European Network of Transmission System Operators for Electricity

entsoe

WINTER OUTLOOK REPORT 2014/15 AND SUMMER REVIEW 2014

1 December 2014

Content

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1. Introduction

ENTSO-E adopts and publishes on an annual basis the “**Winter Outlook and Summer Review**” as required by Article 8 of the EC Regulation n. 714/2009.

These short-term adequacy reports focus on exploring the main risks identified within a seasonal period, highlighting the possibilities for neighbouring countries to contribute to the generation/demand balance in critical situations. These reports consider uncertainties such as climatic conditions and outages, as well as other risks incurred by the system including the evolution of load, load-management, generation capacities, and stability issues. It also provides an overview of the main events which occurred during the previous summer period. The purpose of these reports is to provide a platform for information exchange amongst TSOs, promote discussion on transparency, and inform stakeholders on the potential system risks so appropriate decisions can be made on topics such as maintenance schedules, postponement in decommissioning, and stakeholder awareness about levels of adequacy.

The Winter Outlook Report will present the summary of the national or regional power balances between forecast generation and demand on a weekly basis for the winter period from **1 December 2014 (week 49)** to **19 April 2015 (week 16)**. Note that the period of the assessment in the report is prolonged in order to include two reference points after Easter weekend, which in a number of countries proves to be very relevant for downward analysis. More information regarding reference points is provided in Section 3 – Methodology – and in the questionnaires & template folder[1].

The Summer Review covers the period from **1 June (week 23)** to **20 September 2014 (week 38)**. It outlines the main events during the previous summer, according to TSOs, with reference to security of electricity supply (i.e. summer conditions, power system conditions, as well as availability of interconnections).

The purpose of this report is to present TSOs’ views on any matters concerning security of supply for the forthcoming winter period. It also seeks to identify the risks and the countermeasures proposed by the TSOs in cooperation with neighbouring countries, whilst also assessing the possibility for neighbouring countries to contribute to the generation/demand balance if required.

In addition, throughout this period, an assessment of any “downward regulation” issues was performed in order to provide a level of confidence regarding the effects of intermittent generation such as wind and solar on system operation. For this assessment, two reference points are used, aiming at identifying situations where excess inflexible generator output exceeds overnight minimum demands and any possible downward regulation issues in a low load – high renewable (RES) in-feed situation (typically a sunny weekend day).

In order to harmonise as far as practicable the assumptions on variable energy sources, bearing in mind the inherent differences between countries, two different approaches are applied: while the individual country analysis includes the data provided by the TSOs in order to take into account each country’s specificities, the Pan European regional assessments include a harmonised probabilistic approach using a Pan European Climate Database[2] (PECD).

ENTSO-E has taken into account recommendations from ACER’s opinion on the previous Summer Outlook report by providing the evolution of the main results and values compared to those of the previous year. Also improvements on spare capacity and data regarding export capacities for downward regulation analysis have been included.

[1] https://www.entsoe.eu/extranet/kt/browse.php?fFolderId=14733

[2] Data from Technical University of Denmark

2. Executive summary

The winter outlook analysis, carried out by ENTSO-E, shows that in general Europe has sufficient generation for both normal and severe demand conditions. While various countries may require imports to cover the expected demand, cross border capacity is expected to be mostly sufficient to accommodate them.

Under severe conditions, several countries need imports to fulfil their peak load throughout the winter: Albania, Denmark, Finland, Hungary, Latvia, FYRO Macedonia, Poland, Republic of Serbia and Sweden.

Furthermore, the situation in the coming winter could be potentially stressed in certain periods for the Belgian system. Due to safety issues, two nuclear units (2.014 MW) are shut down during the whole winter period. In addition, a third nuclear unit (1.038 MW) is out of service at least until the end of 2014. Currently it is planned to return into service at the start of 2015. As a consequence Belgium will remain dependent on imports whole winter long.

In France and Belgium, measures have been put in place including contracted emergency load reduction measures and contracted strategic reserves in order to mitigate potential adequacy risks for coming winter. A detailed study carried out by TSOs and Regional Security Coordination Initiatives revealed that given the expected particular situation for next winter, additional countermeasures at regional level might be required to ensure a secure operation of the power system. The TSOs of the CWE region have therefore put into place the necessary extraordinary procedures in order to mitigate the potential risk for next winter.

Globally, the total installed generation capacity throughout Europe continued to be increasing over the past few years; this is due to additional renewable capacity that is being commissioned. Opposed to this trend is the increasing pace at which classical generation capacity is being mothballed or decommissioned. This evolution clearly indicates a fundamental change in the way power systems will have to be operated in the future, which will only intensify the need for cooperation between TSOs and the extension of their electricity grids.

In addition, throughout the winter period a “downward regulation” assessment is carried out to assess the constraints generated by an excess of renewable generation and classical inflexible generation when load is at a low level. This could occur on weekend nights (characterized by low load and high wind and inflexible generation) or also on weekend days, especially in cases of high PV generation.

The present report highlights the fact that during certain weeks over the winter it may be necessary to export excess inflexible generation in various countries. Furthermore, in some countries it might even be required to reduce excess generation as a result of insufficient cross border export capability. For example, the combination of high renewables in-feed and inflexible generation in Germany, the Netherlands, Romania and Denmark could lead to high exports to all surrounding countries at the overnight reference points. Curtailment may become necessary under certain conditions in Ireland, Spain and Portugal due to limited interconnection capacity. Around the daytime reference point, Ireland, Italy and Romania may have to export some of its generated power to neighbouring systems during low-load periods. Based on the minimum NTCs provided, not all excess energy can be evacuated from Germany, and thus measures could be required to limit the generation surplus.

Energy security stress tests have been performed during the summer by all Member States upon request of the EC and in order to assess the impact of Ukraine/Russia gas disruption and the possible mitigating measures that each Member States could take in this context[3]. A specific part of this report deals with the impacts of a potential gas disruption from Ukraine/Russia on each country, as reported by the TSO. Nevertheless, it’s worth noticing that at the time of completion of this report, Russia and Ukraine have signed a deal[4] to secure gas for Ukraine - and ultimately also for Europe.

[3] EC DG-ENER published its final Communication on the short term resilience of the European gas system: ‘Preparedness for a possible disruption of supplies from the East during the fall and winter of 2014/2015’, COM(2014) 654 final, Brussels 16.10.2014, http://ec.europa.eu/energy/stress_tests_en.htm

[4] http://europa.eu/rapid/press-release_IP-14-1238_en.htm

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On 20 March 2015, a solar eclipse will pass over the Atlantic Ocean between 07:40 and 11:50 UCT (08:40-12:50 CET) and the eclipse will be visible across Europe. The reduction in solar radiation, in case of clear sky, will directly affect the output of the photovoltaics (PV) and for the first time this is expected to have a serious impact on the secure operation of the European power system. ENTSO-E has established a task force to investigate the possible countermeasures, including lead time for preparation and activation issues, as well as on which level of commitment (European wide or on national base) these measures could be used.

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3. Methodology

3.1. Towards a new ENTSO-E Adequacy Methodology

The integration of large amounts of Renewable Energy Sources (RES), the completion of the internal electricity market, as well as new storage technologies, demand side response and evolving policies require revised adequacy assessment methodologies.

ENTSO-E is therefore working to improve its existing adequacy methodology with a special emphasis on harmonised inputs, system flexibility and interconnection assessments.

Over the past months, ENTSO-E has promoted a broad and transparent discussion around the new methodologies, on the short, mid- and long term, with external stakeholders. An inaugural workshop on ENTSO-E adequacy assessment took place on Wednesday 16 April 2014 in Brussels. Following the first workshop, ENTSO-E held a second Public Stakeholder Consultation workshop[5] in June 2014, focused on the methodology proposal, and opened a public consultation from 14 July to 19 September.

ENTSO-E has received important feedback and comments during this consultation period. Generally the stakeholders acknowledged the proposed target methodology and the comments received focused mainly on the methodology that will be applied for the adequacy assessments, the assumptions made and models to be implemented for the assessments and the need for increased transparency and further details that should be published by ENTSO-E, so all stakeholders can effectively contribute to developing this methodology further. Increased focus is on economic feasibility of generation assets in relation with adequacy assessments.

ENTSO-E published the final version of the three consultation documents together with the answers to the comments from stakeholders on the ENTSO-E website on 14 November 2014.[6]

3.2. Source of information for Winter Outlook and Summer Review report

The ENTSO-E Winter Outlook 2014/15 is based on the information provided by ENTSO-E members during September - October on both a qualitative and quantitative basis in response to a questionnaire which has been extended in order to increase the level of detail of the analysis performed. It presents TSOs' views regarding any national or regional matters of concern regarding security of supply and/or inflexible generation surplus for the coming winter and the possibility of neighbouring countries to contribute to the generation/demand balance of each respective ENTSO-E member in critical situations. The questions mainly referred to practices as well as qualitative data sent by TSOs in order to present country forecasts on a common basis.

The Summer Review report is prepared on the basis of the information given by ENTSO-E members through a questionnaire in order to present the most important events occurred during the summer period in comparison to the forecasts and risks reported in the last Summer Outlook. The TSOs mainly answered if their respective power system experienced any important or unusual events or conditions during the summer period as well as the identified causes and the remedial actions taken.

3.3. Data used for the regional analysis

An extensive regional analysis was also added to the well-known per-country analysis in the methodology of seasonal outlooks. The aim of this investigation is to assess whether the country based adequacy still remains fulfilled or is even improved when a European scale is taken into account. In other words, it assesses whether the combination of countries with an electrical surplus and interconnection capacities between countries will be adequate at certain points in time to allow the countries with a generation deficit to import the electric power needed.

A synchronous point in time was used for all countries to allow for a meaningful analysis when determining the feasibility of cross border flows. Before starting the data collection, and using European historical load

[5] https://www.entsoe.eu/news-events/events/Pages/Events/Second-Stakeholder-Workshop-Adequacy-Methodology.aspx?EventWorkshopId=150
[6] https://www.entsoe.eu/news-events/announcements/announcements-archive/Pages/News/ENTSO-E-Assessment-of-the-Adequacy-Methodology-Consultation-is-Released-.aspx

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data, a study was conducted to identify the most representative synchronous time for covering the global European peak load in winter. It was concluded that Wednesday, 19:00 CET most closely represents this situation, and therefore data was requested from TSOs for this time point. With regards to the regional analysis, the following data from the data collection spreadsheet was used as input:

- the Remaining Capacity for **normal** and **severe** conditions;
- simultaneous importing and exporting capacity;
- a best estimate of the minimum Net Transfer Capacity (NTC) values towards and from individual neighbouring countries.

In addition, across the period of assessment for the next winter, any European "downward regulation" issues where excess inflexible generator output exceeds demand are investigated. Similar to the peak demand analysis, it provides an indication which countries require exports to manage inflexible generation. Indeed, this involved an analysis of their ability to export this energy to neighbouring regions that are not in a similar situation. The reason for this analysis pertains to the fact that a number of TSOs expressed that they are experiencing growing problems for system operation (mainly) due to the increase of variable generation on the system (wind and solar) and the lack of more flexible generation means.

Similar to the generation adequacy analysis, to carry out a regional downward analysis, a synchronous point in time was used for all countries in order to allow for meaningful analyses when determining cross border flows. The same European load study mentioned before concluded that minimal demand conditions generally take place around 05:00 CET on Sunday morning.

In addition to this minimal demand conditions, it was concluded that these issues with inflexible generation are not only prone to happen during the night, but also during daytime when the energy production of solar panels near its maximum. To cope with this effect, an additional synchronous time point was added for Sunday 11:00 CET, when a combination of potentially high photo-voltaic in-feed and reduced demand levels exist. Quantitative data for this point in time was therefore also requested from all TSOs to allow for a meaningful regional analysis.

For the regional downward analysis, the following data from the data collection spreadsheet was used as input:

- The expected inflexible generation surplus at Sunday 05:00 and 11:00 CET;
- Sum of the inflexible and must-run generation;
- Simultaneous importing and exporting capacity;
- A best estimate of the minimum NTC values towards and from individual neighbouring countries.

3.4. Renewables in-feed data

For the per-country analysis, each TSO was requested to give an estimation of the highest expected proportion of installed solar, onshore wind and offshore wind capacity to be taken into account for the downward analysis. Default values of 65% for wind and 95% for solar were presented, allowing for every country to enter its best estimate. For the generation adequacy analysis the renewables in-feed is handled through an estimation of the non-usable capacity in normal and severe conditions by each TSO.

For the regional analysis though, it was decided to envision building a consistent pan-European scenario for wind and solar in-feed. To this end, a Pan-European Climatic Database[7] was used containing per-country load factors for solar, onshore wind and offshore wind per hour for a fourteen-year period (from 2000 until 2013). This database contains a separate capacity factor for onshore wind, offshore wind and solar per country and per hour of the complete historical period covered. Additionally, geographically averaged hourly temperatures are also included.

To create a consistent scenario throughout Europe, the following approach is adopted for a certain reference time point:

[7] Data from Technical University of Denmark

1) All "records" are retained that lie in a hour interval of 2 hours before the reference time point and two hours after the reference time point, on a date (day/month) between three days before the reference date and three days after the reference date. This yields a collection of 490 (14 years x 7 days x 5 hours) records per reference time point;

2) To achieve per country representative load factors for the generation adequacy analysis, the 50th and 10th percentile of the 490 record collections are respectively calculated for normal and severe conditions of the capacity factors per country and for solar, wind onshore and wind offshore separately. Calculated capacity factors as explained above are provided in Appendix 3.

As such, Pan-European consistent renewable in-feed scenarios are created. For example the 10th percentile scenario represents a consistent worst-case scenario over the different countries and for the different primary energy sources. It needs to be noted that this approach guarantees a worst-case scenario as it does not take into account the correlation between the different capacity factors, *i.e.* renewable in-feed in all countries is simultaneously assumed to be given by the 10th percentile. This scenario can then be used to detect regional adequacy issues that can consequently be further investigated in more detail and with a more realistic (and therefore less worst-case) renewable infeed scenario if necessary.

The methodology for the downward analysis is very similar to the one above, with the difference that the 90th percentile is used. Calculated capacity factors as explained above are provided in Appendix 3.

3.5. Detailed regional analysis for regions at risk

If the previous analysis shows that a certain region (combination of adjacent countries) could experience adequacy issues for a specific time point, this region is investigated more in detail in a next step.

The goal of this detailed analysis is to detect what the main drivers are of a certain adequacy issue (e.g. temperature in country X, or wind infeed in country Y), and to be able to connect an indication of probability of occurrence to it.

For every reference time point, the collection of 490 records is used to run 490 different simulations. The following high-level methodology is applied to build every one of those simulations:

1) As starting point, the qualitative data as given by the TSOs for severe conditions is used;

2) Next, the severe conditions load is replaced by the normal conditions, average load as given by the TSOs;

3) The capacity factors for onshore wind, offshore wind and solar are replaced by those of the concerned record;

4) Then the normal conditions load is scaled by use of load-temperature sensitivity relations. The difference between reference temperature and the temperature of the concerned record is translated into "increase/decrease" of load, using the methodology described in the next section.

After performing these manipulations on the base data, the simulation is run (including the simulation of cross-border exchanges with other countries), and the results are calculated. In this manner, for every simulation it is determined whether or not the considered region suffers adequacy issues or not.

3.6. Scaling the load

As previously explained, for every separate simulation, the per-country load needs to be scaled to a target temperature as given by the PECD. To this end, ENTSO-E-calculated load-temperature sensitivity coefficients were used as a basis. A detailed description on how these coefficients were determined can be found in Appendix 1. TSOs were given the possibility to modify the ENTSO-E centralized load sensitivity factors with their best estimate during the data collection.

The graph below shows how these coefficients, combined with the normal conditions load and its temperature reference as a starting point, are used to scale the load to the target temperature of the concerned record. To this end, when temperatures are concerned, the average daily temperatures are used, which are calculated based on the hourly temperatures of the PECD (see Appendix 1 for details).

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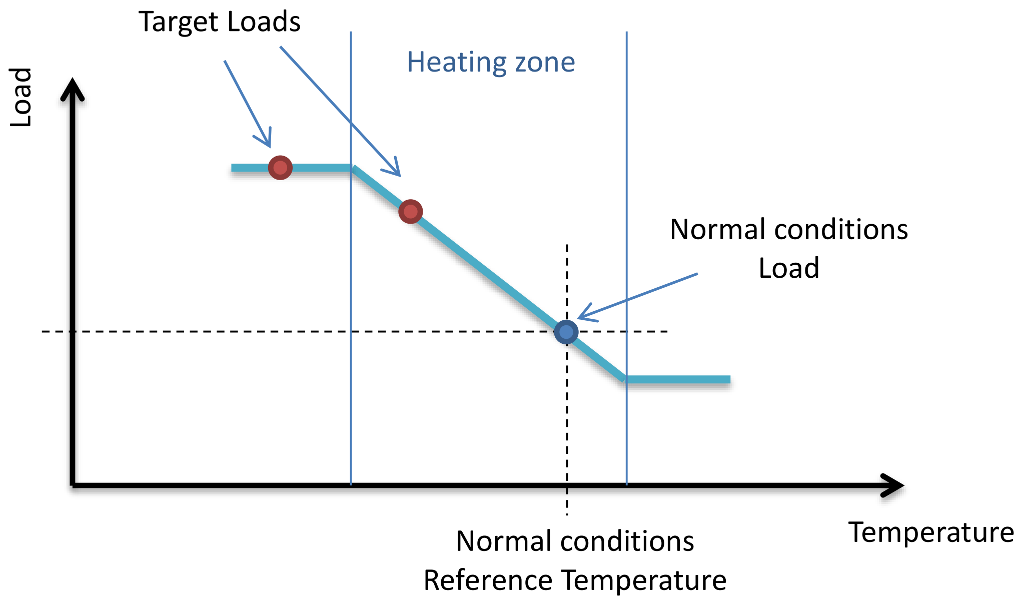

Figure 1 – Load temperature sensitivity

In case no reference temperature at normal conditions is given by the TSO, the 50th percentile of the collection of selected records is used instead.

3.7. Aims and methodology

Upward adequacy
The methodology consists of identifying the ability of generation to meet the demand by calculating the so-called "remaining capacity" under two scenarios: normal and severe weather conditions.

The methodology is schematically depicted on the figure below:

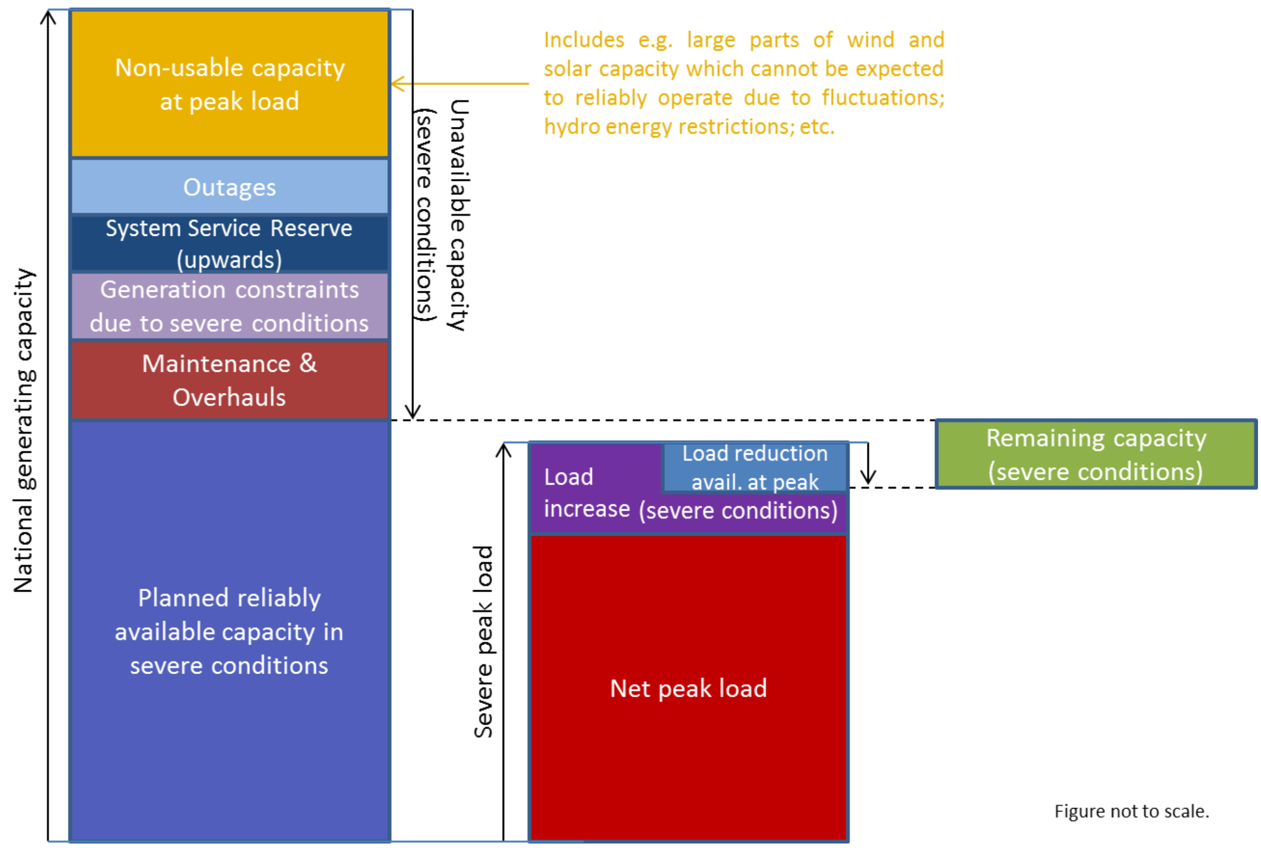

Figure 2 - Summary of upward adequacy methodology

The basis of the analysis is the situation called "**normal conditions**". Normal conditions are defined as those conditions that correspond to normal demand on the system (*i.e.* normal weather conditions resulting in normal wind production or hydro output and an average outage level). A "**severe conditions**" scenario was also built showing the sensitivity of the generation-load balance to low temperature and extreme weather conditions. The severe conditions are related to what each TSO would expect in terms of demand which will be higher than in normal conditions and in terms of generation output which is reduced (*i.e.* severe conditions resulting on lower wind or restrictions on classical generation power plants due to *e.g.* extreme cold).

The figures of the country individual responses show the "National Generating Capacity", the "Reliably Available Capacity" and the "Load at reference point" under normal and severe conditions. The remaining capacity is calculated for normal conditions. The remaining capacity is also evaluated with firm import/export contracts and for severe conditions.

For the Regional analysis, the choice can be made to use the Remaining Capacity before or after inclusion of firm contracts. The right method to use depends on how the Net Transfer Capacity (NTC) values are defined. When the maximal total commercial exchange between two countries equals the sum of NTC and firm contracts, the Remaining Capacity after inclusion of firm contracts should be used. If the maximal total commercial exchange is limited to the NTC value, the Remaining Capacity before inclusion of firm contracts should be used.

There were various countries that gave data on firm contracts. NTC values are used to limit commercial exchanges between neighbouring countries. All participants were asked to provide the best estimate of the minimum NTC values for being able to conduct a worst-case analysis. When two participants provided different NTC values on the same border, the minimum value was taken.

Regional Analysis - The basis of the regional analysis is a constrained linear optimization problem. The target is to detect if problems can arise on a pan-European scale due to a lack of available capacity. No

market simulation or grid model simulation whatsoever is taken into account. Therefore the analysis will only show if there is a shortage on the European or regional level, it will not say which countries exactly will have a generation deficit, as this depends on the actual market price in all connected countries. The goal is to provide an indication whether countries requiring imports will be able to obtain these across neighbouring regions under normal and severe conditions. In other words, the investigation carried out is purely a "feasibility" analysis.

The first element that is checked is whether in a "copperplate" scenario there is enough power capacity to cover the demand. Here, all remaining capacity is simply summed, and when the result is greater than zero, theoretically enough capacity is available in Europe to cover everyone's needs. No problems are expected using this approach, neither for normal conditions nor for severe conditions. As this method does not take into account the limited exchange capacity between countries, it is too optimistic to draw final conclusions based on it.

As a consequence of this, a second, more precise approach is taken. The problem is modelled as a linear optimization with the following constraints:

– Bilateral exchanges between countries should be lower than or equal to the given NTC values;
– Total simultaneous imports and exports should be lower than or equal to the given limits.

Based on this methodology, it was calculated which groups of countries would have a generation deficit for a certain week due to saturated cross-border exchanges.

Due to no information about non ENTSO-E systems, like Russia, Belarus, the Ukraine except the Burshtyn Island (part of the Ukrainian system that operates synchronously with Continental Europe), Morocco and Turkey, the following values were assumed for these systems for the regional analysis:

– The balance (remaining capacity) of these systems was set at **0 MW**.
– A best estimate of the minimum NTC comes from neighbouring systems belonging to ENTSO-E.

This approach will result in a possibility to "wheel" energy through these bordering countries, without them adding to or subtracting from the total generation level of the region.

Downward adequacy

Under minimum demand conditions, there is a potential for countries to have an excess of inflexible generation running. Every TSO is likely to have varying levels of "must-run" generation. This may be CHP or generators that are required to run to maintain dynamic voltage support etc. In addition there will be renewable generation such as run of river, solar and wind whose output is inflexible and highly variable. At times of high renewable output *e.g.* wind, the combination can result in generation exceeding demand and the pumped storage capacity of the country. In that case, the "excess" generation is either exported to a neighbouring region or curtailed.

The regional analysis takes the data submitted by TSOs and alters the renewables in-feed to a representative European scenario as was described in the section above. For countries that have an excess of generation, the optimisation tries to export to neighbouring regions based on the best estimate of the minimum NTC values submitted, and via a constrained linear optimisation.

The analysis will highlight periods where groups of countries cannot export all of their excess generation. It should be again stressed that this analysis is not a market simulation. Rather, it conducts a feasibility analysis to indicate countries which may be required to curtail excess generation due to limited cross border export capacity.

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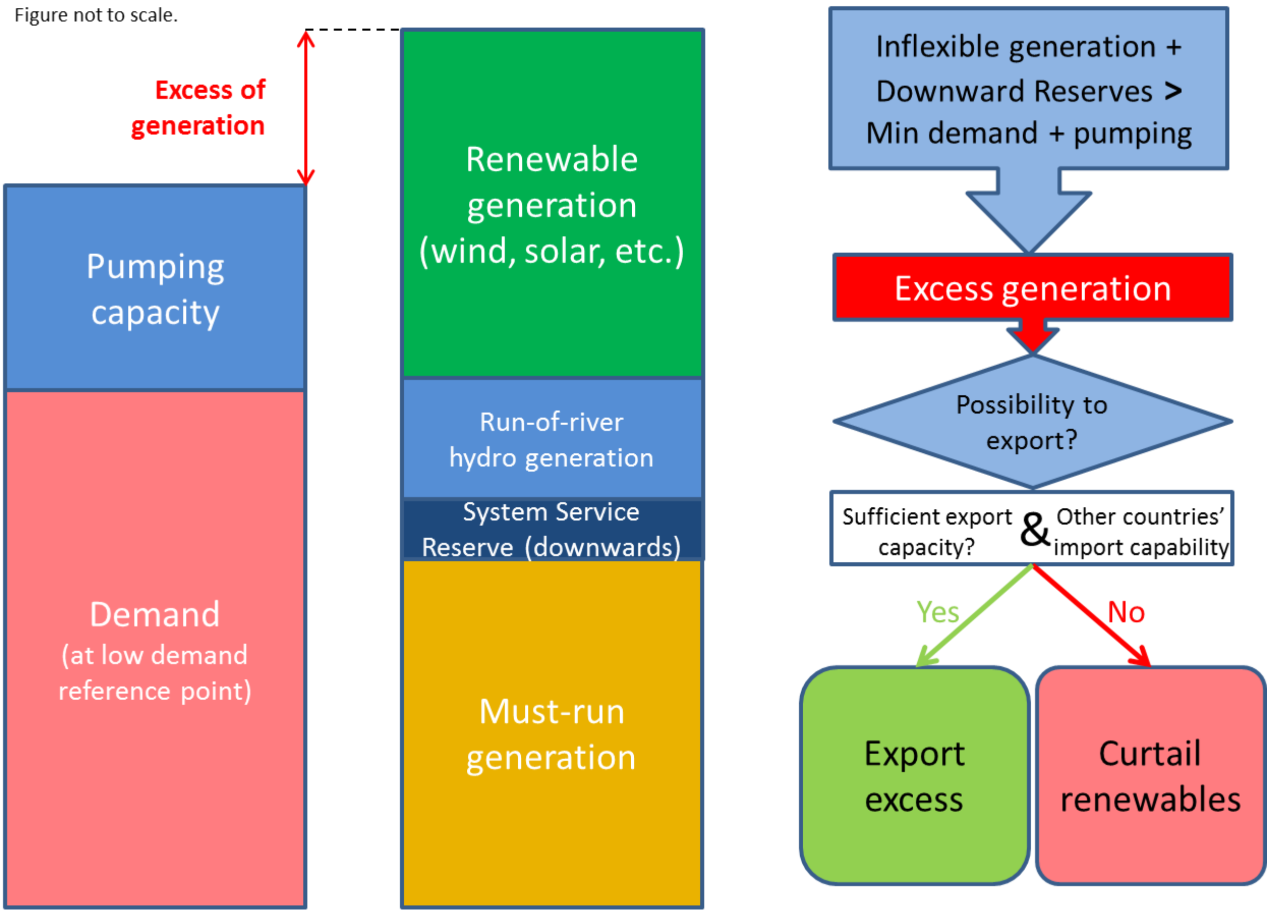

Figure 3 - Summary of downward adequacy methodology

3.8. Glossary of terms

Downward Regulation Reserve: The Active Power reserves kept available to contain and restore System Frequency to the Nominal Frequency and for restoring power exchange balances to their scheduled value;

Downward Regulation: The minimum amount of Downward Regulation Reserve, which is required by the TSO to be able to reduce output on the system;

Firm import/export contracts: Bilateral contracts for the import or export of electrical energy, agreed for a certain period of time in advance;

Generation adequacy: An assessment of the ability of the generation in the power system to match the Load on the power system at all times;

Highest expected proportion of installed renewable generation running: Maximum expected renewable in-feed which should be taken into account in downward regulation analysis. This is set at 65% for the wind and 95% for the solar as a default value but can be replaced as various TSOs will have historic experience of higher or lower output from renewables across the assessed period;

Capacity factor: The ratio of the available output capacity and installed capacity over a period of time for various types of power plants (used primarily to describe renewable output in this report);

Load Management: Load Management forecast is estimated as the potential load reduction under control of each TSO to be deducted from load in the adequacy assessment;

Load: Load on a power system is the net consumption corresponding to the hourly average active power absorbed by all installations connected to the transmission grid or to the distribution grid, excluding the pumps of the pumped-storage stations. "Net" means that the consumption of power plants' auxiliaries is excluded from the Load, but network losses are included in the Load;

Must Run Generation is the amount of output of the generators which, for various reasons, must be connected to the transmission/ distribution grid. Such reasons may include: network constraints (overload management, voltage control), specific policies, minimum number of units needed to provide system services, system inertia, subsidies, environmental causes etc.;

National Generating Capacity (NGC): The Net Generating Capacity of a power station is the maximum electrical net Active Power it can produce continuously throughout a long period of operation in normal conditions. The National Generating Capacity of a country is the sum of the individual Net Generating Capacity of all power stations connected to either the transmission grid or the distribution grid.

Net Transfer Capacity (NTC): The Net transfer capacity is the maximum total exchange program between two adjacent control areas compatible with security standards applicable in all control areas of the synchronous area, and taking into account the technical uncertainties on future network conditions;

Non-usable capacity at peak load under normal conditions: Aggregated reduction of the net generating capacities due to various causes, including, but not limited to temporary limitations due to constraints (e.g. power stations which are mothballed or in test operation, heat extraction for CHP's); limitations due to fuel constraints management; limitation reflecting the average availability of the primary energy source; power stations with output power limitation due to environmental and ambient constraints, etc.;

Pumping Storage Capacity: Net Generating Capacity of hydro units in which water can be raised by means of pumps and stored, to be used later for the generation of electrical energy;

Reference Points: Reference points are the dates and times data are collected for:

– Sundays of Winter on the 5th hour (05:00 CET) and on the 11th hour (11:00 CET)
– Wednesday of Winter on the 19th hour (19:00 CET)

Reliably Available Capacity (RAC): Part of National Generating Capacity that is actually available to cover the Load at a reference point;

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Remaining capacity (RC): The RC on a power system is the difference between the RAC and the Load. The RC is the part of the NGC left on the system to cover any programmed exports, unexpected load variation and unplanned outages at a reference point;

Run of River: A hydro unit at which the head installation uses the cumulative flow continuously and normally operates on base load;

Severe conditions are related to what each TSO would expect under a 1 in a 10 year scenario.[8] For example, the demand will be higher than under normal conditions and in certain regions, the output from generating units (e.g. wind) may be very low or there may be restrictions in thermal plants which operate at a reduced output under very low or high temperatures.

Simultaneous exportable/importable capacity: Transmission capacity available for exports/imports to/from other Control Areas expected to be available each week. It is calculated taking into account the mutual dependence of flows on different profiles due to internal or external network constraints and may therefore differ from the sum of NTCs on each profile of a Control Area or country;

System services reserve under normal conditions: The capacity required to maintain the security of supply according to the operating rules of each TSO. It corresponds to the level required one hour before real time (additional short notice breakdowns are already considered in the amount of outages).

Time of Reference: Time in the outlook reports is expressed as the local time in Brussels.

[8] It is difficult to be very specific and hence a description of the scenario being considered should be provided in the data collection questionnaire by each TSO, if *for example* the 1 in 10 year scenario recommendation is not used, and a TSO only calculates at a 1 in 20 year demand level.

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4. Summer review

Overall the majority of countries reported an average or milder summer compared to previous years. A small number of countries reported high precipitation and flooding. Peak demand was generally lower than what was predicted in the Summer Outlook Report and there were no reports of unusually high demand. A number of countries reported congestion issues on parts of the network including some interconnector sites. The majority of countries did not report any system adequacy issues over the summer, Latvia did have a shortfall which resulted in congestion on its borders.

