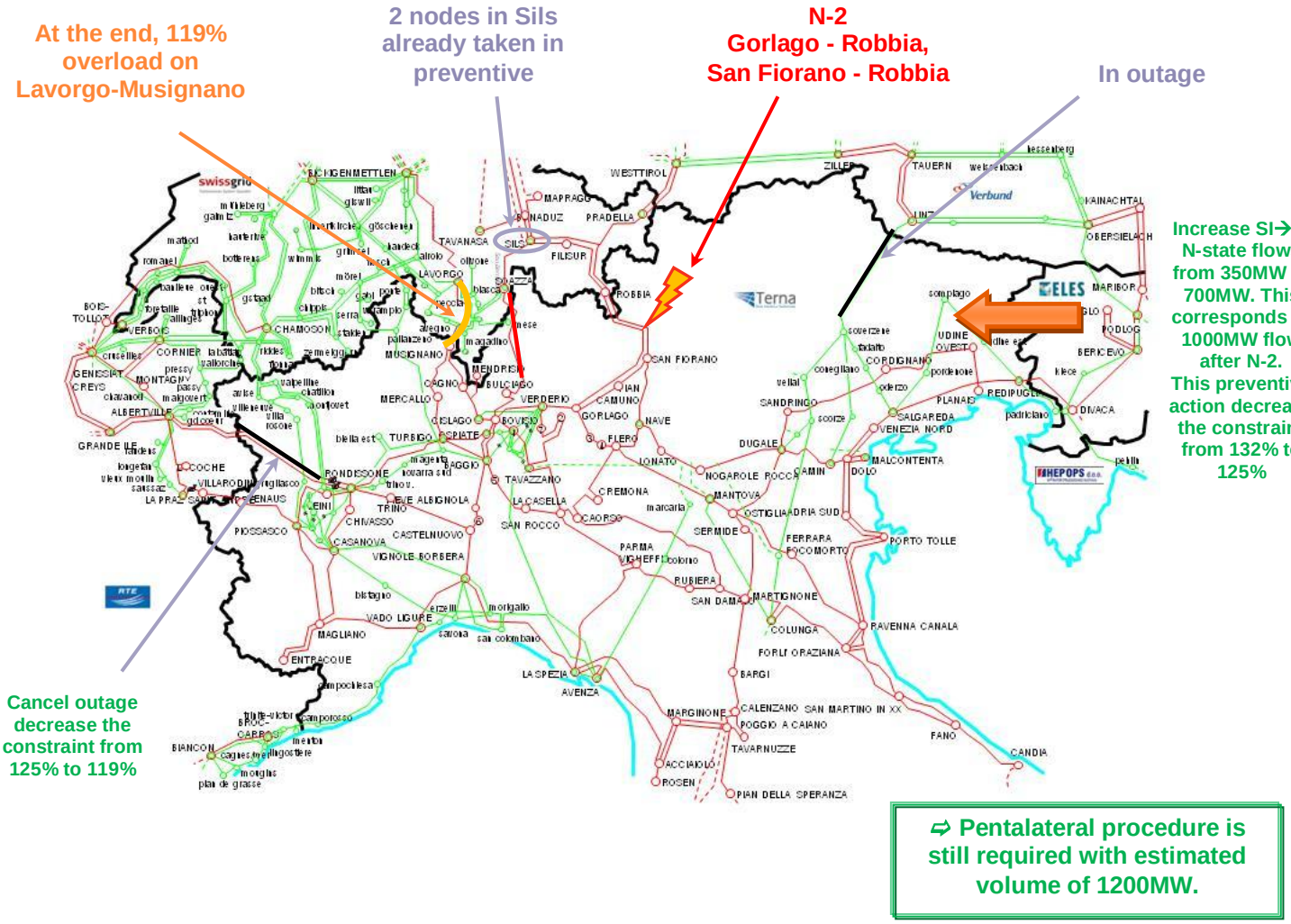
Context: From 08:00 to 18:00, stressed situation is expected on CH-IT border.
2 significant outages on IT border were planned:
- Lienz-Soverzene 220kV (installing new PST)
- Albertville-Rondissone 1 380kV

Those outages limited FR→IT commercial exchanges (NTC) and put AT→IT exchanges to 0.

Day-ahead foreseen situation: High flows in N-state near Swiss/Italian border, due to big flows from Switzerland and low flows from France to Italy (high solar generation from Germany (up to 20GW) were foreseen for midday. Results of analysis shows a 101% overload on Sils-Soazza after N-2 Robbia-Gorlago / Robbia-San Fiorano. Coordination is needed between APG, Swissgrid, Terna and Rte to manage the flows on the Italian/Swiss border.
Preventive action is required.
According to Swissgrid, 380kV Sils substation is operated with two nodes. With these preventive actions, no critical constraints are expected in CSE.

Intraday event :
On May, the 13th tripping of 380kV tie line Bulciago - Soazza happened at 23:23.

In case of N-2 between Switzerland and Italy on Robbia - Gorlago and Robbia - San Fiorano, an overload about 132% was detected on Lavorgo – Musignano tie line (CH – IT). The situation requested preventive actions.



Thanks to those actions (2 nodes in Sils, flows increase on SI border, cancel outage on Albertvile – Rondisonne 1) and to a big pentalateral reduction, the situation was manageable in real time avoiding cascading effect in case of N-2 from Switzerland.

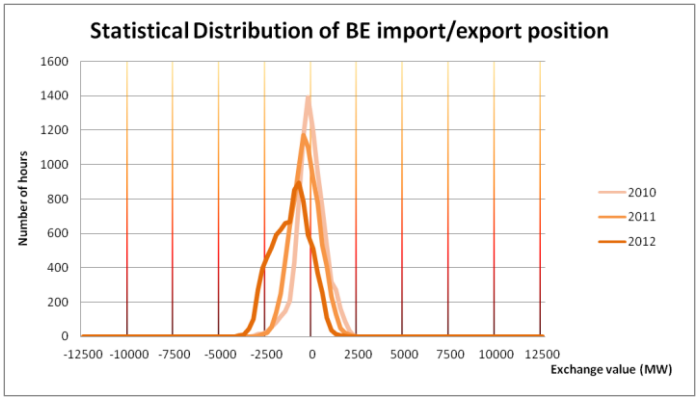
Flows & exchanges statistics for 2012

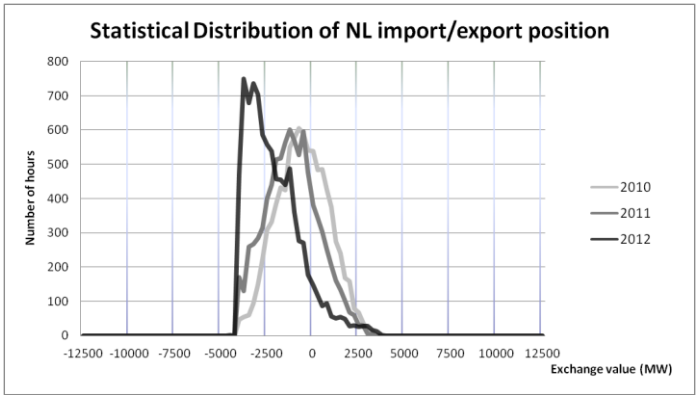
Countries Physical Exchanges

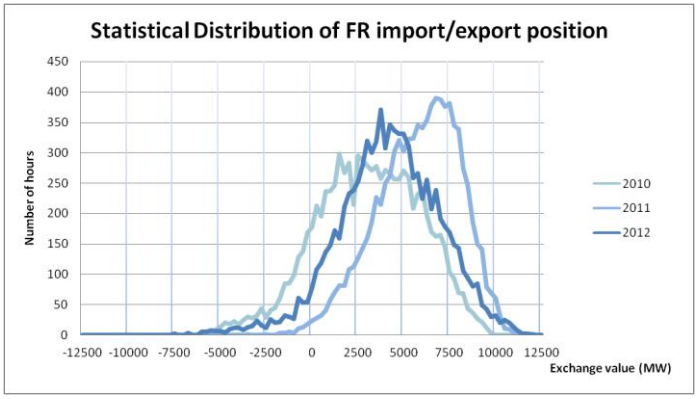
Exchanges data are extracted from Vulcanus website and UK Exchanges are provided by ENSTSOE.net website.

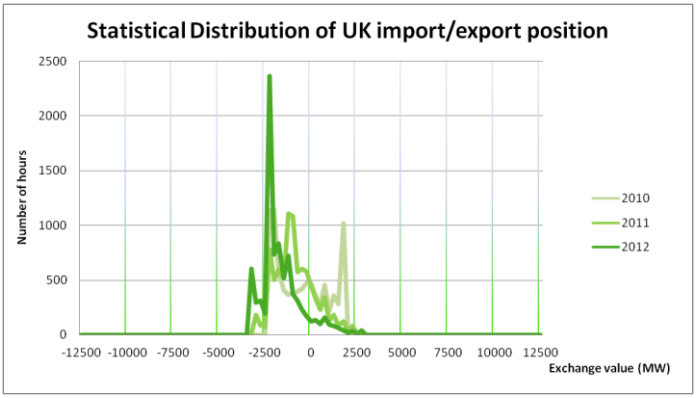
Main 2012 events :

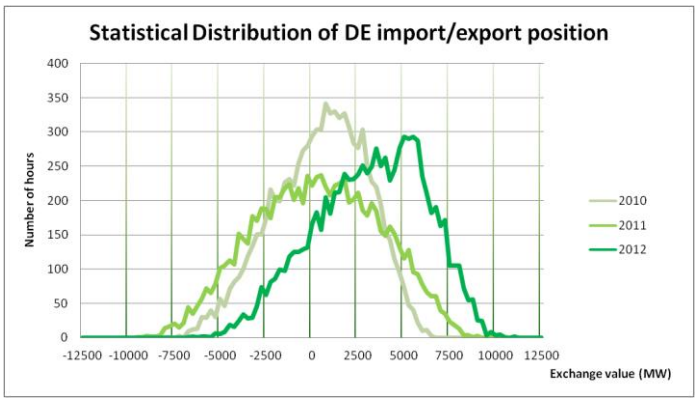
- Thanks to **BritNed cable put in operation on 22/05/2012**, UK was able to exchange more energy leading to deviation in the CWE area compare to the previous years.
- Germany exported more flows to The netherlands also due to **increase of renewable energy**.
- In Belgium the **PST of Zandvliet was out of service during 3 months** which lead to reduce exchanges through Belgium (NTC reduced to 1219MW).

