



coreso

***Leading coordination
For enhanced reliability of supply***

www.coreso.eu

Introduction

Year after year, the creation of the Europe of electricity pursues its way through numerous projects and developments. Coreso is at the core of these evolutions by participating and supporting them in the operational phases as well as in the development.

The year 2014 was marked by a second region of Europe, Central Southern Europe, developing a new coordinated capacity calculation project. After the CWE Flow Based capacity calculation and market coupling, this is again a step in the direction of a more coupled European electricity market. Coreso is at the centre of those two processes and provides expertise and operational knowledge to meet the challenges raised.

These innovative ways of calculating capacities and reinforcing exchanges between European countries present huge challenges and opportunities to all Regional and Security Coordination Initiatives (RSCIs). More exchanges lead to more need of coordination and coordinated security analysis. The operational performance shows that Coreso met this challenge for 2014.

Securing the electrical grid is at the core of Coreso's activities. The winter 2014-2015 showed that also the question of the availability of power supply should be assessed. Coreso proposed an ad-hoc solution to support its shareholders to enhance short term adequacy. This new topic will also become a major one in the coming years and Coreso is eager to participate in this challenge.

To achieve all these major objectives, the data quality and the creation of more reliable grid models to share a common vision of the grid at the different step of Coreso's activities will have a central role. At the same time, the operational coordination should extend to outage planning.

The year 2014 has been a year of successes for Coreso. But these successes only commit us to deploy again our best effort to provide our shareholders more reliable, effective and valuable services. 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 Operational Review 2014

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CORESO

MAIN EVENTS

2014



Coreso main events for 2014

16th January 2014

Board workshop to define Coreso's Strategy.

The Coreso Board met in order to define Coreso's strategy for the creation of a common framework for Regional Security and Coordination Initiatives (RSCI) within Entso-E context.

The focus should be concentrated on the following "key functions":

- Security analysis (mainly oriented on flows)
- Capacity calculation (link to and input for the markets)
- Optimized use of assets (such as PSTs and HVDC links)
- Short term adequacy (match generation-demand)

4th February 2014

Capacity calculation on the Italian Border.

Start of the internal dry run of the D-2 CSE Capacity Calculation.

NWE Day-Ahead Market Coupling was launched on February 4, 2014.

A day-ahead market coupling in the NWE region is successfully implemented based on the price coupling principle, using one single algorithm, calculating simultaneously the market prices, net positions and flows on interconnectors between market areas. To facilitate the market coupling CORESO handles in addition the DC connectors from CWE region in daily ATC Common System computations.

12th February 2014

Visit of EU Commissioner for Energy Günther Oettinger.

The visit was introduced by Coreso Chairman Daniel Dobbeni. Coreso CEO Patrick De Leener then opened a discussion on coordination requirements, the key missions of a regional centre like Coreso and the vision of a model for cooperation in Europe. The guests were also given an interactive tour of the control room by Coreso COO Cédric Auxenfans.

16th February 2014

Coreso celebrates its 5th birthday and launches its new website: www.coreso.eu

17-18th June 2014

Coreso operational Workshop

On Tuesday and Wednesday 17-18th of June, RTE, ELIA, TERNA, National Grid, 50Hertz and Coreso participated to the Coreso Operational Workshop in Lyon which was aimed on the "training" topic this year.

For the second day, a simulation on the French and Italian Grid was organized in the simulation room of the training centre.

19th June 2014

Regional renewable energy forecast integrated in the day ahead report

From Thursday 19th June on, a regional renewable energy forecast up to two days ahead (for CWE, CSE and SWE) has been added to the day-ahead report. This information allows a global view on the expected renewable energy situation for a large part of continental Europe and therefore provides important information with regard to short term adequacy evaluation to our stakeholders.

21st October 2014

Winter action plan at Coreso

The different parts of the winter action plan are on track: the winter study, where the final report is on the table for alignment with the CWE partners; the ad hoc D-2 process, where first results have been shared with stakeholders, and the intraday process, which will be ready soon to pass to the training phase.

Thanks to this coordinated effort, Coreso will be ready by end of November to offer important support to its shareholders with regard to potentially difficult winter situations.

12th November 2014

The Austrian TSO APG integrated in the CWE merging

In 2013, the Pentalateral Energy Forum (PLEF) decided to expand the CWE-region by integrating Austria as a new member. From the 12th of November, APG is submitting D2CF-files for the CWE area and has been integrated in the CWE merging process by Coreso.

The Austrian TSO is now providing daily D2CF files for CWE area. The first days of CWE merging with now 8 TSOs was a success.

18-19th of November

Coreso operational Workshop

On Wednesday and Thursday 18-19th of November, RTE, ELIA, TERNA, National Grid, 50Hertz and TSC participated to the Coreso Operational Workshop in Brussels about Intraday activities.

28th November 2014

Resumption of Redirection of Flows over Interconnectors Project

On Thursday 28 November, the TSOs from the RFI working group met after an 8 month break to recommence the RFI project. The meeting validated the previous work and identified the next steps in the process. The first RFI trial is provisionally planned for after the go-live of Flowbased and should take place in 2015.

30th November 2014

Loss of additional nuclear plant in Belgium on 30 November

On Sunday 30 November, Tihange 3 (1050 MW) tripped following an incident on a current transformer, causing a (small) fire.

Elia started up the crisis organization and evaluate that no scarcity was to be expected neither for Sunday nor for the following days. Coreso assisted by providing additional studies to the concerned TSOs in intraday and day ahead with CWE variants for some additional import capacity (NL-BE and/or FR-BE).

1st December 2014

Coreso starts up capacity calculation service for ELES

Following a tendering process set up by ELES, Coreso was selected as service provider for the CSE D-2 capacity calculation service.

The contractual agreement has been agreed and signed. Start of the service is on December 1st.

9th December 2014

Kick off of offline Flow Based analysis in case of scarcity

As a result of the winter action plan and in addition to the current Flow Based parallel run processes, a new ex post process called "Offline FlowBased (FB) calculations in case of Scarcity" is set up.

Main goal is to assess whether Belgium import would be adequate by applying current rules in the Flow Based parallel run and to get the lessons learned for future winter as well.

CORESO

OPERATIONAL PERFORMANCE

2014



Coreso key figures for 2014

Coreso's operational performance

MAIN PERFORMANCE FIGURES

Publication of 24 merged timestamps	365/365 days
Number of SMART* performed	25 (2013 = 35)
Number of BALIT variants and Intraday studies	37 (2013 = 57)
Number of other variants performed in day-ahead	94 (2012 = 77)
Number of IDCF Studies	606 (c.a 2 per day)

*SMART: System Modification Advice Request

In 2014, Coreso processes reached their target with complete DACF merging and Security Analysis all year long. The IDCF process, started in November 2013 is now fully operational with 709 intraday loopflows forecast in addition to the 606 IDCF studies.

Coreso's ongoing projects

D-2 Capacity Calculation for CSE area

After almost a year of running this new capacity calculation, **concrete results have been gathered on this process:**

- An advanced draft version of the HLBP has been released with all stakeholders of the process sharing a common vision
- Major advancements on the calculation method has been achieved
- A good convergence between the two RSCI (calculation entities) has been reached to secure the results

The challenges for 2015 will be:

- Monitor and work on the quality of the input files
- Develop and secure the calculation (algorithms, methodology, etc.)
- Move to 24 timestamps per day
- Reaching final agreement between TSOs on subjects such as NTC splitting factors or TTC selection

The external dry run, which consists in the external publication of the results for information, is expected for 2015.

D-2 Capacity Calculation for CWE area

The Flow-Based Capacity calculation's parallel run has been performed all year long without any major incident although major development steps were taken:

- Daily publication of parallel run results instead of weekly publication
- Update of Flow-Based Central Environment and accordingly development of existing procedures
- Integration of Austrian D2CF in CWE merging process and Flow-Based computations
- Reaching technical readiness for Go-Live with respect on tools and processes

The challenges for 2015 will be:

- Implementation of BCI (Base Case Improvement) methodology for D2CF merging.
- Go-Live of Flow-Based methodology, replacing the existing ATCbased process.