In other countries there were some reports of system security issues, such as system faults leading to boundary constraints e.g Poland was affected by unscheduled flows through the system from the west to the south. The Polish TSO had to activate remedial actions many times to avoid not fulfilling N-1 criteria, including high volumes of bilateral redispatching. The amount of monthly energy redispatched bilaterally in July amounted to 104 GWh and was almost three times higher than the historical one from December 2013. On 22 July bilateral redispatch on the Polish TSO western border reached the historically highest level of 1600 MW.

5. Winter Outlook

5.1. General overview

The coordination team which developed the regional analysis methodology is comprised of experienced experts from various TSOs across Europe. The data submitted has been inspected by team members with a focus on those regions on which they have extensive knowledge and have determined that the main conclusions from the analysis are valid.

It should be noted that the analysis was based on data submitted by each TSO. A synchronous point in time was requested for all data in order to allow for a comparison between regions. Hence, a feasibility test to determine that there is enough generation to meet demand under normal and severe scenarios was enabled.

The winter outlook analysis, carried out by ENTSO-E, shows that Europe has sufficient generation for both normal and severe demand conditions. While various countries may require imports to cover the expected demand, cross border capacity is expected to be sufficient to accommodate them. However, according to the information available to TSOs at the time of production of this report, the levels of reliably available generation capacity under severe conditions are lower when compared to the outlook for winter 2013/14: slightly more outages are identified and the amount of mothballed units, including CCGT, continued decreasing with respect to past winters. On the other hand, hydrological conditions in the South-East European region (where the share of hydro generation is relatively high) seem good, and expected peak loads show a very slight decrease compared to last winter. Furthermore, the situation in the coming winter could be potentially stressed in certain periods for the Belgian system.

As for the past Summer and Winter Outlook Reports, throughout the winter period a “downward regulation” assessment is carried out to assess the constraints generated by an excess of renewable generation and classical inflexible generation when load is at a low level. This could occur on weekend nights (characterized by low load and high wind and inflexible generation) or also on weekend days, especially in cases of high PV generation. Taking into account the reported interconnection capacities and using a consistent scenario for the renewables infeed, the analysis revealed that under the considered circumstances sufficient means should be available to export energy out of the countries which expect an excess of inflexible generation.

In the next sections, we will first focus on the generation adequacy analysis, or in other words, the question whether the available generation can cover demand; both on a national and a pan-European level (Regional assessment). Second the downward regulation margin will be analysed. In this section issues resulting from an excess of inflexible generation will be investigated, as well as the possibility to export these excesses, or alternatively the necessity to curtail their outputs. Furthermore, sensitivity analysis of the regional assessment on the contracted emergency load reduction measures and strategic reserves has been performed. Finally, an overview of the impact of the solar eclipse foreseen in March is presented.

5.2. Individual country perspective analysis

Generation adequacy

Considering *normal conditions*, the majority of countries are expected to be able to balance load without the need for imports, as shown in green in Table 1. For weeks shown in yellow, the concerned country has to rely on imports in order to meet its demand and reserve requirements. The table does not give an indication on the level of imports needed; this information can be found in the individual country responses in chapter 7.

Table 1 - Import needs under normal conditions

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL																				
AT																				
BA																				
BE																				

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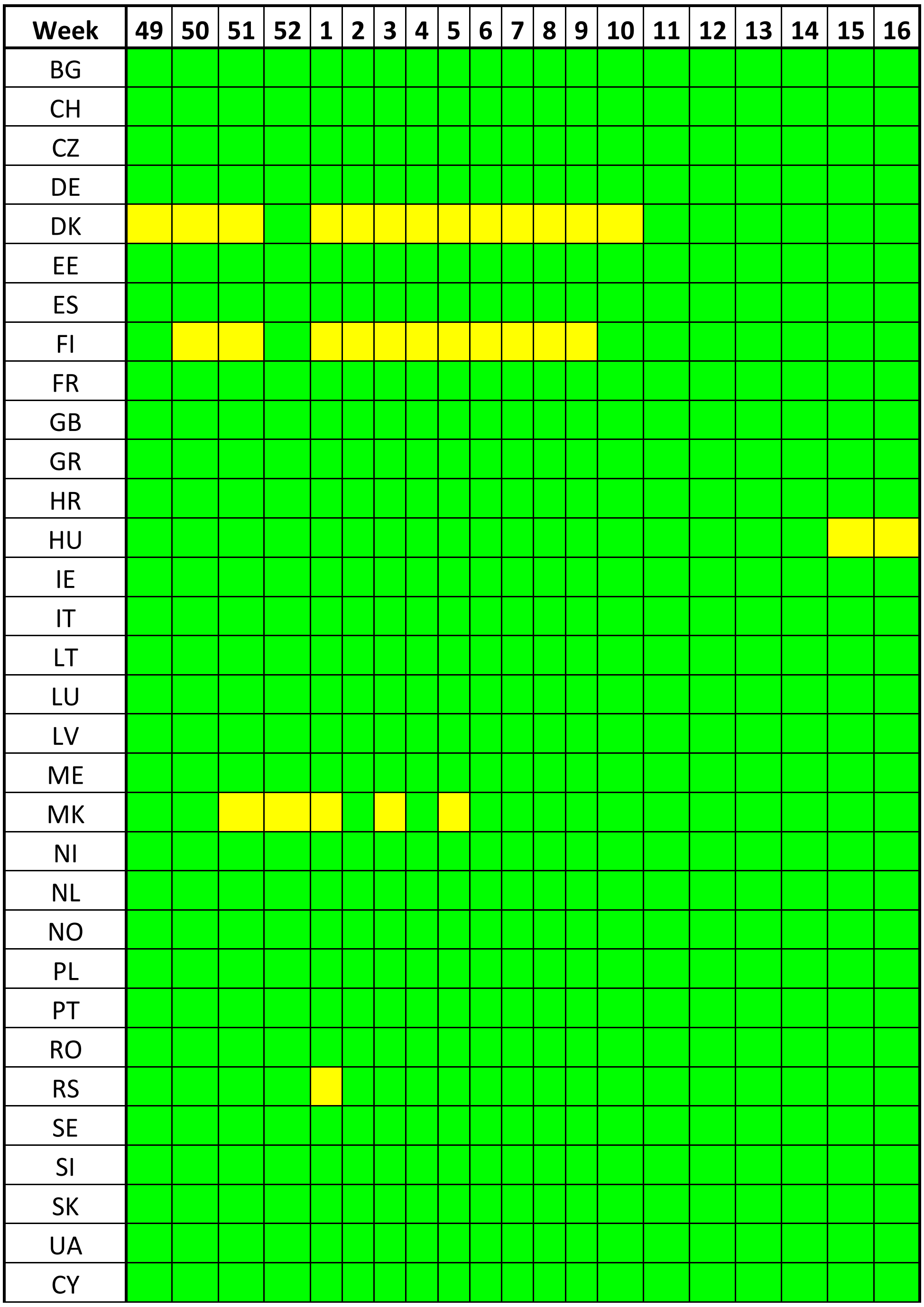

An illustration of the evolution of generation capacity throughout Europe is depicted below in Figure 4. It needs to be noted that the quoted quantities are installed capacities; outages or the availability (of renewables) are not taken into account in these illustratory graphs.

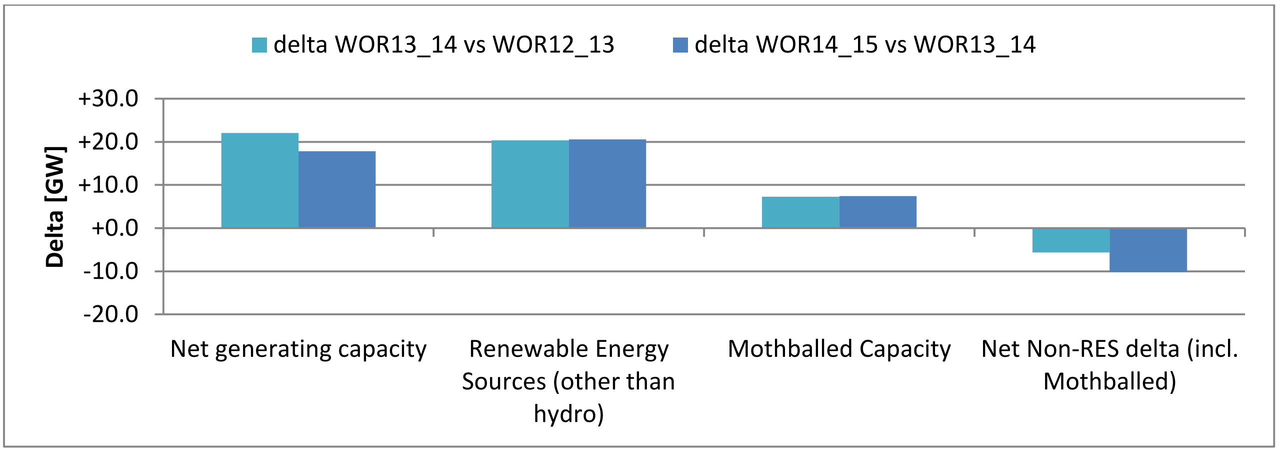

Figure 4 – Breakdown of net installed generation (compared to previous report, data in GW)

Under severe conditions (defined as 1 in every 10 years), the picture is significantly different (see Table 2 below): each individual country's demand increases, whilst for certain countries which have predominantly electric heating, the increase is noteworthy. This is particularly noticeable in France. The analysis indicated that under severe conditions (approached as ones expected to occur once in every 10 years – not capturing situations like those experienced e.g. during February 2012) across all of Europe, more countries require imports over several weeks to ensure their demand being covered. Therefore, the transmission of power through the cross border interconnectors becomes more vital for system security.

Table 2 - Import needs under severe conditions

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL																				
AT																				
BA																				
BE																				
BG																				
CH																				
CZ																				
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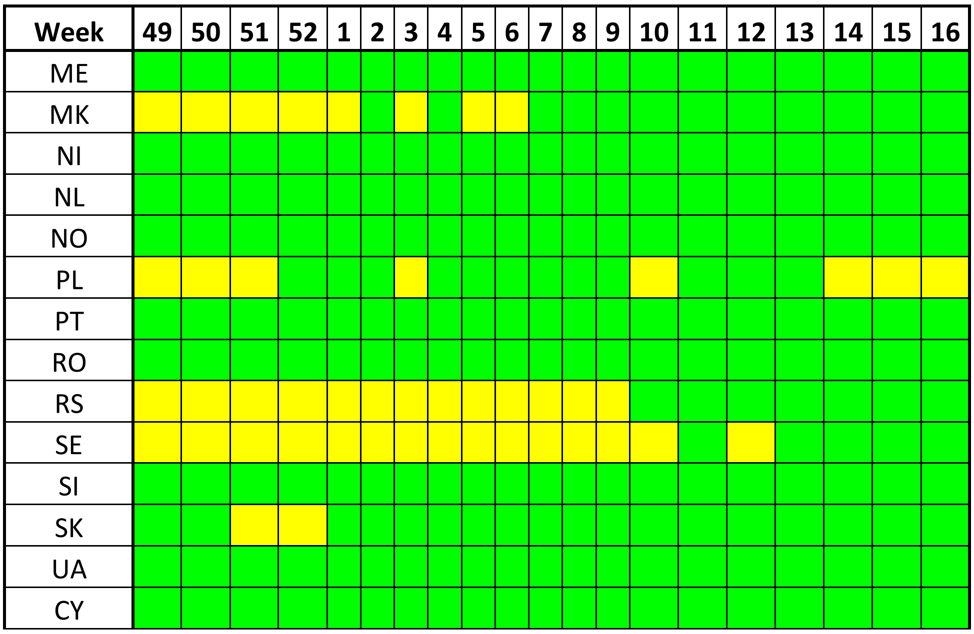

The countries that need to rely on imports at the evening peak load in case of low renewable (wind and solar) in-feed during (almost) all weeks are Belgium and Finland.
Most countries did not communicate an increased risk of generation adequacy issues for the coming winter. Some countries however provided specific comments on their situation. These comments are summarized below.

Belgium:
The situation in winter 14-15 will potentially be very stressed for the Belgian system. This is mainly due to three facts: firstly, resulting from measurements carried out in June and July 2012, potential problems were detected with the reactor vessel of one of the nuclear power plants on the site of Doel. Similar problems were also detected during the revision of a similar nuclear power plant at the Tihange site. As was already the case for winter 2012-2013, currently both units (adding up to more than 2000 MW) are shut down, and decisions about re-starting the power plants or permanently putting them out of service are not expected before the end of the winter.

Secondly, due to a technical defect, a third nuclear unit (1038 MW) is out of service at least until the end of 2014. Currently it is planned to return into service at the start of 2015.

Thirdly, the recent closing in 2013 of classical generation units. Additionally, the nuclear phase-out according to Belgian law starts on the 15th of February with the closure of Doel 1, a 433 MW unit. Compared to previous winter, these closures are - in terms of capacity - still more than compensated for by new renewable production units. However, the infeed of these renewable units is less stable and less guaranteed compared to classical production units, yielding a negative effect on global generation adequacy. On the other hand, no new thermal units are planned to be commissioned.

For the adequacy analysis, all most recently available official information is used. There is however an important dependence on the availability of the nuclear unit that is out due to technical reasons. When this unit would not return before 1 January, and stay out whole winter long, the probability of loss of load for the Belgian system becomes very significant.

Due to the announced closing of different CCGTs and Doel 1 and the lack of new generation capacity, the Belgian parliament already enacted a new law in March 2014, introducing the concept of strategic reserves for the Belgian system. These additional reserves are constituted of generation units and demand response contracts amounting up to 840 MW in total for coming winter. The strategic reserves are taken out of the market, and can only be used when Belgium experiences risks of shortage to cover the Belgian load. This

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capacity is included in the Elia contribution to the ENTSO-E Winter Outlook under the "Load Reduction" category.

Under normal circumstances (average temperatures, average load, average forced outages and average renewables infeed), Belgium probably will already be structurally dependent on imports to cover the evening peak on weekdays. The expected import needs are estimated at about 800 MW, which under those conditions should be perfectly feasible regarding cross-border capacities and regarding available energy in neighboring countries. Under severe conditions however (cold temperatures, low renewables infeed and high forced outages) Belgium will heavily depend on structural imports up to 3.6 GW (even after the above mentioned strategic reserves are used). Under specific conditions of generation deficit in Belgium and France, these amounts of imports could be problematic considering estimated cross-border flows of CWE and surrounding countries. Moreover, the corresponding energy should be available for purchase in the market.

Apart from the holiday period, all weeks can potentially be critical depending mainly on the meteorological conditions in Belgium and neighbouring countries (Figure 5).

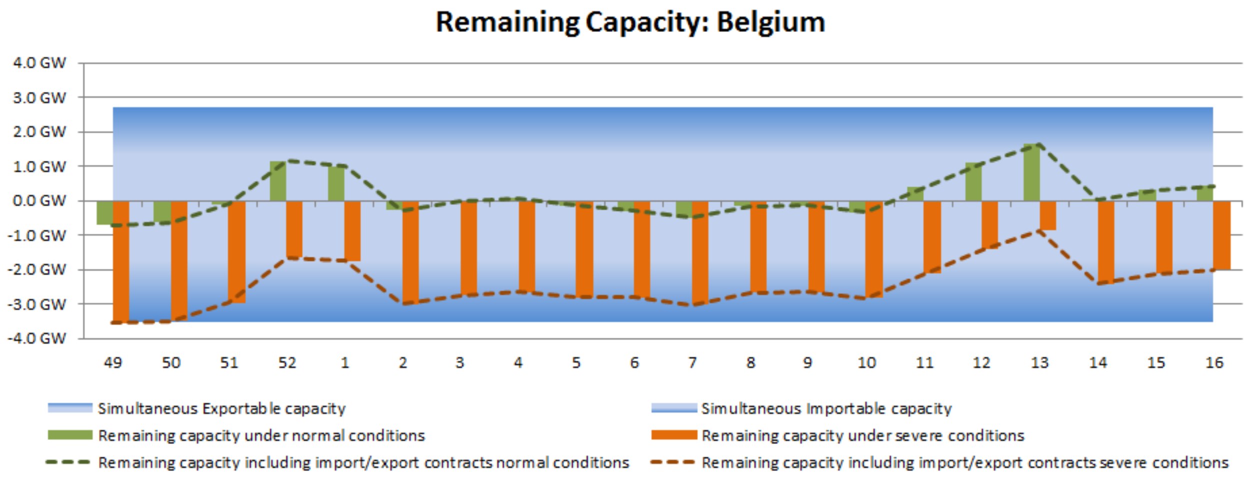

Figure 5 - Remaining capacity in Belgium through the winter period under normal and severe conditions

Finland:
As in the previous winters, Finland is a deficit area in peak demand hours. Demand is highly dependent on outside temperatures and most critical period is from week one to nine. The deficit is expected to be met with import from neighboring areas.

No specific problem should occur in the minimum demand hours because the installed wind and solar power capacity is relatively low in Finland.

France:
Under normal meteorological conditions, the forecast outlook for the electricity supply-demand balance in continental France shows no particular risk for the entire winter 2014 - 2015 period.

For the coming winter, the main risk factors are the sensitivity of load to low temperatures and unplanned outages of generating units. The temperature sensitivity is illustrated in the graph below (analysis according to regional assessment methodology), showing that in case of temperatures remaining considerably below those assumed in a severe weather scenario, the amount of necessary imports could become close to the available import capacity.

The risk related to security of supply is mainly low, with a few periods (from January to the mid February) with moderate risks.

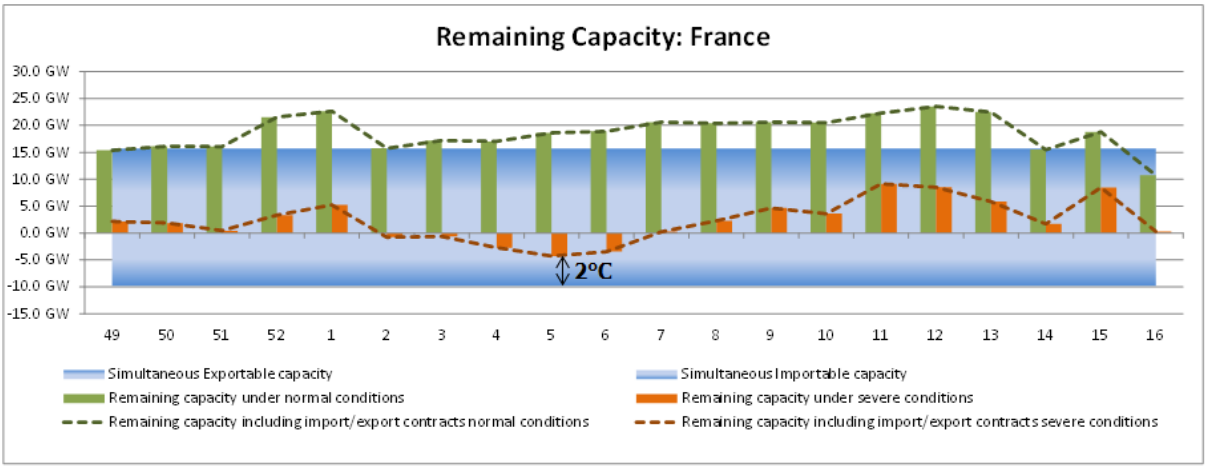

Figure 6 - Illustration of temperature sensitivity of margins (France)

Germany:

After the first steps of the nuclear phase-out in Germany in 2011 German TSOs are still facing a situation characterized by the enduring regional lack of conventional generation, primarily in Southern Germany. At the same time the commissioning of important conventional power plants in Germany is further delayed.

Learning from last winters, a situation with high load, low RES feed-in and high exports to support the neighbouring countries has to be considered.

Regarding the generation – load balance for Germany usually it is not assumed that there is a non-availability for generation units that are dependent on fossil fuels due to a lack of primary energy sources.

RES are continued to be installed at a high pace. For southern Germany this attributes largely to distributed PV generation. In the end of the year 2014 the installed capacity of PV generation in Germany is expected to reach about 37.5 GW. That means an increase of about 1.3 GW in 2014. The German government has cut down the financial subsidies for photovoltaic power plants; nevertheless a notable reduction of the fast increase of installed PV capacity is not expected soon as subsidies are planned to stop at a level of 52 GW of a total installed capacity of PV. The installed capacity of wind power plants is expected to increase by about 4.9 GW reaching 38.4 GW. However for the winter period with peak load in the evening, PV generation does not contribute to the coverage of demand while wind feed-in is not guaranteed.

In the winter period the German TSOs may be faced again with problems to meet (N-1)-security rules, especially in situations with high wind feed-in in the North and high load in the South of Germany. In these situations, an excess of transmission capacities of network elements in the important transmission axes from North to South has to be expected. Being faced with these risks for security of supply the German TSOs are again preparing a high amount of grid- and market-related measures e.g. redispatch with increasing amount of power to be shifted between control areas.

To cover the anticipated very high redispatch demand as for the last winter, the German TSOs determined the need of an additional reserve generation capacity of about 3,1 GW for the winter 2014/2015. Almost the complete capacity has already been contracted. In order to contract these required reserves a new German regulation allows to prevent the switch-off of system-relevant units, which are instead transferred into a TSO-controlled reserve. They are still included in the data table. Additionally 0,8 GW of reserves have been contracted in Austria for the coming winters.

A further benefit for generation adequacy is provided by the new regulations for contractual load reductions.

Great Britain:

Weather corrected peak demand has continued to decline. Given that statistical review of positive gross domestic product (GDP) figures shows that the economy has been better than recent years, it seems likely that the decline in peak demand is due to energy saving measures, increase in embedded generation and a move away from heavy industry to less energy intensive industrial activity. However, generation capacity has also continued to fall due to the closure of more coal and oil plants as a result of the Large Combustion Plant Directive and the closure of uneconomic gas fired power stations, although this has been partially offset by additional wind capacity.

The overall effect on margins is that they have decreased compared to recent historic levels but they are still expected to be adequate based on normal temperatures and expected levels of generation availability. Under severe weather conditions (defined as 1 in 20 cold temperatures for GB), forecast demand including reserve would still be met, but full interconnector exports to the continent and Ireland would not be possible in all weeks of the year. In the unlikely event that the amount of generation does not meet the amount of demand for a period of time, National Grid, as GB TSO, would need to take mitigating actions to avoid any loss of load. These actions include the use of two New Balancing Services: Demand Side Balancing Reserve (DSBR) and Supplemental Balancing Reserve (SBR), which provide the option of additional capacity if necessary. There is also the option of using the existing approaches such as the emergency assistance from interconnectors, maximum generation service or voltage reduction, as long as there were no interconnector exports. The most critical periods are early December and mid-January when margins are expected to be very low under 1 in 20 conditions with the interconnectors at float.

Downward regulation margin

Table 3 and Table 4 below show the exporting needs at the Sunday, 11 AM and 5 AM synchronous time points respectively. It should be noted that the renewables in-feed from the data collection was used, which represents a worst-case situation for every country separately.

Table 3 - Export needs at the daytime minimum

week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL																				
AT																				
BA																				
BE																				
BG																				
CH																				
CZ																				
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week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LV																				
ME																				
MK																				
NI																				
NL																				
NO																				
PL																				
PT																				
RO																				
RS																				
SE																				
SI																				
SK																				
UA																				
CY																				

The countries that need to export or curtail an excess of inflexible generation at the daytime minimum in case of high renewables (wind and solar) in-feed during (almost) all weeks are Germany, Romania and FYRO Macedonia.

Table 4 - Export needs at the nighttime minimum

week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL																				
AT																				
BA																				
BE																				
BG																				
CH																				
CZ																				
DE																				
DK																				
EE																				
ES																				
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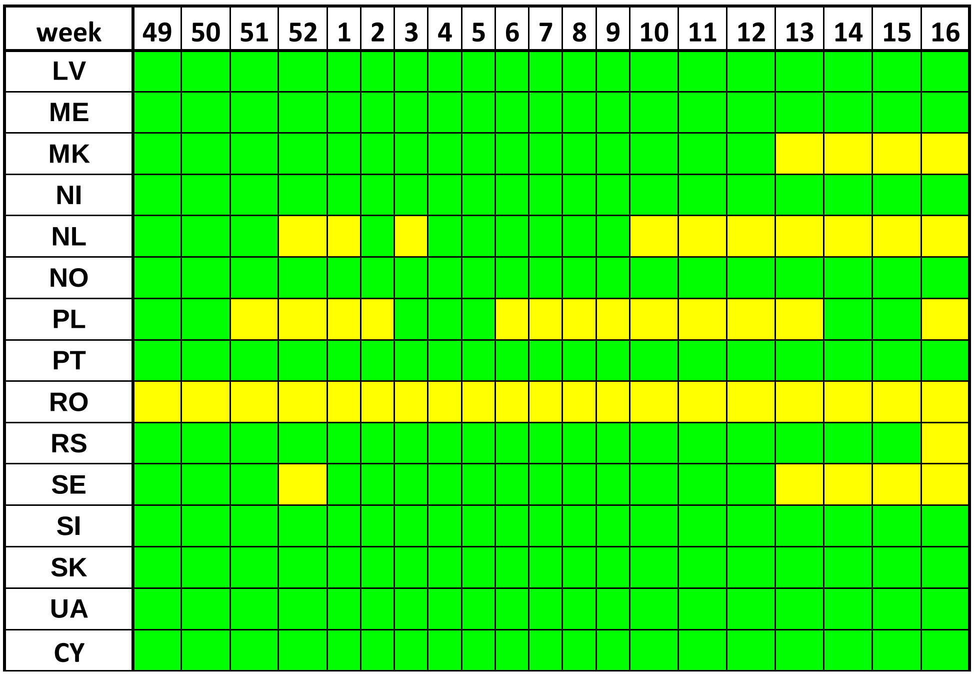

During the overnight minimum, the picture is more or less similar, now reflecting mainly the countries with large amounts of wind generation installed. The countries that need to export or curtail an excess of inflexible generation in case of high renewable (onshore and offshore wind) in-feed during (almost) all weeks are Romania, Ireland, Germany, FYRO Macedonia and Denmark.

Most countries did not communicate an increased risk of downward regulation issues for the coming winter. Some countries however provided specific comments on their situation. These comments are summarized below.

Germany:

After the first steps of the nuclear phase-out in Germany in 2011 German TSOs are still facing a situation characterized by the enduring regional lack of conventional generation, primarily in Southern Germany. At the same time the commissioning of important conventional power plants in Germany is further delayed.

Learning from last winters, a situation with high load, low RES feed-in and high exports to support the neighbouring countries has to be considered.

Regarding the generation – load balance for Germany usually it is not assumed that there is a non-availability for generation units that are dependent on fossil fuels due to a lack of primary energy sources.

RES are continued to be installed at a high speed. For southern Germany this attributes largely to distributed PV generation. In the end of the year 2014 the installed capacity of PV generation in Germany is expected to reach about 37,5 GW. That means an increase of about 1,3 GW in this year. The German government has cut down the financial subsidies for photovoltaic power plants; nevertheless a notable reduction of the fast increase of installed PV capacity is not expected soon as subsidies are planned to stop at a level of 52 GW of a total installed capacity of PV. The installed capacity of wind power plants is expected to increase by about 4,9 GW reaching 38,4 GW. However for the winter period with load maximum in the evening PV generation does not contribute to the coverage of demand while wind feed-in is not guaranteed.

In the winter period the German TSOs may be faced again with problems to meet (n-1)-security rules, especially in situations with high wind feed-in in the North and high load in the South of Germany. In these situations, an excess of transmission capacities of network elements in the important transmission axes from North to South has to be expected. Being faced with these risks for security of supply the German TSOs are again preparing a high amount of grid- and market-related measures e.g. redispatch with increasing amount of power to be shifted between control areas.

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To cover the anticipated very high redispatch demand as for the last winter, the German TSOs determined the need of an additional reserve generation capacity of about 3,1 GW for the winter 2014/2015. Almost the complete capacity has already been contracted. In order to contract these required reserves a new German regulation allows to prevent the switch-off of system-relevant units, which are instead transferred into a TSO-controlled reserve. They are still included in the data table. Additionally 0,8 GW of reserves have been contracted in Austria for the coming winters.

A further benefit for generation adequacy is provided by the new regulations for contractual load reductions.

Poland:
Owing to the lasting increase of wind NGC in Poland and assumed pessimistic factor for wind utilization (85%), PSE mentions possible stress in downward regulation at 5 a.m. CET for two reference points, which are specific: Christmas Eve on 24 December and New year's Eve on 31 December. Nevertheless possible problems will be managed during operational planning, when precise forecast of wind generation will be known. PSE has also operational procedures to keep system at safe level (including wind farms switching off as a last resort).

Spain:
Given that there's not risk situation concerning generation adequacy, the period with lowest remaining capacity is the first half of December, and March due to increased overhauls. Concerning minimum demand periods with high probability of RES spilling, March and April are the most critical months.

5.3. Regional assessment

In this section, a regional assessment of generation adequacy and downward regulation margin is performed. For this analysis, the in-feed from renewable energy sources (notably wind and solar) was modified to obtain a more consistent scenario of renewable in-feed over Europe. To this end, the methodology described in chapter 3 was used.

It is important to underline that the scenarios evaluated in the regional assessment (for both upward and downward analysis) represent conditions that are significant and realistic for the European system as a whole, therefore they may differ from the scenarios evaluated in each individual country perspective analysis, which corresponds to conditions significant and realistic for each country.

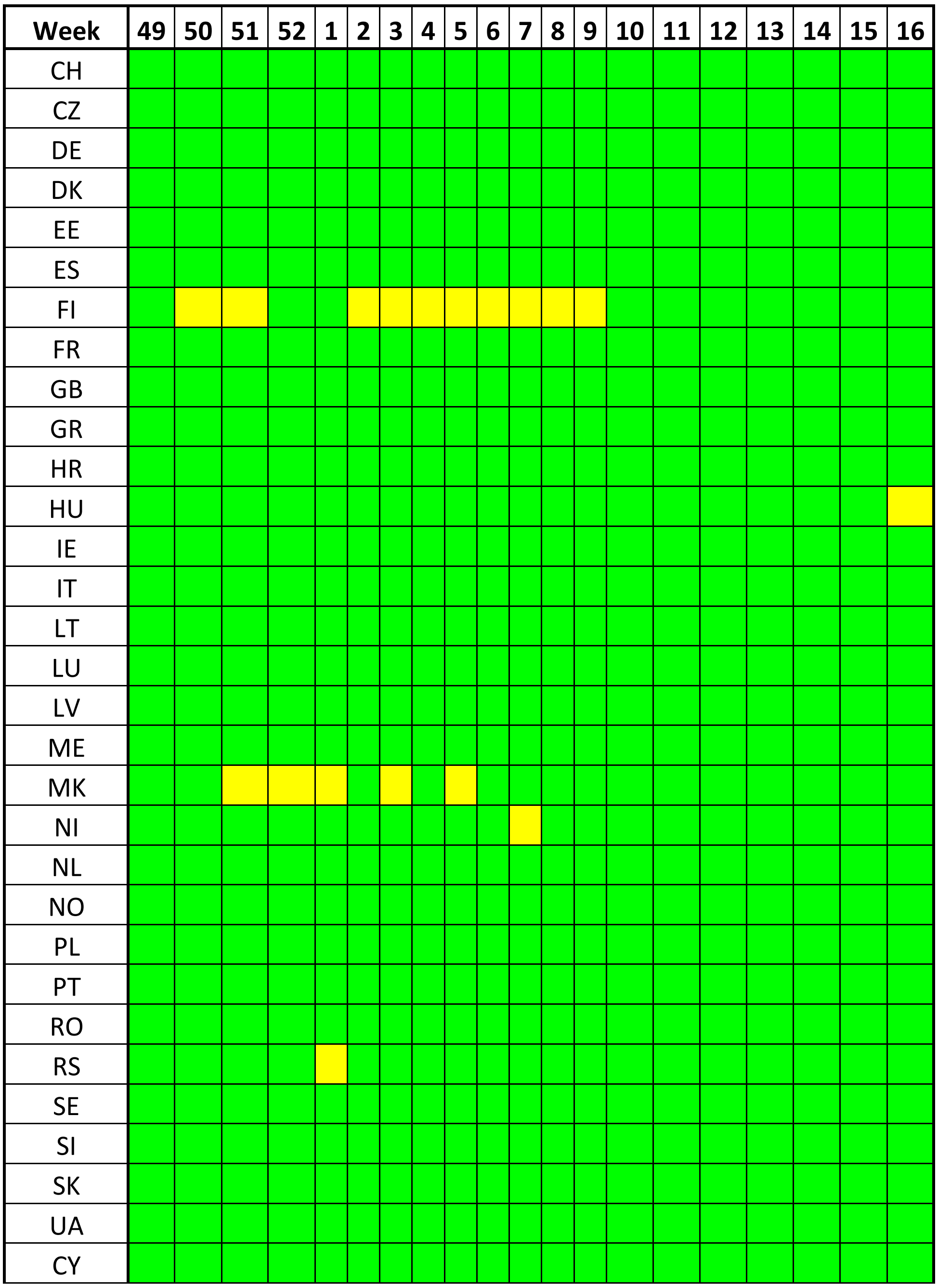
For example, the severe conditions of the whole European System do not correspond to the "simple envelope" of each individual severe condition but rather to a European wide "severe condition" situation which can be understood as a European wide "worst case" situation. The results described in the paragraphs below could consequently differ from the ones presented in previous paragraph.

Generation adequacy

Based on normal conditions for generation and demand, the majority of countries do not require imports for adequacy reasons as shown pictorially in Table 5. Where a country is coloured green, it has excess capacity to meet demand and reserves. The countries which are coloured in yellow can cover their deficit with imports, whereas for the countries in red the regional analysis revealed that their deficit cannot be covered with imports due to insufficient reported cross-border exchange capacities on their borders or on the borders of other countries that are used to bring import the energy from a region with surplus generation capacity.

Table 5 - Weekly stress assessment under normal conditions

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL																				
AT																				
BA																				
BE																				
BG																				



While the majority of regions do not require imports for adequacy reasons, markets will determine the economic energy transfers based on the respective price differentials between regions, and hence various borders may be transmitting power at their maximum capacity. As indicated in the description of the methodology, this analysis is not a market simulation and hence real physical flows resulting from commercial exchanges are not indicated. Although some regions do require imports for generation adequacy reasons, there is ample interconnector capacity from neighbouring regions to cover their demand.