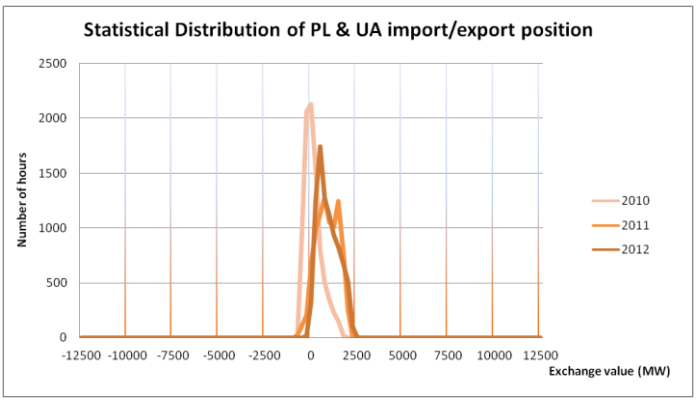


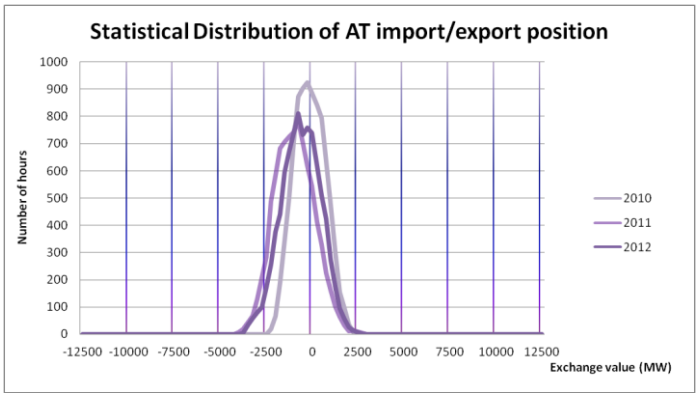


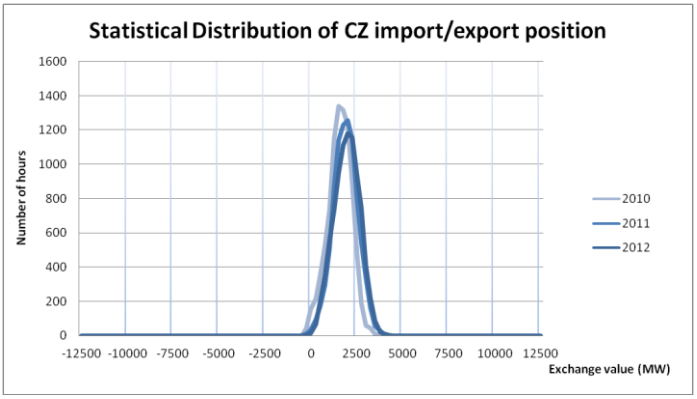


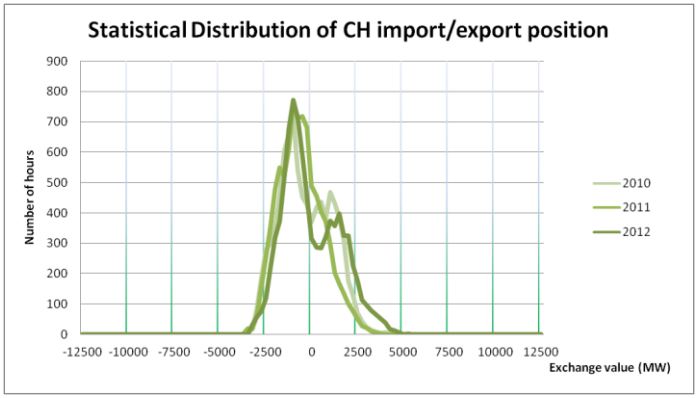


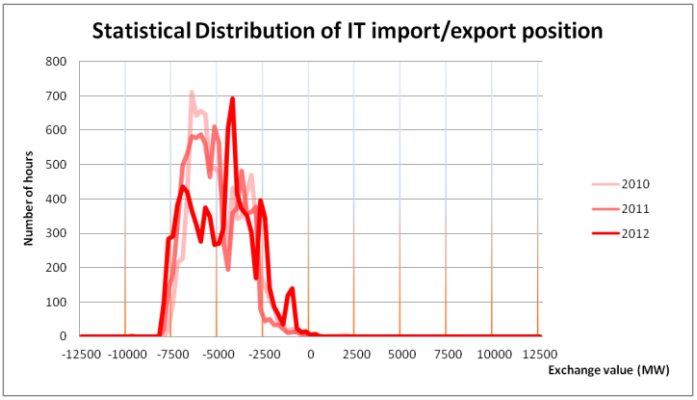


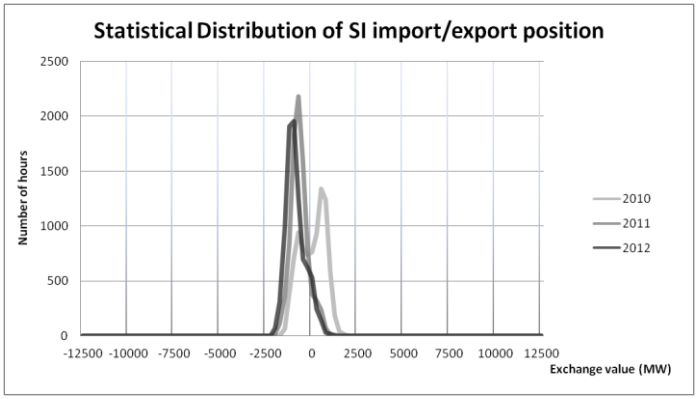




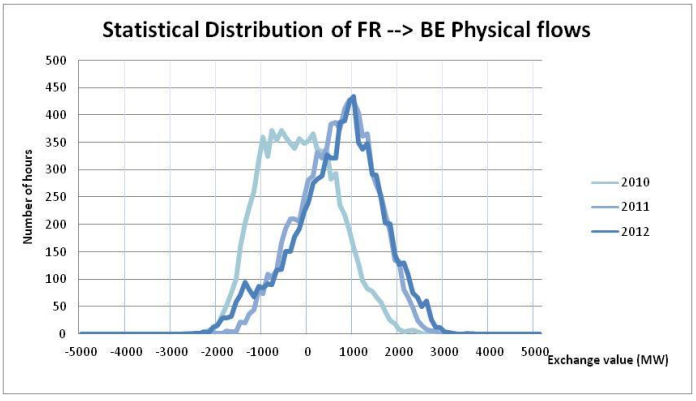


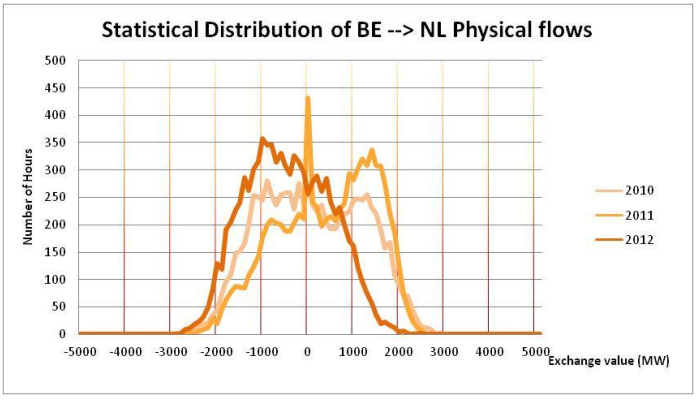


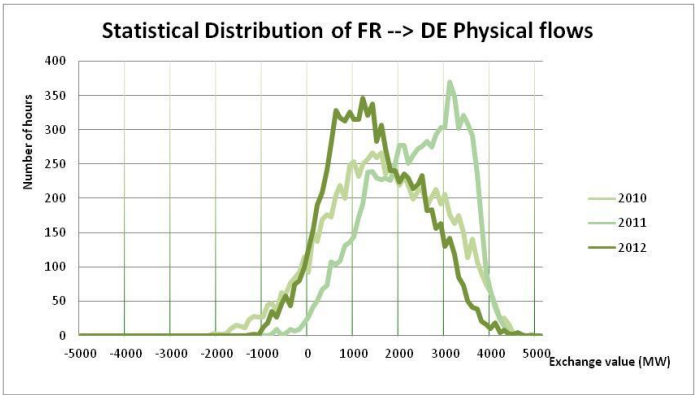


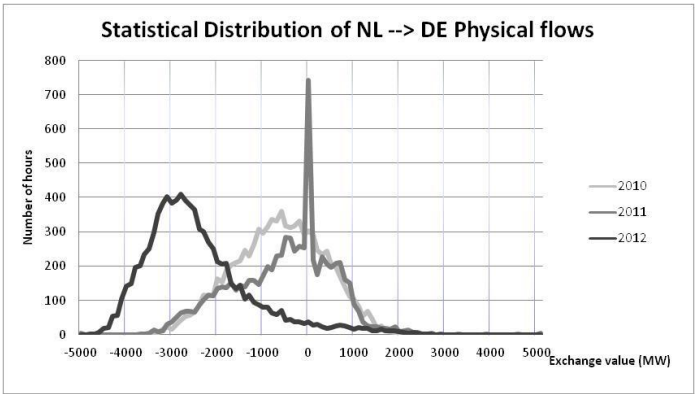


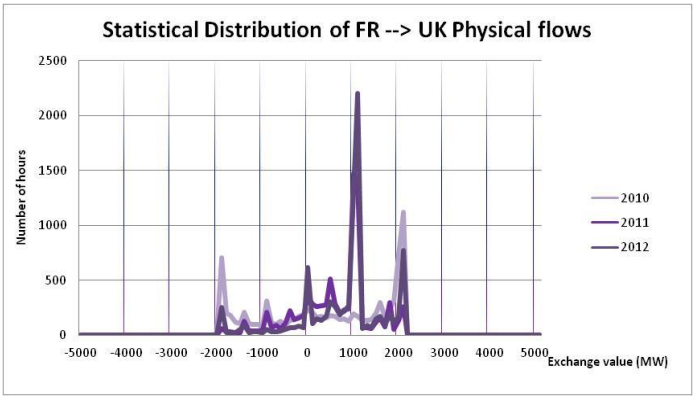
Main Physical flows on borders