Adequacy process and short term adequacy

Due to major hazards on the availability of some nuclear generations in Belgium, adequacy issues were foreseen in Belgium for the winter 2014/2015. In order to guarantee security of supply as well as a maximum import capability in Belgium, a dedicated process was set up in Coreso to:

- Assess the short term adequacy of generation in Belgium
- Detect scarcity situations
- Find solutions in case of critical situations at several time horizons (D-2, D-1 & ID)

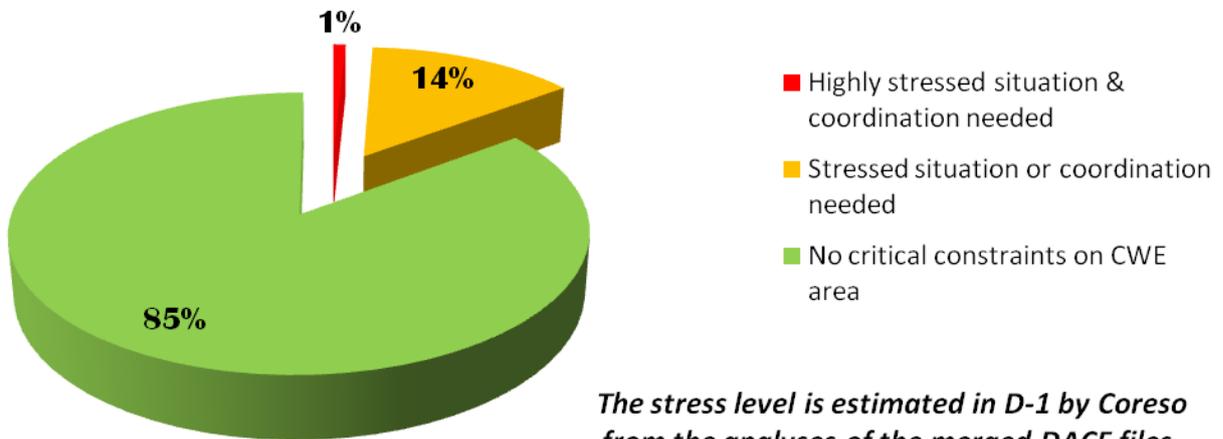
At the same time, Coreso adjusted its whole organization (IT infrastructure, team organization, etc.) in order to be able to provide all its services within the context of a highly stressed winter period.

Fortunately, no situation of this type was detected during the winter period.

Coreso operational activities

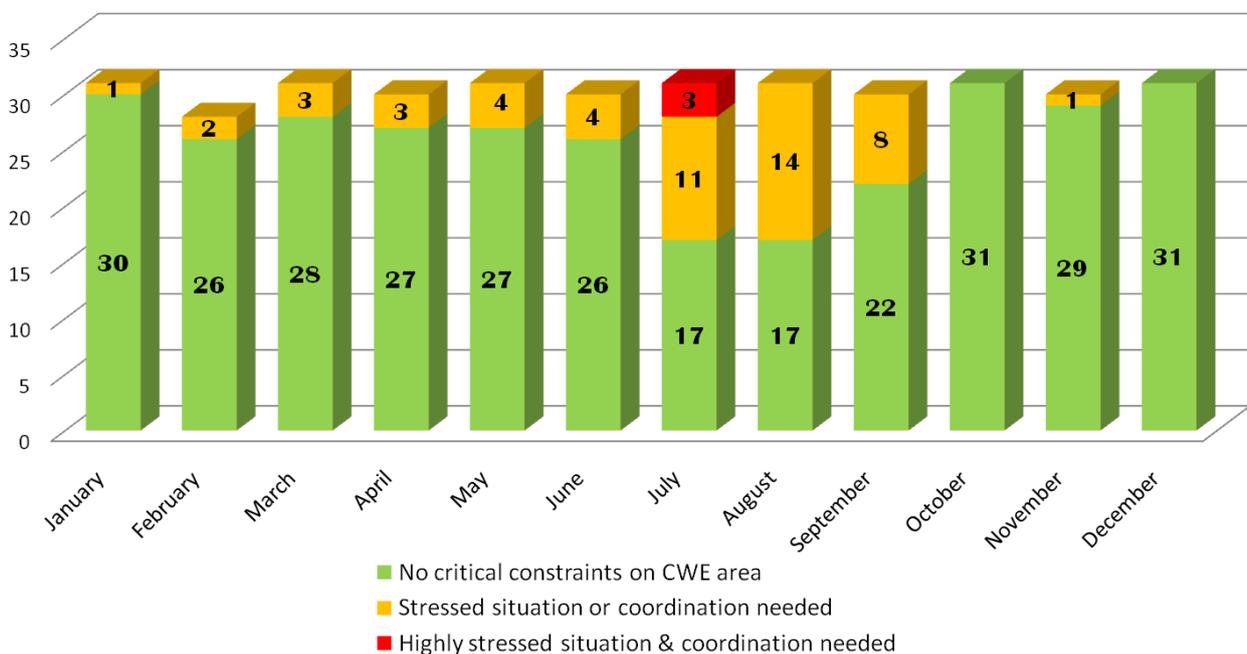
North Stress level (CWE)

2014 Stress Level on North grid



Occurrences	2011	2012	2013	2014
Red situations	4	5	6	3
Orange situations	47	57	44	51

Monthly North stress level statistics for 2014



Example of stressed situation on the North grid in 2014 (CWE)

19th of July 2014

Context:

Summer period: France is exporting a lot on all its borders (French balance higher than 12 GW).

An unplanned outage of St-Alban nuclear power plant led to stay with Cattenom on schedule (direct impact on the Vigy-Ensdorf axis).

Tie-line outages: 225kV Chooz – Monceau

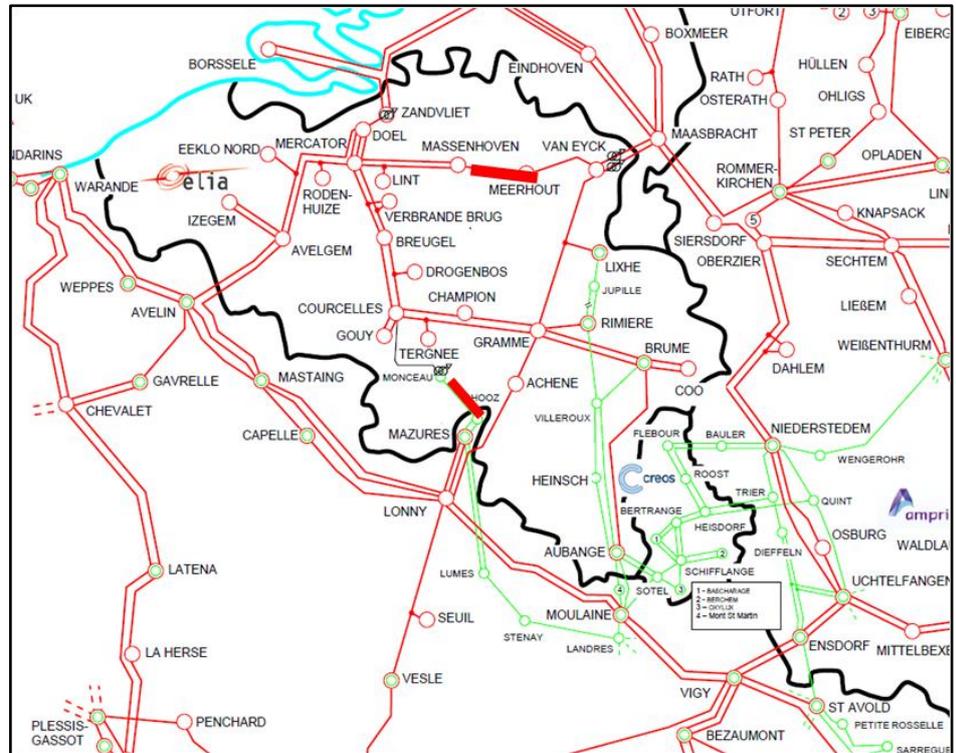
Internal line outage: 380kV

Massenhoven - Meerhout

→ No real efficiency of PST Van Eyck 1.

Day-ahead foreseen situation:

During the day-ahead process, high constraints are detected on both Vigy-Ensdorf axis and on the Belgium – Nederlands tie lines. Curative actions can be applied in both cases, requiring close coordination.



A variant with Cattenom on schedule is implemented in order to cover the full range of the possible patterns.

The day-ahead forecast stress level is set up to red.