Under severe conditions (defined as 1 in every 10 years), the picture is somewhat different: the demand of most countries increases to a certain extent due to colder temperatures, whilst generation availability might be lower due to forced outages and lower renewable infeed. The analysis indicated that even under severe conditions across all of Europe, demand is almost everywhere met and reserves can be maintained. As was noted before, some countries however have to rely structurally on imports.

In Belgium, a potential adequacy issue might arise at the beginning of the investigated period due to high generation unavailability (including three nuclear generation units in outage) which results in needed imports that are close to the system's limits should unfavorable conditions materialize.

No country or region was identified having a severely increased risk of adequacy issues throughout the whole winter period taking into account cross-border exchanges, limited by the cross-border capacities as communicated by the TSOs.

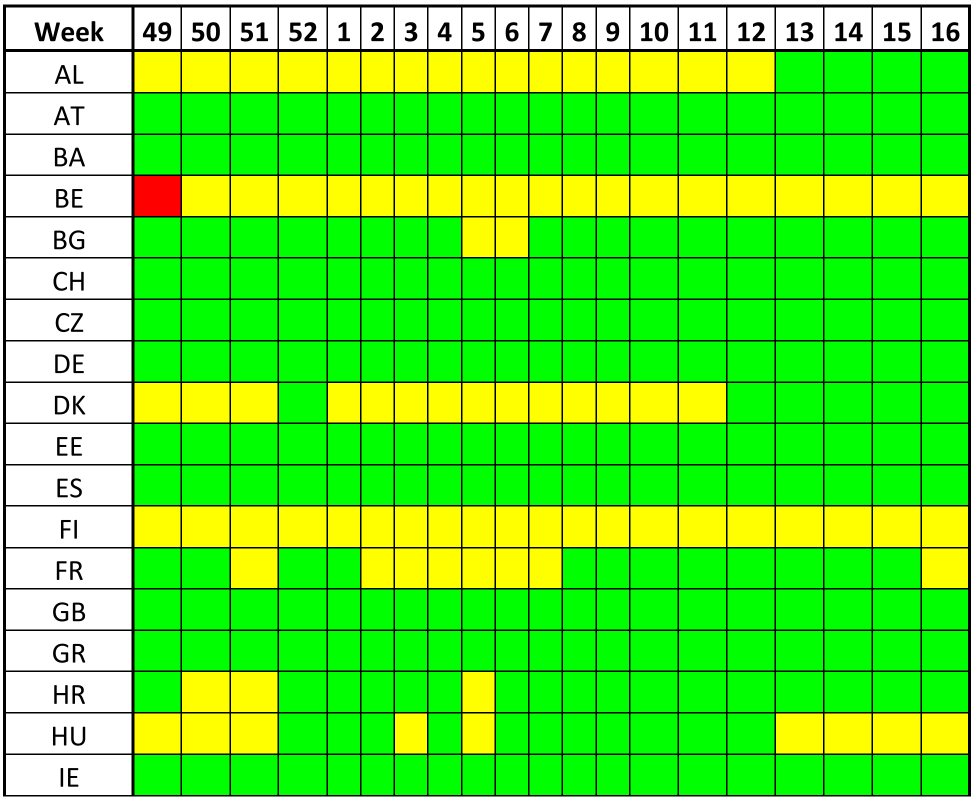
However, according to studies concerning the upcoming winter that have been performed by the TSOs, Coreso and SSC[9], in case of a very high load (and low wind) scenario the "classical cross-border capacity values" could lead to physical flows that are not manageable with the usual topological measures. As one of the consequences of these studies, the TSOs in the Central Western Europe region have drafted an extraordinary procedure for the coming 2014/2015 wintertime in the CWE region; which states the following:

"*A reduction of the global North to South flows by adjusting (reducing) commercial exchanges on certain CWE borders can support securing the situation. Since reducing NTCs on Belgian borders would lead to additional curtailment deteriorating the situation in Belgium a reduction on other borders is recommended. The above described measures should reduce the requisite of load shedding in the Belgium control area during the concerned time horizon.*"

These statements underline the fact that although the winter outlook analysis based on the collected data does not identify a major risk, the circumstances for this coming winter are quite different with respect to previous winters and caution should be taken in that classical assumptions and measures might not hold anymore for some stressed periods during coming winter. This is why the TSOs of the CWE-region initiated coordination and thorough assessments to identify all measures that can be taken to mitigate the additional risk and prepare for such situations.

A sensitivity analysis on the load reduction availability through the winter has been performed in section 5.4.

Table 6 - Weekly stress assessment under Severe Conditions



[9] Coreso and SSC are two of the Regional Security Coordination Initiatives that are active in Europe, having as member TSOs 50Hertz, Elia, National Grid, RTE and Terna and Amprion and TenneT respectively.

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Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IT																				
LT																				
LU																				
LV																				
ME																				
MK																				
NI																				
NL																				
NO																				
PL																				
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UA																				
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The map below (Figure 7) gives another view on the data shown in Table 6. It indicates the countries expecting a need for imported energy in at least one week of the considered period or in all weeks of the considered period respectively. As can be seen on this map, quite some countries show a need for importable energy.

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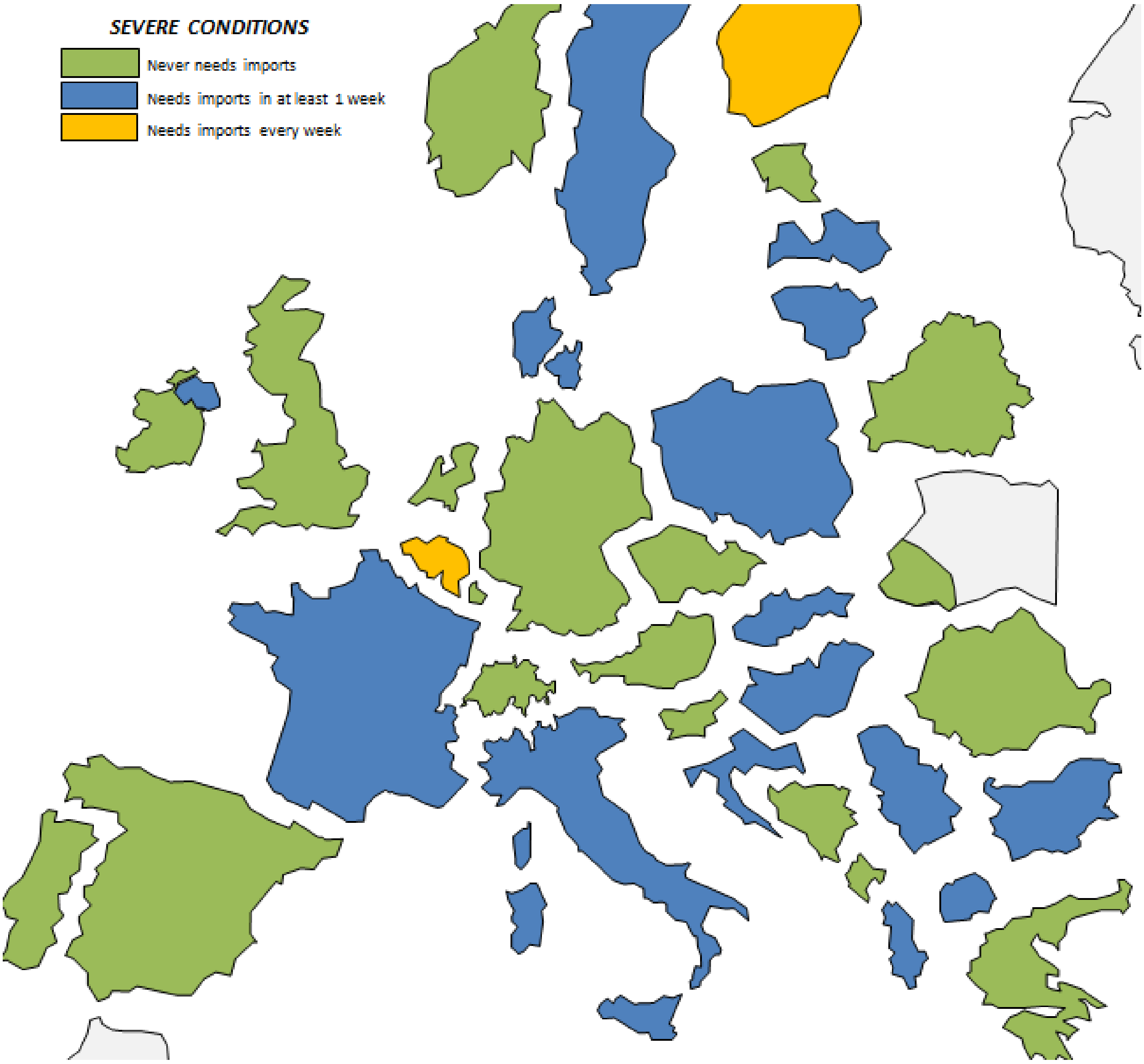


Figure 7 - Overview of the import needs for severe conditions

Downward regulation margin

With increasing renewable generation in Europe, the output of the analysis is shown below in Table 7. Where a country is coloured green, it has sufficient downward regulation margin. The countries which are coloured in orange can export their excess energy, whereas for the countries in red the regional analysis revealed that their excess cannot be entirely exported considering the reported NTC values.

Table 7 - Weekly stress assessment for daytime minimum

week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
AT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
BA	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
BE	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
BG	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
CH	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
CZ	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
DE	green	green	green	orange	green	green	green	green	green	green	green	green	green	orange	orange	red	orange	orange	orange	orange
DK	orange	green	green	orange	orange	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
EE	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
ES	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
FI	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
FR	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
GB	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
GR	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
HR	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
HU	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
IE	orange	orange	orange	orange	orange	orange	orange	orange	orange	green	green	green	green	green	green	green	orange	green	green	green
IT	green	green	green	green	green	green	green	green	green	green	green	green	green	orange	orange	orange	orange	orange	orange	orange
LT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
LU	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
LV	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
ME	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
MK	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
NI	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
NL	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
NO	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
PL	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
PT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
RO	orange	green	green	orange	orange	orange	orange	green	green	orange	orange	orange	orange	orange	orange	orange	orange	green	orange	orange
RS	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
SE	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
SI	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
SK	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
UA	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green

week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CY																				

It can be observed that with a wind and solar output set at a representative level across the ENTSO-E region (see Appendix 3 for the load factors used), there are some countries that would be required to export excess inflexible generation under minimum daytime demands to neighbouring regions. For most countries, the estimated minimal NTC's in combination with the possibility for neighbouring countries to absorb excess energy result in a feasible ENTSO-E wide situation. Only for Germany (one week) a potential issue regarding excess inflexible generation might arise.

An analysis of the overnight minimum demand scenario (Table 8) yields different results from the daytime scenario: a potential issues regarding excess inflexible generation might arise in Spain, Ireland and Portugal. In these countries a risk of RES curtailment could be encountered.

Table 8 - Weekly stress assessment for overnight minimum

week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AL																				
AT																				
BA																				
BE																				
BG																				
CH																				
CZ																				
DE																				
DK																				
EE																				
ES																				
FI																				
FR																				
GB																				
GR																				
HR																				
HU																				
IE																				
IT																				
LT																				
LU																				
LV																				
ME																				
MK																				
NI																				
NL																				
NO																				
PL																				
PT																				
RO																				

week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RS																				
SE																				
SI																				
SK																				
UA																				
CY																				

The maps below give another view on the data shown in Table 7 and 8. They indicate the countries expecting a need for exported energy in at least one week of the considered period or in all weeks of the considered period respectively.

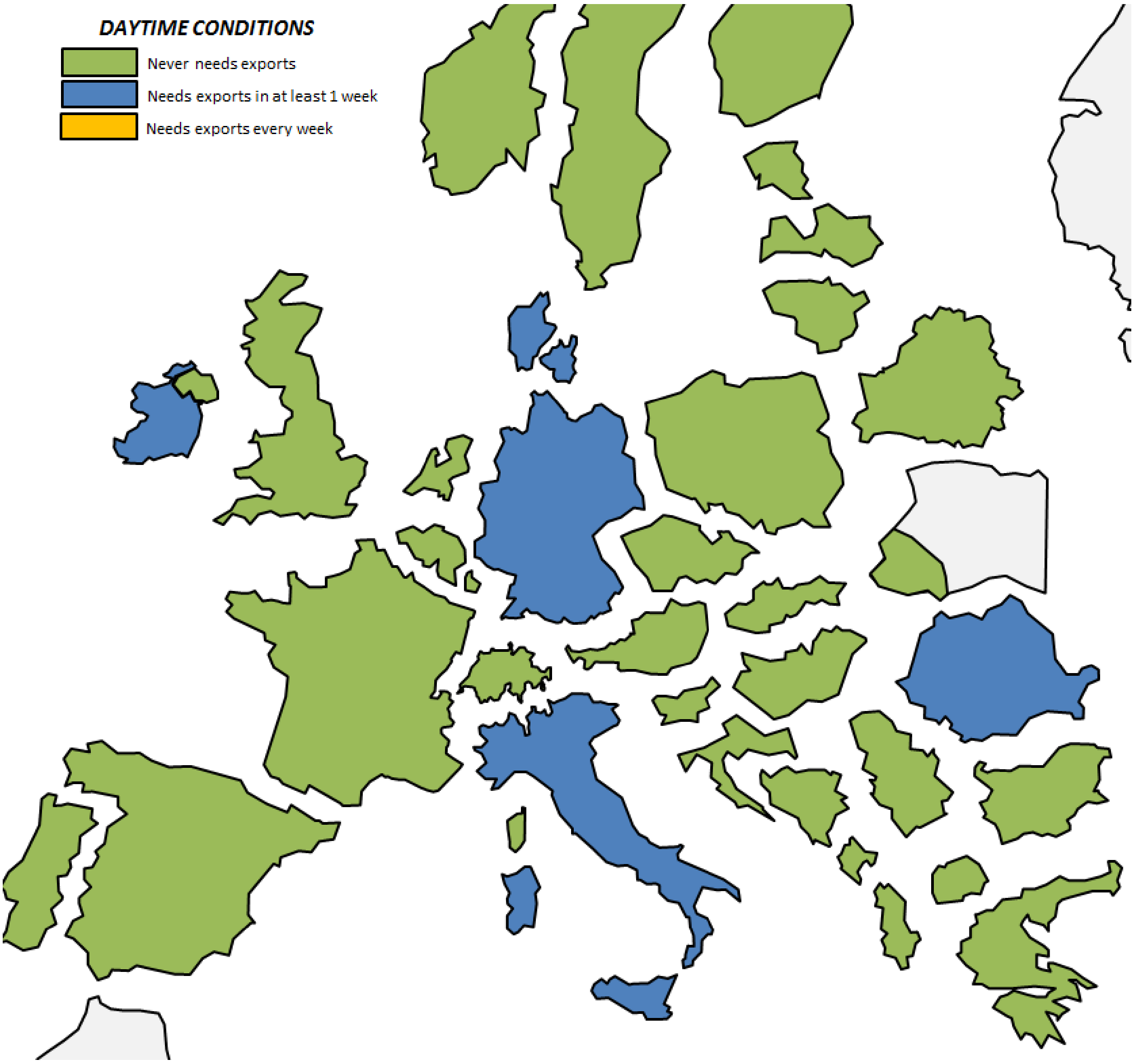


Figure 8 - Overview of the export needs for the daytime scenario

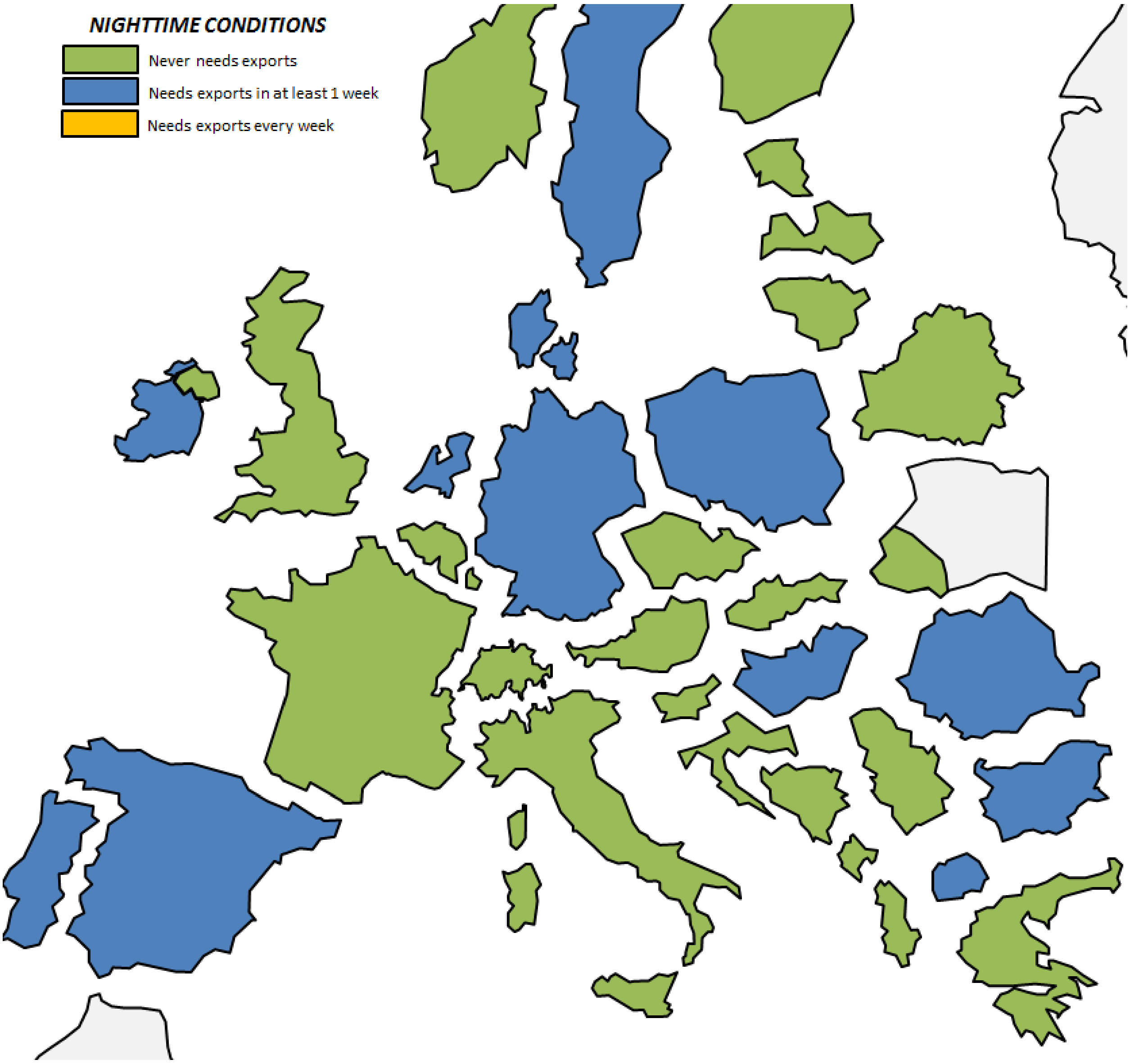


Figure 9 - Overview of the export needs for the nighttime scenario

5.4. Regional assessment – sensitivity on contracted emergency load reduction measures and strategic reserves

From the quantitative data provided by the different TSOs, it became apparent that quite some countries reported potential contracted emergency load reduction measures and strategic reserves. These numbers were taken into account in the remaining margins of those countries, and therefore are included when determining the status of a country in the tables above.

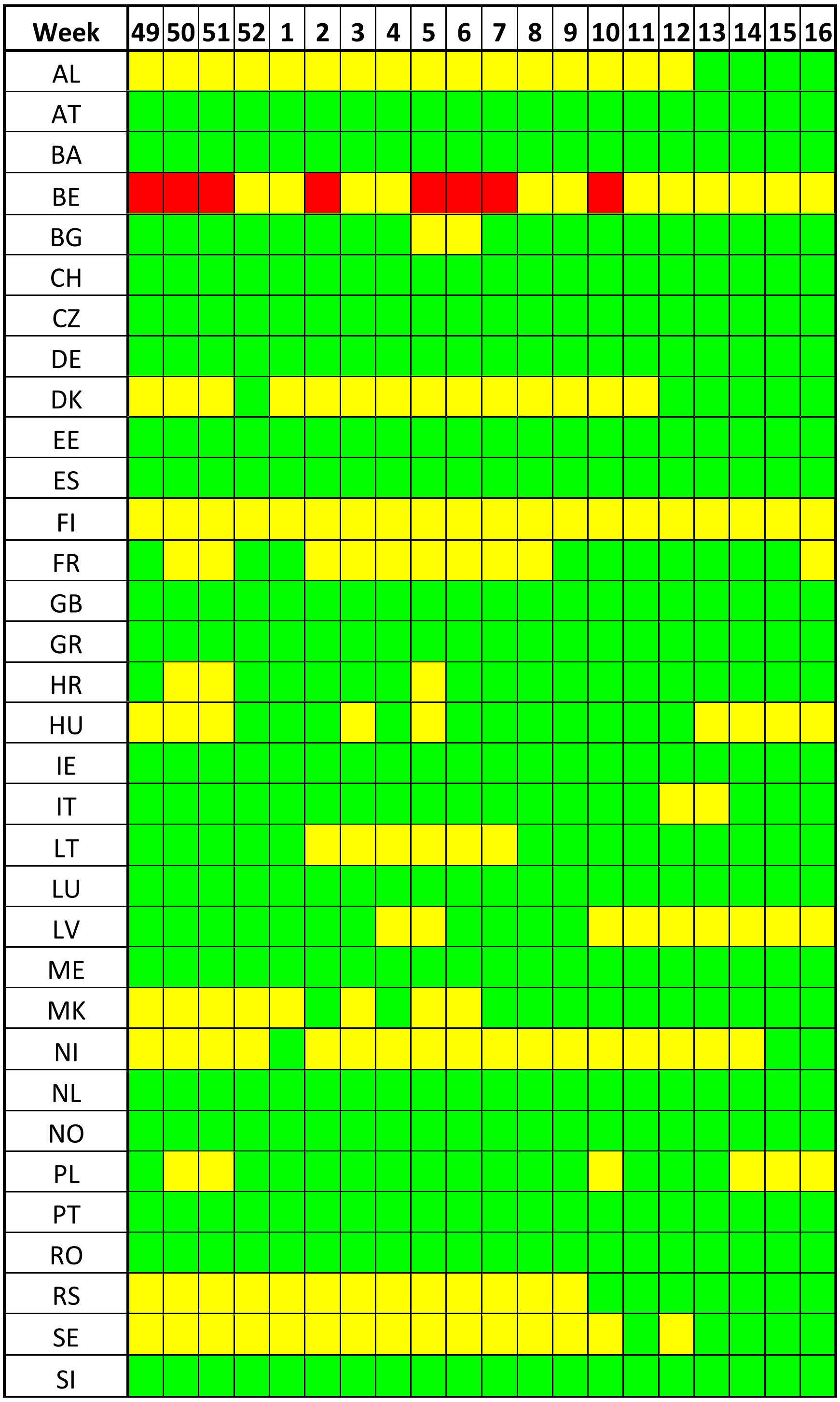
However, from the comments of the different countries it became clear that at least some of those contracted measures and strategic reserves are constituted of some type of emergency reserves that might only be used in case of a severe adequacy risk. It was therefore deemed useful to repeat the regional adequacy assessment while excluding these contracted strategic reserves to give an indication of the necessity of these measures for coming winter, and the probability of their use.

The following changes with respect to prior simulations were made:

- Belgium: the volume of strategic reserves (on generation as well as on load) were removed from the remaining margin;
- France: the volume of contracted emergency load reduction measures was removed from the remaining margin.

Table 9 below shows an overview of the results for the described variant scenario. Compared to the base case, a difference clearly emerges: Belgium seems to show an adequacy risk during several weeks. Therefore, both the regions Belgium/France will be analysed more in detail in the next paragraphs.

Table 9 - Weekly stress assessment for load reduction sensitivity



Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SK																				
UA																				
CY																				

Belgium / France

Below (Figure 10) a detail of the Belgian/French situation for **week 5** is shown. As depicted, all cross-border capacities into the Belgian-French block are saturated (all **import** arrows sourrounding the perimeter enclosed by the border of France *and* Belgium are red). This indicates that there is a lack of generation capacity in the region enclosed by these two countries. The final distribution of the deficit energy over those two countries is determined based on the market parameters, and therefore the results of these simulations give no indication whatsoever how this deficit energy will be distributed**. This is the reason why both countries were colored in red on the map below.**

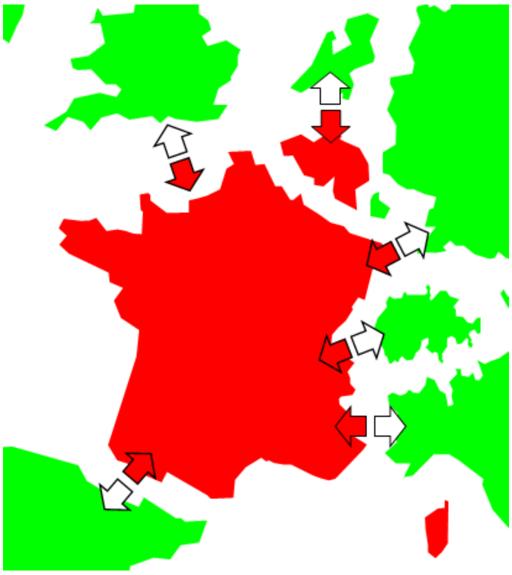
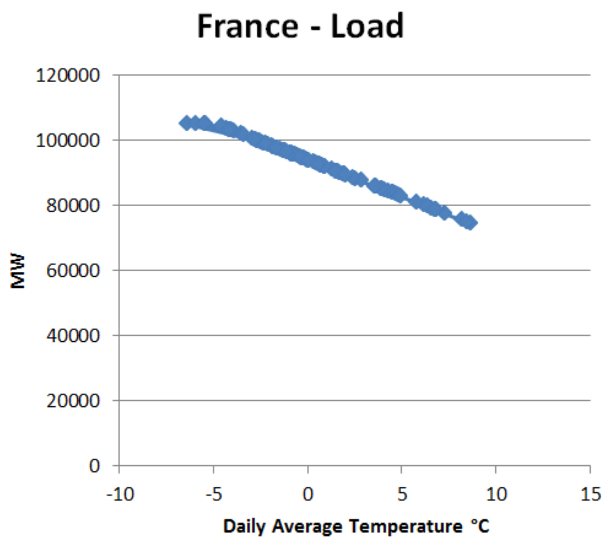


Figure 10 - Detailed French/Belgian situation without contracted strategic reserves

The previous situation apparently can arise over almost all weeks in winter when severe conditions materialize. This results in the observation that under such circumstances, the use of contracted strategic reserves in Belgium and contracted emergency load reduction measures in France will be quite probable for next winter.

To investigate the above representative situation more in detail, further simulations have been carried out. As explained in the methodology, a large number of simulations (490 in total) were run, varying the temperatures and renewables infeed, and assessing the impact on the remaining capacity in Belgium and France.

Figure 11 below shows the simulated load for both countries, depending on the daily average temperature. This relationship between load and average temperature was approximated by a linear gradient of about 2300 MW per °C decrease in average daily temperature for France, and about 186 MW per °C decrease for Belgium. For France this load increase saturates at a daily average temperature of -5°C, whereas in Belgium this takes place at -7°C.



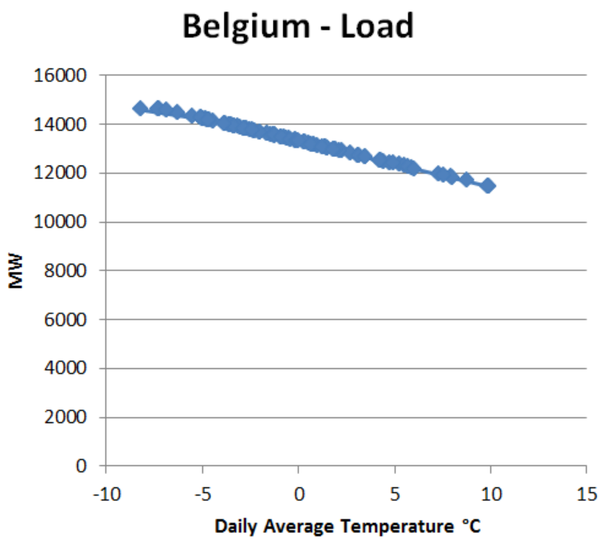


Figure 11 - Simulated temperature dependence of load for France (left) and Belgium (right)

Figure 12 and Figure 13 show the results of the simulations for France and Belgium respectively, with on the horizontal axis the total (onshore and offshore wind are weighted based on their installed capacity) wind capacity factor, and on the vertical axis the daily average temperature. For every simulation that was run, a marker is shown:

- Green if no imports are needed for that simulation;
- Blue if imports are needed, but sufficient energy can be imported to cover the load;
- Red if imports are needed and insufficient energy can be imported to cover the load; and therefore the contracted strategic reserves and emergency load reduction measures might have to be used.

It is clear that in the majority of the simulations, Belgium needs to count on imports, which makes Belgium structurally dependent on energy from neighbouring countries. France on the other hand can be self-contained down to an average daily temperature of about -2°C.

It appears that for both countries around average daily temperatures of -6°C, combined with wind capacity factors of 20% or less, potential issues would start to appear. In those scenarios it could therefore be needed to use the contracted strategic reserves and emergency load reduction measures that are put into place in Belgium and France respectively. It is also clear that in those cases where adequacy might be at risk, it is of utmost importance to provide maximal cross-border capacities to the market on the borders surrounding Belgium and France. It will probably be on those borders were maximal gains for social welfare can be found in case of scarcity issues.

From those simulations we can also get an idea on the probability of occurrence of adequacy issues in Belgium and France (given the hypotheses taken, and **for a particular week where the above representative situation was investigated**):

- In 90% of the cases, Belgium needs to rely on imports. For France this is only in about 20% of the cases true.
- In 5.5% of the cases, Belgium cannot cover its load with the given NTC's and without activating strategic reserves. For France this happens in 1% of the cases without activation of emergency load reduction measures.

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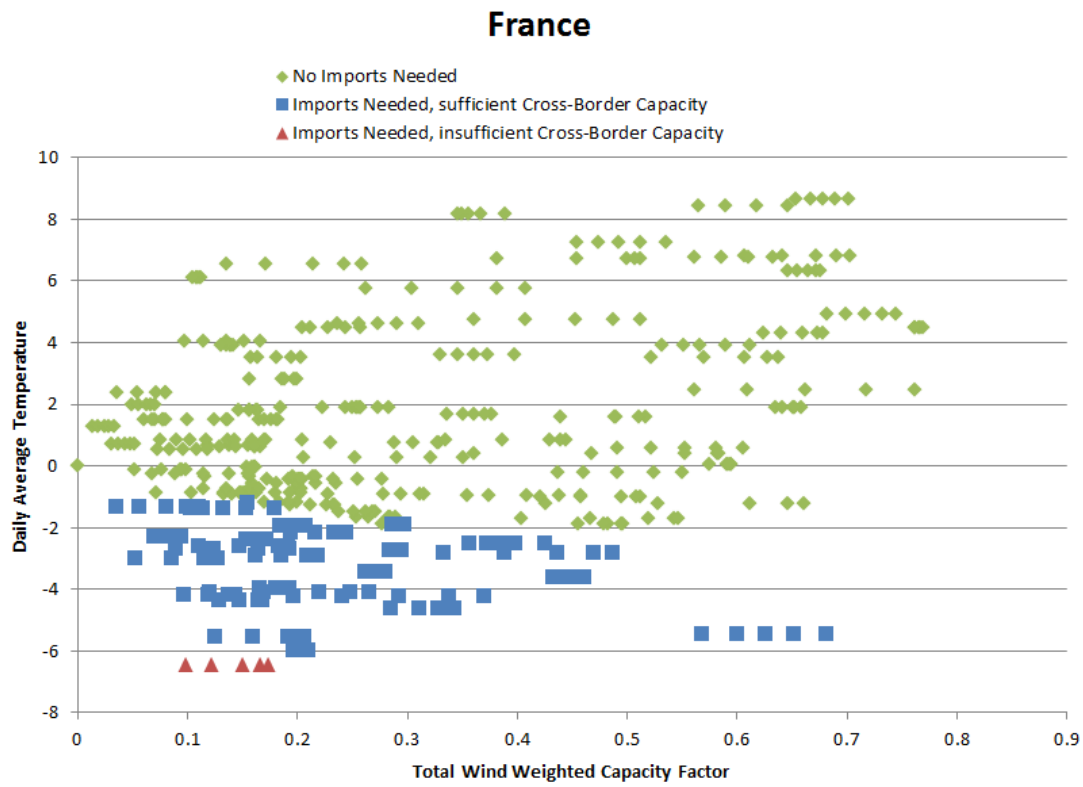

Figure 12 - Probabilistic assessment of emergency load reduction sensitivity for France for the representative situation investigated

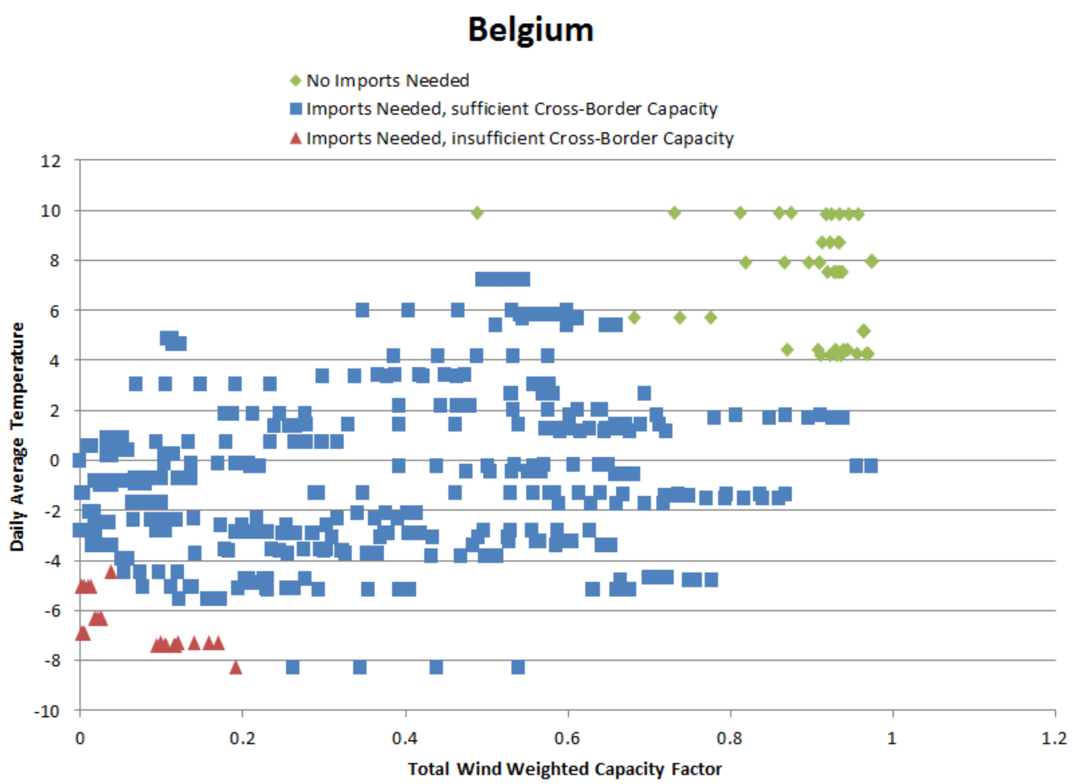

Figure 13 - Probabilistic assessment of strategic reserves sensitivity for Belgium for the representative situation investigated

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5.5. Impact of the solar eclipse on European power system

On 20 March 2015, a solar eclipse will pass over the Atlantic Ocean between 07:40 and 11:50 UCT (08:40-12:50 CET) and the eclipse will be visible across Europe. The reduction in solar radiation, in case of clear sky, will directly affect the output of the photovoltaics (PV) and for the first time this is expected to have a serious impact on the secure operation of the European power system.