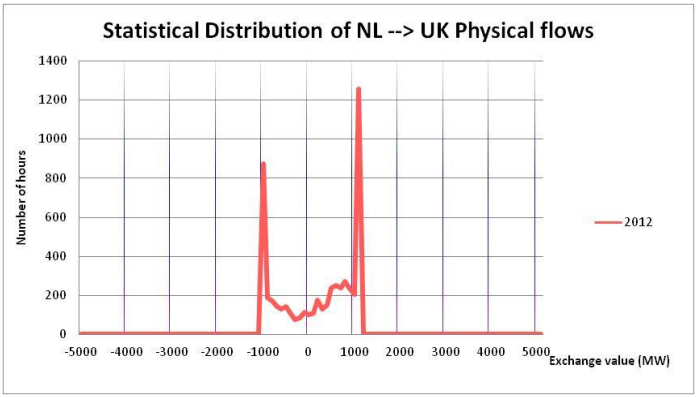








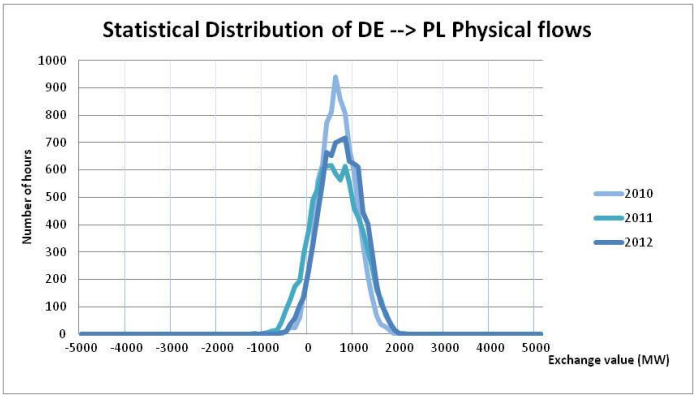


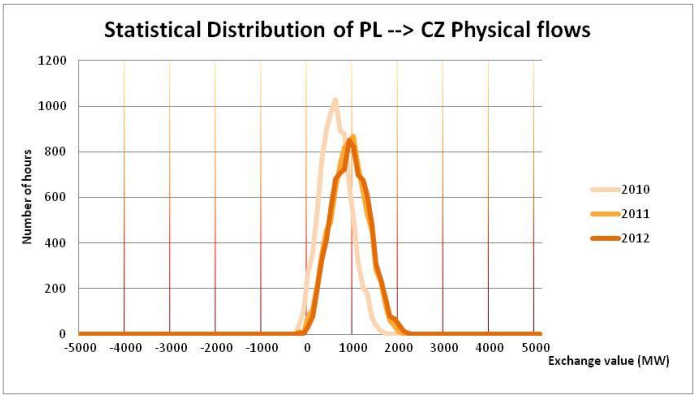


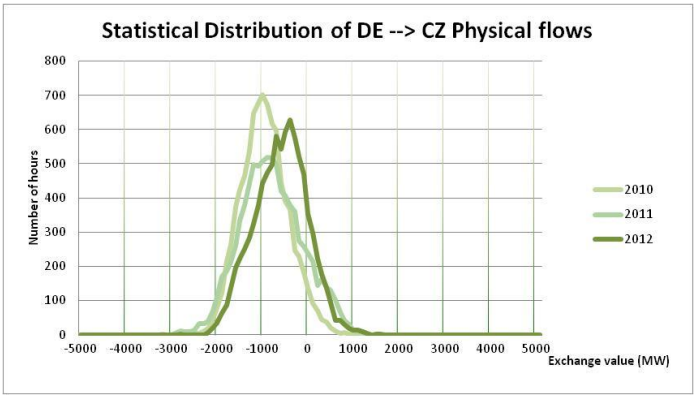
The curves show a long period exchanges around 1000MW. This is due to maintenance on IFA cables, which force us to stay with only one bipole (Maximum 1000MW per bipole).

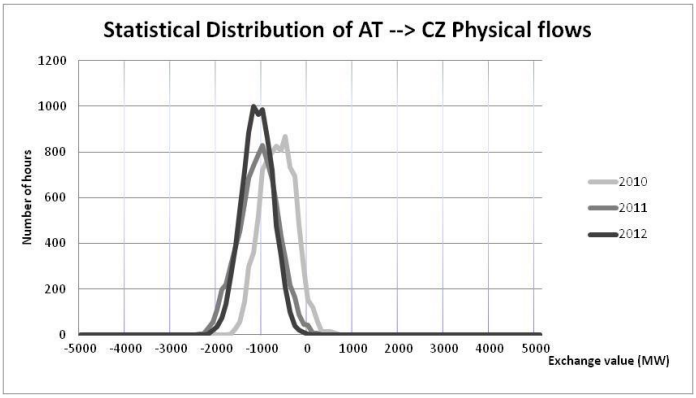
BritNed cable put in operation on **22/05/2012**.

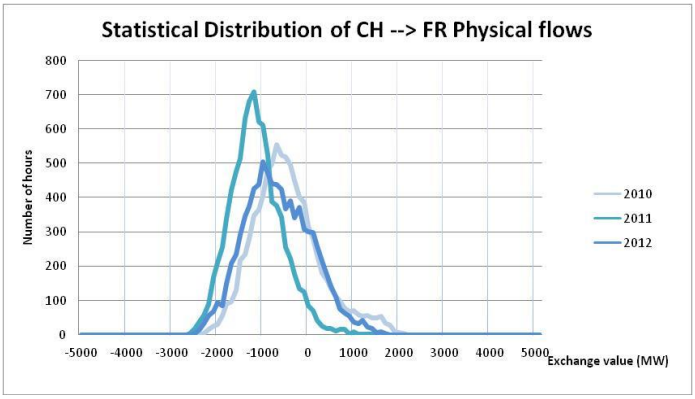
21,2% of the year at maximum export to UK.