Constraints on Elia, RTE (North) and 50HzT 400kV grids and tie-lines

TSO	Validity	Contingency				Constraint				Timestamps of max	
		U (kV)	Substation 1	Substation 2	Code	Overload	U (kV)	Substation 1	Substation 2		Code
RTE / Amprion	06:30-11:30	380	Vigy	Ensdorf	Axis	125%	400	Vigy	Ensdorf	Remaining	09:30
		Preventive actions : Tap 18 in Van Eyck 2 PST and 2 nodes in Uchtelfangen (agreed with amprion) => 109% remaining Curative actions : 3 Nodes in Vigy, open Vigy Moulaine n°2, 2Nodes in Lonny => 99% remaining									
Elia	01:30 - 11:30	380	Maasbracht	Busbar		124%	380	Doel	Zandvliet	25	08:30
		380	Gramme	Maasbracht	11	111%					
Curative action: Increase 4 taps (22 -> 26) in Zandvliet => 98% remaining											

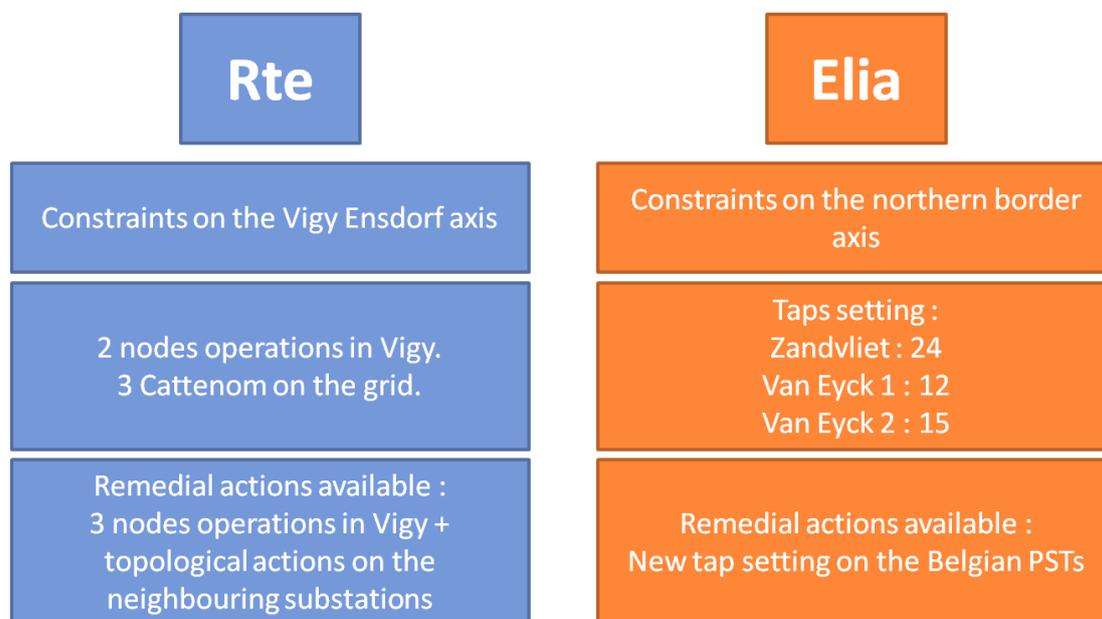
Variant with 4 units in Cattenom (planned stop of the unit 3 cancelled after tripping of St Alban 2) 2 Nodes in Uchtelfangen and tap 18 in VanEyck n°2 implemented

RTE / Amprion	06:30-11:30	380	Vigy	Ensdorf	axis	122%	400	Vigy	Ensdorf	Remaining	09:30
Curative actions : 3 Nodes in Vigy, 2 Nodes Bezeumont, open transformer n°2 in Vigy => 99% Remaining											

Real Time situation:

No special commercial exchanges are seen on the intraday market. The real-time situation is a little bit worse than forecasted during the day-ahead process. Preventive remedial actions have to be implemented in order to remain inside the operational limits.

For Elia and Rte, some “internal” remedial actions are available:



Around 7:30, French and Belgian TSOs are requesting the support from Coreso for the coming timestamps to assess the effectiveness of the “non cost” remedial actions mentioned above.

This situation shows that the internal remedial actions would not be effective at the regional level. Combining those two remedial actions would even have led to a globally unchanged situation (flows before and after both topological action on French-German border and PST tap setting in Belgium would have been approximately the same). The coordination is the key in this kind of situation to define and implement the most effective remedial actions to secure the grid.

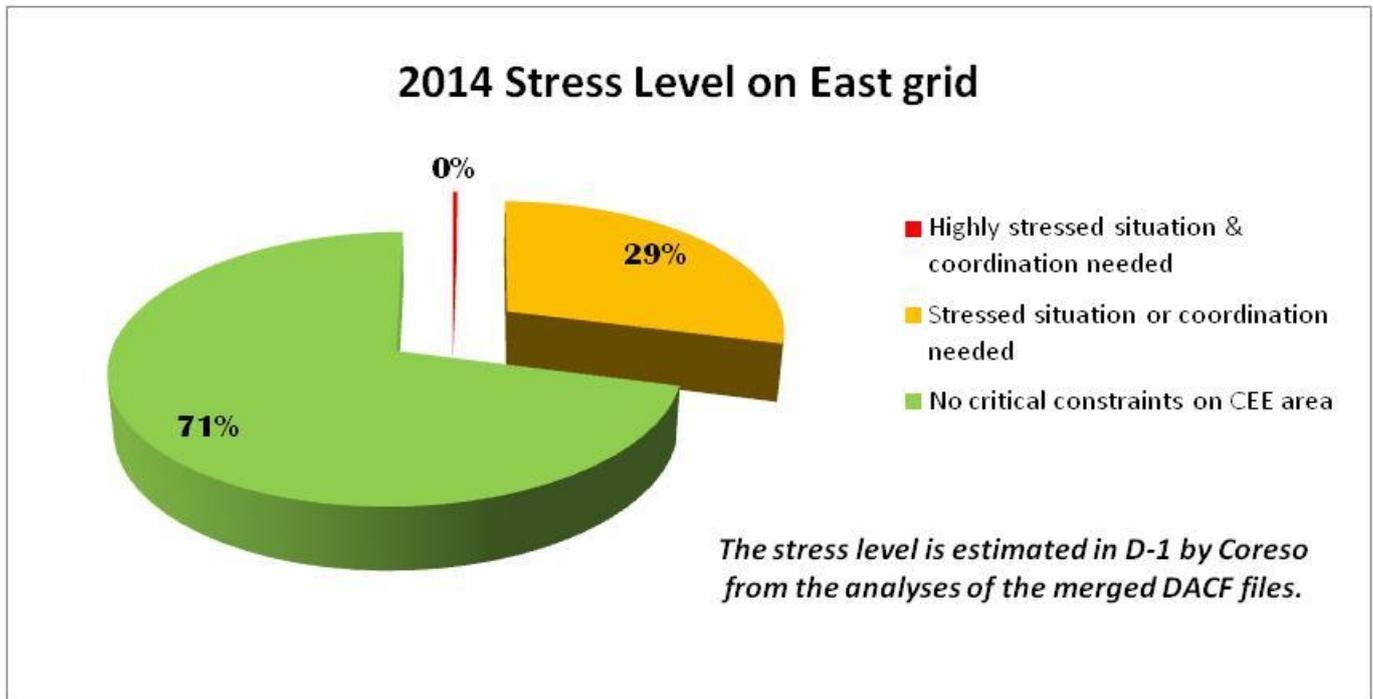
Eventually, Elia went for 200MW of redispatching with Tennet NL, releasing the constraints on both borders.