In 2015 the installed capacity on PV in the synchronous region of Continental Europe is expected to reach 87 GW and the eclipse may potentially cause a reduction of the PV infeed by more than 30 GW during clear sky conditions. This situation will pose a serious challenge to the regulating capability of the interconnected power system in terms of available regulation capacity, regulation speed and geographical location of reserves.

First level of responsibility to handle solar eclipse issues is on the shoulder of the TSO with PV installations. Obviously, TSOs with a large amount of PV installations, especially with a larger amount than available individual reserves, need to work together with other TSOs.

ENTSO-E has established a task force to investigate the possible countermeasures with aspects of lead time for preparation and activation and on which level of commitment (European wide or on national base) these measures could be used. The goal of the work is to confirm that the effects of the solar eclipse, even with clear sky, will be manageable by the sum of all taken measures.

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6. Gas disruption

EC DG-ENER in a letter of 24 July 2014 informed ENTSO-E about the energy security stress test exercise to all the Member States in order to assess the impact of Ukraine/Russia gas disruption and the possible mitigating measures that each MS can take in this context. The outcome of this exercise feed into the European Council discussion on 23 October. EC DG-ENER published its final Communication on the short term resilience of the European gas system: 'Preparedness for a possible disruption of supplies from the East during the fall and winter of 2014/2015[10].'

ENTSOG has performed a top-down modelling approach of gas supply, demand and infrastructures to support the European Commission in their assessment of the bottom-up approach of Member States gas disruption stress tests. The ENTSO-G results provide a top-down approach in which the disrupted gas demand is spread between Member States in order to minimize the relative share of disrupted demand in each country. Also ENTSOG assessment allows for a repartition of the direct imports, allowing for the adaptation of the supply to the mitigation of a disruption (e.g. countries not directly disrupted will import more LNG to free up other supply including UGS to support the most affected countries). ENTSOG has recently published its Winter Supply Outlook 2014/15 & Winter Review 2013/14[11].

Short Term Data Correspondents (SACs) were kindly asked, at the launch of the data collection process, for any available information provided by TSOs to their ministries in relation to the request from EC-DG ENER to Member States on the energy security stress tests to assess the risk of short-term gas supply disruptions during the coming winter.

The answers provided by TSOs assess the two main risks for the electricity sector due to the gas disruption:

1. Reduction in power (electricity and heat) production from gas fired power units (e.g. CCGT, GT, CHP, etc.).
2. Increase in electricity demand from household, industry and district heating as a consequence of the gas disruption. Typically each country follows a «protected consumers» distribution procedure when spreading the gas disruption among the different sectors. The residential sector is typically the most protected one and the last one to be affected by any gas disruption.

Below the assessment by the different TSOs on impact of gas disruption is provided.

One important conclusions is that the regional cooperative assumptions used by ENTSO-G in their top-down modelling approach of gas supply are not necessarily in line with the positions of each MS as provided during the stress test exercise. Correspondingly the 'bottom-up' data figures provided by TSOs for this WOR14/15 report, provide the 'best estimate' from TSOs on two main risks for the electricity sector of their system due to the gas disruption.

It should be noted that these answers do not necessarily need to correspond to the impact for the electricity sector when considering the ENTSOG results. ENTSOG results provide a top-down view on how the disrupted gas demand could be spread between Member States in order to minimize the relative share of disrupted demand gas within (an affected region of) the European system within a cooperative situation and under several severe scenarios. These regional cooperative assumptions by ENTSO-G might not be the same

[10] Communication from the Commission to the European Parliament and the Council on the short term resilience of the European gas system 'Preparedness for a possible disruption of supplies from the East during the fall and winter of 2014/2015' COM(2014) 654 final, Brussels 16.10.2014, http://ec.europa.eu/energy/stress_tests_en.htm

[11] Winter Supply Outlook 2014/15 & Winter Review 2013/14, SO0008-14, 3 November 2014, http://www.entsog.eu/public/uploads/files/publications/Outlooks & Reviews/2014

as the ones adopted by the MS during the stress test exercise and the ‘bottom-up’ data figures provided by TSOs for the WOR14/15 report here[12].

Is it worth noticing that at the time of completion of this report, Russia and Ukraine have signed a deal to secure winter gas supply for Ukraine and EU[13].

6.1. Individual country responses to Gas disruption

Austria

In Austria an interruption of supply to gas-fired power plants might imply overloaded lines. Especially because of the high load flows from west to east and on the tie lines between CEPS and APG. One of the reasons for these high load flows is the relatively low production of electricity in the eastern part of Austria at this time (low hydropower, no wind, no photovoltaics, no gas power). The lack of electricity can be partially substituted by intensified operation of pump storage power plants. This leads to constraints of the availability of the operational reserves. Additionally import will increase massively. During the longer period (six months) this situation will get even worse and could trigger the application of the Energy Emergency Power Act.

Bulgaria

In case of total interruption of supply to gas-fired CHPPs, there are two options:

- without any use of substitute fuel the effect will be a decrease of total electricity power output for Bulgaria estimated at 329MWe. This option must be avoided at all cost, because during the winter the full shut down of CHPPs will lead to total crash of equipment (pipes, boilers, cooling towers and so on) due to freezing and will require totally new investments;
- with use of substitute fuel the effect of decreasing the total electricity power output for Bulgaria is estimated at 83MWe.

Czech Republic

Level of generation capacity maintenance is in accordance to the standard revision plans. Therefore we don't expect during the winter period any problems with limited availability.

Hydro inflows in reservoirs are calculated at 50% probability and we do not expect any congestion for run of river power plants production. Gas power plants in Czech Republic are prevailingly used for peaking or regulation reserves.

The expected impacts of the shortages of the Russian gas deliveries can classified as minimal based on the following assumptions:

- low participation the gas generation on the CZ electricity production – ratio less than 2%;
- gas turbines are providing ancillary services and due the low utilization in the case of activation such capacity can be replaced or substituted by other fuel – for example heating oil.

In the situation of longer shortages of gas deliveries for household heating and other vulnerable consumers are limited the possibilities of the substitution to other fuel. In the case of the switching to the electricity supply, we have to consider increase of the electricity consumption, but it will not exceed significantly severe conditions assessed in the Winter Outlook. Main limitation parameter is the reserved capacity from the distribution grid.

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[12] During September and based on ENTSO-G input, data from previous Outlook Reports (Winter 2013 & Summer 2014) and Eurostat data, ENTSO-E provided a high level preliminary assessment of ENTSO-G gas disruption figures on the electricity sector to EC DG - ENER.

[13] http://europa.eu/rapid/press-release_IP-14-1238_en.htm

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Taking into account available fuel mix for electricity generation in the Czech Republic we can conclude that will be created sufficient reaming capacity in CZ power system allowing in the acceptable range to help with export to other TSOs. Due to the used technology on gas turbines (especially in case of CCGTs) the minimal generation is higher than zero approx. up to 300 MW. Therefore we are recommend to use this value for remaining capacity.

Denmark

For Denmark, the gas supply situation for the next winter is better compared to the last winter. The gas storages are filled to a high level.

Additionally a new compressor station has been completed in September 2013 linking Denmark and Germany closer to each other. This is a first step of a two-step project.

Using this information, ENTSO-G has investigated the remaining flexibility and potential level of demand curtailment in Europe for the coming winter for high demand situations plus some extra challenges.

During a cold winter day the situation improved for Denmark due to filled storages and enhanced connection to Germany compared to last winter, both, with and without disruption of transit through Ukraine.

In case of a 14-days cold spell across Europe, for Denmark there is still a risk curtailed demand, both, with and without disruption through Ukraine. Remaining flexibility is less than 1% and share of curtailed demand is less than 25%.

Step 2 of the cross-border project to Germany is expected to mitigate this risk.

Finland

In Finland, gas supply disruption wouldn't have remarkable impact on electricity generation capacity. Gas can be replaced with other fuels within short time in gas power plants.

France

From the French gas system, the risk of a gas shortage (Ukrainian crisis) involving CCG generation is mainly low.

Great Britain

Whilst the GB market does not receive gas directly from Russia, there is a potential for wider European impact, which could impact gas flows across the whole of Europe. Gas stress tests have been carried out to understand the impact that any potential gas supply disruptions might have on GB. The results of the analysis show that GB gas demand can be met as normal under average winter conditions, with both low and high levels of disruption. Additional market actions (e.g. reduced exports to the continent, maximised liquefied natural gas (LNG), and/or demand-side reduction) would only need to be triggered for the most extreme scenario of cold weather conditions combined with a full disruption of gas from Russia. It is likely that much of the replacement gas in the event of high levels of disruption would be met from increased LNG imports.

Hungary

As matter stands the outcome of the Ukrainien crisis is possible to have significant impact on the Hungarian electricity system. In case the gas supply wanes or terminates, then the operation of gas-fired power plants is likely to become unpredictable, which in extreme conditions can cause even 4000 MW capacity outage in contribution with the decrease of electricity import coming from Ukraine. The unavailability of the needed capacity in this range for a relatively long period of time cannot be compensated neither by domestic sources, nor by additional import. In case there is no continuous gas supply, it is possible to run out of alternative fuels within 2 weeks. Moreover, it is necessary to take into consideration further decrease of import as a consequence of available capacity limitation in the gas-fired power plants of the adjacent electricity systems.

Ireland

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A Gas Stress Test analysis has been carried out by EirGrid on behalf of the Commission for Energy Regulation (CER). 96% of Ireland's annual gas demand is supplied from Great Britain and with lack of gas storage and LNG facilities, there are limited preventive measures that can be taken in the short term to reduce the effects of a gas supply interruption. However, the market modelling applied by Great Britain's TSO (i.e. National Grid), on behalf of the UK Government, indicates that there is no unmet gas demand in the UK and Ireland in the event of a one month or six month gas supply interruption from either Russia or Ukraine. Therefore, it is assumed that Ireland's gas supplies from Great Britain will be maintained.

In the event that Ireland has insufficient gas to meet its gas demands, load shedding arrangements may need to be applied by Ireland's National Gas Emergency Manager (Gaslink). Such arrangements would initially involve the load shedding of gas-fired generators, followed by industrial customers and smaller gas consumers. Practical measures are in place to cope with a reduction of gas supply, including the availability of secondary fuels for power stations, ensuring rota-load shedding plans for electricity consumers are up to date, and carrying out a national gas emergency planning exercise.

Italy

Emergency plans elaborated by the Italian Ministry of Economic Development in which it was analyzed the risk for the italian sistem, highlight the capacity of italian gas system to cope with limited consequences for quite a long period (up to 3 months) with suspension of the gas transit through Ukraine.

Latvia

The base load in Latvia is covered by CHPs which are mainly running on gas and currently there is no available back up fuel possibilities for these power plants. In case of full gas disruption the non usable capacity of CHPs could be around 1.19 GW and can make a big trouble in heating system and electricity sector. According to exchanged information among Government and Latvian Gas Company during the summer, a serious gas disruption couldn't be expected. Taking into account the existing agreements between Latvian Gas Company and Russia and sufficient amount of natural gas in Latvian gas storages there is not predicted any gas restrictions for coming winter. Latvian TSO has been participated in the preliminary Gas stress assessment for Latvian power system prepared by responsible Ministry and the following conclusions in case of full gas disruption in Latvia are pointed out:

1. Most critical transmission line (TL) maintenance in Russia could reduce internal Baltic cross-border capacities (XBC) significantly (1150 MW to 800 MW). (Electricity consumption reduction needed aprox. 500 MW in Latvia and Lithuania).
2. Emergency outage of Baltic internal TL could reduce XBC from 1150 MW to 750MW. (Electricity consumption reduction needed aprox. 550 MW).
3. The next emergency outage of TL leads to collapse of Baltic transmission network and possible blackouts of Latvian, Lithuanian, Belorussian and Kaliningrad power systems.
4. Emergency outage of TL could be compensated by the Hydro power reserves in Latvia and Lithuania up to 30h; after if no network restoration – load reduction up to 550MW necessary in LV and LT – appropriate B-TSOs agreement is necessary.

Lithuania

Majority of Lithuanian power plants are gas fired and gas supply. However gas supply to Lithuania is controlled by the one monopoly provider from Russia. In scenario of gas restriction the 750MW net generating capacity will be unavailable. In the beginning of 2015 the 1131 MW net generating capacity have possibility to operate on oil fuel. This amount of generating capacity can cover 57 % of peak load. The load increment for severe condition was calculated taking into account the gas restriction scenario which should increase the normal load by 10%.

Concerning all available oil fuel generation and generation from renewable sources we expect up to 750 MW deficit at peak hours which can be covered by imports from neighbour countries. Electricity demand during off-peak hours can be covered by local oil generation. During gas supply interruptions, additional risk of disconnection of cross-border tie lines between Baltic countries and with third countries is considered. In such scenario, Baltic power systems would have to operate in isolated mode and special measures need to be introduced, however operational security would be decreased. Considering Kaliningrad area operation in isolated mode together with Baltic power systems would result in higher level of readability of the region, however Kaliningrad area operation in isolated mode is also technically possible as recent tests of Kaliningrad area shown.

The Netherlands

Due to the fact that the Netherlands has sufficient Gas supplies of its own, any crisis in Gas is not to be expected to have an effect on the Dutch electricity supply.

Norway

Norway will not be directly affected by a reduced gasflow from Russia or Ukraine.

Poland

No special impact of the potential gas disruption on the polish electricity system is forecasted, mainly due to fact that energy generation from gas amounts at about 2% of total production.

Portugal

Uncertainty arising from situation in Ukraine does not also poses a risk, as natural gas supplies for the national system have origin in 51% in the Maghreb pipeline with the rest coming from different sources around the world in LNG cargo ships that unload in our facilities in Sines.

Romania

In case of a gas crisis certain thermal power plants can switch from gas fired to only oil fired. In case of coal freezing the slow tertiary reserve and part of the remaining capacity will be activated.

Serbia

Gas supply shortage caused by Ukrainian crisis. From experience of gas crisis in 2009 it is estimated that gas shortage may increase electricity consumption up to 300 MW and further increase over this margin in winter peak is not possible due to constraints in distribution system.

Slovakia

The share of power plants that in the process of electricity production need natural gas in some way (start of the production, stabilization, etc.) is up to 26% (2106 MW) of the total installed power of power plants in Slovak Republic.

However, the total loss of actual produced electricity is calculated from the actual produced electricity, not from the installed power, and this loss will represent only from 4.5% (September = 160 MW) to 6% (January/February = 245 MW) of the total load in the peak time.

During the previous gas crisis (01/2009), households were not interrupted from natural gas supplies. Slovakia has reserves of natural gas for about three months in case of gas interruption from abroad. Analysis of electricity consumption during the gas crisis came to the conclusion that consumption of customers had no or insignificant increase of electricity consumption (some households changed the source of heating to electricity systems). Substitution of natural gas by electricity as the primary source for heating is not popular due to the price relations between electricity and gas in Slovak Republic. We expect similar scenario, therefore increase of electricity consumption in case of total interruption of natural gas supply from Ukraine is not expected until natural gas reserves run out. Moreover Slovakia has developed possibility of reversible flow of natural gas from west Europe since the last gas crisis. Reversible gas flow from west Europe will save gas reserves.

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Cut off of gas supply from the Ukraine will have impact on ancillary services provision. Secondary control power is provided also on gas power plants in Slovakia. In case that gas power plants are not able to run the tertiary control have to be activated much more.

Spain

From the point of view of generation adequacy, the margins evaluated in the Spanish peninsular system for the upcoming winter are quite wide even considering very low wind generation (95% probability) and a high thermal forced outage rate. Adequacy problems are very unlikely to happen even under extreme conditions. Gas supply in Spain is covered 50% by LNG - coming from a very wide range of geographical areas - and 50% through gas pipelines from North Africa. No problem related to gas disruption are foreseen for the upcoming winter.

Sweden

Sweden will not be directly affected by a reduced gas-flow.

7. Country level

7.1. Individual country responses to Winter Outlook

Albania

For the coming winter the balance between generation and load will be managed by using our hydro power plants and imports. Considering the firm import contracts, the adequacy and security of the Albanian power system will not be threatened. In Albania there are not yet installed wind generations, and we do not expect to face inflexible generation at times of minimum demand. The maintenances of generation units and in transmission system will be avoided at that period. The cross border capacities will be sufficient to make possible planned import and transit.

General situation

The firm maintenance program of the generation units for next year, normally is issued in October, nevertheless, the maintenance schedule of the generating units is set to minimum because the most maintenance works have been accomplished during the summer period of the year. In case of deficiency of generation (low hydrology, loss of major units) or unavailability of imports from neighboring countries, and if the system reserves could not cover the lack of energy, last measure load reduction is possible according to national defense scheme. We do not expect any problems related with shortages of transmission capacity or low generation availability, all maintenance works are already performed during the summer and fall period of the year.

Most critical periods

The most critical period remains during the second part of December and January, depending from weather conditions and temperature. Historically, the last week of the year has been the most critical. In case of emergency, our Operator is authorized to apply load shedding in accordance with terms of Grid Code.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

In relation to maintain adequacy, our power system is usually dependent upon imports of electricity from neighbouring countries, and it will be dependent upon imports also for the coming year. Physical imports are expected from the Greece and Montenegrin border and exports on the Kosovo border. Due to high transfer capacities (two interconnectors 400 kV and two 220 kV), no problems with congestions due to transit flows or security of supply are expected.

In general the interconnections are sufficient for import/export of electricity. The average simultaneous import capacity for the coming winter is approximately 500 MW, whereas the average simultaneous export capacity is approximately 300 MW.

Available cross border capacity allows compensation of eventual energy deficit and transit of energy for successfully functioning of electrical market.

We rely upon imports due to both security of electricity supply reasons and also market conditions between our system and the neighbouring countries.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

Due to lack of wind generation, we are not expecting to have inflexible generation at demand minimum periods. Anyway in export direction always we have enough available transfer capacity.

Synopsis

As in the previous winters, Albania is a deficit area in peak demand hours, and that deficit will be offset by imports from neighboring areas. It is expected that the coming winter will be calm, though the most critical period remains during the second part of December and January. The level of remaining capacity considered as necessary in order to ensure a secure operation for the next winter is 120 MW. In Albania there are not yet intermittent energy sources like wind or solar, to be taken into account in our assessment. The maintenance of the generating units is performed already. No problems in the transmission network are expected because the most maintenance works have been accomplished during the summer and fall period of the year. Import Contracts till the end of this year are concluded already by market participants and the wholesale public supplier, and the other contracts covering the first quarter of next year, are under the process. In case of severe conditions it will be requested to increase the import with at least 100 MW. Under these conditions all criteria for the system adequacy will be met.

Framework and methodology of the assessments

According to the Grid Code, OST's regular operation planning horizons are: year (Annual Operation Study, AOS), month, week and day. The AOS is based on a model combining stochastic and deterministic approach, and make use of information provided by grid users. In medium and short term, OST conducts studies concerning the Generation Adequacy Assessment. The studies include load forecasts and multiple scenarios on energy management using probabilistic and deterministic methods. The energy management studies aims at checking the actual energy situation and the level of hydro reserves. These studies are regularly revised to include mainly variations in the load and/or the availability of the power plants. The winter adequacy assessment is made by using these studies and OST’s data base.

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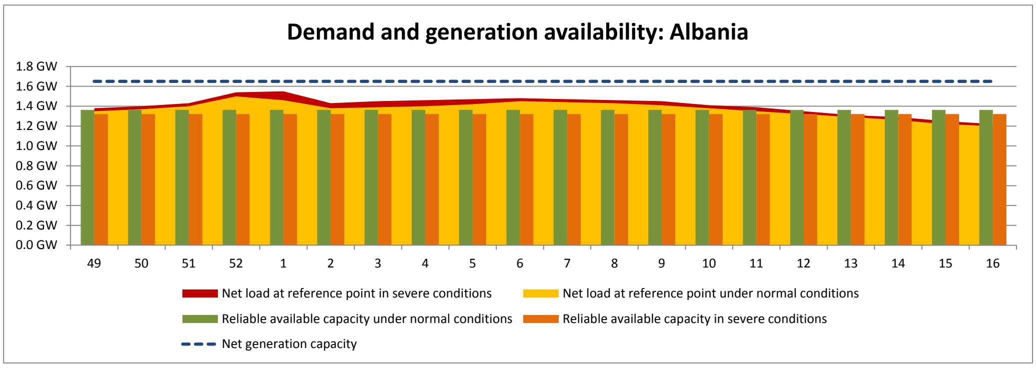
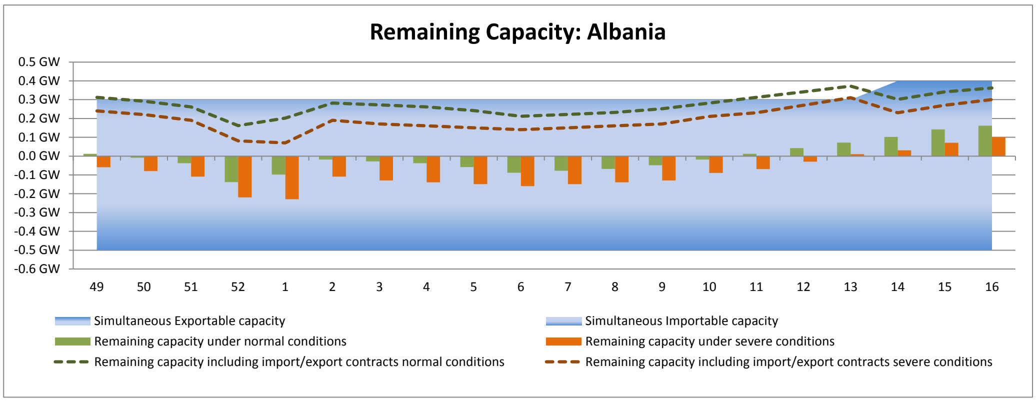
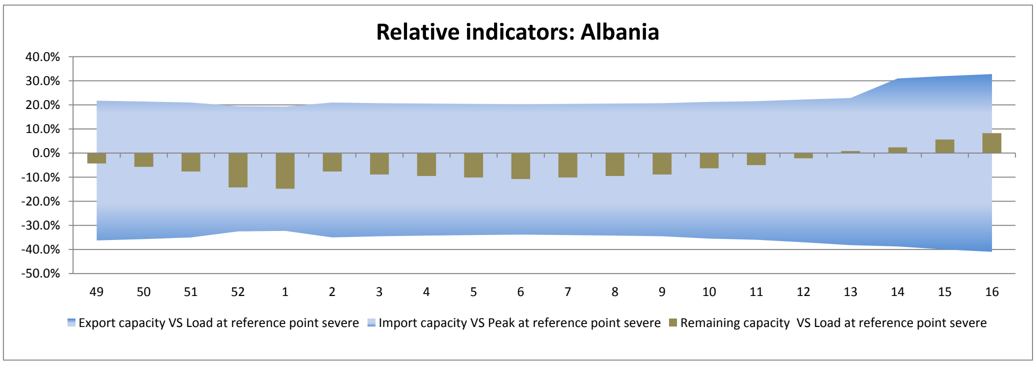
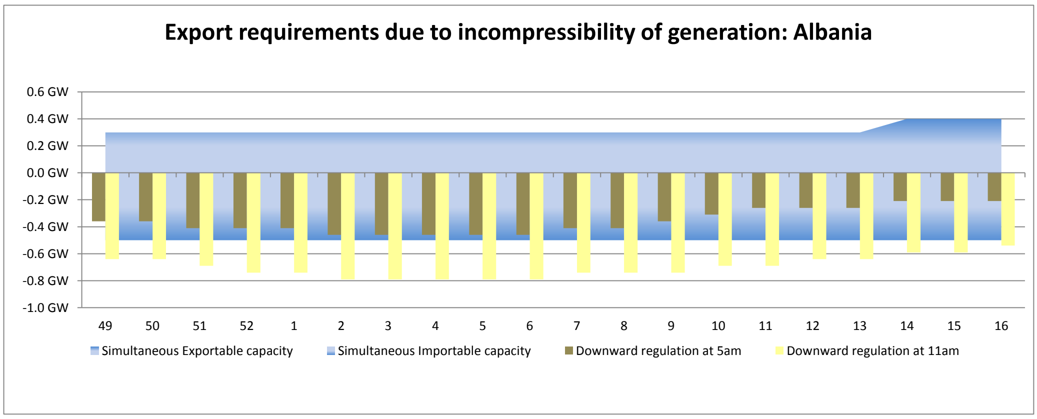

Demand and generation availability: Albania
1.8 GW
1.6 GW
1.4 GW
1.2 GW
1.0 GW
0.8 GW
0.6 GW
0.4 GW
0.2 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Albania
0.5 GW
0.4 GW
0.3 GW
0.2 GW
0.1 GW
0.0 GW
-0.1 GW
-0.2 GW
-0.3 GW
-0.4 GW
-0.5 GW
-0.6 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Albania
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
-50.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Albania
0.6 GW
0.4 GW
0.2 GW
0.0 GW
-0.2 GW
-0.4 GW
-0.6 GW
-0.8 GW
-1.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Austria

Under normal conditions no problems with regards to load generation balance are expected in Austria for winter 2014/2015. There is only a very small risk in case of very high load (due to a long lasting period with extreme low temperatures) in combination with reduced generation (due to dryness and lack of primary energy sources like natural gas). In general APG observes a tendency of thermal powerplants to be temporay mothballed also during winter times.

General situation
No major specifics are foreseen during winter 2014/2015.

Most critical periods
No specific critical periods are expected but situations with high wind infeed in Germany could have critical impact.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Due to increased renewable infeed in Germany, high imports are expected in the coming winter period.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
No problems concerning interconnectors are expected.

Framework and methodology of the assessments
For the upcoming winter APG assumed an increase of load of +0.5% compared to winter 2013/2014. Wind power plants and solar power plants are treated as 100% Non-usable capacity at peak load under normal and severe conditions. Biomass power plants and 50% of all thermal power plants used for district heating are assumed to be "Must Run Units" during the next winter period.

The net generating capacity of the Kraftwerksgruppe Obere Ill-Lünersee is considered as firm export to Germany as it is directly connected to the German TSO TransnetBW. The net generating capacity adjusted by an unavailability of 20% amounts to 1,4GW. This procedure has been agreed on with TransnetBW. As there is a common market between Austria and Germany no NTC values were considerd at this border.

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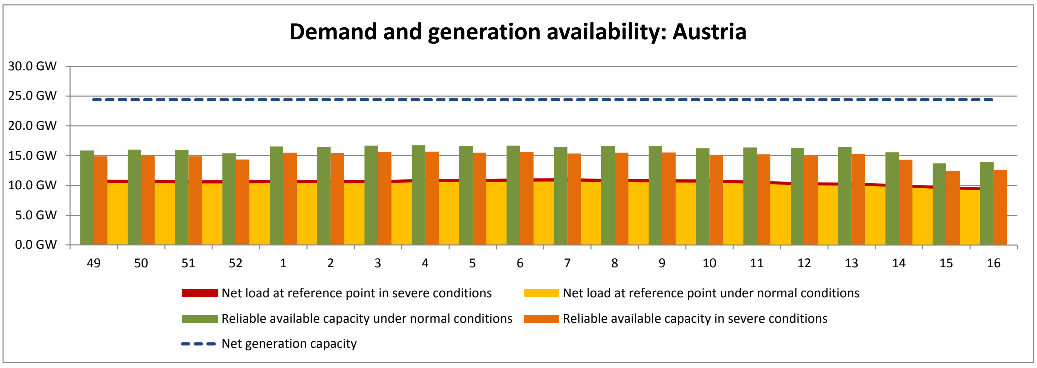
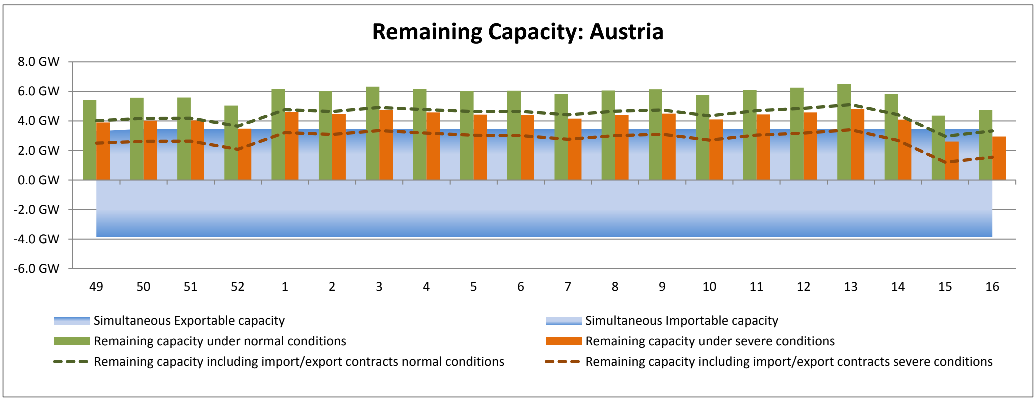
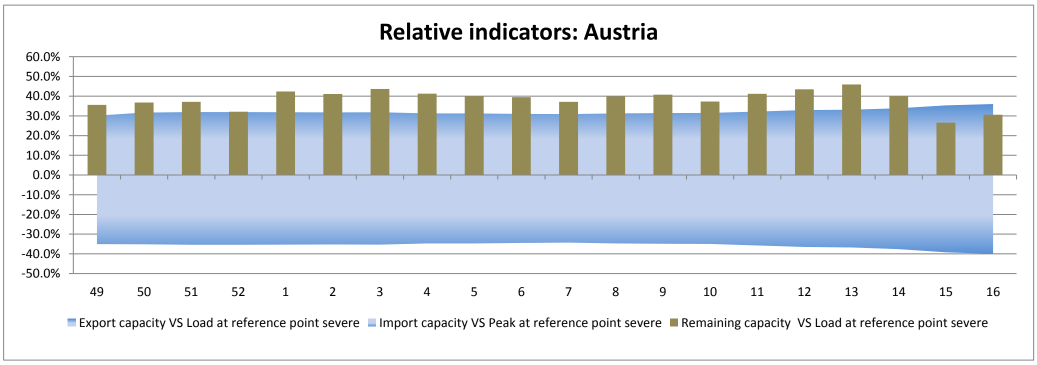
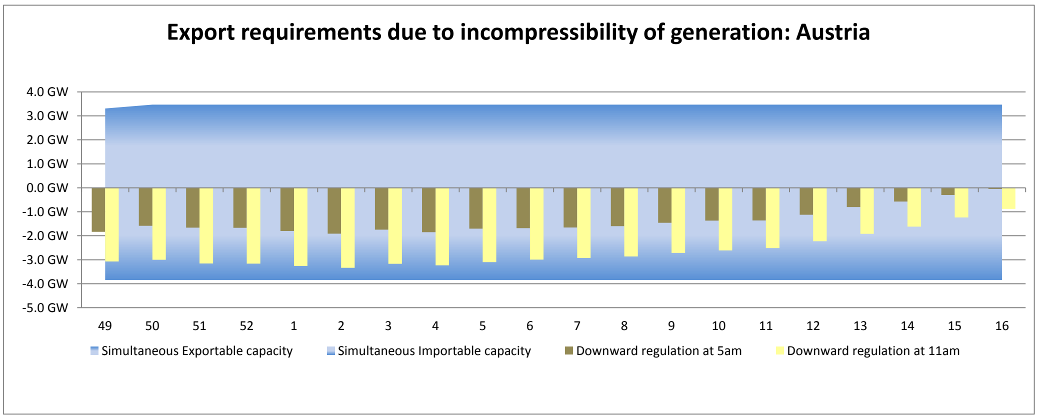

Demand and generation availability: Austria
30.0 GW
25.0 GW
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Austria
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Austria
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
-50.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Austria
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
-5.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Belgium

General situation
The situation in winter 2014/2015 will potentially be very stressed for the Belgian system. This is mainly due to three facts: firstly, resulting from measurements carried out in June and July 2012, potential problems were detected with the reactor vessel of one of the nuclear power plants on the site of Doel. Similar problems were also detected during the revision of a similar nuclear power plant at the Tihange site. As was already the case for winter 2012/2013, currently both units (adding up to more than 2000 MW) are shut down, and decisions about re-starting the power plants or permanently putting them out of service are not expected before the end of the winter.