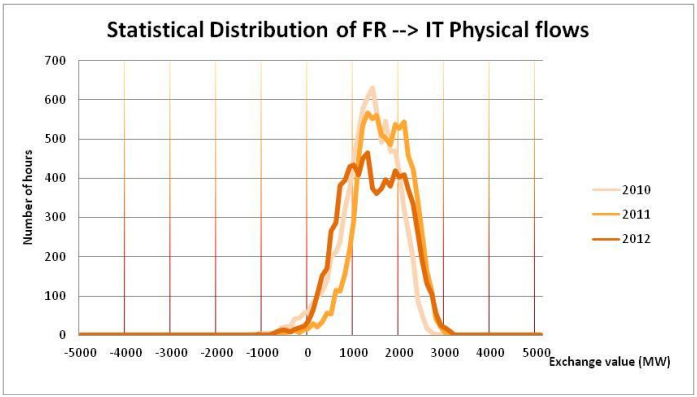


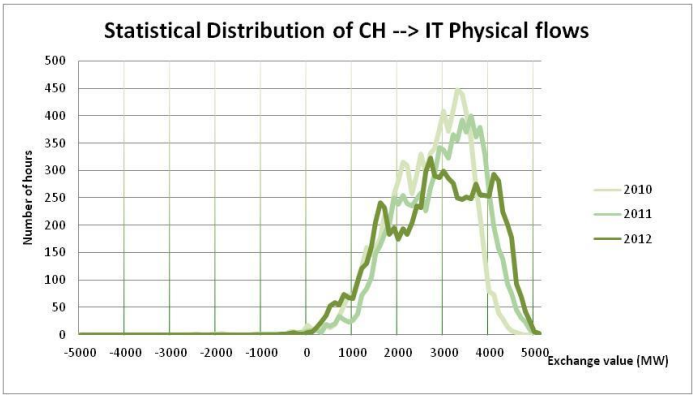


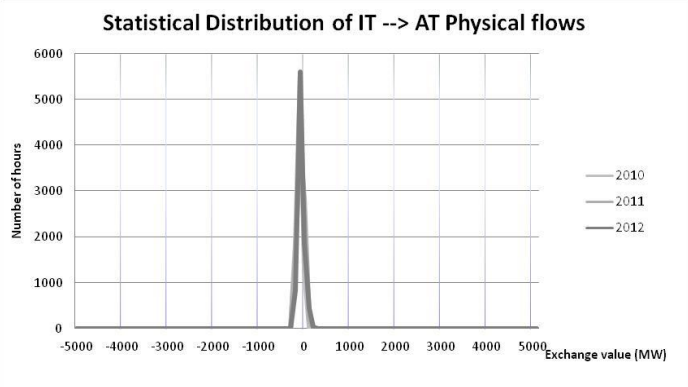


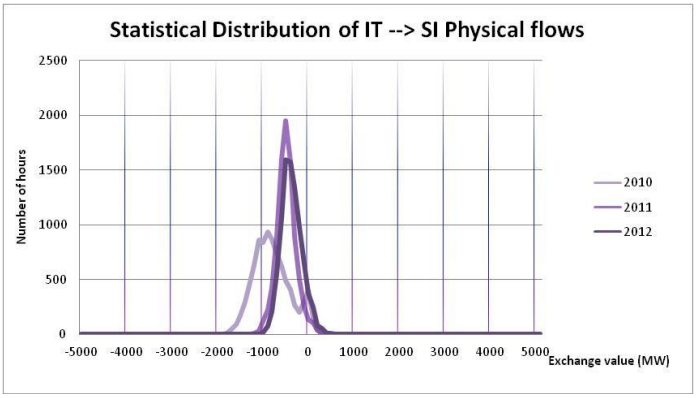




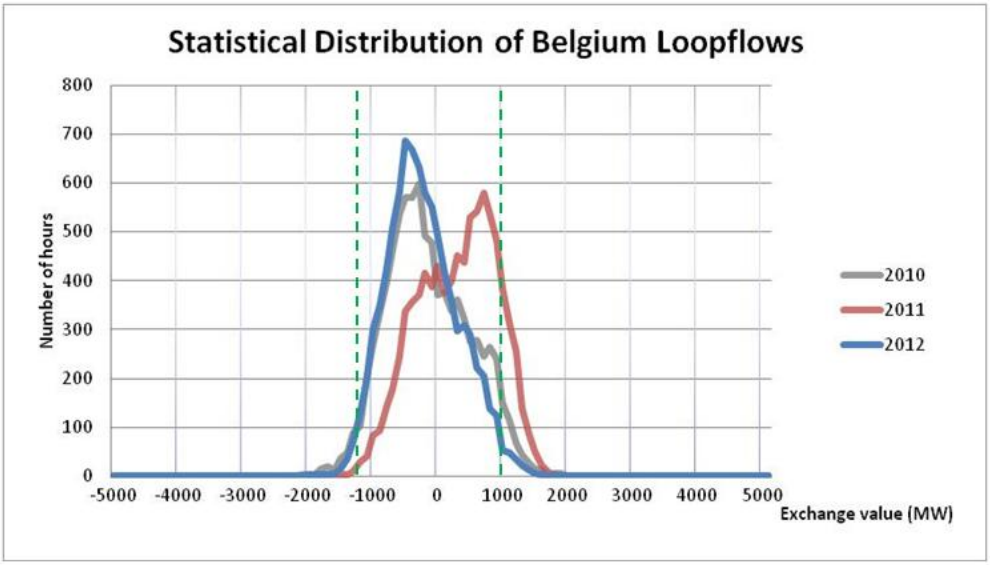








Belgian Loopflows



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

Compare to 2011, in 2012 Zandvliet PST was out of service for 3 months.

Definition :

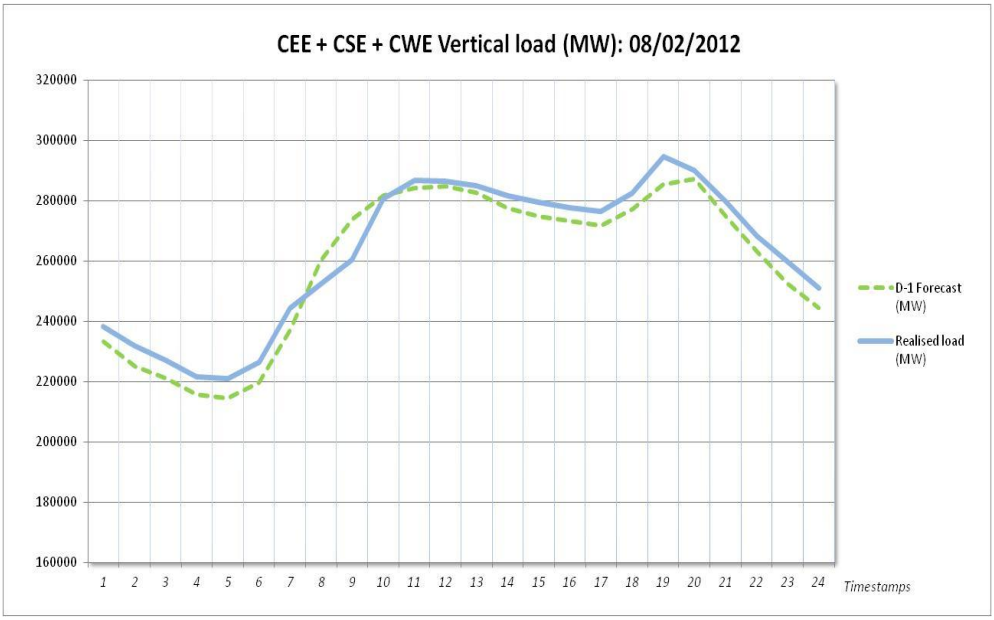
(+) = South to North flows

(-) = North to South flows

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.

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

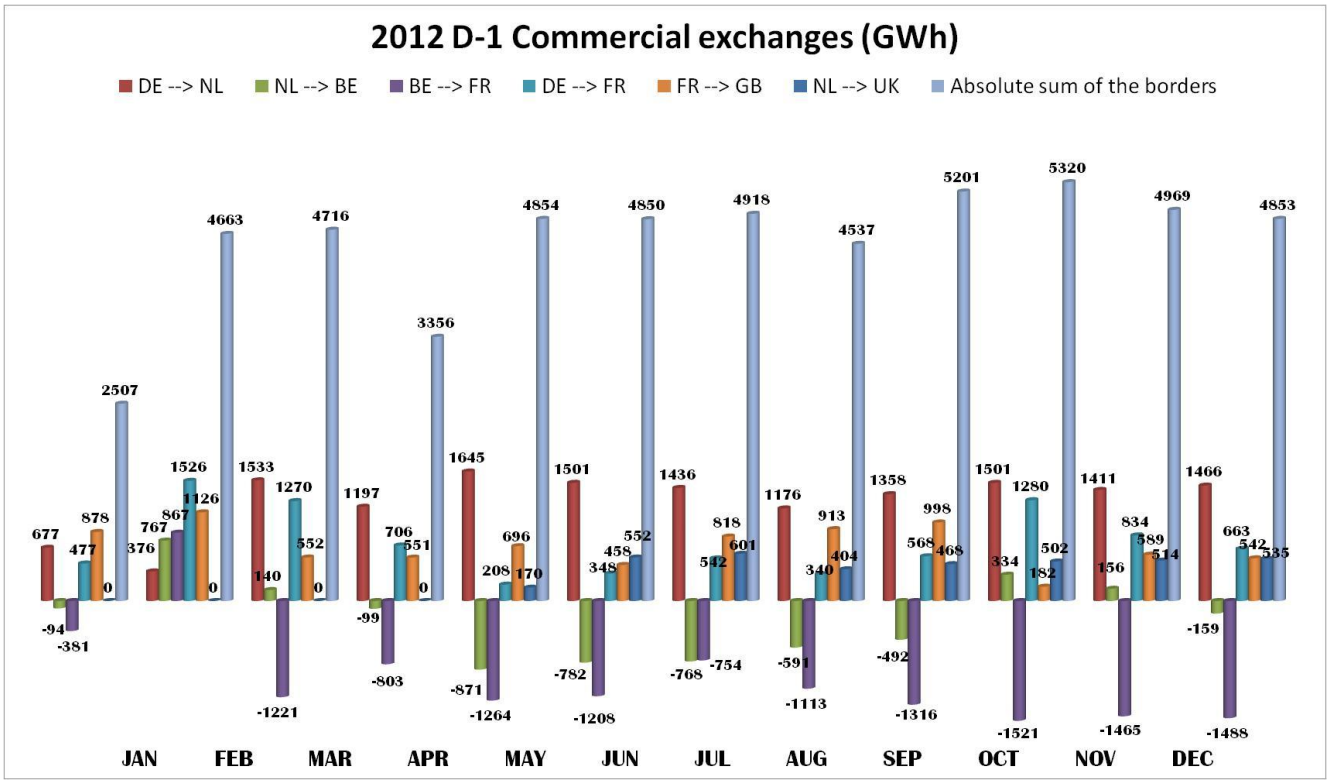


Vertical load peak of 294 590 MW between 18:00 and 19:00 (hourly average).