Conclusion and perspectives:

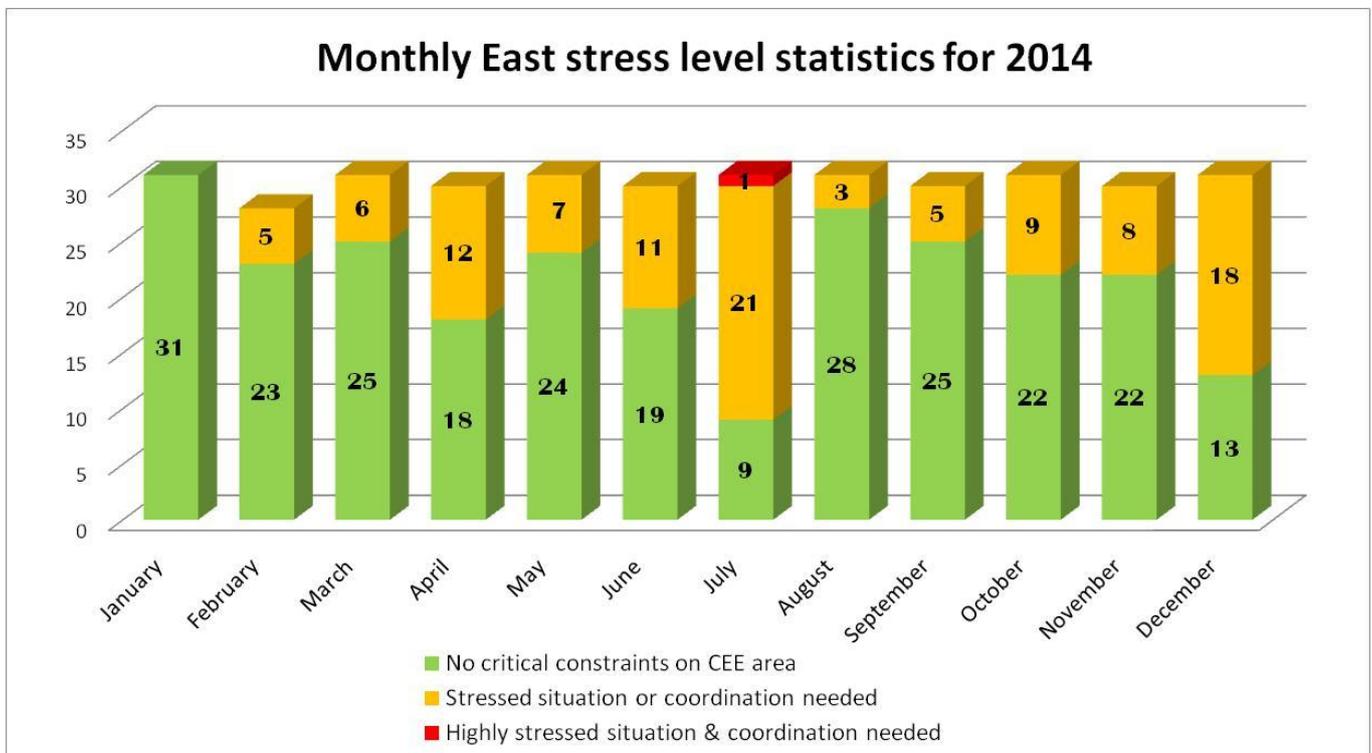
The coordination and the discussions between Elia, Rte and Coreso were fruitful and the situation remained secure all along this event. Nevertheless, this event is also the occasion to raise some questions on the role of RSCIs in the coming years:

- The role of the RSCIs in case of coordination at regional level will become major in the coming years. How the remedial actions could be split between the different stakeholders of this kind of situation will be a key question for both TSOs and RSCIs.
- How to handle agreements between TSOs during coordination and share the responsibilities and costs of the remedial actions decided to secure the grid.

East Stress level (CEE)



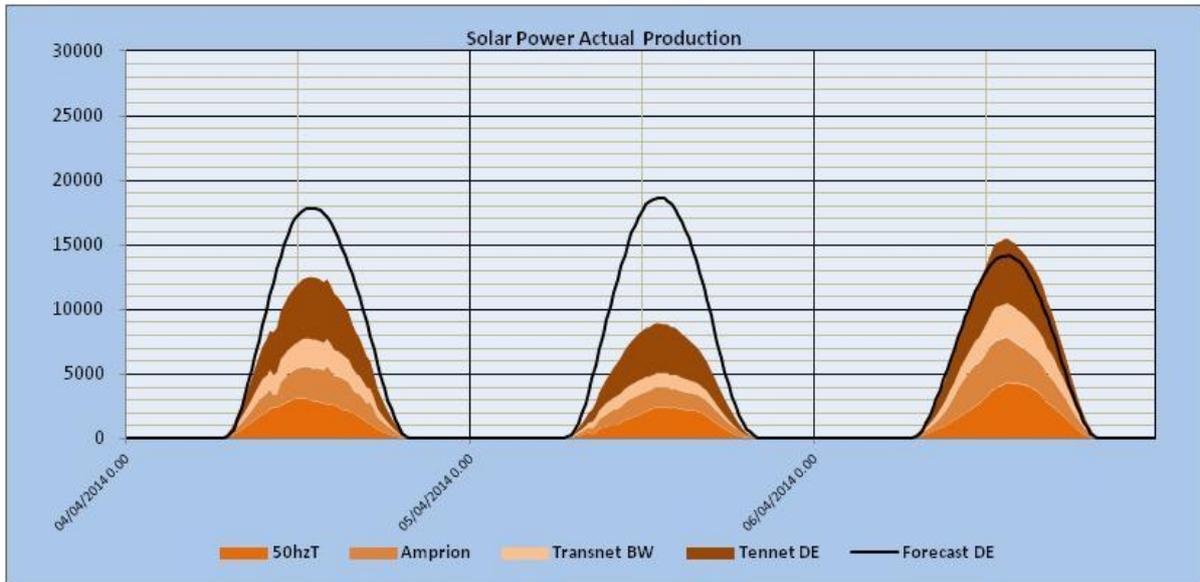
The follow up of the stress level started in 2014 for the CEE area. The stress level for the CEE area is defined during the day-ahead process with our colleagues of 50HzT based on the constraints detected and the amount of redispatching and countertrading foreseen.



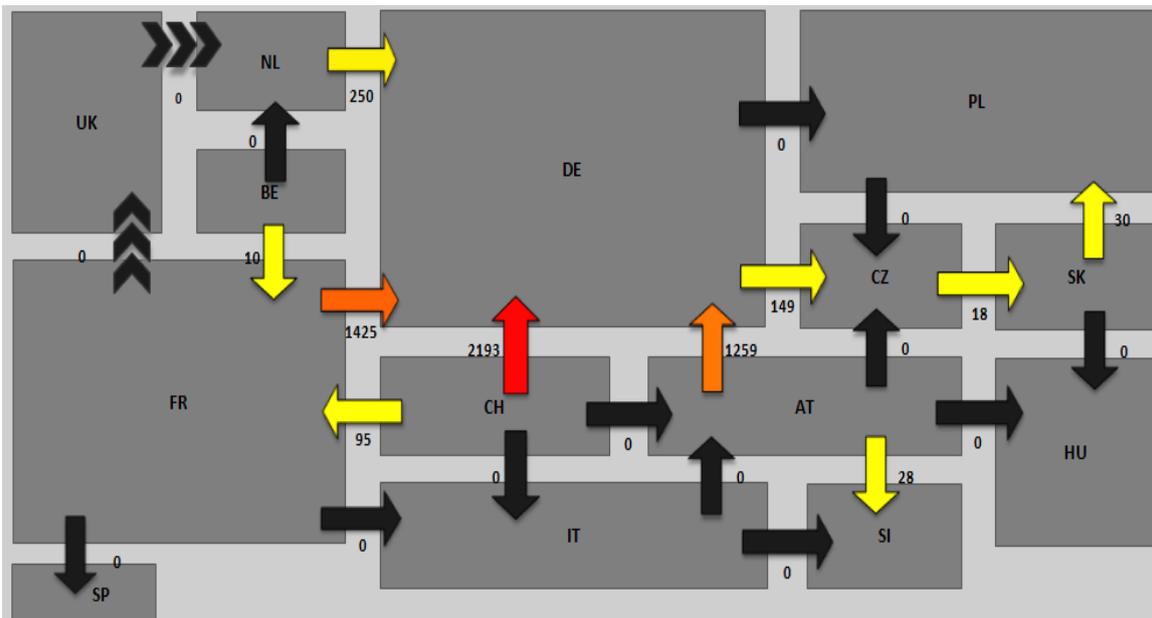
Example of stressed situations on the East grid in 2014

5th of April 2014

The real time solar infeed in Germany is short of 9800MW.



Below: the compensation made by Germany on its border to compensate the solar infeed.