Secondly, due to a technical defect, a third nuclear unit (1038 MW) is out of service at least until the end of 2014. Currently it is planned to return into service at the start of 2015.

Thirdly, the recent closing in 2013 of classical generation units. Additionally, the nuclear phase-out according to Belgian law starts on the 15th of February with the closure of Doel 1, a 433 MW unit. Compared to previous winter, these closures are - in terms of capacity - still more than compensated for by new renewable production units. However, the infeed of these renewable units is less stable and less guaranteed compared to classical production units, yielding a negative effect on global generation adequacy. On the other hand, no new thermal units are planned to be commissioned.

For the adequacy analysis, all most recently available official information is used. There is however an important dependence on the availability of the nuclear unit that is out due to technical reasons. When this unit would not return before 1 January, and stay out whole winter long, the probability of loss of load for the Belgian system becomes very significant.

Due to the announced closing of different CCGTs and Doel 1 and the lack of new generation capacity, the Belgian parliament already enacted a new law in March 2014, introducing the concept of strategic reserves for the Belgian system. These additional reserves are constituted of generation units and demand response contracts amounting up to 840 MW in total for coming winter. The strategic reserves are taken out of the market, and can only be used when Belgium experiences risks of shortage to cover the Belgian load.

This capacity is included in the Elia contribution to the ENTSO-E Winter Outlook under the "Load Reduction" category (and therefore the “Net Load” in Appendix 4 already includes the full use of the strategic reserves).

Under normal circumstances (average temperatures, average load, average forced outages and average renewables infeed), Belgium probably will already be structurally dependent on imports to cover the evening peak on weekdays. The expected import needs are estimated at about 800 MW, which under those conditions should be perfectly feasible regarding cross-border capacities and regarding available energy in neighboring countries. Under severe conditions however (cold temperatures, low renewables infeed and high forced outages) Belgium will heavily depend on structural imports up to 3.6 GW (even after the above mentioned strategic reserves are used). Under specific conditions of generation deficit in Belgium and France, these amounts of imports could be problematic considering estimated cross-border flows of CWE and surrounding countries. Moreover, the corresponding energy should be available for purchase in the market.

Most critical periods
Apart from the holiday period, all weeks can potentially be critical depending mainly on the meteorological conditions in Belgium and neighbouring countries.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Belgium structurally and heavily relies on import from other countries to cover its peak load. This tendency was already apparent last years, but is currently boosted by the large nuclear unavailability. The real-time exchanged energy is of course dependent on the market situation, and can therefore be completely different from the strictly theoretical necessity of importing energy for maintaining generation adequacy.

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Expected role of interconnectors for managing an excess of inflexible generation at demand minimum periods

No issues with excesses of inflexible generation are expected for the winter to come.

Synopsis

Statistical studies performed by Elia identified important risks for the Belgian grid. Even under the following prerequisites:

- having the contracted amounts of strategic reserves available;
- having **3500 MW interconnection capacity available for imports into the Belgian grid (supposing that excess generation is available in other CWE countries); and**
- average temperatures for the coming winter and limited growth of the peak loads,

generation adequacy might not be guaranteed during the entire winter period, and demand limiting actions might be necessary for a limited amount of time. In case one or more of these prerequisites are not fulfilled, the probability and duration of needing additional demand limiting actions severely increases.

These findings are confirmed by the quantitative ENTSO-E Winter Outlook results for Belgium.

This assessment takes into account the actual, announced overhaul and an estimation of the average outages and non-usability factors of the generator units connected to the Elia grid and the DSO grids. The average outage rates of generation units were estimated based on historical data for the Belgian production park. Elia has the possibility to reduce the offtake of some large industrial customers on the basis of interruptible load contracts, but as these are part of the tertiary reserves, they are not used as a preventive measure to ensure system adequacy in the quantitative analysis.

In Figure 14 below it can be seen that under normal circumstances (average temperatures and average renewables infeed), a moderate level of imports is needed during most of the winter period to assure the adequacy of the Belgian system.

For severe conditions however – shown in Figure 15 – with cold temperatures (P95: 19 in 20 days were warmer since 1994) and almost no wind infeed, between 3000 and 3600 MW of imports are needed to cover the Belgian load.

In both scenarios, the additional capacity of the strategic reserves is already included in the remaining margins.

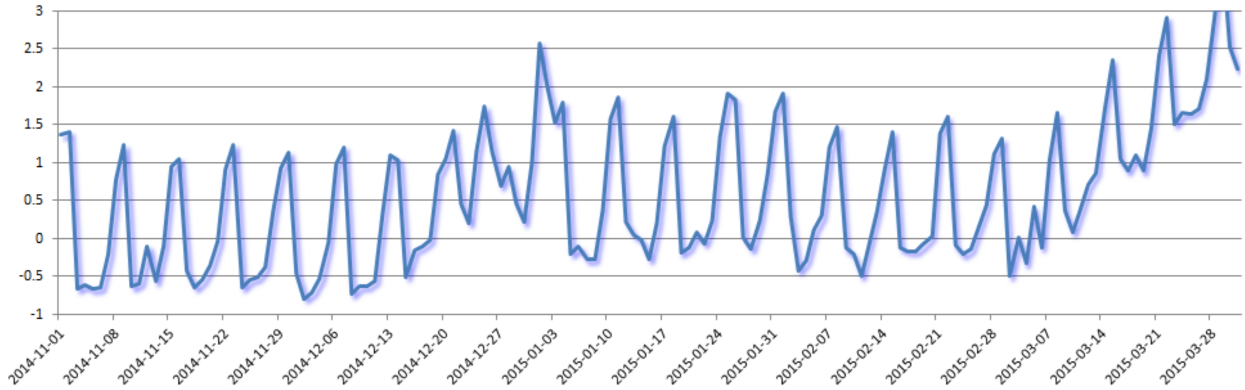

Figure 14 - Remaining capacity under normal conditions

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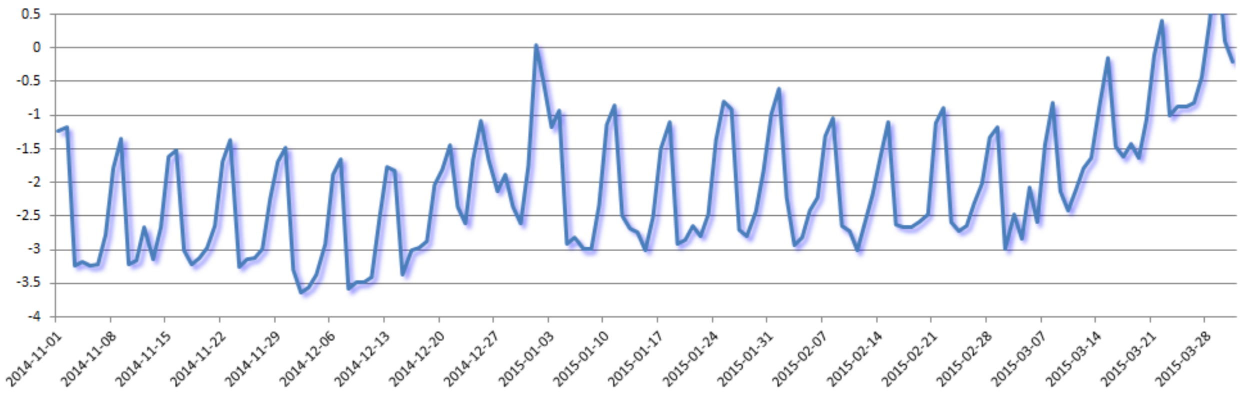

Figure 15 - Remaining capacity under severe conditions

The large unavailability of nuclear power plants shall therefore lead to an increased Belgian dependency on imported energy. **It should be assessed if no energy shortages on the European scale – and more specific on the CWE market – are expected, which could make importing sufficient amounts of energy impossible.**

To prepare for the coming winter, **a winter action plan (called BE.Ready)** was put into place by Elia. This plan encompasses several actions to mitigate these problems as much as possible by:

- altering (cancelling) maintenance and outage plans (grid and generation) for the coming winter;
- assuring import capacities;
- sensibilize and strongly financially incentivize balance responsible parties by increased imbalance tariffs in scarcity conditions;
- updating procedures and action plans in case of an energy shortage.

As a conclusion, the increased structural Belgian dependency on imports is a fact. As a consequence, the generation/load adequacy cannot be ensured at national level, even under normal conditions. Taking into account severe conditions aggravates the situation considerably. Therefore, Belgium will be dependent on the availability of energy in the CWE region. In case of scarcity, there is a risk that demand limiting measures might have to be taken.

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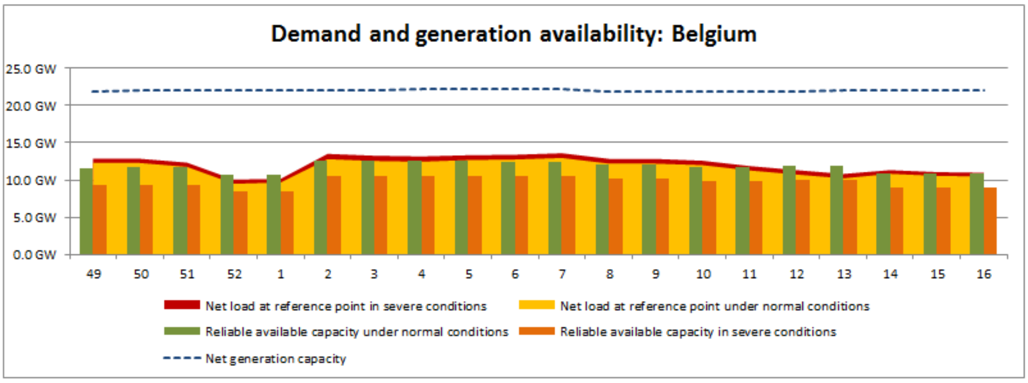
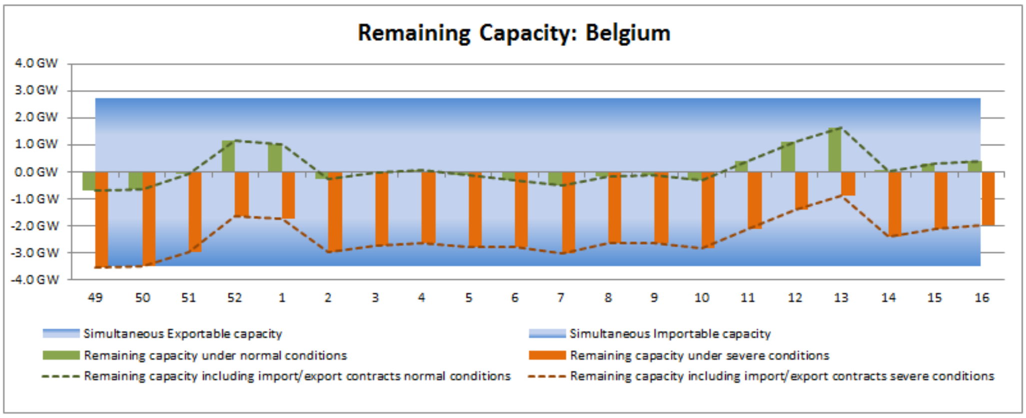
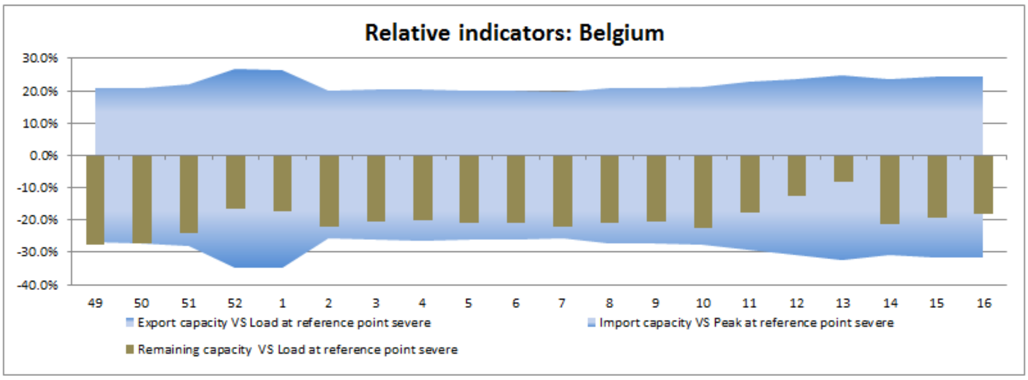
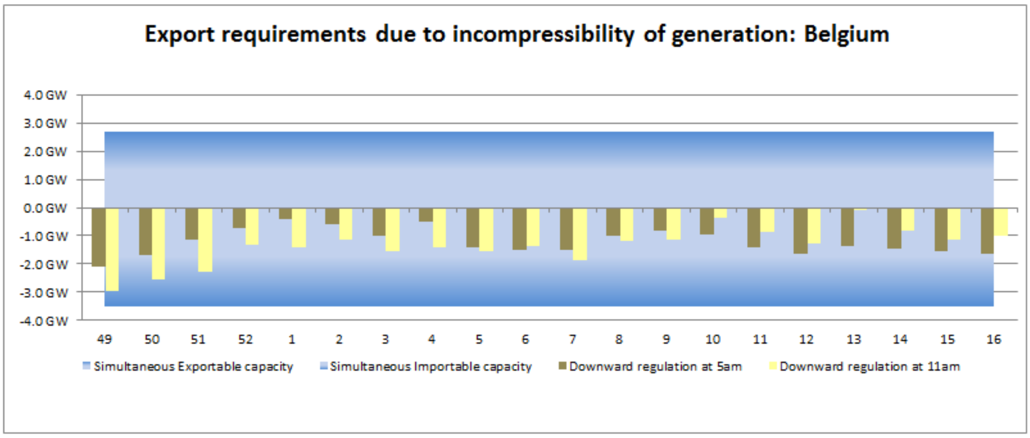

Demand and generation availability: Belgium
25.0 GW
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Belgium
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Belgium
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Belgium
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Bosnia and Herzegovina

Generally, there are not expected problems regarding power system adequacy in Bosnia and Herzegovina for the winter 2014/2015.

General situation

Regarding possible gas reduction, there is expected an increase of load about 10%, and possible overload in some power station 110/ x kV in Sarajevo region, but power system adequacy would not be endangered.

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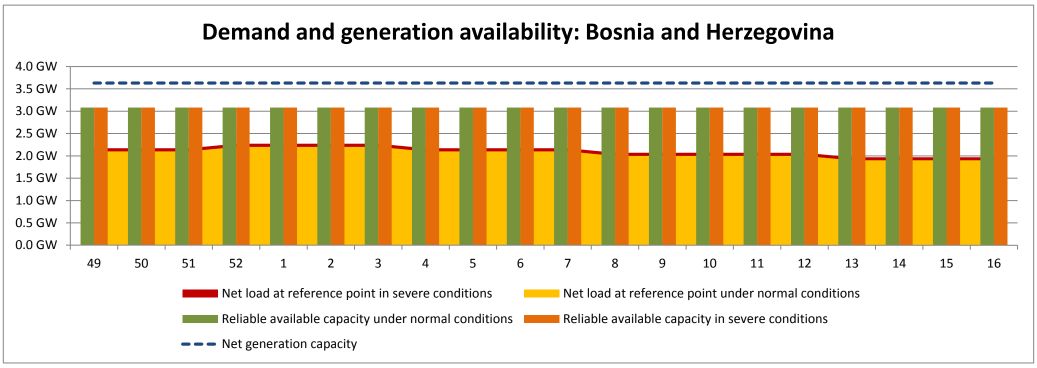
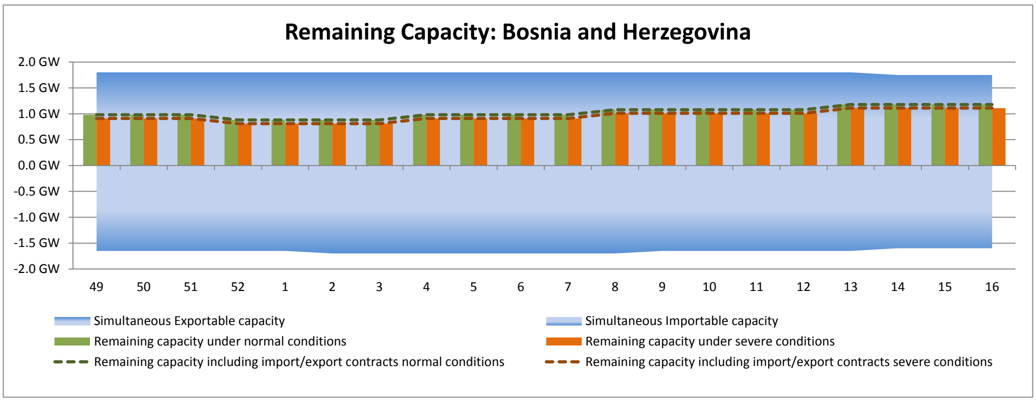
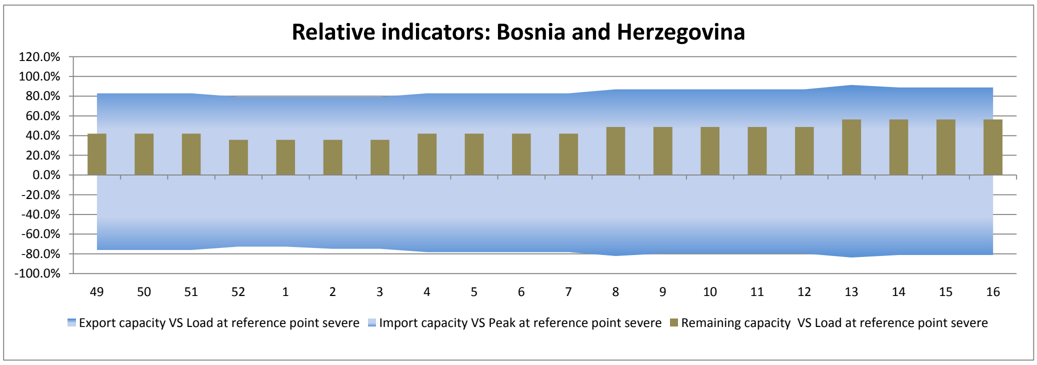


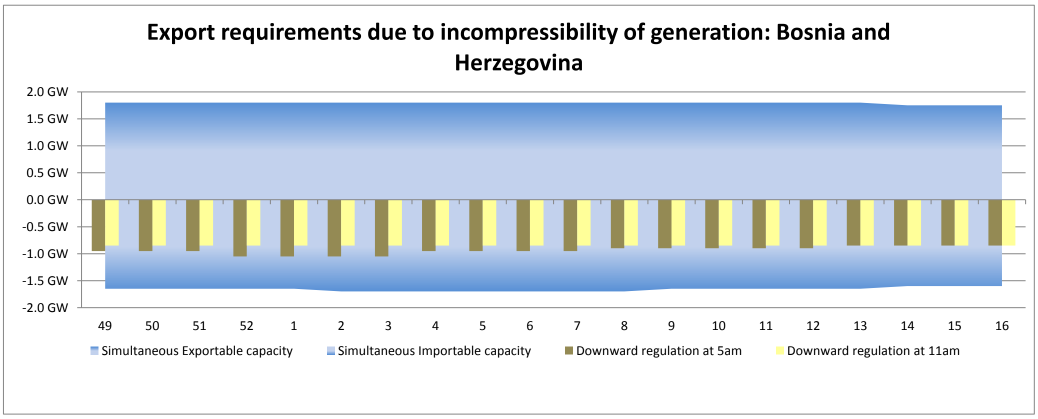
Demand and generation availability: Bosnia and Herzegovina
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity



Remaining Capacity: Bosnia and Herzegovina
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions



Relative indicators: Bosnia and Herzegovina
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe



Export requirements due to incompressibility of generation: Bosnia and Herzegovina
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Bulgaria

We do not expect adequacy problems for the upcoming winter season in both conditions – normal and severe. The maintenance schedule of all major generating units is strictly followed and will be finished by mid October. Accompanying measures for keeping the forced outage rates at the lowest possible levels will be taken as well. The current target levels of the big reservoirs are met and we expect reliable operation and predictable contribution of all storage and pump storage hydro plants to the power balance.

No problems in the transmission network are expected because of intense maintenance work over the summer period. The wind penetration is still not critical for the system (684 MW) and that is why we do not expect any problems concerning combinations of high wind and high level of must run generation during night hours of low demand. We expect some balancing problems at the end of the assessed period (end of March, beginning of April) due to the high penetration of PV plants (1036 MWp) and their highest output and low consumption typical for the weather conditions for this period of the year. Pump utilization increases during afternoon hours of low load levels.

For our power system severe winter conditions are considered periods with daily average temperatures lower than -5 C which is the saturation tenperature of the heating zone in Bulgaria. Nominally the severe temperture condition are defined as periods where the daily average temperature is wit more than 9 C' lower than the normal dayly average temperature for the assesed period. The load sensitivity to temperature for the assessed period is as follows: December and January -95 MW/C, February -100 MW/C and March -90 MW/C. This results in an increase of the load on minimum basis of 700 MW during severe cold waves. The latest information and assessments regarding the energy security stress tests in Bulgaria related to an eventual gas crisis have already been submitted to EC.

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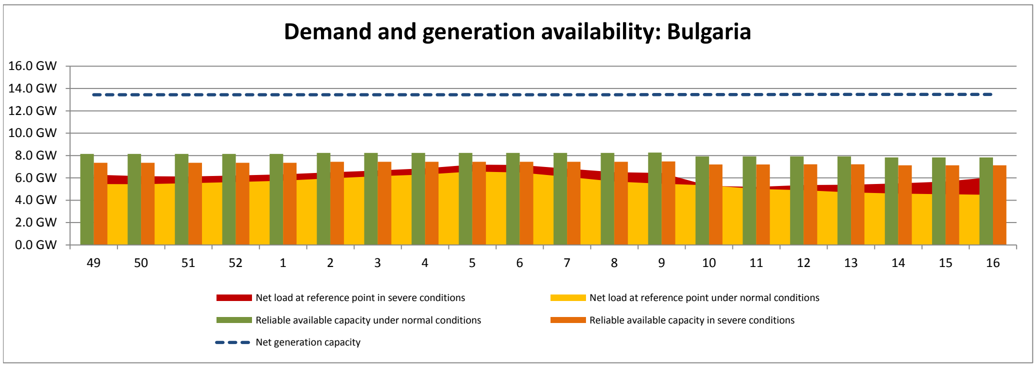
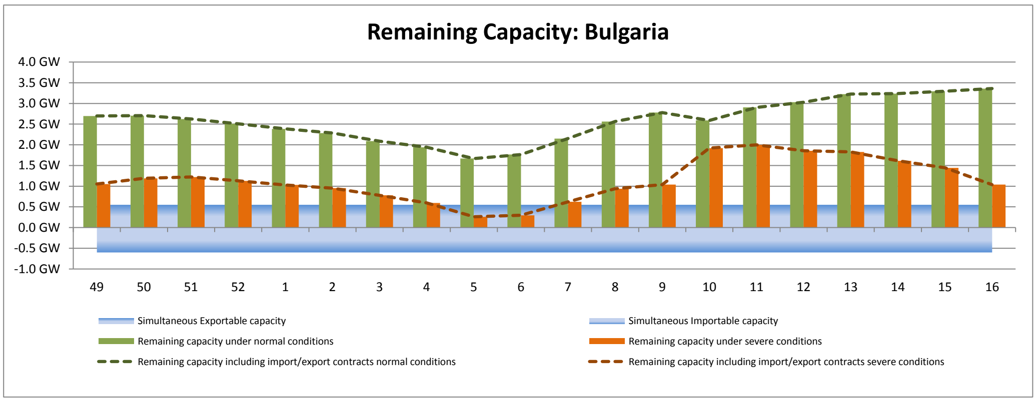
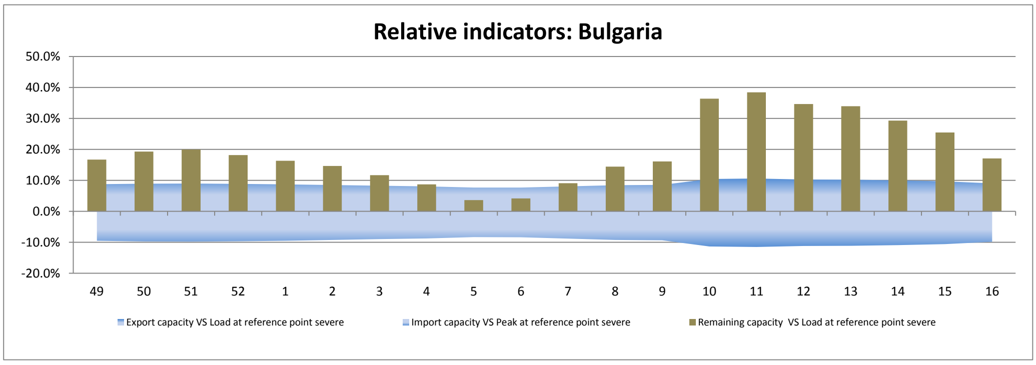
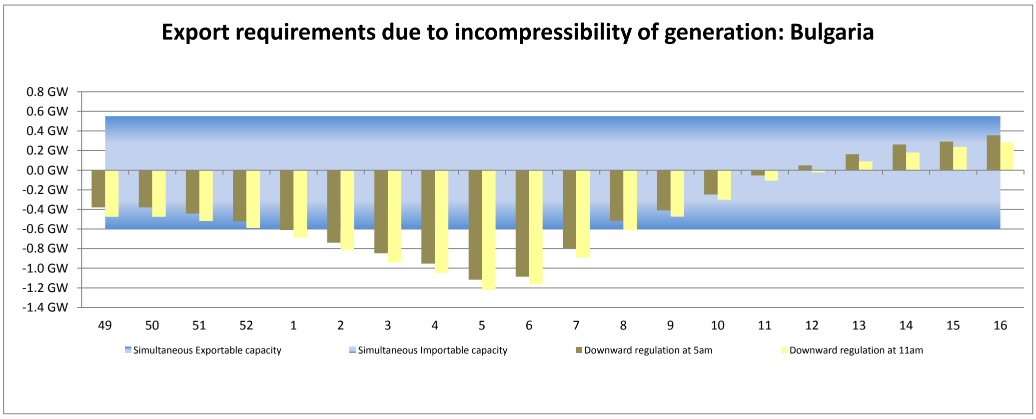

Demand and generation availability: Bulgaria
16.0 GW
14.0 GW
12.0 GW
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Bulgaria
4.0 GW
3.5 GW
3.0 GW
2.5 GW
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Bulgaria
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Bulgaria
0.8 GW
0.6 GW
0.4 GW
0.2 GW
0.0 GW
-0.2 GW
-0.4 GW
-0.6 GW
-0.8 GW
-1.0 GW
-1.2 GW
-1.4 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Croatia

Croatian transmission system operator (HOPS) does not expect any serious problem to achieve generation - load balance next winter. As the hydrological situation is satisfactory, domestic generation can be enough to meet great part of demand. To meet the rest of demand the generation of thermo power plants and imports should be used, depending on market and other conditions.

General situation

Generally all maintenances have to be avoided during the winter period. Maintenance activities can be expected from April 2015. Hydro levels are at this moment (October 2014) satisfactory. Some information about gas storage is not available to HOPS.

Most critical periods

Most critical periods are those with unfavourable weather conditions. Last three years Croatian power system suffered mostly at the beginning of February when the low temperatures followed by strong wind and heavy precipitations occurred.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

Croatian power system is connected with four neighbouring systems. The number of tie-lines is sufficient to enable import needed for electricity supply. There is not any problem expected with electricity transit also.

Synopsis

Most stressful periods for Croatian power system in winter period are those with unfavourable weather conditions. Such conditions were experienced last three years at the end of January and beginning of February when strong wind, heavy precipitations and melting snow caused interruptions in supply. Nevertheless, Croatian transmission system operator (HOPS) does not expect significant problems to meet demand. At this moment (beginning of October 2014) hydrological situation is satisfactory and with rainfalls in autumn it could be even better. For the supply of electricity customers in Croatia there are available tie-lines also.

Framework and methodology of the assessments

For making the winter adequacy assessment the data from the data base of Croatian transmission system operator (HOPS) were used.

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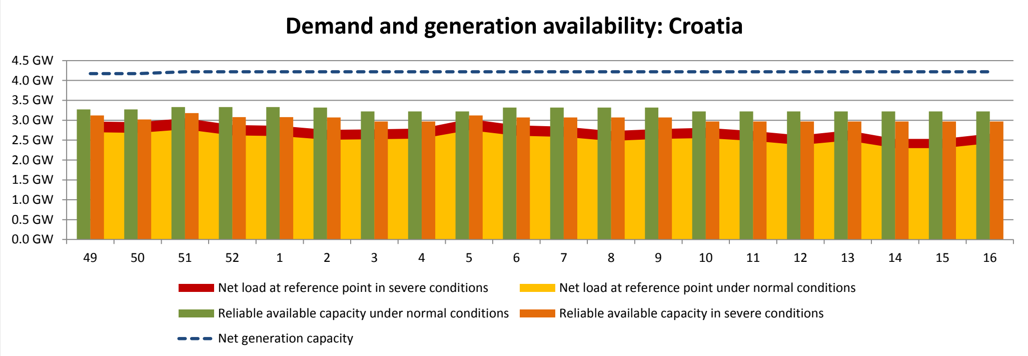
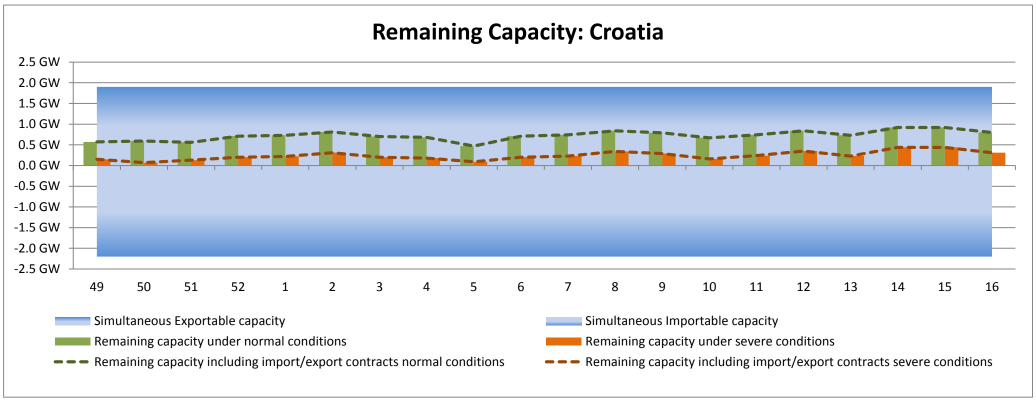
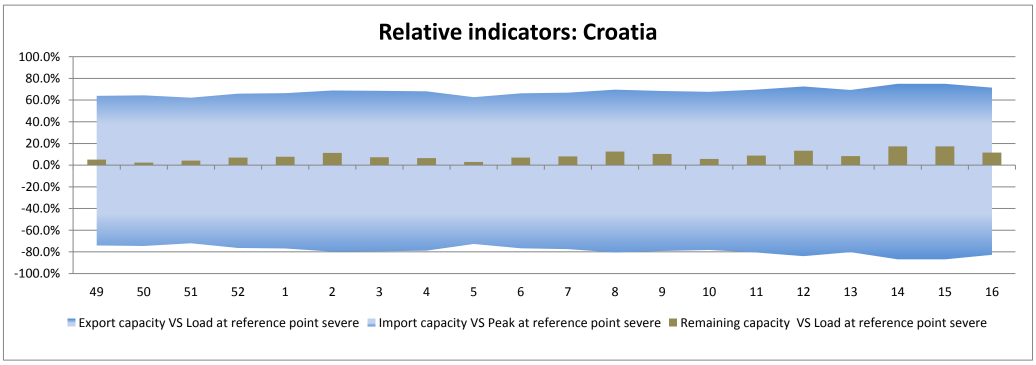
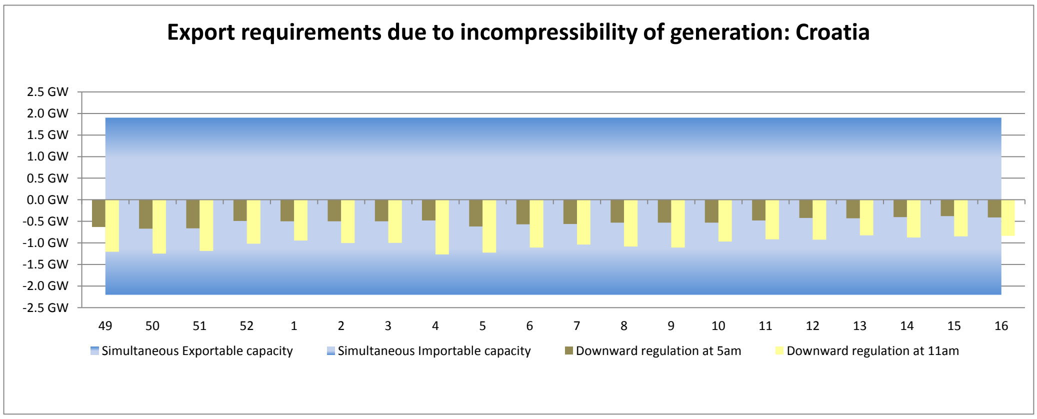

Demand and generation availability: Croatia
4.5 GW
4.0 GW
3.5 GW
3.0 GW
2.5 GW
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Croatia
2.5 GW
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
-1.5 GW
-2.0 GW
-2.5 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Croatia
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
-80.0%
-100.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Croatia
2.5 GW
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
-1.5 GW
-2.0 GW
-2.5 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Cyprus

The calculation of the load normal and severe conditions is based on the weekly system forecast under normal temperatures and the weekly system temperatures under extreme temperatures. In both cases the average weekly temperatures are considered.

General situation
Peak load in Cyprus is observed during the summer. Maintenance of thermal units, which is around to 15% of the total installed capacity, is carried out not at low demand periods. Also in the period examined a 220MW unit will be unavailable due to repair works.

This increases the average outage range to 30%.