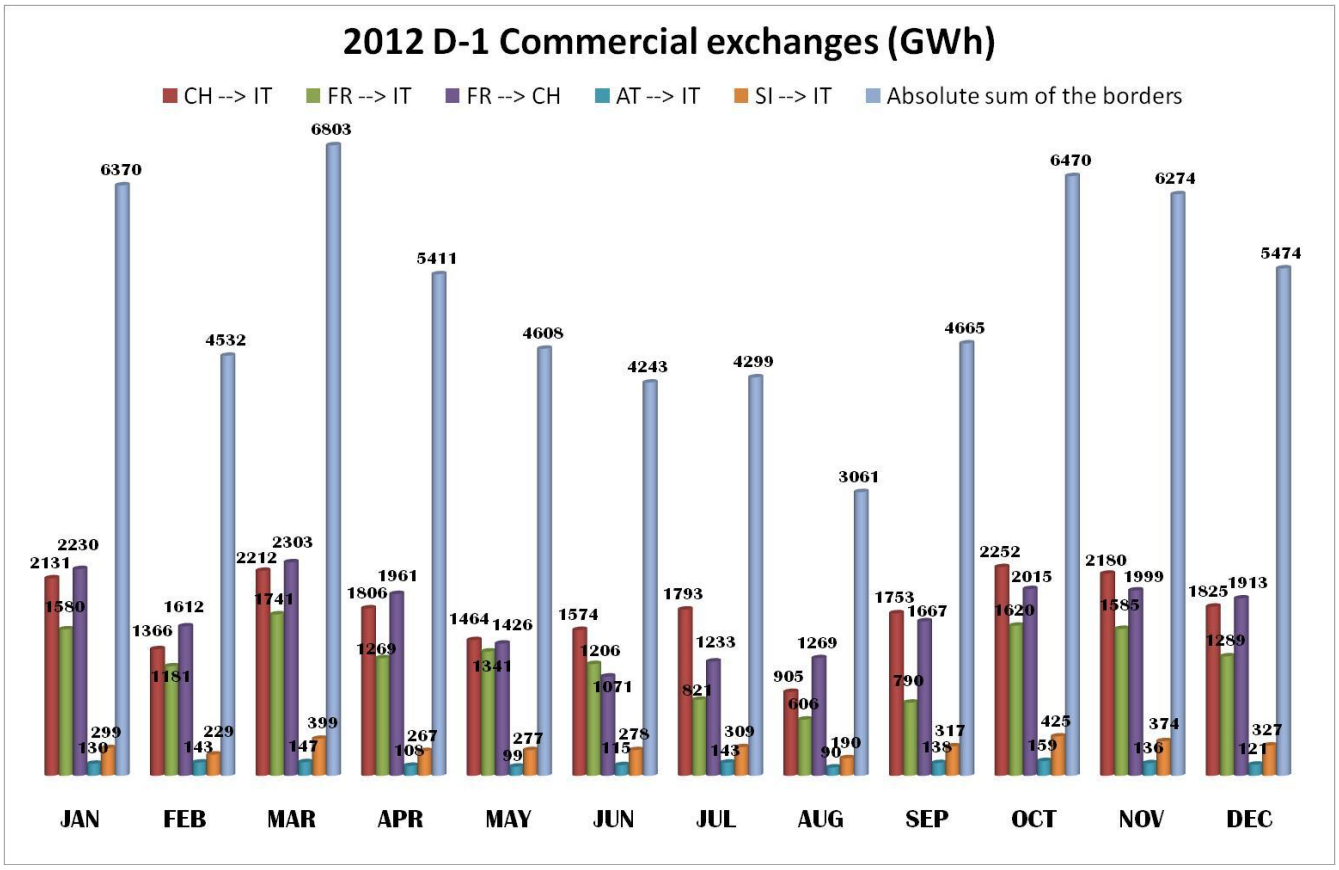
Around 9% more compare to the maximum load register in 2011 (04/01/2011).

France peak demand exceeds 100GW for the first time!

North D-1 Commercial exchanges



South D-1 Commercial exchanges

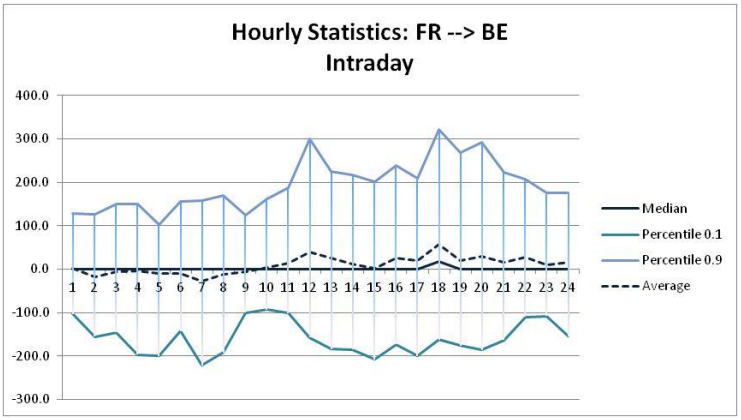


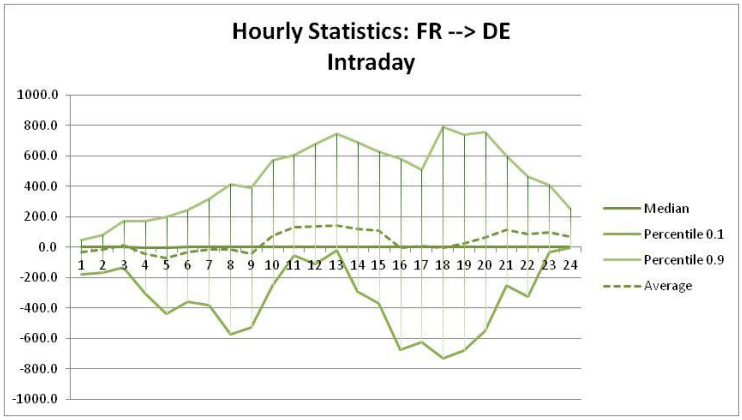
North Intraday exchanges

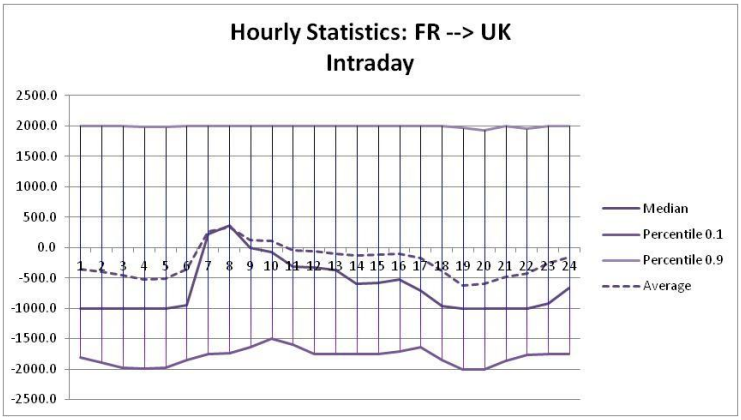
These charts represent the most frequent values of intraday exchanges (in MW). For each timestamp, the intraday volume was included between the 2 percentile curves, 80% of the days.

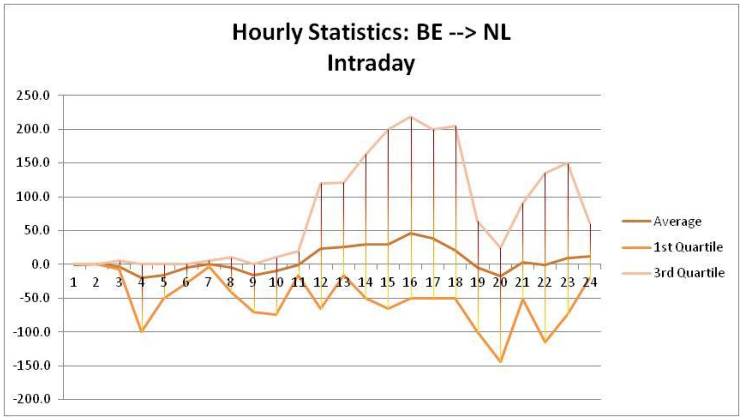
January – March 2012

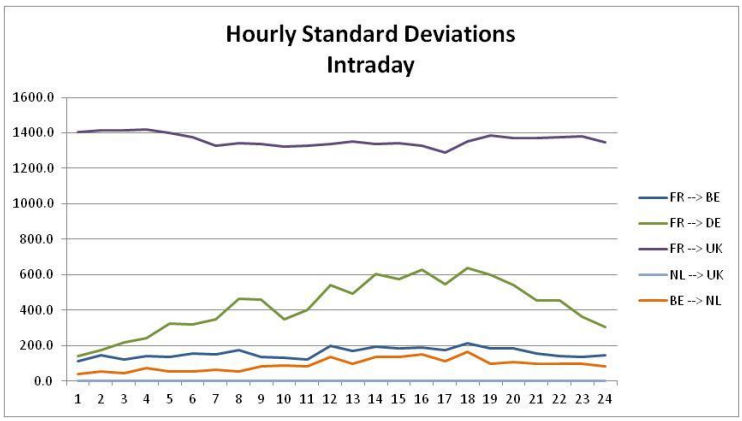
This period correspond to the winter time, when the peak demand in the North area is in the evening.