Commercial exchange intraday variations compared to D-1 forecast for the 5th of April 2014 at 14:30

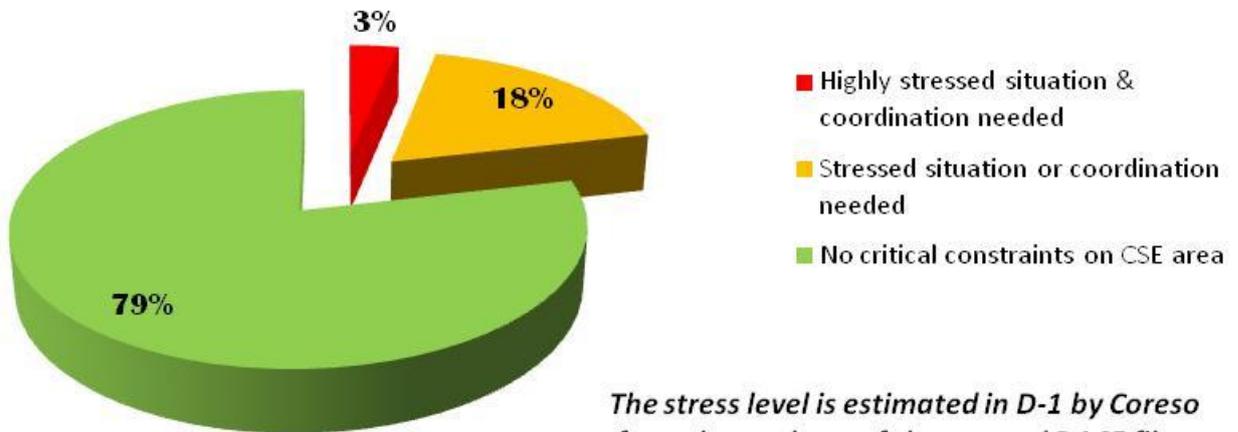
Note: HVDC cables with Scandinavia, not shown above, were also used for extra import

This highlights at the same time the growing importance of the renewable infeed, the importance to update studies within the IDCF process and the interest of interconnections to provide mutual support in such cases of energy scarcity.

Coreso gets now new renewable infeed forecast every 6 hours for a large part of Europe. The IDCF process ran all year long and 2015 will bring a special focus on the Intraday topic.

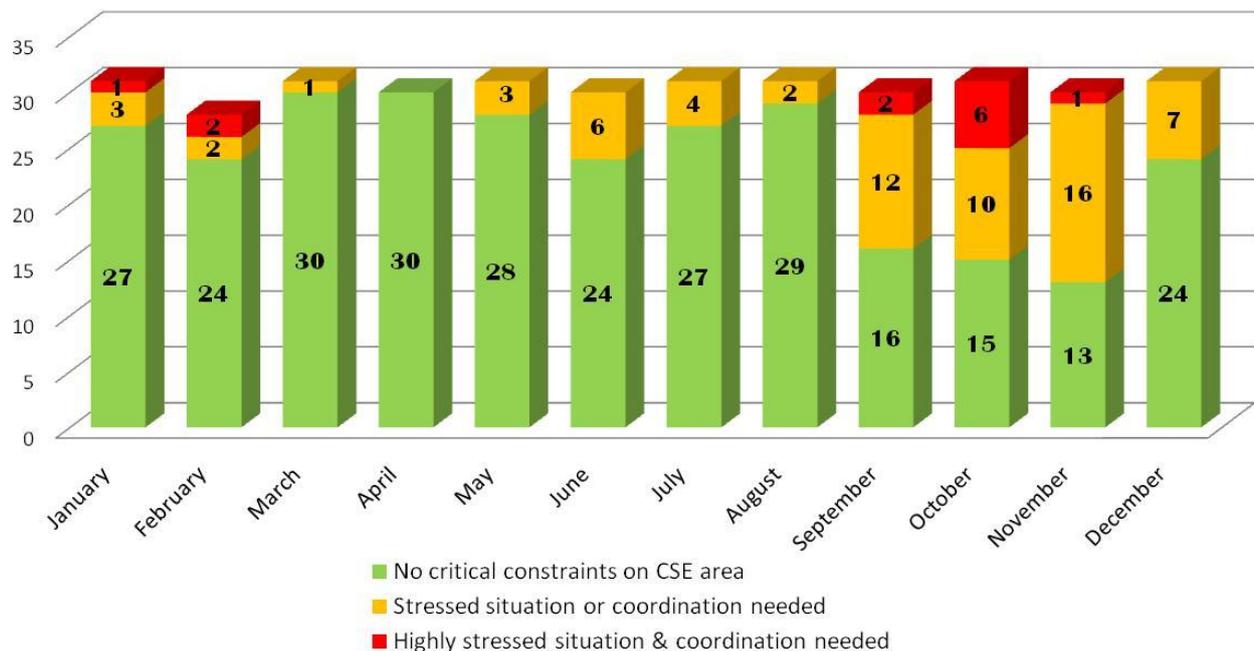
South Stress level

2014 Stress Level on South grid



Occurences	2011	2012	2013	2014
Red situations	4	14	11	12
Orange situations	39	69	64	66

Monthly South stress level statistics for 2014



Example of stressed situations on the South grid in 2014

04/10/2014

Context:

Important outages:

- Swissgrid : Benken – Mettlen / Benken – Sils / Gosgen – Mettlen
- Terna / Swissgrid : Gorlago – Robbia and Robbia-San Fiorano

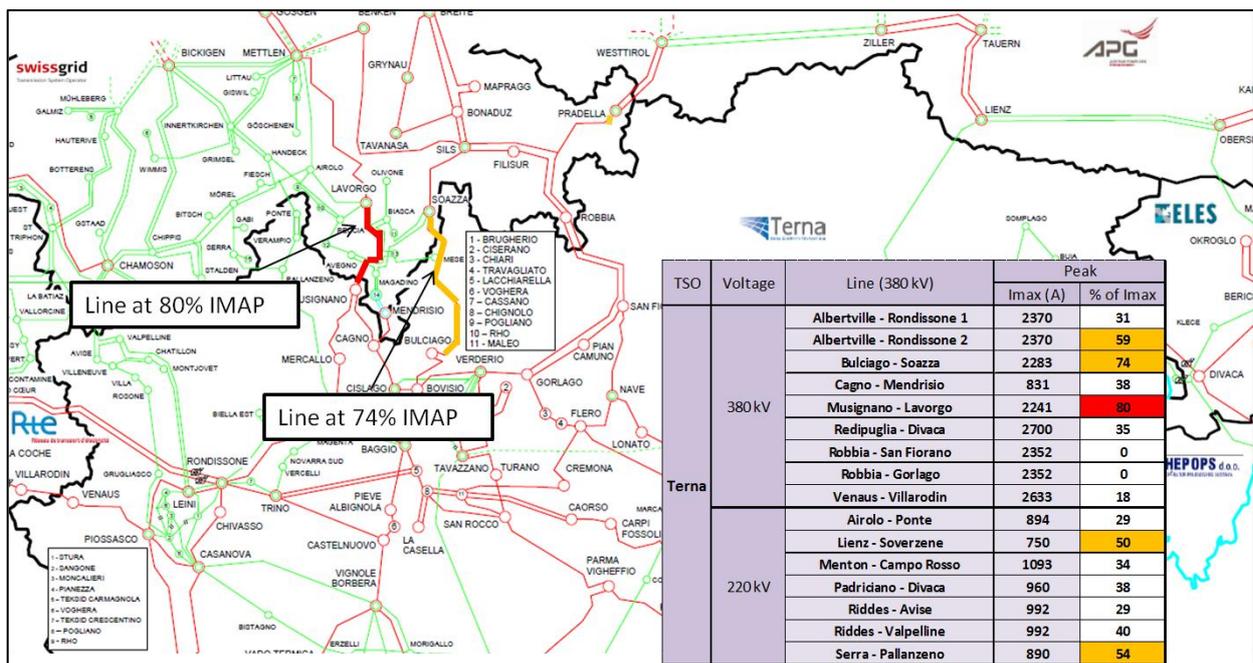
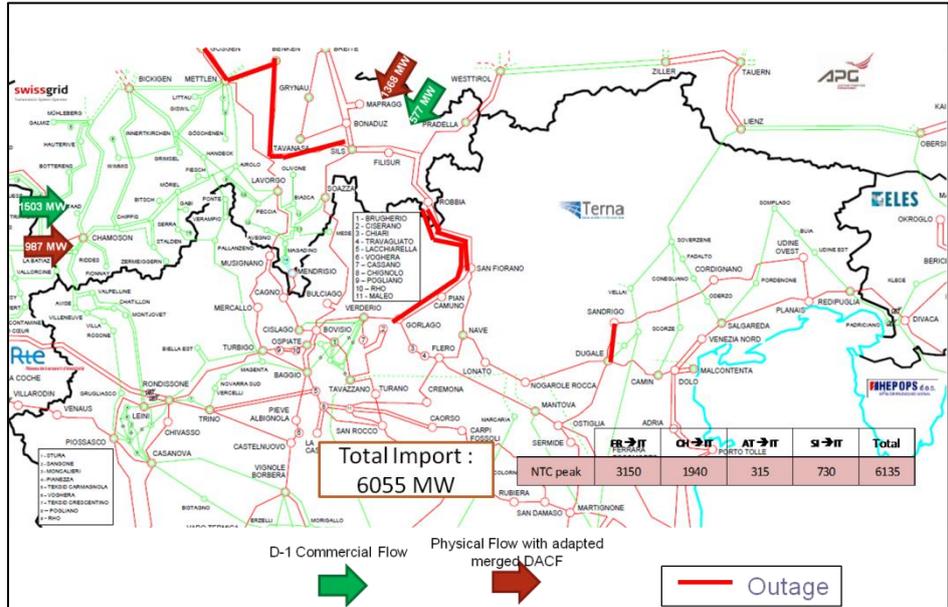
Total Import on the Northern Italian border: 6055 MW.