Most critical periods
No specific period is considered critical during the winter period.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Not Applicable

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
Not Applicable

Synopsis
During winter no specific period is considered critical. Cyprus is an isolated electricity system that faces high wind penetration during low demand periods at night. This is dealt with wind generation curtailment.

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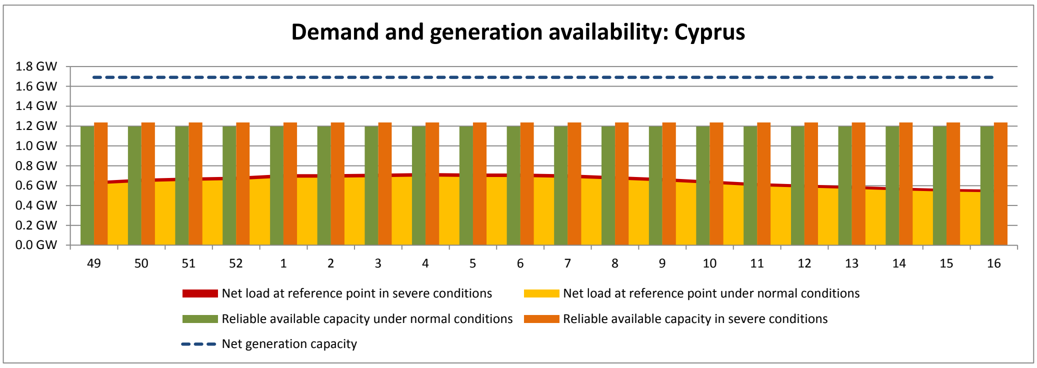
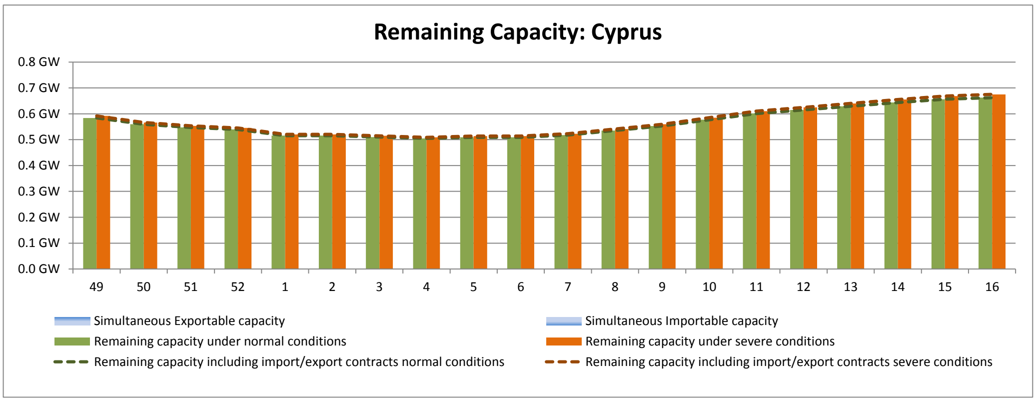
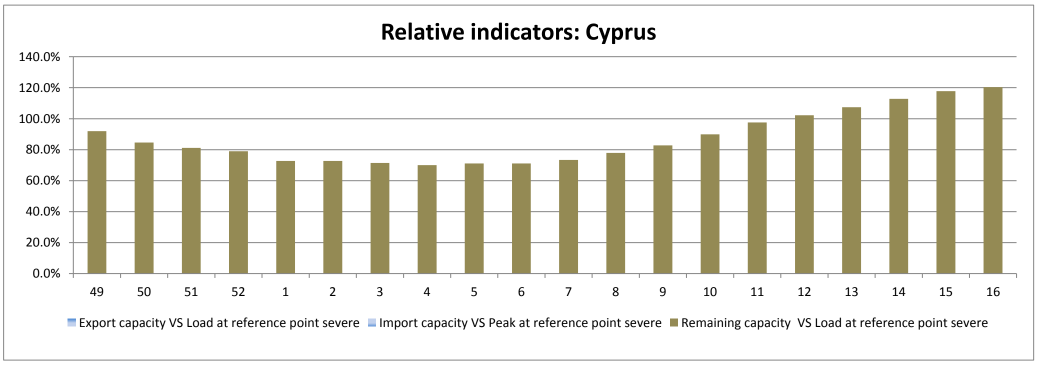
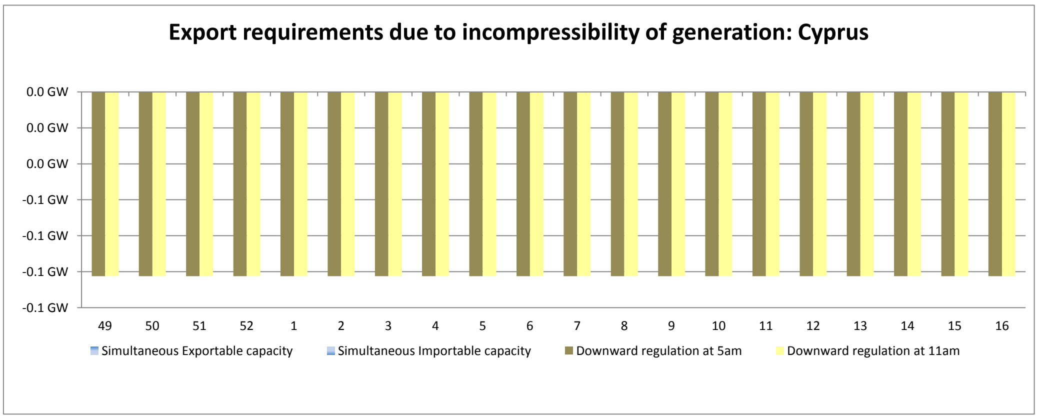

Demand and generation availability: Cyprus
1.8 GW
1.6 GW
1.4 GW
1.2 GW
1.0 GW
0.8 GW
0.6 GW
0.4 GW
0.2 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Cyprus
0.8 GW
0.7 GW
0.6 GW
0.5 GW
0.4 GW
0.3 GW
0.2 GW
0.1 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Cyprus
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Cyprus
0.0 GW
0.0 GW
0.0 GW
-0.1 GW
-0.1 GW
-0.1 GW
-0.1 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Czech Republic

Expected load development and availability of generation capacities are in balance during whole winter period. Reserve margin capacity is positive from 2600 MW up to 3600 MW. This value is result of continuing stagnation in electricity consumption in Czech Republic and commissioning of new generation capacity.

General situation
Level of generation capacity maintenance is in accordance to the standard revision plans. Therefore we don't expect during the winter period any problems with limited availability.

Hydro inflows in reservoirs are calculated at 50% probability and we do not expect any congestion for run of river power plants production. Gas power plants in Czech Republic are prevailingly used for peaking or regulation reserves.

The expected impacts of the shortages of the Russian gas deliveries can classified as minimal based on the following assumptions:

- low participation the gas generation on the CZ electricity production – ratio less than 2%;
- gas turbines are providing ancillary services and due the low utilization in the case of activation such capacity can be replaced or substituted by other fuel – for example heating oil.

In the situation of longer shortages of gas deliveries for household heating and other vulnerable consumers are limited the possibilities of the substitution to other fuel. In the case of the switching to the electricity supply, we have to consider increase of the electricity consumption, but it will not exceed significantly severe conditions assessed in the Winter Outlook. Main limitation parameter is the reserved capacity from the distribution grid.

Taking into account available fuel mix for electricity generation in the Czech Republic we can conclude that will be created sufficient reaming capacity in CZ power system allowing in the acceptable range to help with export to other TSOs.

Due to the used technology on gas turbines (especially in case of CCGTs) the minimal generation is higher than zero approx. up to 300 MW. Therefore we are recommend to use this value for remaining capacity.

Most critical periods
Yearly load minimum can be considered as a most critical period in winter. Based on the load prognoses in normal weather conditions it is expected in week 52, 1 and 15-16. To avoid excess of inflexible operation during this period relevant measures has been taken to reserve sufficient volume of ancillary services especially for the downward regulation (MR-) focusing on weekends and off-peaks.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Due to the maintenance coordination between generation and transmission facilities Czech power grid reached optimal level, taking into account requirements for long term revision of transmission lines. Potential occurrence of transit flow from neighboring systems is limiting the role of the interconnectors to maintain optimally the system adequacy with respect to transmission grid operational criteria.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
The forecasted NTC values represent best estimate values refecting available information. (e.g. Maintanace plan) for the time being. These values may be subject of later update.

Synopsis
Availability of generation capacities and expected load is adequate during whole winter period. Load scenario is based on continuing stagnation of the electricity consumption in CR. In power balance we included commissioning of new generation capacity. For this reason it was reserved sufficient range of regulation power with special focus on downward regulation on weekends and public holiday.

Framework and methodology of the assessments

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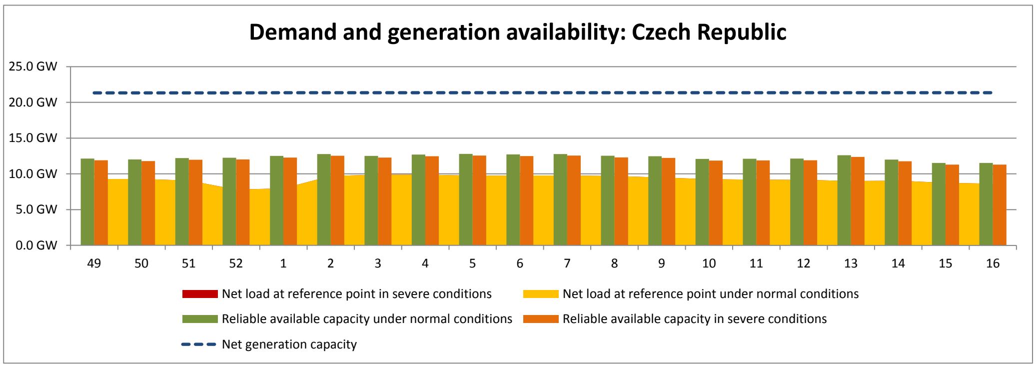
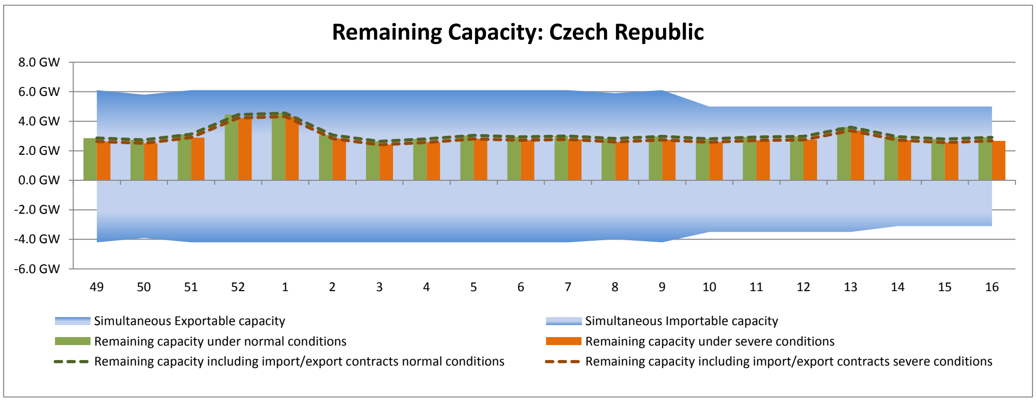
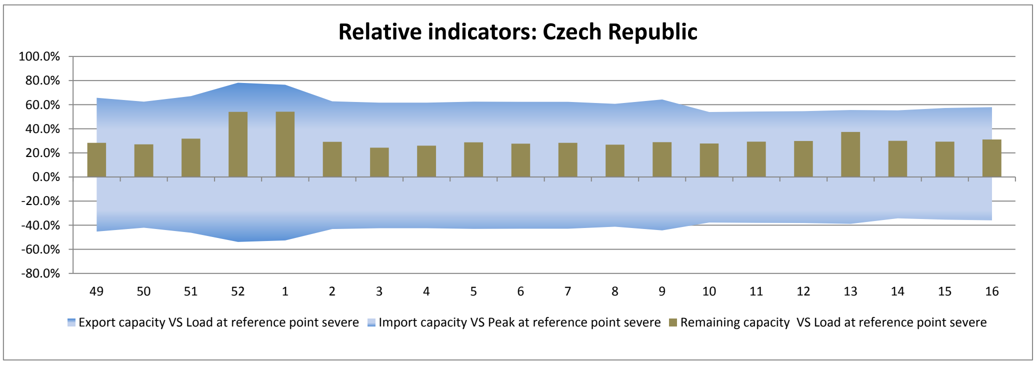
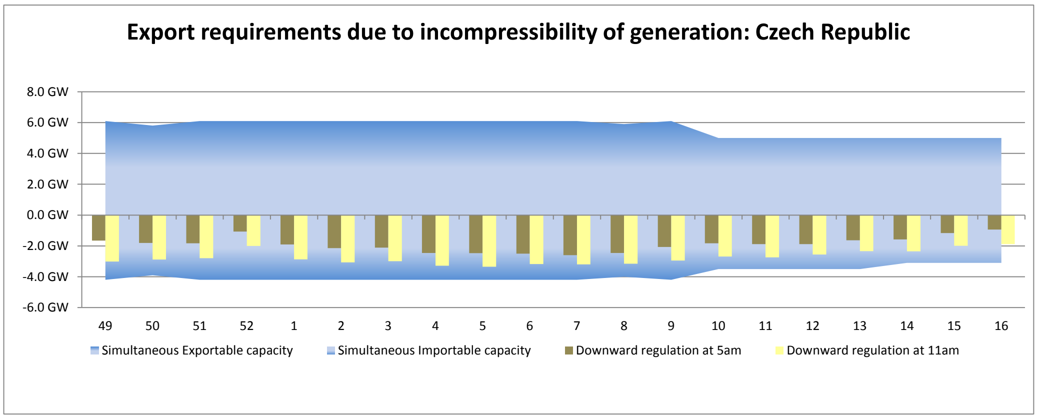
We use methodology of ENTSO-E.









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Denmark

General situation
The winter is expected to be acceptable from an adequacy point of view. However, Denmark has experienced many extreme storms the past couple of years.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
In general, Denmark is dependent on its interconnectors. In peak load hours, Denmark has a deficit most of the weeks from December to March. However, these figures assume 0% production from wind power and no import, which would not happen in reality.

Synopsis
The winter is expected to be acceptable from an adequacy point of view. However, Denmark has experienced many storms during the past couple of years.

There are several projects running over the autumn, but they are expected to be completed at the end of 2014. However, there will still be projects over the winter, among others, the takeover of the 150 kV grid on the west coast of Jutland (Denmark west) and the 132 kV grid at Western and Southern Zealand.

Furthermore, the cable laying of the 132/150 kV installations will continue over the winter. It is also expected that the inspection and maintenance works continue until middle of December 2014. The Kontiskan connection will be disconnected for replacement of a cable during the autumn of 2014. The expected duration is approx. two weeks.

It is expected that all not-mothballed power stations will be available. There will be no inspection and maintenance work and several power stations will be in operation due to heat constraints.

The planned outages are not expected to cause any problems to the power balance over the winter.

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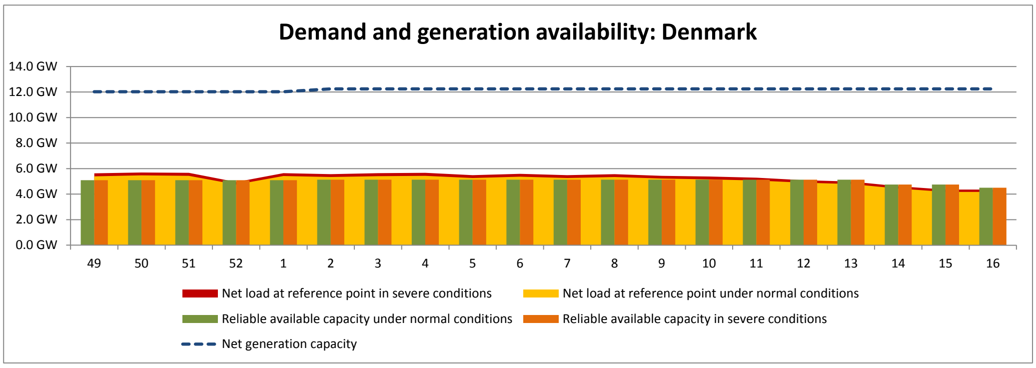
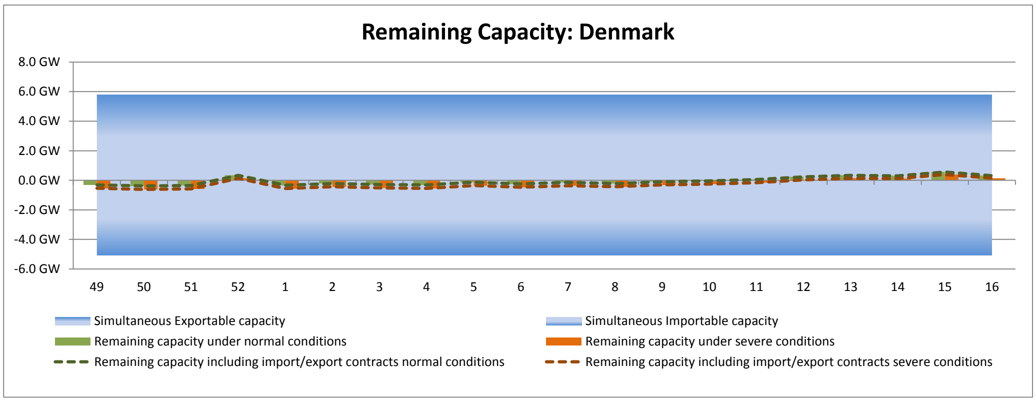
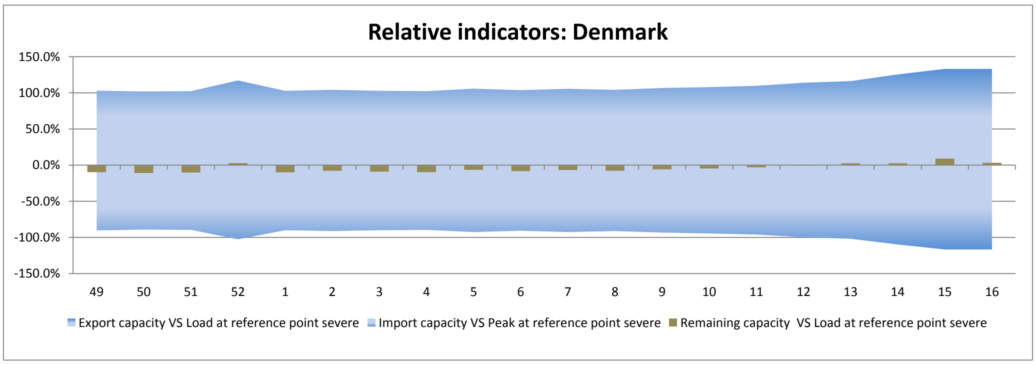
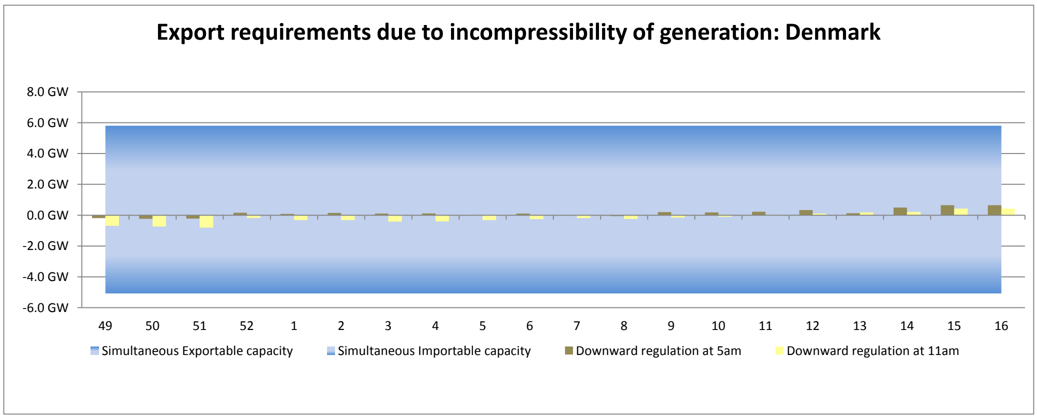

Demand and generation availability: Denmark
14.0 GW
12.0 GW
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Denmark
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Denmark
150.0%
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Denmark
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Estonia

Elering estimates that during the coming winter, the domestic consumption at any time period will be ensured by domestic production capacity. Estonia's peak load of last winter was 1,51 GW (on 30.01.2014 16:55 CET). The historic peak load has been 1,587 GW (on 28.01. 2010) and on severe weather conditions it is expected that the peak load can be over 1,6 GW. Still there is expected to be enough production in system to cover the demand. As according to recent available data the total net installed capacity in the system is 2,71 GW and the availble capacity during coming winter will be 1,72-1,89 GW (depending on the maintenances of power plants), under severe condition 1,67-1,84 GW, which is sufficent to cover the peak load, even in severe condition.

General situation

The highest level of maintenances in power plants are planned in April, during weeks 15 and 16 and in December, weeks 49 until beginning of January in week 1. During higher load periods in January and February there are currently not planned any maintenances in power plants.

Most critical periods

Most critical period is considered to be the end of January and the beginning of February, weeks 4-7, were usually the outdoor temperatures are lowest and the probability for peak load to appear is highest. Still there is expected to have enough production capacity in the system therefore no severly critical situation is foreseen for upcoming winter.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

The part of inflexible generation in the system is not significant and no problems are expected for managing the inflexible generation inside the power system, even during minimum demand periods.

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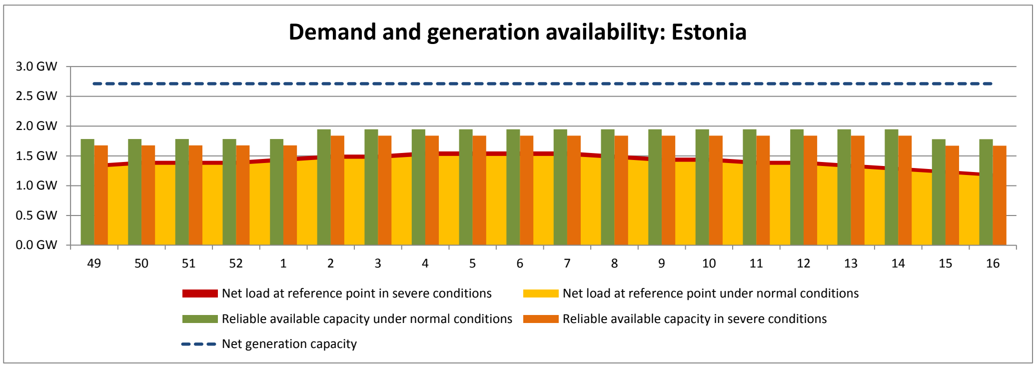

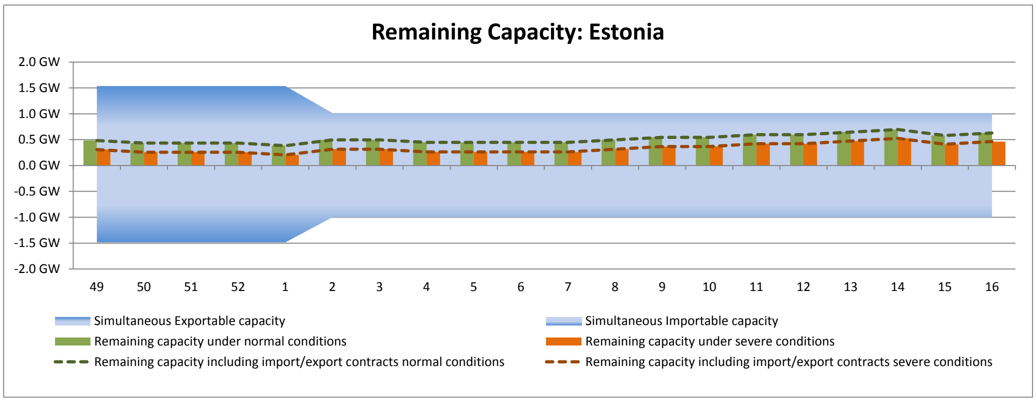

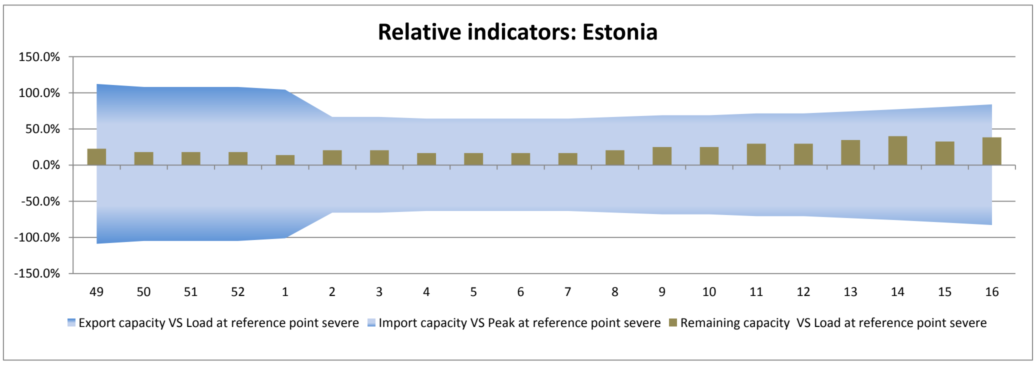

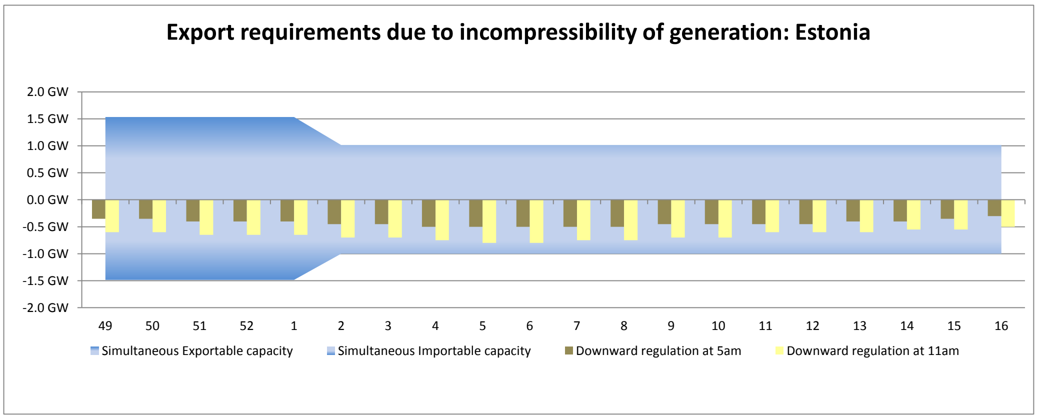

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Finland

As in the previous winters, Finland is a deficit area in peak demand hours. Demand is highly dependent on outside temperatures and most critical period is from week one to nine. The deficit is expected to be met with import from neighboring areas.

No specific problem should occur in the minimum demand hours because the installed wind and solar power capacity is relatively low in Finland.

General situation
No yearly overhauls are carried out during the most critical period. Overhauls of two coal firing plants take place during last weeks of the analysis period. Peak load reserve is available from the beginning of December till the end of February.

Most critical periods
The most critical period in Finland is typically from week one to nine when the lowest temperatures are expected.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Import is needed to cover the demand in peak hours. The maximum deficit in severe conditions is 2,5 GW from week 2 to 8. The import capacity on interconnections, 5,2 GW, is sufficient to meet the deficit.

Required amount of import is expected to be available from neighboring areas also in severe weather conditions. However, it should be noted that there are uncertainties with Russian import due to capacity tariff on the Russian electricity markets.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
There should be no specific problem with inflexible generation in Finland in the coming winter. Installed wind power and solar power capacities are relatively low and there is a lot of export capacity available.

Synopsis
General
As in the previous winters, Finland is a deficit area in peak demand hours. The deficit is expected to be met with import from neighboring areas.

Available capacity
There are no significant changes in Finnish net generation capacity compared to previous winters.

Non-usable generation capacity is estimated on the basis of TSO's own experience and statistics available. It includes estimated reductions because of very different reasons; outages, the electrical output of CHP plants is reduced in cold conditions as more heat is needed, etc.

For thermal power plants and hydro power, the availability is assumed to be same in both normal and severe conditions. In nuclear power plant's case, high availability is expected as in previous winters. Wind power availability percentage in normal conditions, 20 %, is based on recorded average output during top 10 demand hours in Sweden and Finland in 2009-2011. 6 % availability in severe conditions is based on Nordic researches.

Peak load situations

In the coming winter, possible peak demand is estimated to be at the same level as in the previous years. Peak load in normal conditions represents average weekly maximum load from 2008 - 2013. Peak load in severe conditions represents possible maximum load in once in 10 year winter conditions. Load reduction due the simultaneously increasing electricity price is assumed to be 500 MW when demand exceeds 15 GW and 300 MW when it exceeds 14,5 GW.

Import is needed to cover the demand in peak hours. The maximum deficit in severe conditions is 2,4 GW from week two to eight. The interconnection capacity is sufficient to meet the deficit.

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Required amount of import is expected to be available from neighboring areas also in severe weather conditions. However, it should be noted that there are uncertainties with Russian import due to capacity tariff on the Russian electricity markets.

Minimum load situations

Must run generation in Finland is assumed to include nuclear power generation in total, hydro and CHP generation to some extent. Installed wind power and solar power capacities are relatively low and there is a lot of export capacity available, so no specific problem is expected with inflexible generation in Finland in the coming winter.

Framework and methodology of the assessments

Finland's data does not include Åland Islands.

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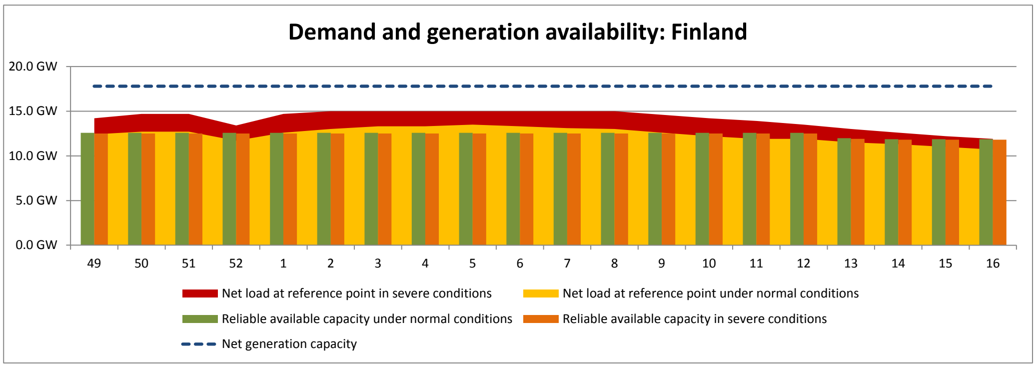
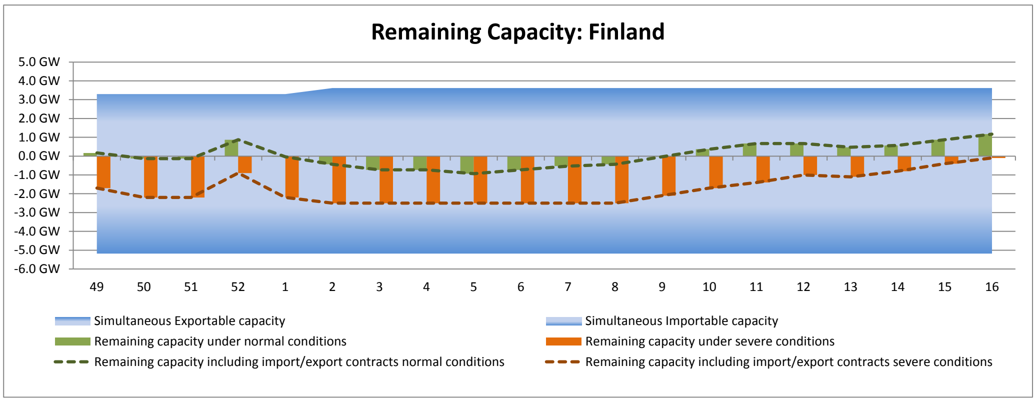
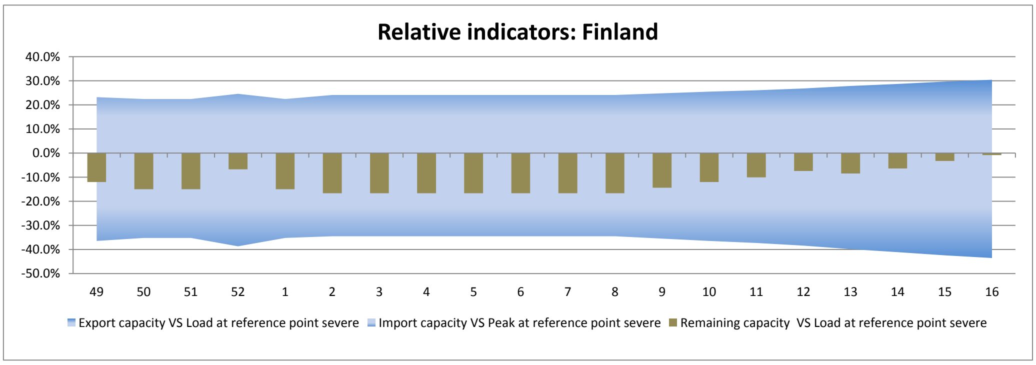
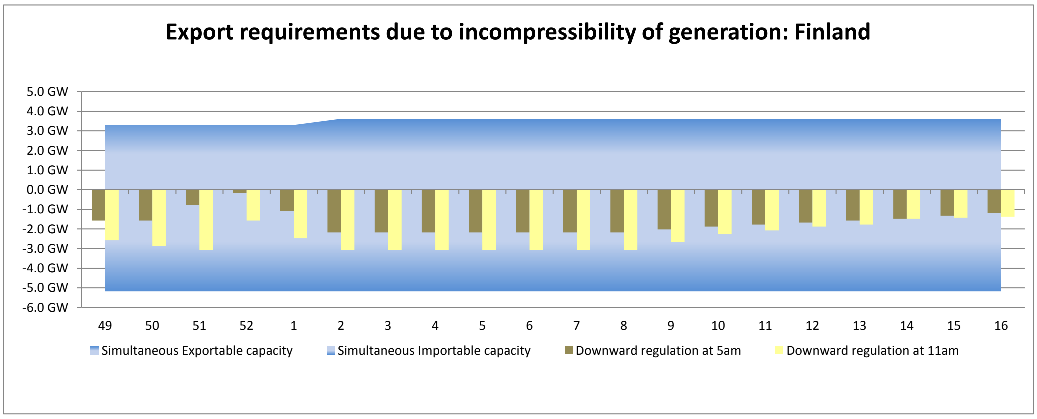

Demand and generation availability: Finland
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Finland
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
-5.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Finland
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
-50.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Finland
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
-5.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

France

Under normal conditions, the situation is correct. No difficult situation occurs during winter concerning the balancing. In severe conditions, the situation needs to be watchful from week 2 to week 6, the adequacy is dependent on imports especially in week 5 where 4,3 GW are needed.The result of a load reduction tender call will be known in early December 2014. This result may offer more load reduction from the 1 of January 2015.