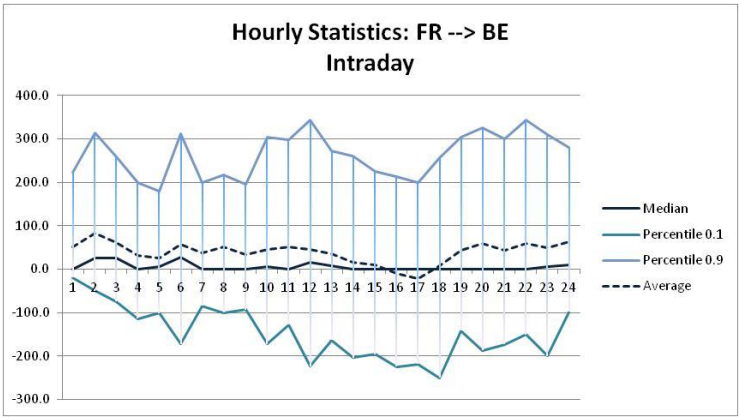


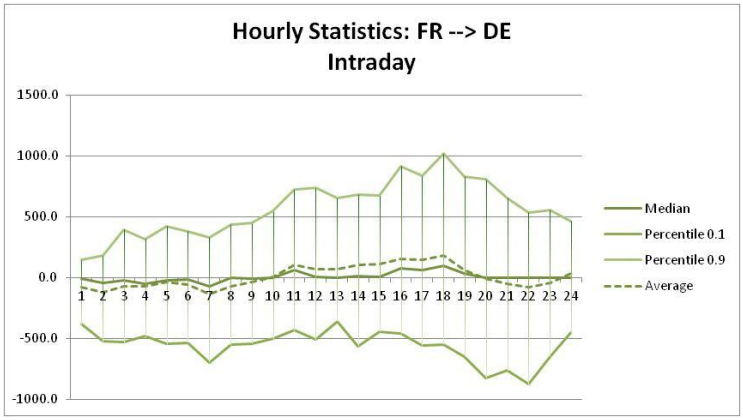


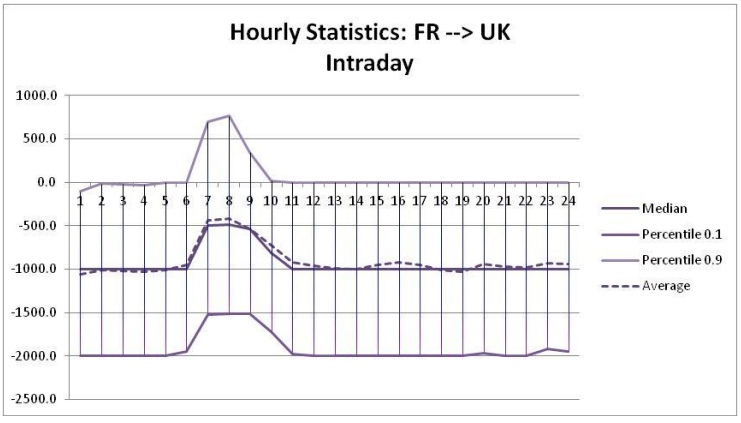
The intraday activity is higher around peak demand time: exchanges are more important but also more fluctuating.
The same performance is observed in November and December.

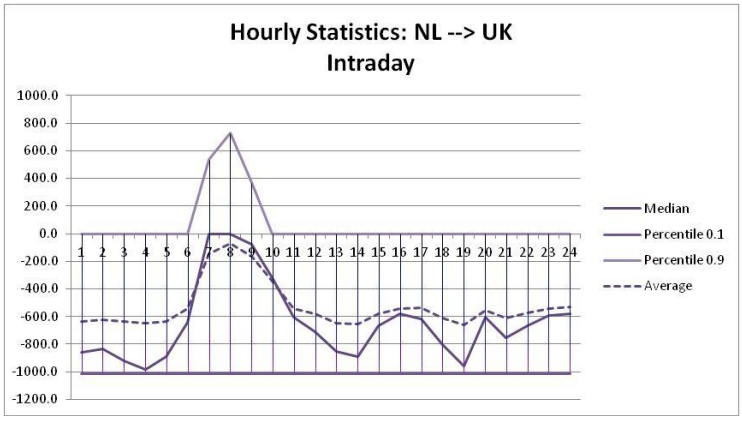
April – October 2012

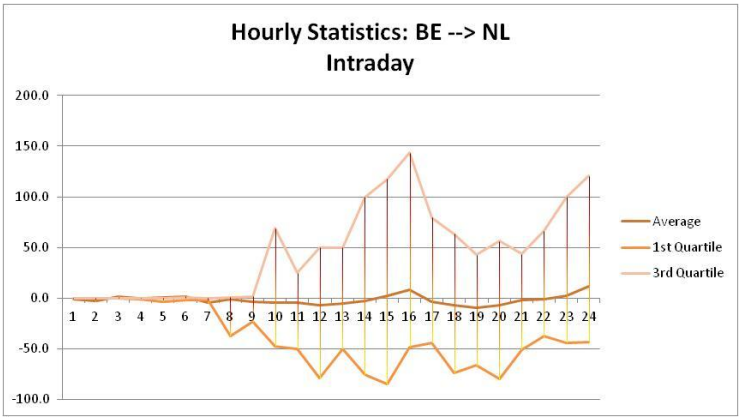
This period corresponds to the summer time, when the peak demand in the north area is at noon.

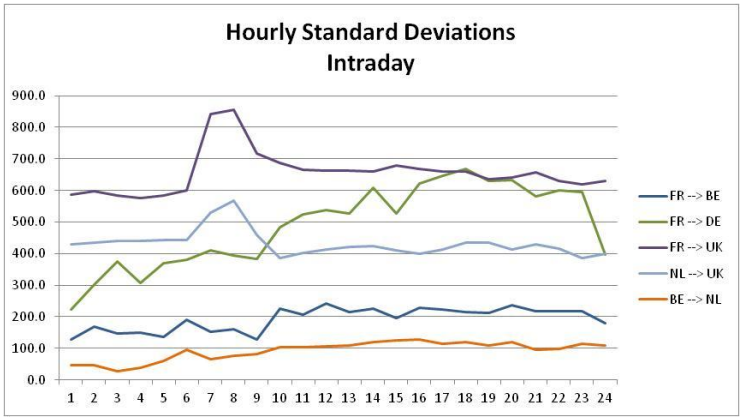












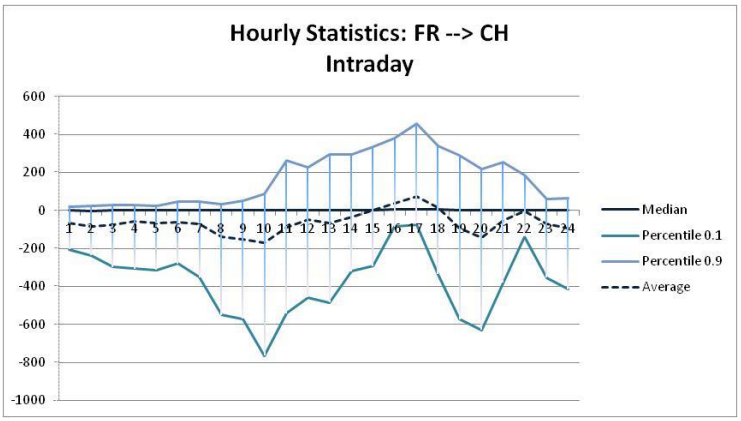
Evening exchanges remain important but the differences of fluctuation and quantity with morning or noon exchanges are less significant during summer time.

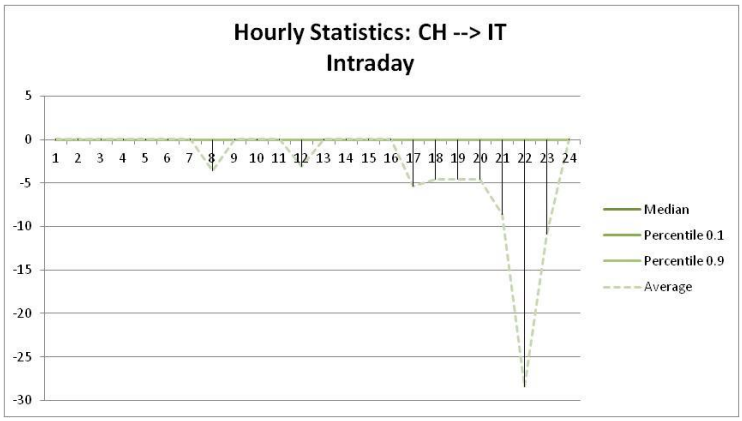
South Intraday exchanges

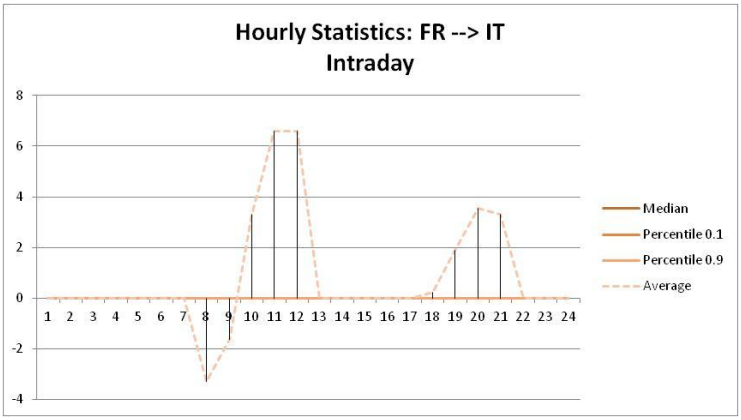
These charts represent the most frequent values of intraday exchanges (in MW). For each timestamp, the intraday volume was included between the 2 percentile curves, 80% of the days.