Day-ahead foreseen situation:

Peak Study done at 08:30 with the following hypothesis:

- La Praz PST at tap 17
- Rondissone PST at tap 0
- Target flow on the SI-IT border : 800MW
- Second DACF version of Italian files

The N-state flows are very high, as shown on the scheme below:



Some preventive remedial actions were implemented during the study in Coordination with the TSOs:

- Increasing the target flow on the slovenian border
- 2 nodes topology in Sils was not possible because of maintenance on the line Sils-Benken.
- Open a transformer in Soazza
- Change the taps on Soazza PST
- Change taps on Lavorgo PST.

Even with those preventive remedial actions were implemented, some N-1 overloads were still present that could be worsened if increasing the flows from Slovenia was impossible.

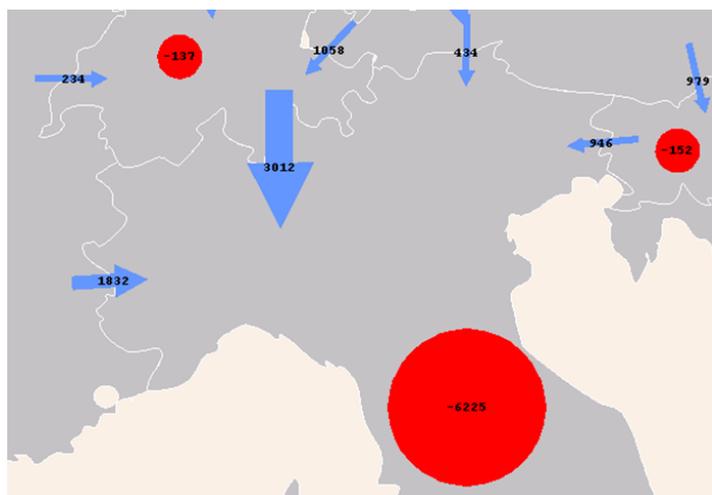
Coreso checked in a coordinated way that with a pentalateral reduction of 400MW in Italy combined with a minimal tap on La Praz PST solved most constraints.

Real Time situation:

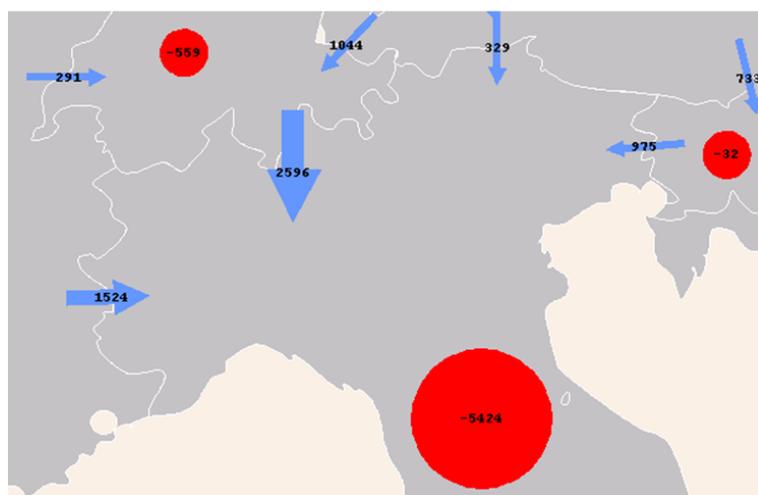
The snapshot file from 8:15 shows constraint on Sils-Soazza in case of ATD redipuglia-planais (107%) or Lavorgo-Mettlen (109% as seen by Swissgrid).

At 8:28, Swissgrid and Terna decided to activate a pentilateral reduction (bilateral) of 600MW from 9:00 to 15:00.
-> No more constraints were detected on the Italian tie lines from 9:00 to 16:00.

Physical flows at 8:15



Physical flows at 9:00



Conclusion and perspectives:

This event shows that the day-ahead process is a major step in the security assessment at the regional level. In this case, 5 TSOs and 2 RSCIs were involved, resulting in actions for 2 TSOs. This shows the importance of close coordination and cooperation between TSOs and RSCIs in order to anticipate the real-time situations.

This event also highlights the importance of sharing remedial actions at the day-ahead stage. This is one of the major topics on the table for RSCIs in the coming years.

CORESO

OPERATIONAL DATA

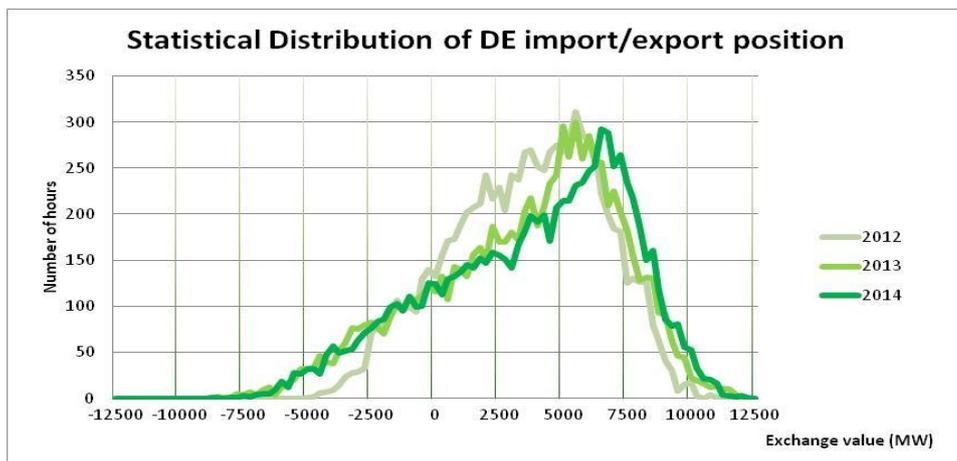
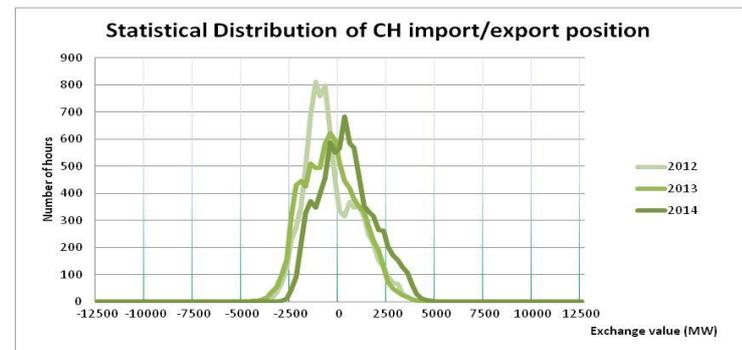
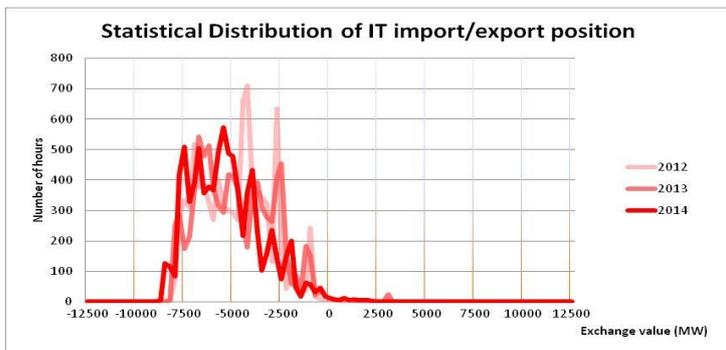
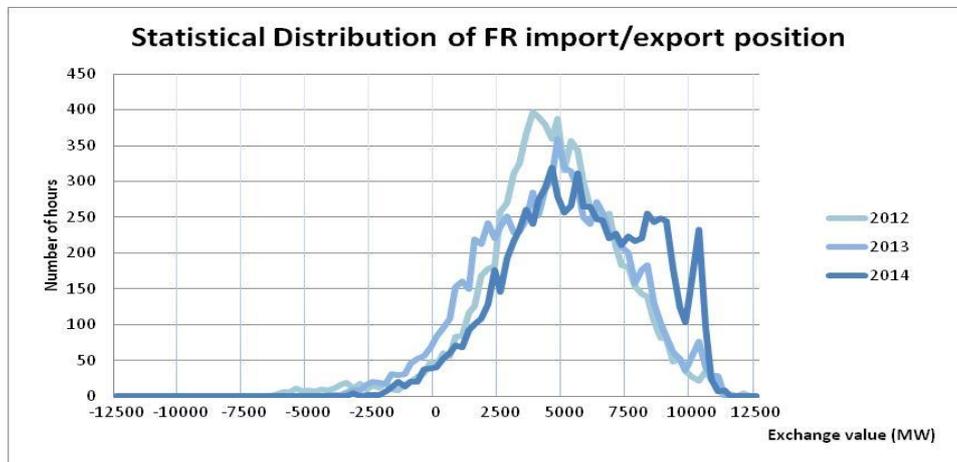
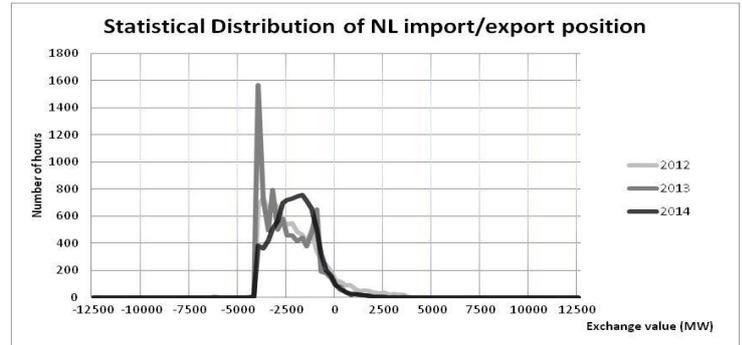
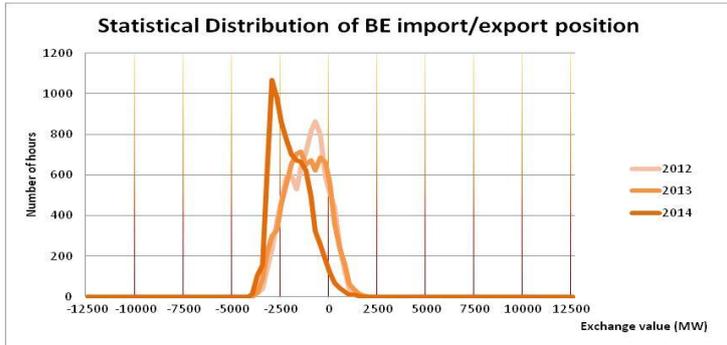
2014