General situation
The level of generation is similar to last year.

The level of maintenance is higher than last year for thermal power. In particular there are the shutdown of approximately 1000 MW of fossil fuel generation in the end of March. This winter 0,48 MW of capacity is mothballed for economical reason.

Most critical periods
In severe conditions weeks 5 and 6 are the most constrained. France requires 4,3 GW of imports in week 5 to fulfill the load.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
In case of a cold spell interconnectors would be necessary otherwise no risk on the security of supply is identified.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
No risk of an excess of inflexible generation is identified.

Synopsis
Under normal meteorological conditions, the forecast outlook for the electricity supply-demand balance in continental France shows no particular risk for the entire winter 2014-2015 period.

For the coming winter, the main risk factors are mainly the sensitivity of load to low temperatures, unplanned outages of generating units. From the French gas system, the risk of a gas shortage (Ukrainian crisis) involving CCG generation is mainly low.

The generation – load balance on the French system should be maintained for the coming winter. The risk related to security of supply is mainly low, with a few periods (from January to the mid February) with moderate risks.

Demand:
The weekly peak load is calculated for normal and severe conditions.
The net weekly peak load takes into account load restrictions corresponding to the statistical value of load reduction available for customers with special contracts. It does not account for customers' offers on the Balancing Mechanism.
Demand under normal conditions:

1. Demand forecast takes into account consumption trends, assuming temperatures are in line with seasonal norms.
2. Maximum demand forecast is estimated around 84 GW (unrestricted).

Demand under severe conditions:

1. A decrease in temperature of 1°C causes demand to rise by approximately 2300 MW.
2. Maximum demand forecast is estimated around 104 GW (unrestricted).

Generation:
Overhauls are consistent with the last schedule given by the Generators to RTE (beginning of September).
A sensitivity analysis can be carried out if needed.
Generation under normal and severe conditions:

1. The overall installed generating capacity is similar to last year: the shutdown of fossil fuel power plants is compensated by the developpement of solar and wind power.
2. The overall availability of generating facilities is expected to be lower than last winter because of high level of maintenance.
3. No reduction of generation in severe conditions is taken into account.

RTE also does not take into account solar generation for winter studies (peak load during winter occurred around 7p.m).
Wind generation is estimated:

1. by the average generation observed in the last winters;
2. by forecasting the increase of installed capacity.

Hydro level and inflows are supposed to be at their historical average value.
Outages capacity is calculated for each week considering the unavailability rates of thermal units.

<u>Generation – Demand balance</u>

The generation – load balance on the French system should be maintained for the coming winter. The risk of an interruption in supply is moderate during the whole winter.
Under severe conditions some imports up to 4,3 GW could be needed in mid January.

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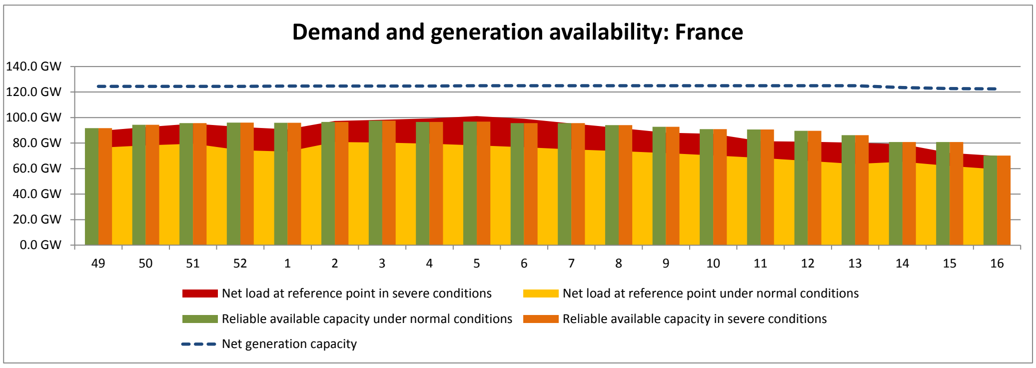

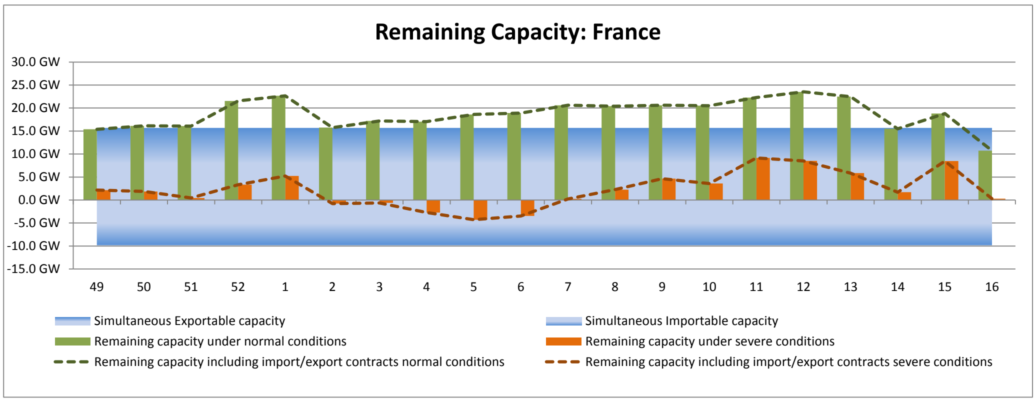

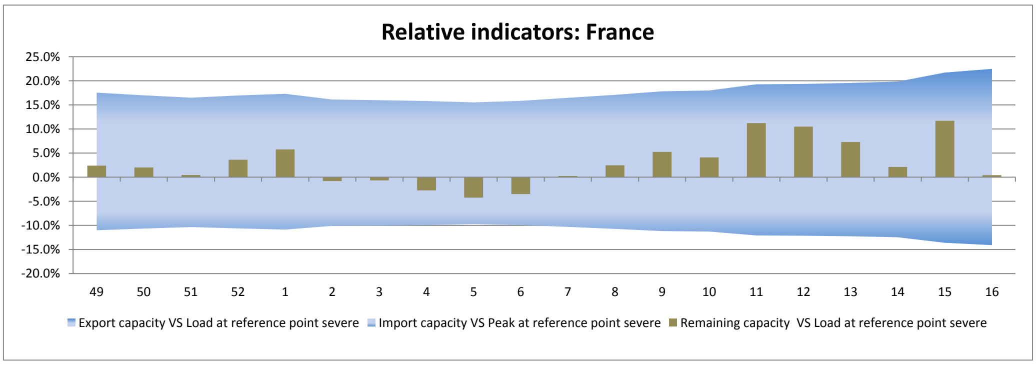

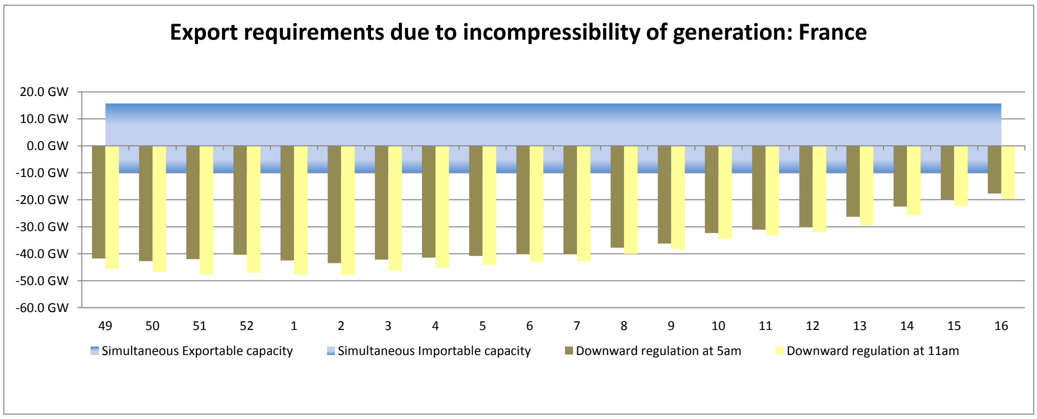

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FYRO Macedonia

The generation-load balance in the Macedonian power system should not be risky during the winter 2014/2015. For the upcoming winter period the adequacy and security of the Macedonian power system will not be threatened taking into account the high hydro power plant reservoir basens as well as the planned availability of the production and transmission facilities.

General situation

The maintenance schedule of the generation units is set to minimum. No problems in the transmission network are expected because all of the maintenance work has been finished during the summer period.

Most critical periods

We consider that the most critical period will be during the secound half of December and first half of January.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

Our transmission capacities are sufficient to meet the needs for energy import.

Synopsis

Taking into consideration the firm import contracts for this year we do not expect significant balance problems in the Macedonian Power System during the approaching winter period. In a case of unexpected low temperatures associated with increased demands it will be necessery to increase the energy import volume using the avalable interconnections. Physical imports are expected from Serbia and Bulgaria and exports to Greece. The average simultaneous import capacity for the coming period is approximately 1000 MW, while for export is 500 MW. The level of remaining capacity depends on the load level. For this period it varies from 50 MW in days with high load, up to 500 MW in days with low load.

Framework and methodology of the assessments

Weekly peak load for a normal condition is obtained by scaling the realized load for the same period during the 2013-2014 with 2,3%, for the season normal temperature that is about -8°C . This is the percentage increase in total energy consumption according to official Energy balance of the Republic of Macedonia in the period from 2014 to 2018.

Weekly peak load for a severe condition is obtained by scaling the realized load for the same period during the 2013-2014 with 7%, for the abnormal seasonal temperature of about -20°C.

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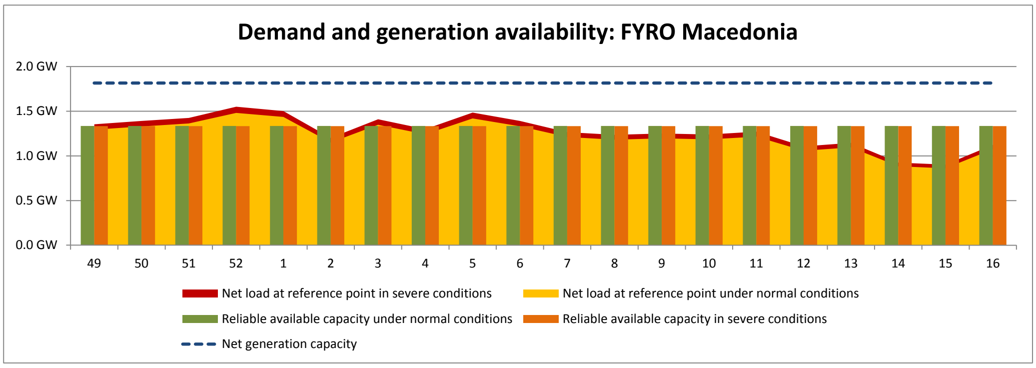
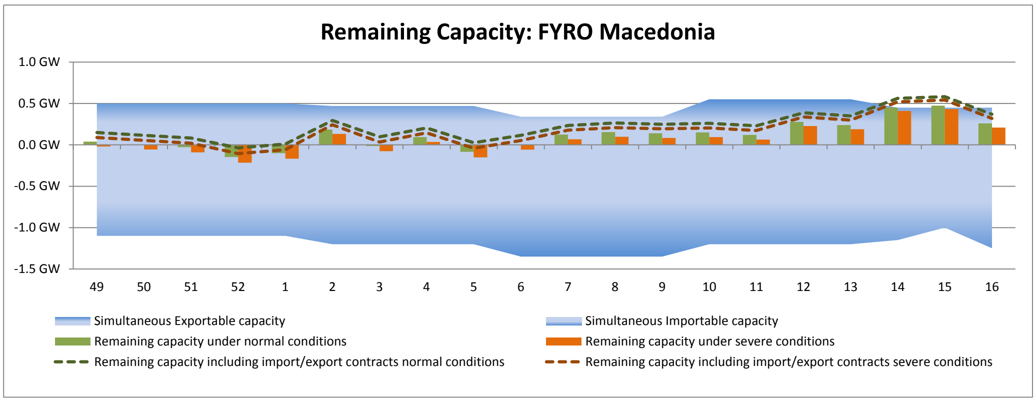
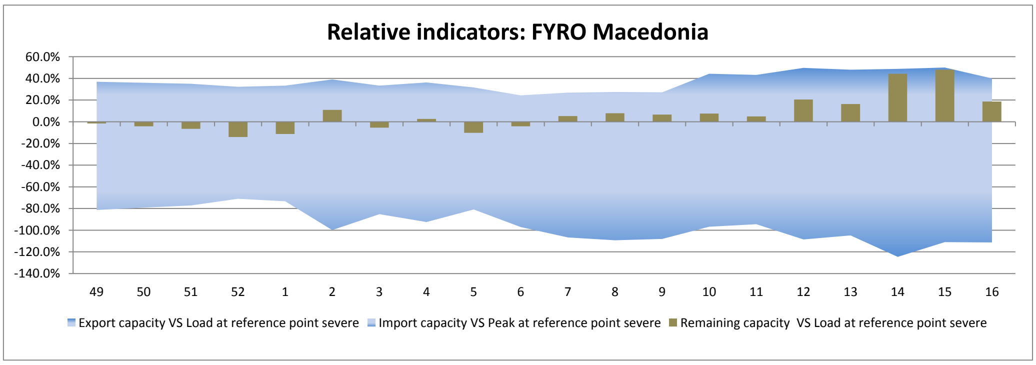
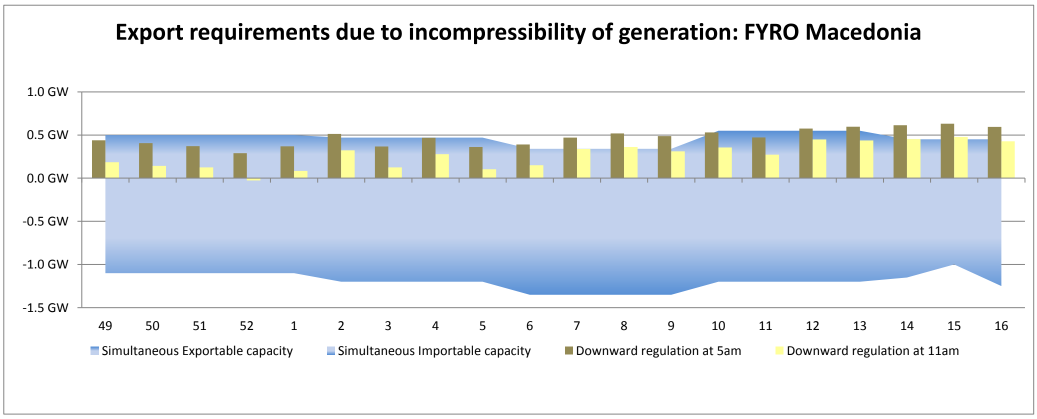

Demand and generation availability: FYRO Macedonia
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: FYRO Macedonia
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: FYRO Macedonia
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: FYRO Macedonia
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Germany

The balance between generation and demand is generally expected to be maintained during the winter period in case of normal and severe conditions.

General situation
Regarding the generation–load balance for Germany usually it is not assumed that there is a non-availability for generation units that are dependent on fossil fuels due to a lack of primary energy sources.

Most critical periods
From the experience of past winters the period around Christmas could be critical due massive oversupply of the German control area. This could result in strong negative prices for electricity and could contribute to high upward frequency deviations. In such a case the German demand for negative control reserve might not be covered by the procured reserves and emergency reserve would have to be used.

Another critical situation would be posed by an unexpected strong cold-spell with little wind feed-in and a possible gas shortage, which could lead to an undersupplied control area.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Interconnectors are generally expected to be important for the ability to import or export.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
The interconnectors are expected to play an important role for the export of excess generation during minimum demand periods. According to the quantitative analysis of the downward regulation capabilities, especially on 11 a.m. on Sundays a great amount of excess generation is espected. However, it has to be noted that in such cases it is also possible for German TSOs due to specific laws and regulations to reduce the RES feed-in in order to mitigate any negative effects on the network.

Synopsis
After the first steps of the nuclear phase-out in Germany in 2011 German TSOs are still facing a situation characterized by the enduring regional lack of conventional generation, primarily in Southern Germany. At the same time the commissioning of important conventional power plants in Germany is further delayed.
Learning from last winters, a situation with high load, low RES feed-in and high exports to support the neighbouring countries has to be considered.
Regarding the generation – load balance for Germany usually it is not assumed that there is a non-availability for generation units that are dependent on fossil fuels due to a lack of primary energy sources.
RES are continued to be installed at a high speed. For southern Germany this attributes largely to distributed PV generation. In the end of the year 2014 the installed capacity of PV generation in Germany is expected to reach about 37.5 GW. That means an increase of about 1.3 GW in this year. The German government has cut down the financial subsidies for photovoltaic power plants; nevertheless a notable reduction of the fast increase of installed PV capacity is not expected soon as subsidies are planned to stop at a level of 52 GW of a total installed capacity of PV. The installed capacity of wind power plants is expected to increase by about 4.9 GW reaching 38.4 GW. However for the winter period with load maximum in the evening PV generation does not contribute to the coverage of demand while wind feed-in is not guaranteed.
In the winter period the German TSOs may be faced again with problems to meet (n-1)-security rules, especially in situations with high wind feed-in in the North and high load in the South of Germany. In these situations, an excess of transmission capacities of network elements in the important transmission axes from North to South has to be expected. Being faced with these risks for security of supply the German TSOs are again preparing a high amount of grid- and market-related measures e.g. redispatch with increasing amount of power to be shifted between control areas.
To cover the anticipated very high redispatch demand as for the last winter, the German TSOs determined the need of an additional reserve generation capacity of about 3,1 GW for the winter 2014/2015. Almost the complete capacity has already been contracted. In order to contract these required reserves a new German regulation allows to prevent the switch-off of system-relevant units, which are instead transferred into a TSO-

controlled reserve. They are still included in the data table. Additionally 0,8 GW of reserves have been contracted in Austria for the coming winters.

A further benefit for generation adequacy is provided by the new regulations for contractual load reductions.

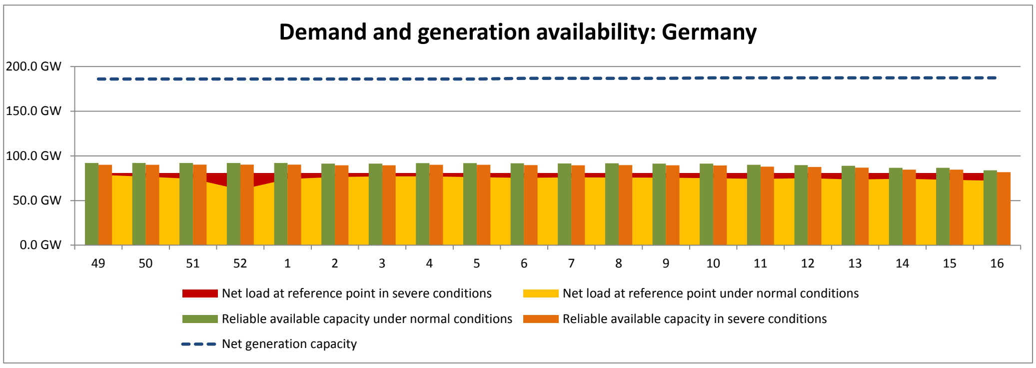
Framework and methodology of the assessments

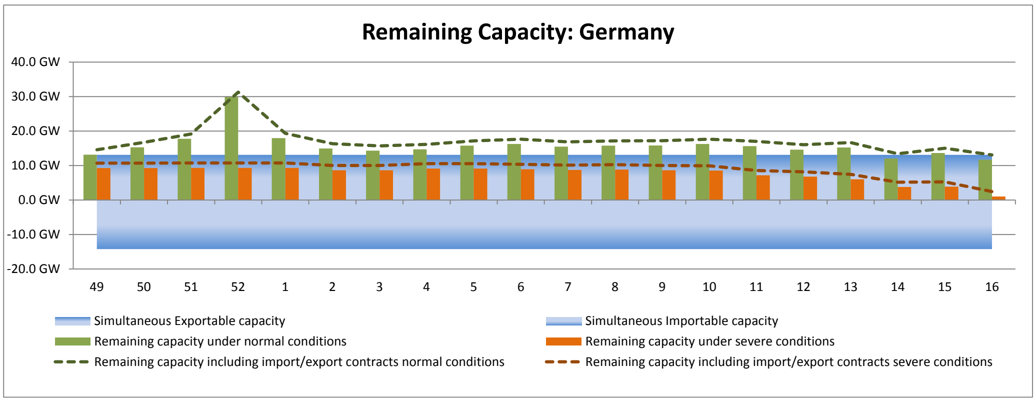
Due to minor changes in the used data basis in comparison to previous Winter Outlooks, the values in this report are not directly comparable to previous ones.

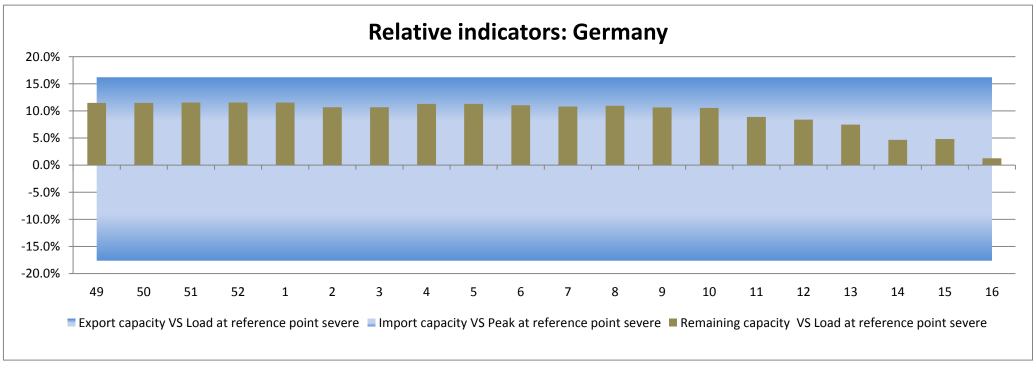
Nonetheless there is still lacking data so that further improvements of the data base are necessary. In combination with the used estimations, necessary e. g. for outages, this means that possible sources of errors are present in the current data.

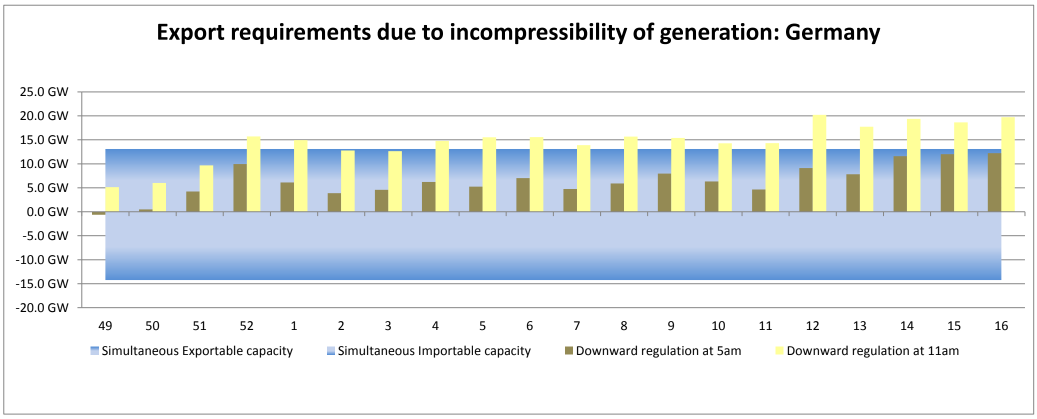
The net generating capacity of the Kraftwerksgruppe Obere Ill-Lünersee in Austria is considered as firm import to Germany as it is directly connected to the German TSO TransnetBW. The net generating capacity adjusted by an unavailability of 20% amounts to 1,4GW. This procedure has been agreed on with APG. However, there are further kinds of power plants which will in future perhaps be in included in firm imports.

The common network analysis of the German TSOs for the winter has continued as in the year before providing important background information also for the system adequacy assessment especially with respect to the dimensioning of extra reserves.


Demand and generation availability: Germany
200.0 GW
150.0 GW
100.0 GW
50.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Germany
40.0 GW
30.0 GW
20.0 GW
10.0 GW
0.0 GW
-10.0 GW
-20.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Germany
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
-15.0%
-20.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Germany
25.0 GW
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
-5.0 GW
-10.0 GW
-15.0 GW
-20.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Great Britain

Weather corrected peak demand has continued to decline. Given that statistical review of positive gross domestic product (GDP) figures shows that the economy has been better than recent years, it seems likely that the decline in peak demand is due to energy saving measures, increase in embedded generation and a move away from heavy industry to less energy intensive industrial activity. However, generation capacity has also continued to fall due to the closure of more coal and oil plants as a result of the Large Combustion Plant Directive and the closure of uneconomic gas fired power stations, although this has been partially offset by additional wind capacity.

The overall effect on margins is that they have decreased compared to recent historic levels but they are still expected to be adequate based on normal temperatures and expected levels of generation availability. Under severe weather conditions (1 in 20 cold temperatures), forecast demand including reserve would still but full interconnector exports to the continent and Ireland would not be possible in all weeks of the year. In the unlikely event that the amount of generation does not meet the amount of demand for a period of time, National Grid, as GB TSO, would need to take mitigating actions to avoid any loss of load. These actions include the use of two New Balancing Services: Demand Side Balancing Reserve (DSBR) and Supplemental Balancing Reserve (SBR), which provide the option of additional capacity if necessary. There is also the option of using the existing approaches such as the emergency assistance from interconnectors, maximum generation service or voltage. The most critical periods are early December and mid-January when margins are expected to be very low under 1 in 20 conditions with the interconnectors at float.

General situation

Electricity margins have decreased this winter compared to recent years due to planned generator closures and breakdowns. There is also still some uncertainty on generators returning from outage. Four nuclear reactors are currently out of service for boiler checks. They will return progressively until the end of December but will be restricted to 80% of full load. In order to take account of this uncertainty, National Grid (as GB TSO) has procured two New Balancing Services to manage the risk for this winter. These services are Demand Side Balancing Reserve (DSBR) and contracts for three power stations to provide Supplemental Balancing Reserve (SBR). These New Balancing Services will provide a combined total of 1.1 GW additional available capacity this winter.

Most critical periods

The most critical weeks are weeks 49, 50, 51, 3 and 4, especially under severe conditions.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

As shown by the graphs, over the mid winter period, full interconnector exports would not be possible, especially under severe conditions.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

Demand is expected to be well in excess the inflexible generation under all scenarios and conditions.

Synopsis

Weather corrected peak demand has continued to decline. This is thought to be due to the recession, energy saving measures, a move away from heavy industry to less energy intensive industrial activity, increasing volumes of small embedded generation and increased customer demand management. However, generation capacity has also continued to fall due to the closure of more coal and oil plants as a result of the Large Combustion Plant Directive and the closure of uneconomic gas fired power stations, although this has been partially offset by additional wind capacity.

The overall effect on margins is that they have decreased compared to recent historic levels but they are still expected to be adequate based on normal temperatures and expected levels of generation availability. Under severe weather conditions (1 in 20 cold temperatures), forecast demand including reserve would still be met but full interconnector exports would not be possible in all weeks of the year. In the unlikely event that the amount of generation does not meet the amount of demand for a period of time, National Grid, as GB TSO, would need to take mitigating actions to avoid any loss of load. These actions include the use of two New Balancing Services: Demand Side Balancing Reserve (DSBR) and Supplemental Balancing Reserve (SBR), which provide the option of additional capacity if necessary. There is also the option of using the existing approaches such as the emergency assistance from interconnectors, maximum generation service or voltage reduction. The most critical periods are early December and mid-January when margins are expected to be very low under 1 in 20 conditions withthe interconnectors at float.

Framework and methodology of the assessments

1. The weekly peak load for severe conditions is based on a 1 in 20 figure.
2. We expect about 1.5 GW of generation capacity to be sterilised in Scotland due to transmission constraints under high wind conditions, although such conditions are not expected to result in system tightness.
3. The level of pump storage pumping load that is expected to be on the system at the time of the weekly overnight minimum demand has been used instead of pumping capacity as other factors limit the the maximum pumping that can be achieved.
4. The demand forecasts for Sunday mornings have already been depressed to allow for embedded solar generation.
5. Must run plant for the weekly overnight minimums and the Sunday morning demands include plant required to provide the positive reserve requirements.
6. The generation availability data does not include the additional 1.1 GW capacity procured by the New Balancing Services (DSBR and SBR)

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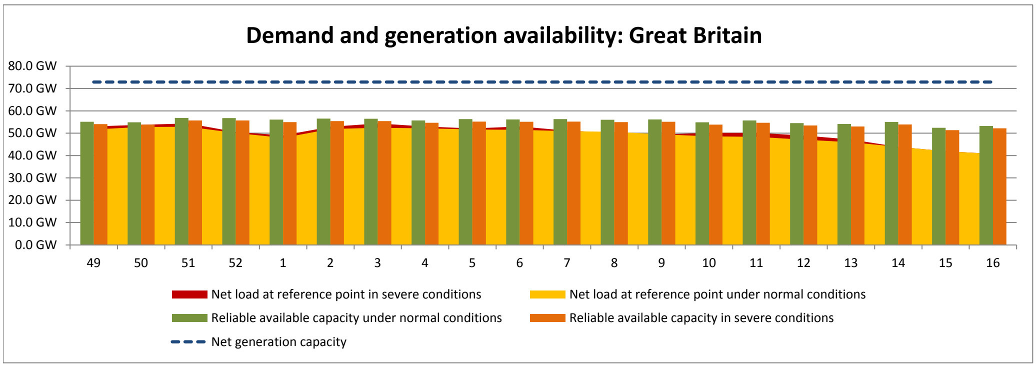
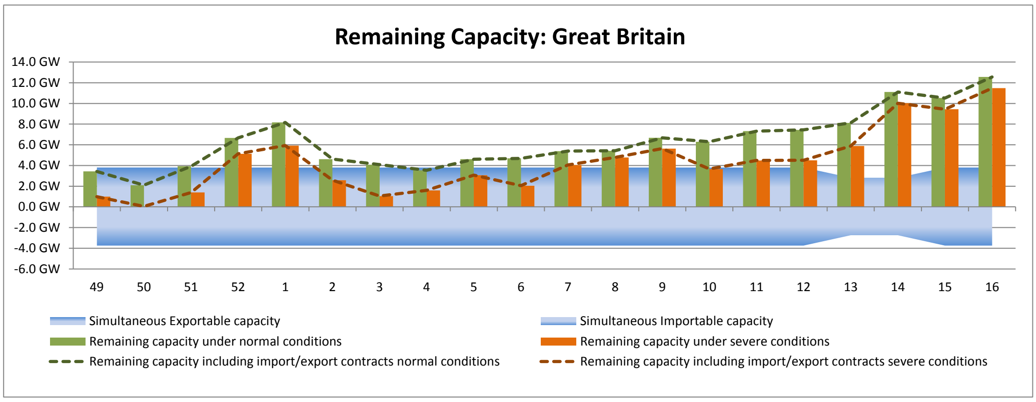
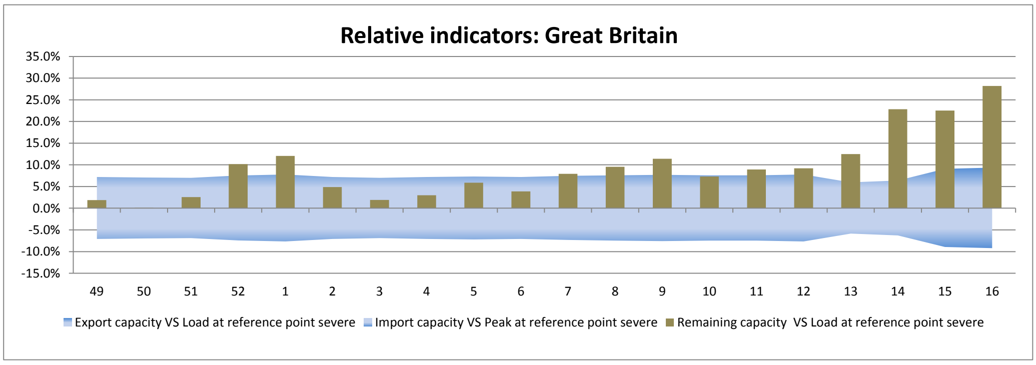
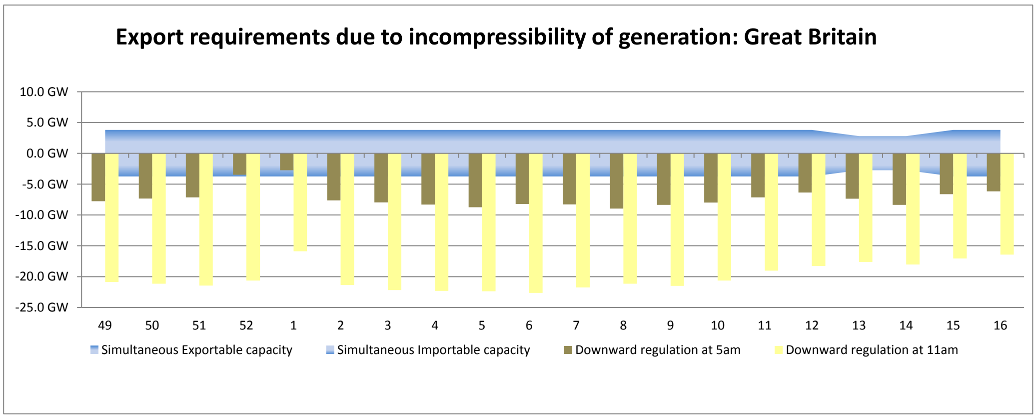

Demand and generation availability: Great Britain
80.0 GW
70.0 GW
60.0 GW
50.0 GW
40.0 GW
30.0 GW
20.0 GW
10.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Great Britain
14.0 GW
12.0 GW
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Great Britain
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
-15.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Great Britain
10.0 GW
5.0 GW
0.0 GW
-5.0 GW
-10.0 GW
-15.0 GW
-20.0 GW
-25.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Greece

General situation

The Greek system is expected to be in balance in the upcoming winter period (2014/2015). The level of indigenous national generation the good hydraulic storage of hydropower stations ensure the adequacy and security of the Greek interconnected System, which is not threatened under normal and severe weather conditions and there is no planning for high level of maintenance during this winter.