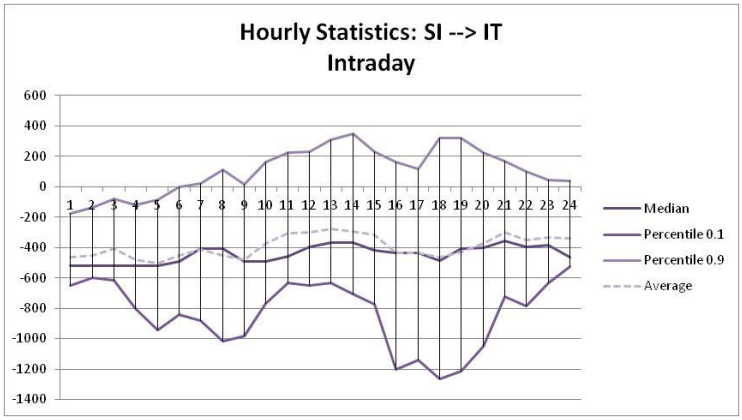
January – March 2012

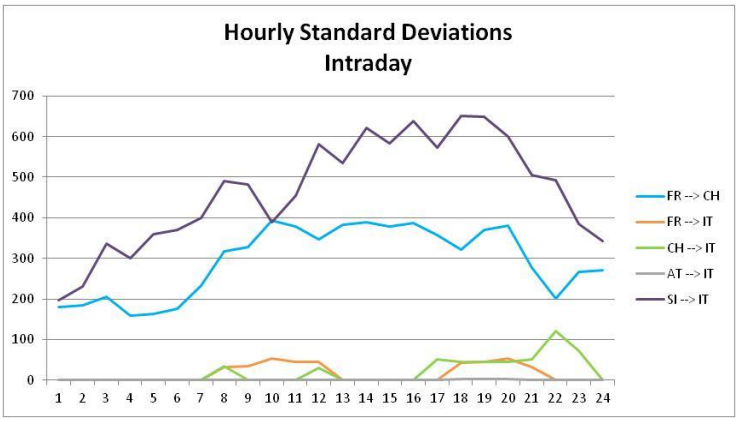
This period corresponds to the winter time, when the peak demand in the South area is in the evening.







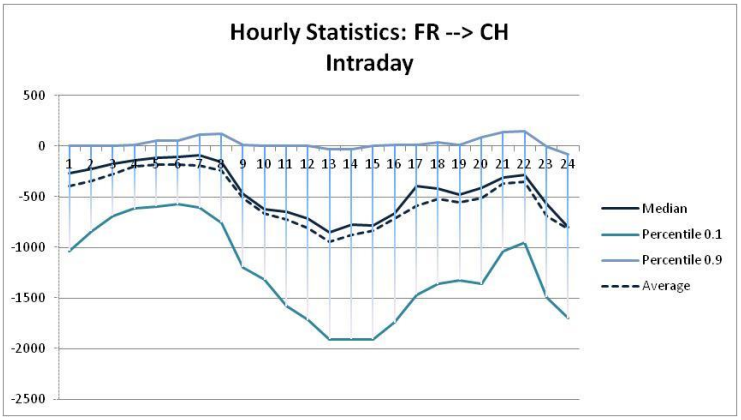


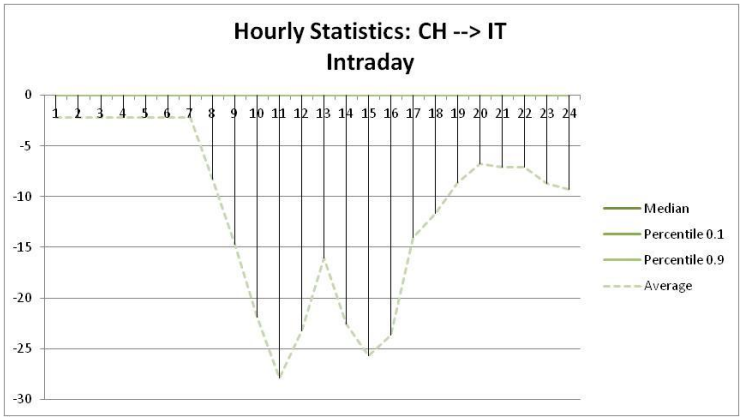


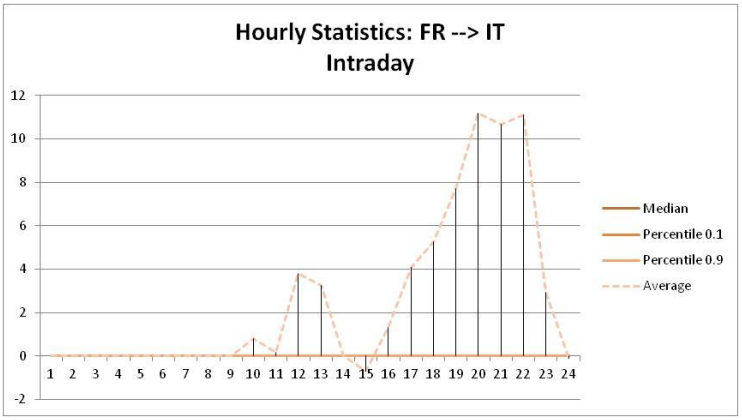
The intraday activity is most important around peak demand time: exchanges are less important.

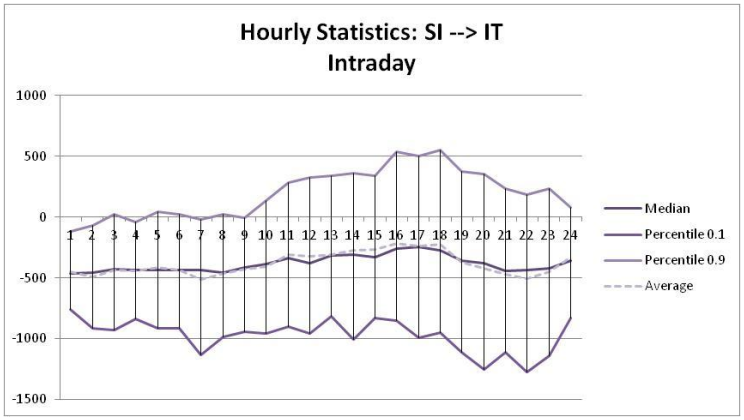
April – October 2012

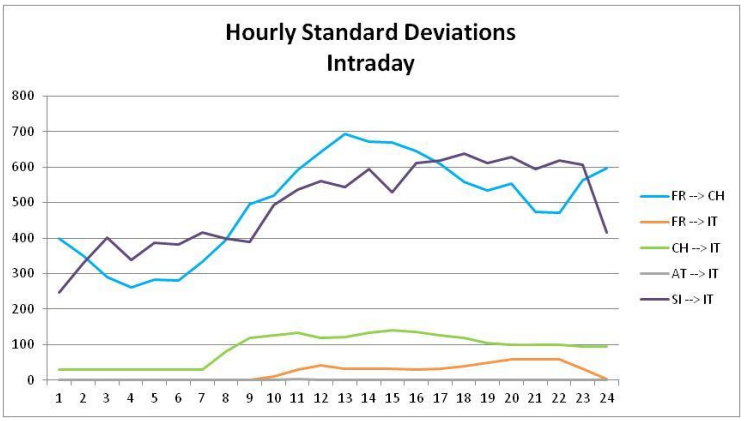
This period correspond to the summer time, when the peak demand in the south area is at noon.











Exchanges are higher during summer time with more fluctuation.

German Renewable Energy

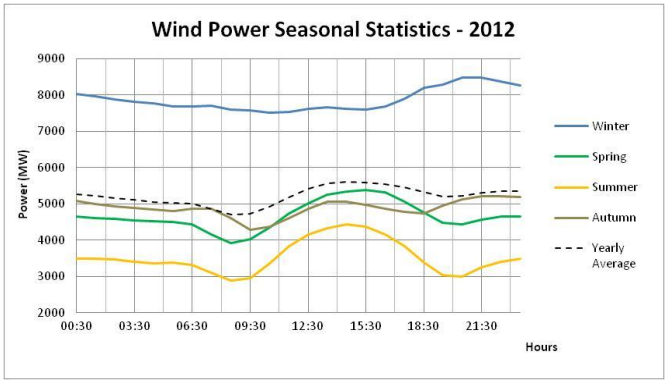
Data are coming from EEX website. Only Germany renewable energy is described in the report.