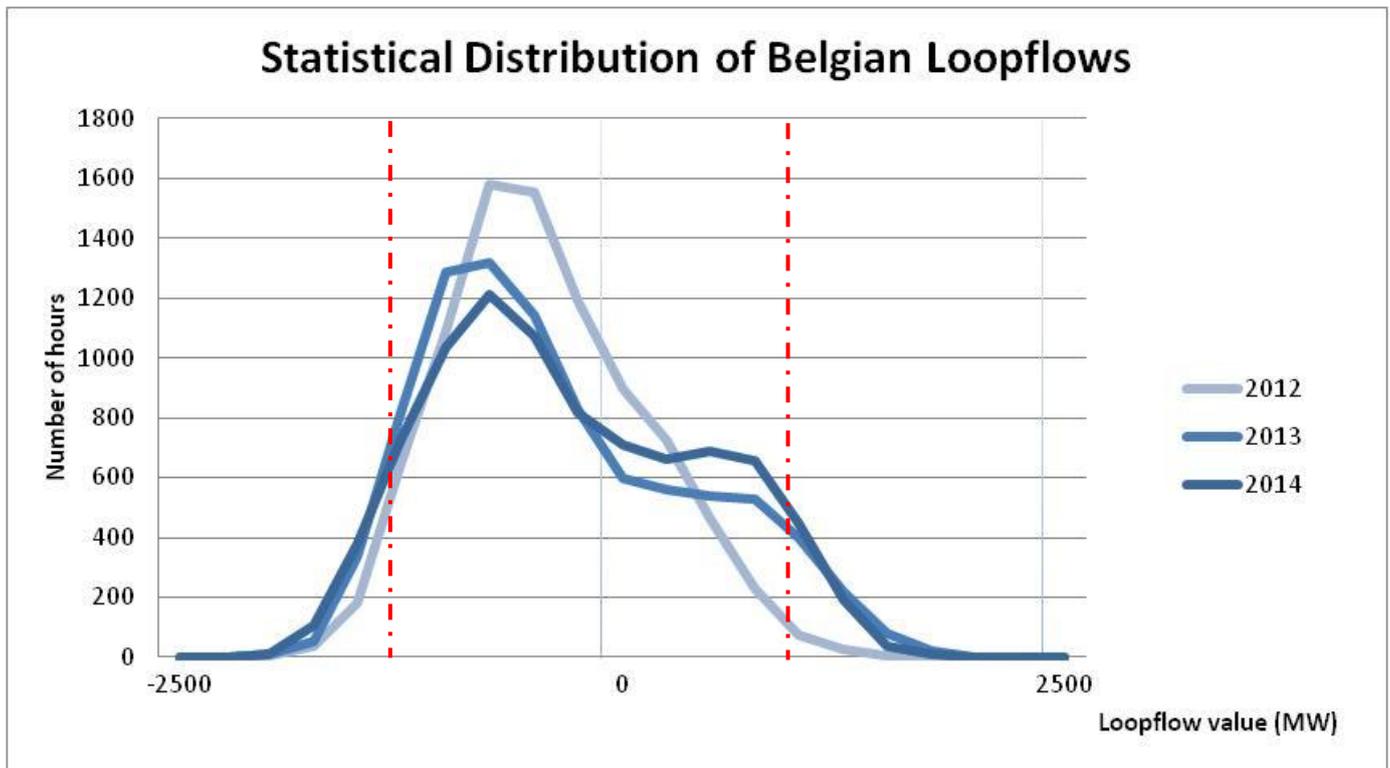
Flows & exchanges statistics for 2014

Countries Physical Exchanges

Exchanges data are extracted from Vulcanus website.



Belgian Loopflow



Definition:

(+) = South to North flows

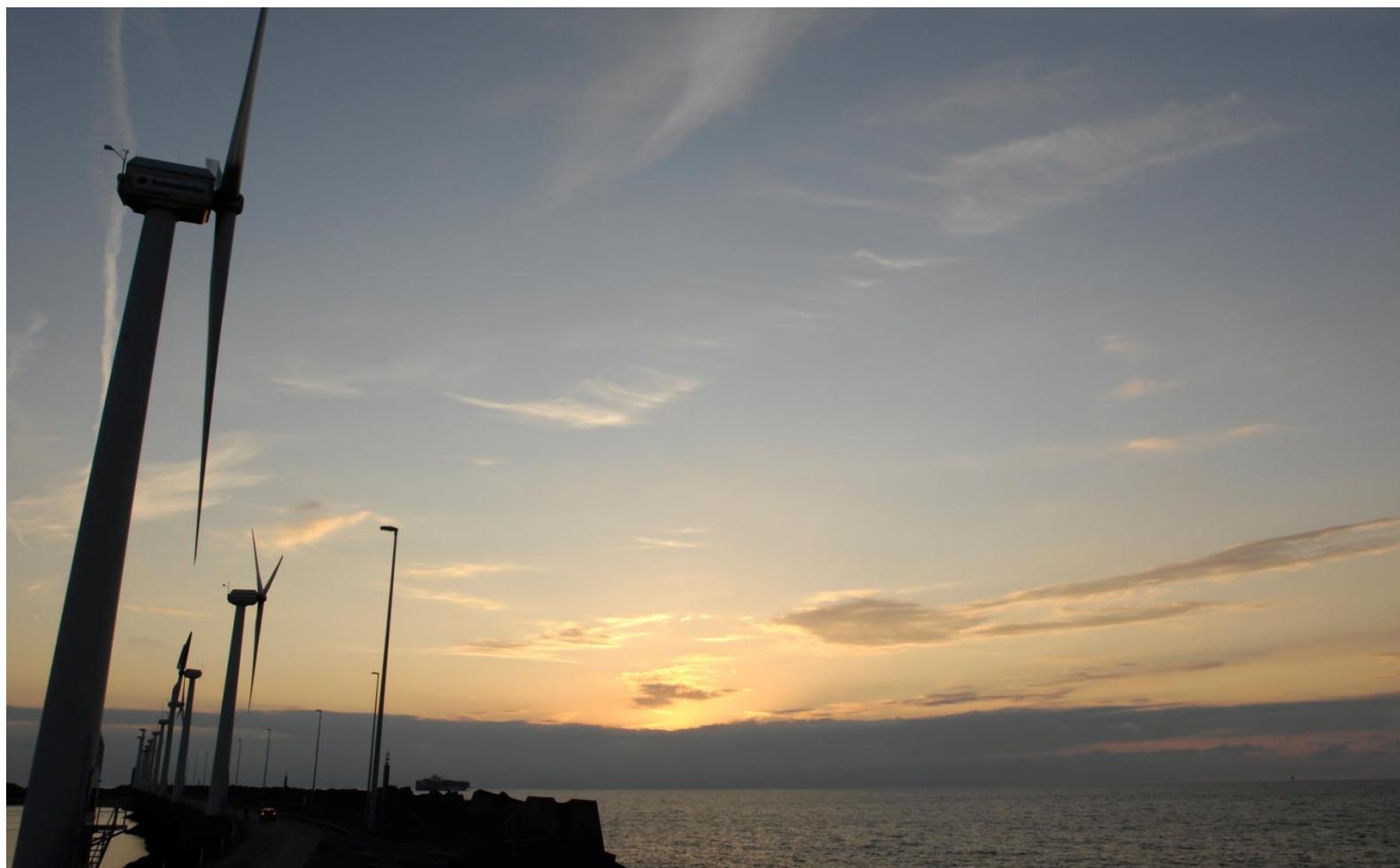
(-) = North to South flows

The previous years, BE Loopflows tended to be oriented North to South, in line with the development of the German Renewable Energy. This year, the situation seems to temper.

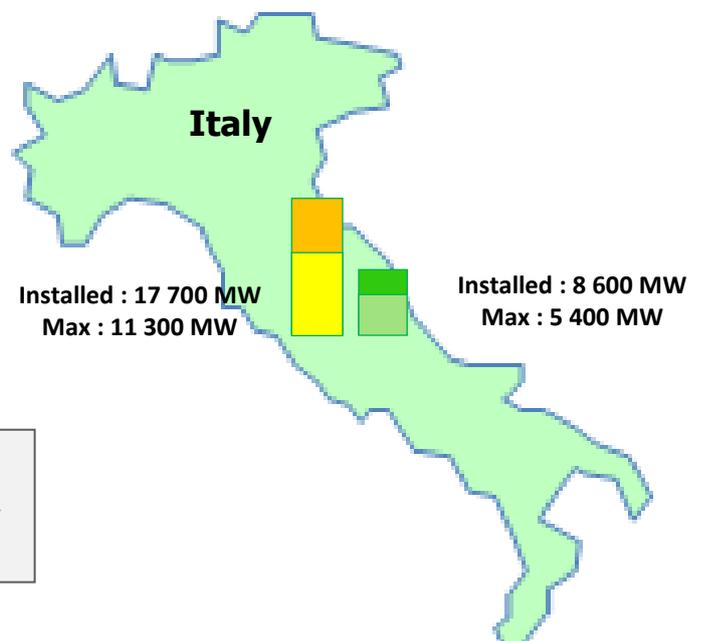
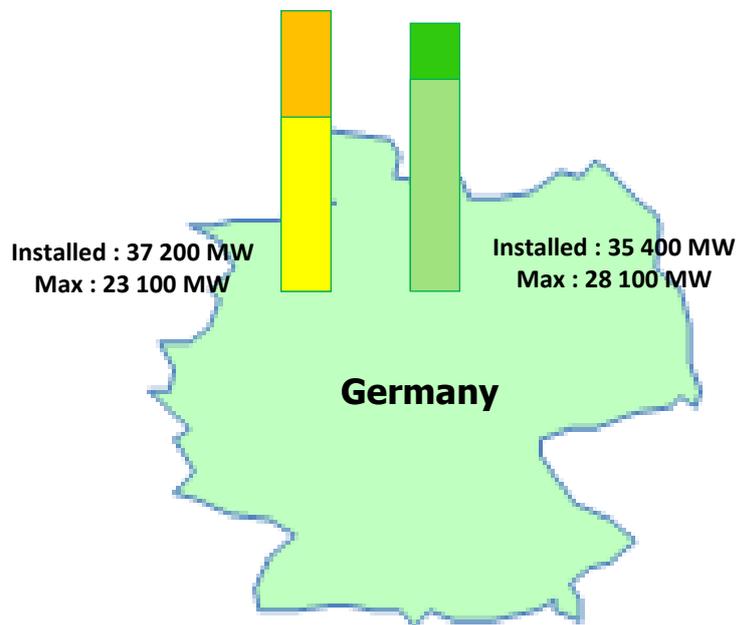
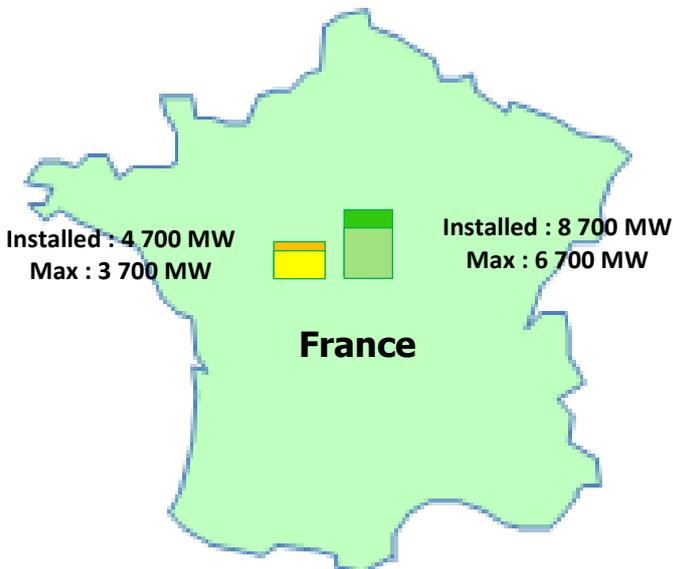
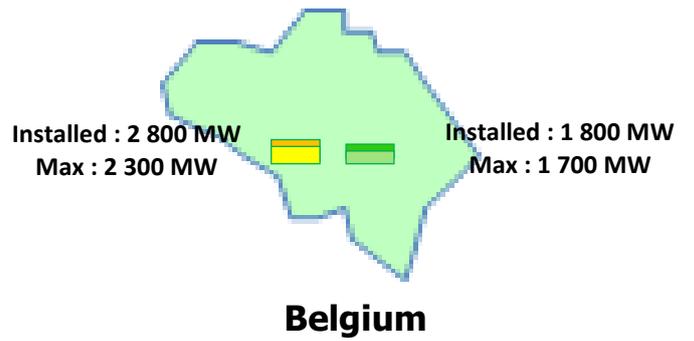
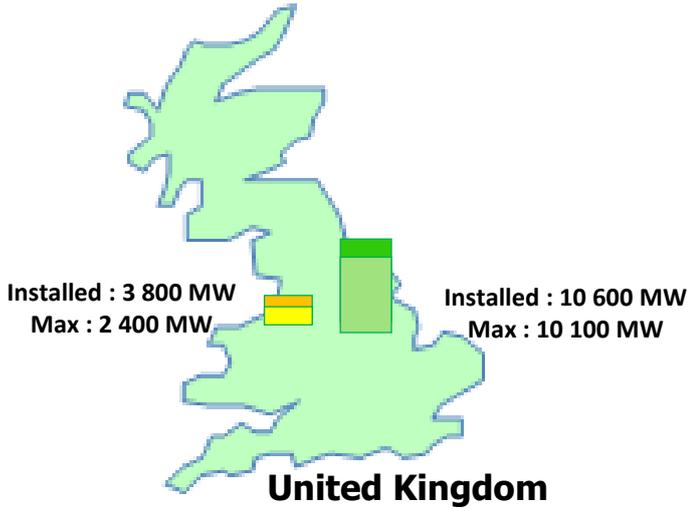
CORES

RENEWABLE OVERVIEW

2014



Renewable Energy Overview



Graph Legend

Installed solar capacity		Installed wind capacity	
Max solar infeed 2014		Max wind infeed 2014	

Data are coming from Meteologica

THANKS

FOR

READING



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