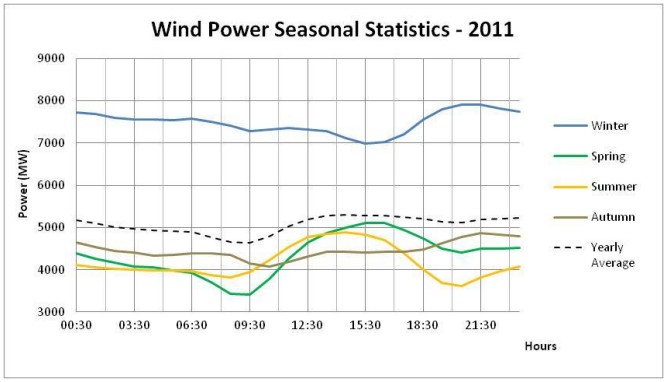
MAIN **WINDPOWER** 2012 FIGURES

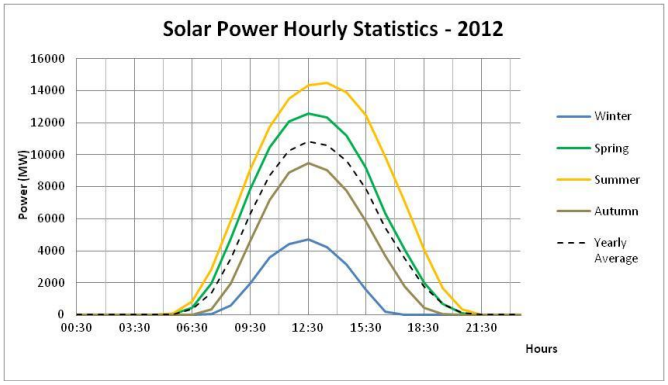
	2011 (GW)	**2012 (GW)**
Maximum generated	22,8	**24,1**
Average generated	5,1	**5,2**
3rd quartile (75% data amont < X)	7,3	**7,1**
Maximum deviation in 15 minutes	1,1	**2,4**

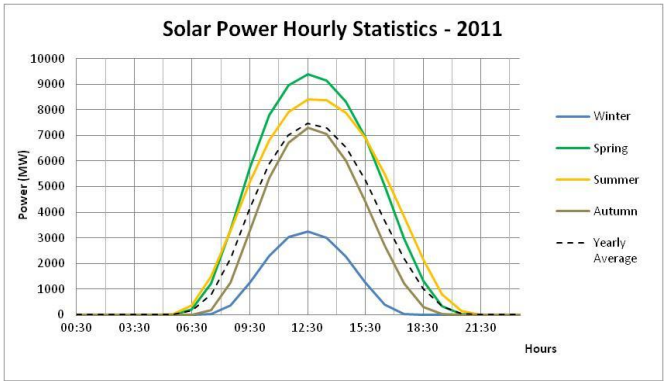
MAIN **SOLARPOWER** 2012 FIGURES

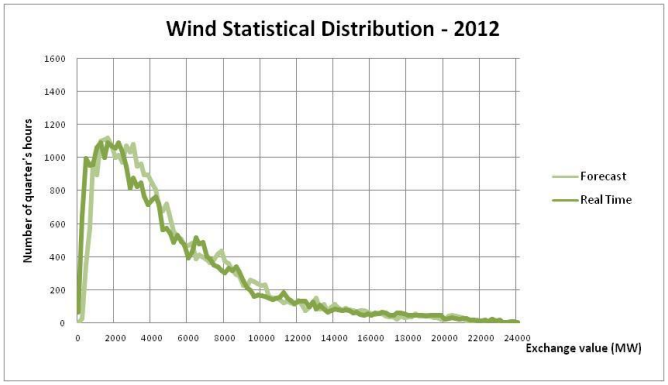
	2011 (GW)	**2012 (GW)**
Maximum solarpower generated	13,2	**22,4**
Average solarpower generated	2,3	**3,1**
3rd quartile (75% data amont < X)	3,9	**5**
Maximum deviation in 15 minutes	1,4	**1,9**

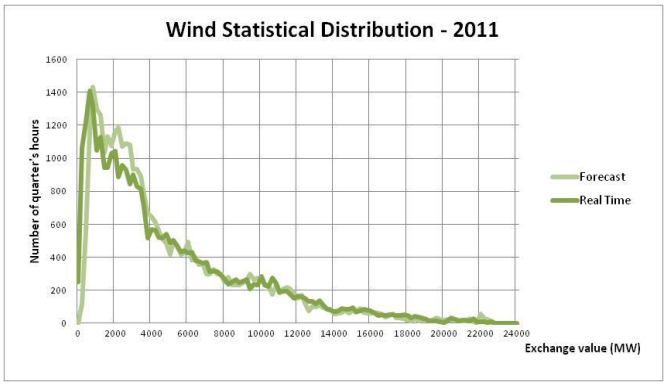


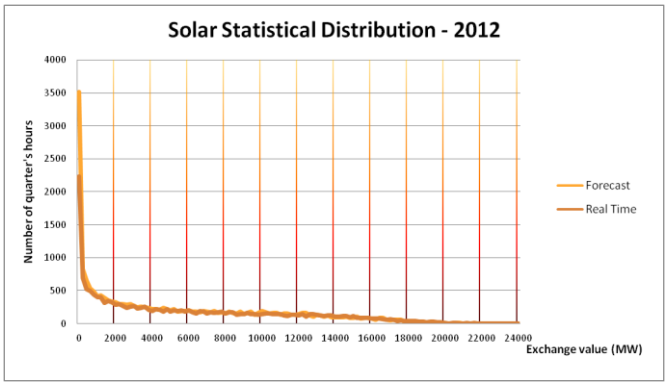


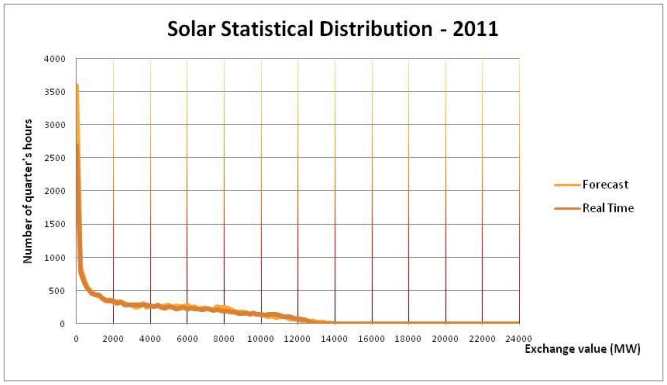






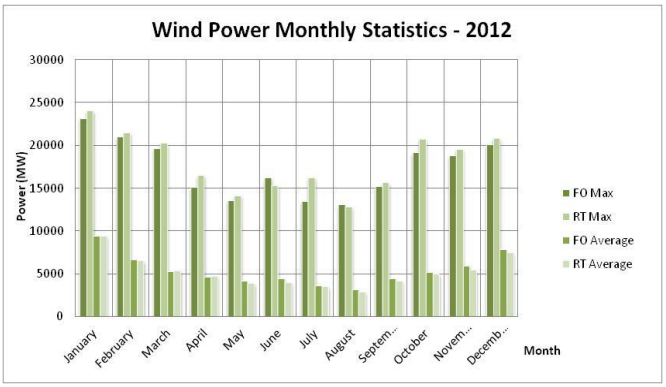


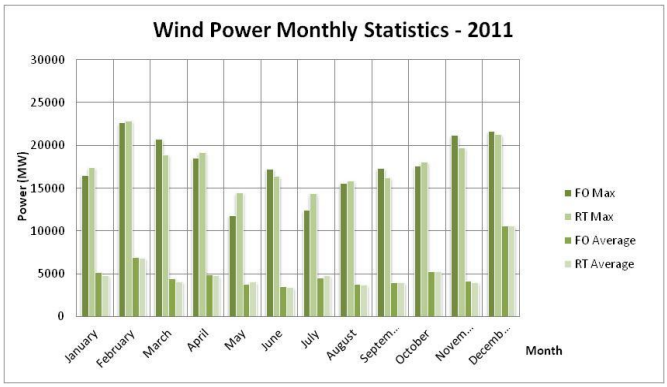


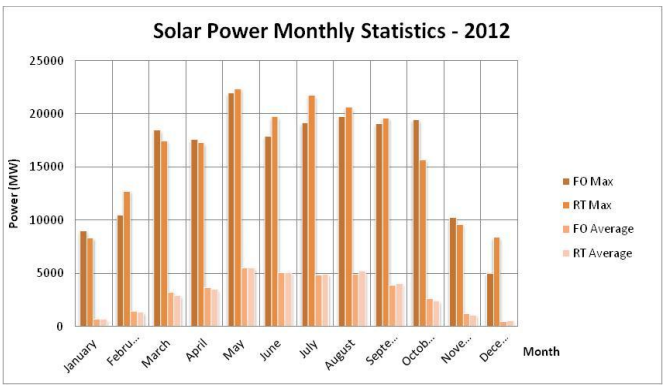


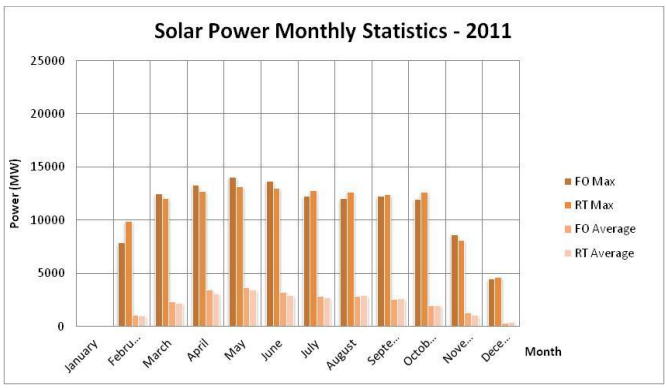
Wind infeed was a little bit higher than in 2011, with more times spent up than 4000MW of generation.

Solar infeed continues to increase in 2012 with a maximum of 22.4GW thanks to the new installed capacity.









Wind infeed is higher during winter period.

Like expected, solar infeed is greater during summer period.