Most critical periods

The most critical period during winter is the second half of December and January. Moderate imports are needed to meet our operating criteria under normal conditions.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

The role of interconnectors currently is not important for generation adequacy due to decrease of the demand the last years.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

Mainly we use the MEAS (Mutual Emergency Assistant Service) agreement in order to help the Italy in the period of the increasing production by Renewable energy sources.

Framework and methodology of the assessments

In long term, a System Load Forecast study covering both energy and yearly peak load is carried out every year. The results are included in the Ten-Year Network Development Plan issued by IPTO and published upon approval of the Regulatory Authority for Energy. In this frame, monthly peaks are also calculated.In medium and short term, IPTO conducts studies concerning the Generation Adequacy Assessment. The studies include load forecasts and multiple scenarios on energy management using deterministic methods. The energy management studies aims at checking the actual energy situation and the level of hydro reserves. These studies are regularly revised to include mainly variations in the load and/or the availability of the thermal units.

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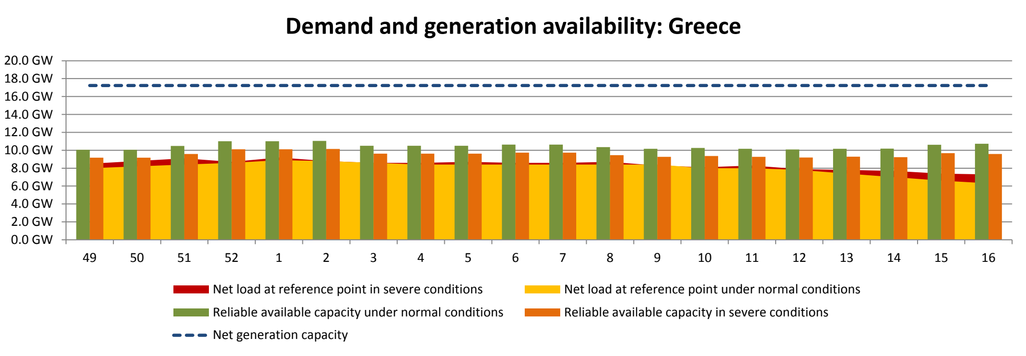

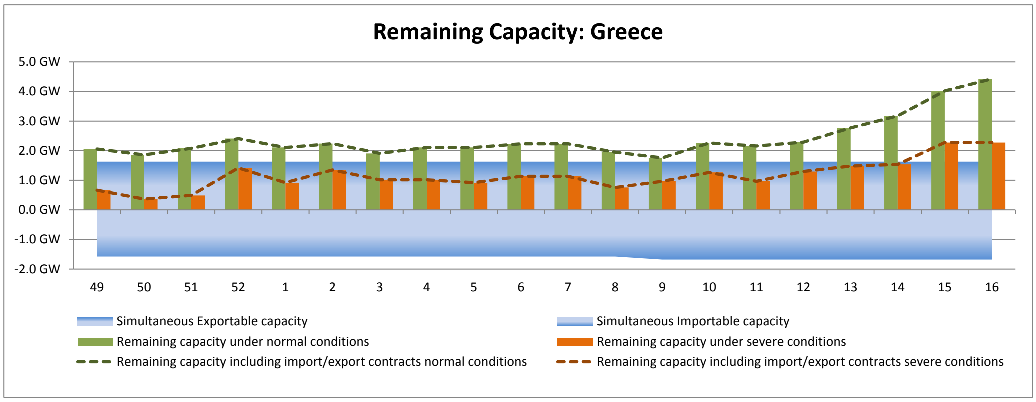

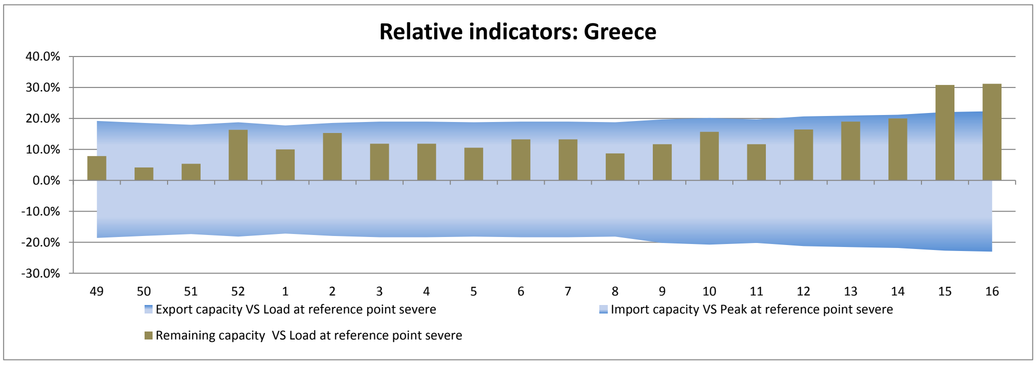

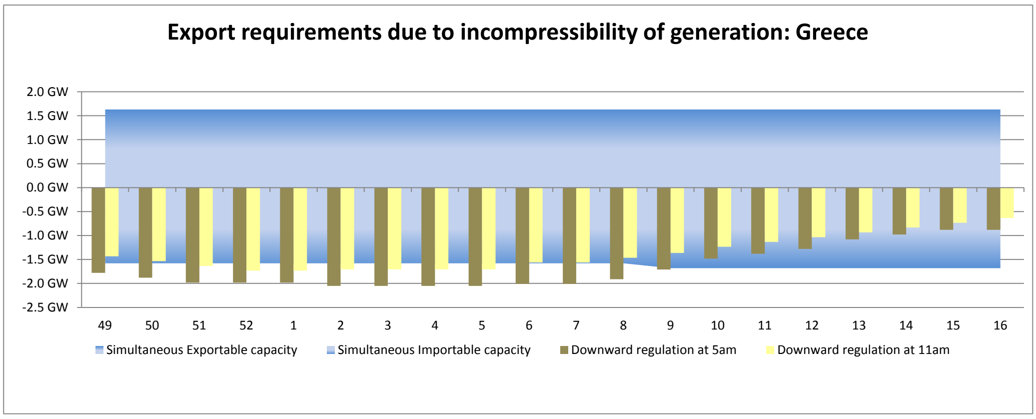

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Hungary

In the Hungarian electric power system the required adequacy margin can be guaranteed by a considerable amount of import only. Several years are necessary to overcome this historical feature, being a result of missing competitive, highly flexible generation units.

General situation
The level of maintenance is relatively high during the spring, it is between 200 and 1200 MW, which is 5-12% of the Hungarian installed capacity. The most critical periods are the weeks of April.

Most critical periods
The most critical periods can be caused by the severe weather conditions in December and January, since the units are temperature dependent.

The critical weeks are expected to be until mid January, in February and April, since the level of maintenance is higher then, than in the previous months.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Access is possible via yearly, monthly, daily and even intraday capacity tenders, auctions. Limitation is due to high transit flows through the interconnections, as well as due to planned maintenance in some periods.

Synopsis
In spite of the growing uncertainty on both generation and demand side, as a result of market development on the one hand, and promotion of intermitted generation on the other, the Hungarian power system is expected to be on the safe side during the next winter period.

However, there are a few risks that must be carefully managed by the TSO. These risks are:

- Availability of fuel, first of all that of natural gas. During long-lasting cold winter periods, demand for natural gas becomes very high at households and at power plants at the same time. Therefore, a well-functioning gas market, as well as satisfactory replacement fuel reserves at generators are essential to keep the lights on. High capacity gas storage was built so that the security of the gas supply could be increased.
- Overall cross-border capacity is satisfactory, however, allocation of cross-border capacity rights on the respective border sections may be an issue.
- The required level of remaining capacity can only be guaranteed by a certain amount of import, mainly under severe conditions. Cross-border exchange is a matter of economy for market players. Their decision-making can be influenced by contractual conditions, e.g. on reserves.
- As matter stands the outcome of the Ukrainien crisis is possible to have significant impact on the Hungarian electricity system. In case the gas supply wanes or terminates, then the operation of gas-fired power plants is likely to become unpredictable, which in extreme conditions can cause even 4000 MW capacity outage in contribution with the decrease of electricity import coming from Ukraine. The unavailability of the needed capacity in this rate for a relatively long period of time cannot be compensated neither by domestic sources, nor by additional import. In case there is no continuous gas supply, it is possible to run out of alternative fuels within 2 weeks. Moreover, it is necessary to take into consideration further decrease of import as a consequence of available capacity limitation in the gas-fired power plants of the adjacent electricity systems.

The reference adequacy margin at weekly peak is 0.5 GW, the capacity of the largest generation unit in the power system.

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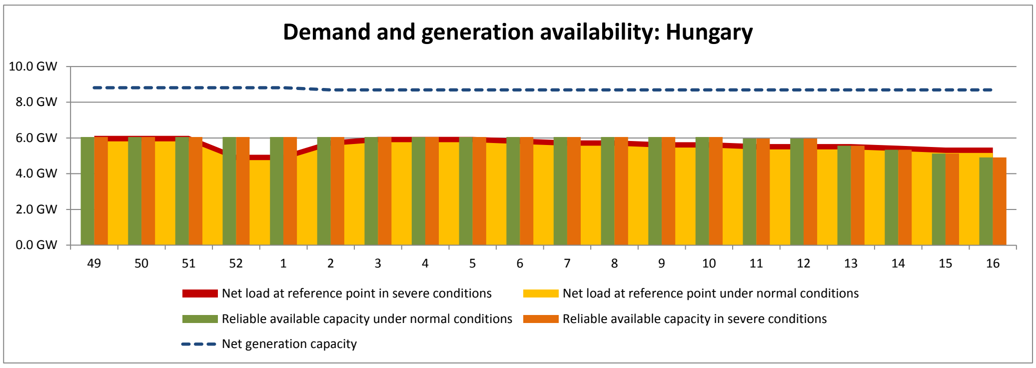
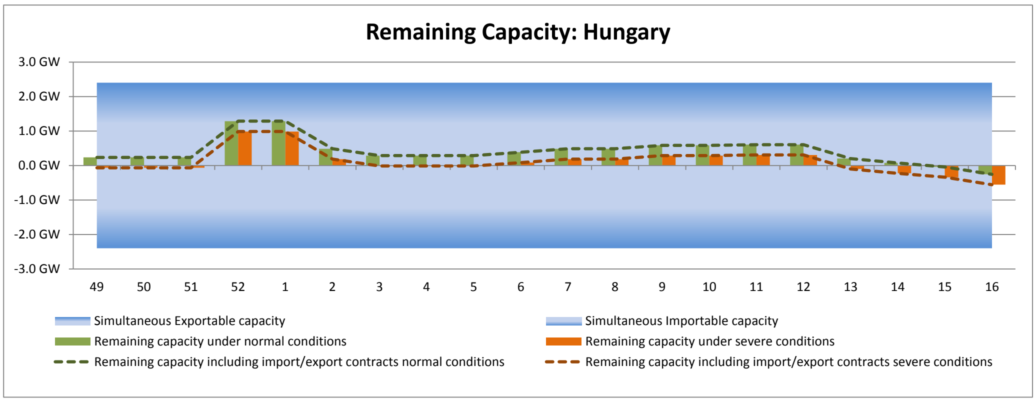
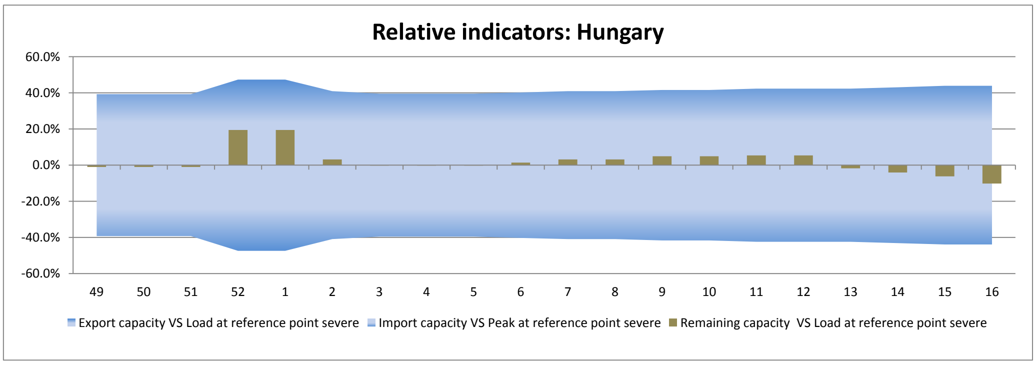
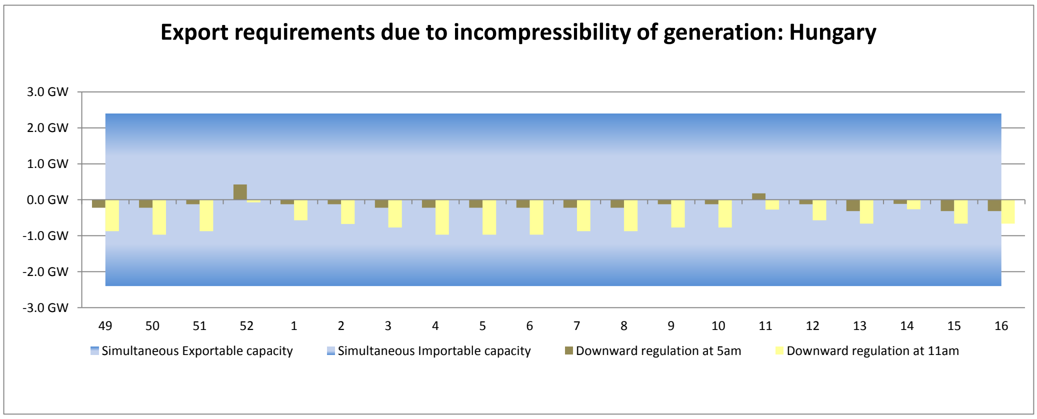

Demand and generation availability: Hungary
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Hungary
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Hungary
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Hungary
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Ireland

It is expected that there will be sufficient generation in Ireland to ensure an adequate capacity margin for the coming winter. Demand growth is relatively flat.

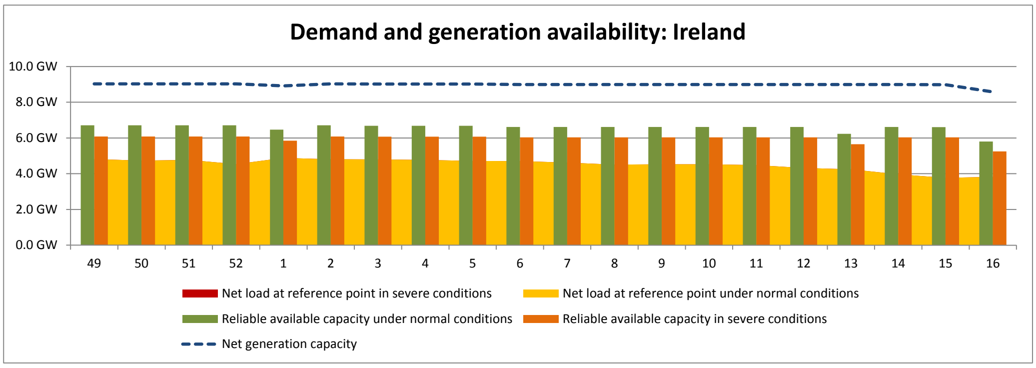
General situation
Most transmission feeders are expected to be back in service for the high demand winter period. Some maintenance outages will be scheduled during this period but will not effect system security.

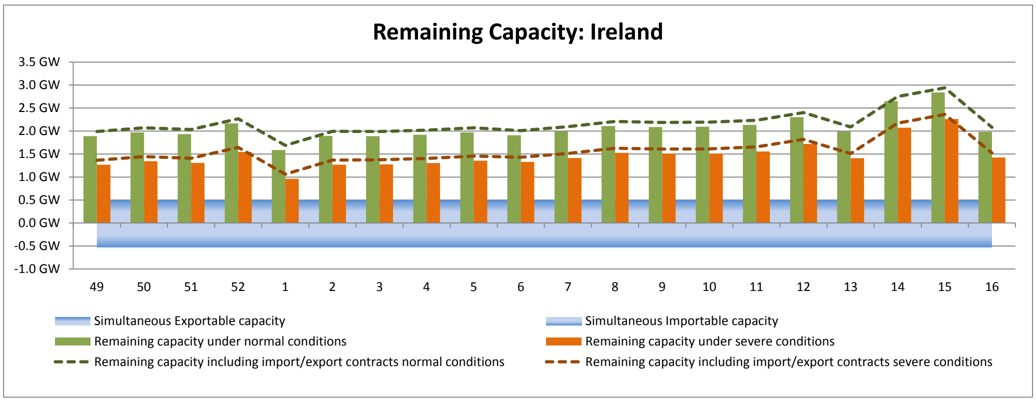
Most critical periods
The cold months of December, January and February will have high demand which is why there are no major outages planned for this period. The only outages at times of high demand are hydro units and two gas turbine units of short duration and which are not occurring simultaneously.

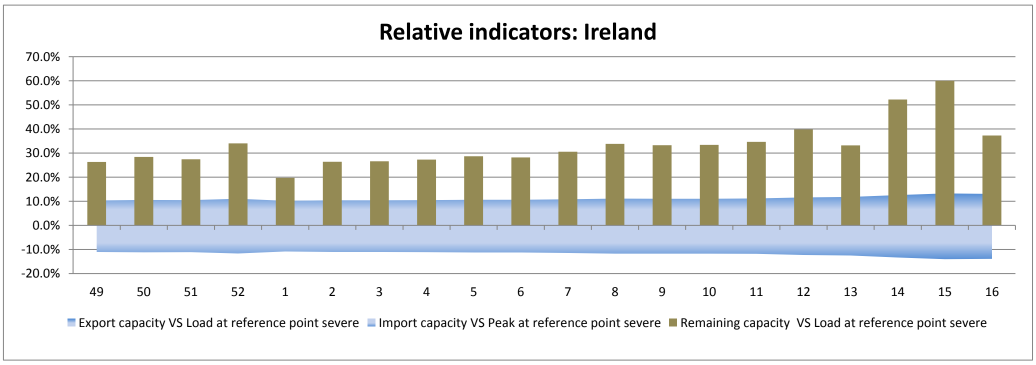
Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
The East-West Interconnector (EWIC) should be fully available during the winter period. This should provide Ireland with the capability to export or import 500MW of power. Due to current electricity prices in both Ireland and Great Britain, it is likely that that the flow on the interconnector will be primarily imports from Great Britain into Ireland.

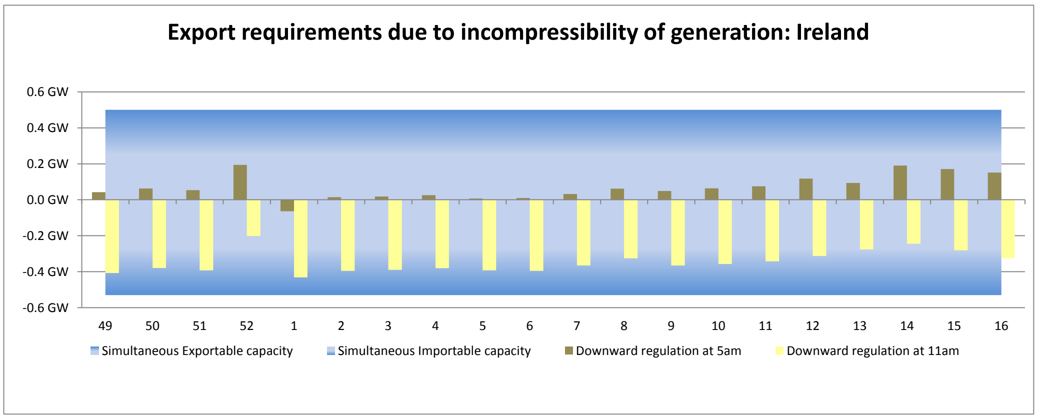
Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
EWIC can export to the UK in times of minimum demand.

Framework and methodology of the assessments
The generator capacities, generator margins and provisionally scheduled outages of generator units are stored in a bespoke database system used for analyzing generator margins and outage schedules. This system will export results for capacity margins and schedule outages which have been included in this report. The forced outage probabilities used are generated each year based upon the generators availability over the past three years. Generator must run status is based on current operation policies and constraints.


Demand and generation availability: Ireland
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Ireland
3.5 GW
3.0 GW
2.5 GW
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Ireland
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Ireland
0.6 GW
0.4 GW
0.2 GW
0.0 GW
-0.2 GW
-0.4 GW
-0.6 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Iceland

The generation capacity in Iceland is expected to be sufficient to meet peak demand this winter under normal as well as severe conditions. Landsnet does not anticipate any particular problems in the isolated Icelandic power system.

The installed generation capacity connected to the Icelandic transmission system is approx. 2.7 GW, of which 77% is hydro based and 23% based on geothermal energy.

Long term Generation Capacity Assessment and Load Forecast for the Icelandic power system are made by Landsnet every year and reported in the Transmission System Development Plan and Energy and Power Balance report. For short term assessment, studies are made by Landsnet on a weekly basis for Generation Capacity, Reserves and Load Forecast.

The generation capacity in Iceland is expected to be sufficient to meet peak demand this winter under normal as well as severe conditions. However, the transmission capacity may be limited in parts of the system during late winter/early spring, due to bottlenecks in the transmission system. Landsnet is aware of the problem and will operate the system accordingly.

General situation
Scheduled maintenance usually takes place during the summer period.

Most critical periods
The transmission system is expected to be most stressed from late January until mid-March, due to bottlenecks and local consumption in certain areas. The generation capacity, however, is generally not expected to be a problem. It may though be needed to transmit power between areas, due to local discrepancies of hydro power inflow status.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
N/A

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
N/A

Synopsis
See above.

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Italy

General situation

In normal condition, no problem regarding system adequacy is expected in the Italian system: notwithstanding the decommissioning or mothballing of a large number of old mainly oil-fired power plants, the reliable available capacity is expected to be higher than the peak load in the whole period. Also under severe conditions the general situation expected this winter is not critical, with some problems that may arise only in the island of Sicily (the new interconnection with mainland is expected to be put into operation in the second half of the year).

The main issues which could affect the generation capacity and the related countermeasures are the following:

- lack of adequate downward regulating capacity: high renewables production (wind and solar) during low load periods, taking into account the level of the other inflexible generation, could lead to a lack of adequate downward regulating capacity. In order to cope with this risk, Terna prepares preliminary analysis and, in case of need, adopt the appropriate countermeasures;
- shortage of gas supply: emergency plans elaborated by the Italian Ministry of Economic Development in which it was analyzed the risk for the italian sistem, highlight the capacity of italian gas system to cope with limited consequences for quite a long period (up to 3 months) with suspension of the gas transit through Ukraine;
- grid constraints: the limitations applied to the generation plants, due to grid constraints are minimized through the planning of the outages of the relevant grid elements during appropriate periods.

Most critical periods

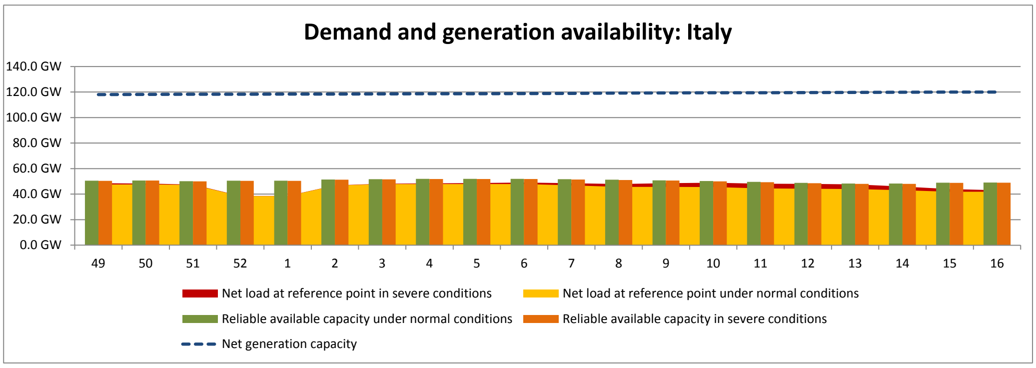
The worst weeks for downward regulation are expected to be the ones during very low load periods (Christmas and Easter holiday).

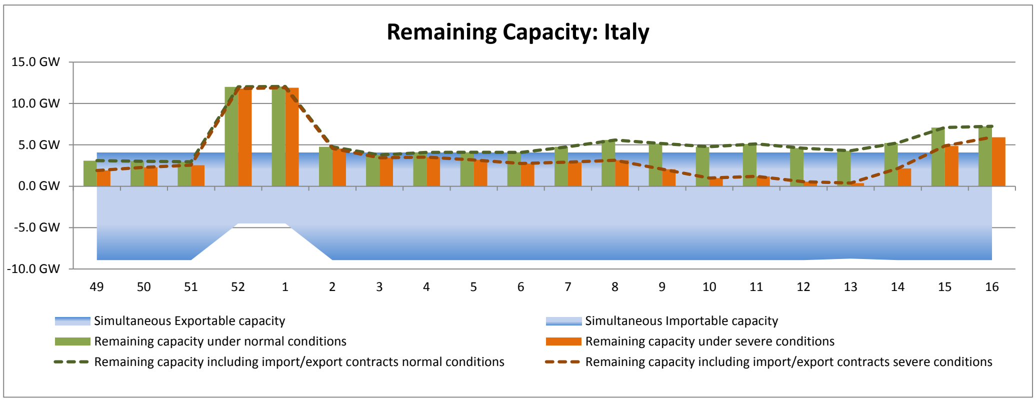
Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

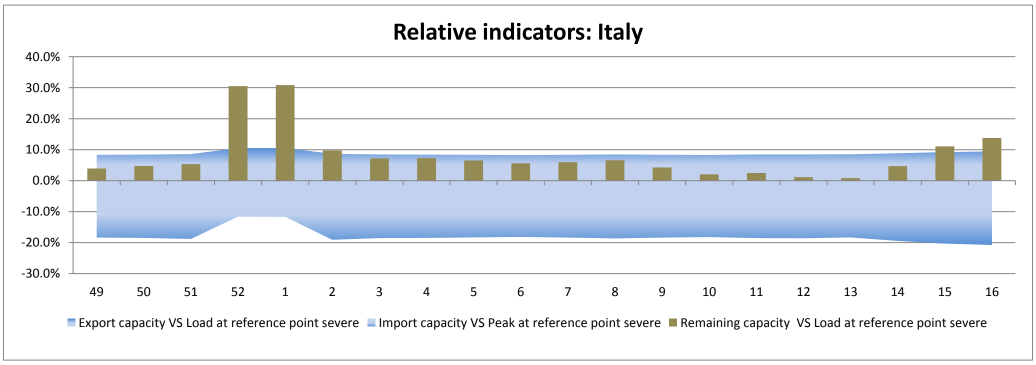
The Italian system is not dependent upon import/export of electricity from neighbouring countries to meet the balance between generation and demand.

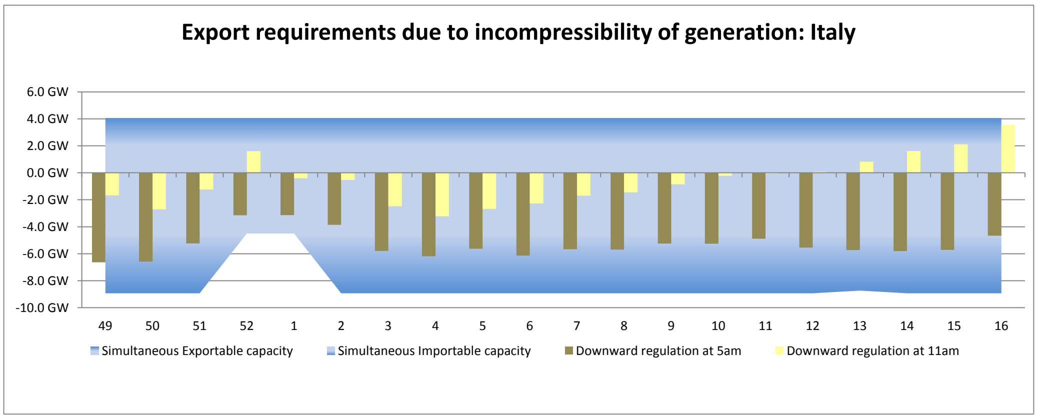
Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

During high renewable/low load periods, in order to guarantee the system security, Terna could adopt special remedial actions.


Demand and generation availability: Italy
140.0 GW
120.0 GW
100.0 GW
80.0 GW
60.0 GW
40.0 GW
20.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Italy
15.0 GW
10.0 GW
5.0 GW
0.0 GW
-5.0 GW
-10.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Italy
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Italy
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
-8.0 GW
-10.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Latvia

Looking to the next winter overview Latvian TSO “Augstsprieguma tikls” AS did not perform any specific short-term studies or assessments for the upcoming winter period 2014/2015 at national level or in cooperation between neighboring TSOs. Baltic TSOs always are keeping close relationships regarding transmission network reliable operation and cooperation for security of supply issues in the Baltic region. The load forecast is prepared based on last winter's weather conditions (2013/2014), long-term water inflow level in Daugava River, average heat consumption in Riga city and existing gas price in Latvia. Latvian TSO is expecting that we can cover the peak load during whole winter period in normal conditions but in severe conditions problems might have from week 10, when available capacity doesn't reach forecasted peak load. In this case TOS will be dependent on cooperation between neighboring countries. Although starting from week 10 the available capacity doesn't reach the peak load but it is very close to it. TSO can expect higher water inflow in Daugava River because the historical data shows that from the second part of March water inflow in Daugava River is increasing.

Latvian power systems base power is generated by CHP plants and they can cover about 35% of peak demand. 60% of total installed generation capacity in Latvia is run-of-the-river hydro power plants which are located on Daugava river, but in normal conditions to cover the peak load TSO is expecting 500 MW of hydro (30 % of installed capacity) in December, January and February but 700 MW of hydro in March and April (starts of flood season on Daugava river). In severe conditions TSO is expecting only 300 MW of hydro (around 20 % of installed capacity) in December, January and February but 400 MW of hydro in March and April (starts flood season on Daugava River). Hydro forecast has been made based on historical annual data but in dry and cold years water inflow could be very small. The severe conditions are expecting if will be especially low average air temperature during winter most of the time. In the high water in-flow periods Daugava HPPs are going to work on the base power mode and usually it is happening in spring (April, May). Generally Daugava HPPs are designed for “peak”, “half-peak” and emergency modes of operation and today on the Duagava River Latvian TSO is keeping the main reserves for Latvian power system. In mentioned hydro power plants is possible to increase or decrease the load comparatively quickly as the need arises. The infelxible generation in area of Latvia is very insignificant therefore TSO is not expecting any troubles regarding to this.

General situation

Despite sufficient installed capacity on the hydro power plants, shortage of inflow water is the main limiting factor for generation availability in Latvia. The main periods of stress for the Latvian power system are possible if water inflow in Daugava river will be very low as showed in severe conditions and all consumption must be covered mainly by CHPPs. The main Latvian CHPPs are fuelled by gas. The fossil fuel for CHPPs Latvian power companies are importing from Russia and gas prices are one of the most significant indicator which could affect CHPPs generation availability in Latvia. In this winter it is expected, that gas import will be according to CHPPs generation plans and will be sufficient for the CHPPs requirements. CHPPs are the main power plants for Riga district-heating and they should be in operation whole winter period.

Latvian TSO is responsible for the security and reliability of power supply in Latvia area and according to the availability of excess generation capacity in neighbouring power systems and adequate transmission capacity manages the balance of Latvia power system. In the winter for normal conditions, Latvia power system is self sufficient for whole winter period. The critical periods for TSO are all weeks when remaining capacity could be below zero and then Latvia is planning to be dependent from energy import from neighbouring countries. In severe conditions remaining capacity is also below zero from week 10 till week 16 because second unit of Riga CHP2 is going iunder repair (lose of around 442 MW). In severe conditions from week 10 till week 16 Latvian TSO is ready for the power import from Russia and Estonia. Generally Latvian power system is the electricity importer in winter periods as well as in the summer periods but if we are looking annually then Latvian power system is quite close to balance because in spring period (March/April,May) Latvian HPPs exporting very huge amount of electricity to neighbouring power systems. Latvia can import the remaining part of the basic state electricity supply from Estonia, Lithuania and Russia, and there is also an opportunity of electricity supply from the Nordic countries. Security and reliability of

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power supply in winter period will be dependent on whole Baltic States generation availability, import and export amounts from third countries and cross-border transfer capacities between Baltic States, Russia and Nordic countries. TSO is expecting that these different energy sources guarantee uninterrupted and reliable electricity supply in Latvia during whole winter period.
The basic schedules for planned maintenance of power plants which are connected directly to the transmission system are already known for the coming winter period and further. From week 10 one 442 MW unit of RigaCHP2 is going under repair but hydro production can cover demand instead of it. During winter under normal conditions and under severe conditions mainly all available CHP plants will be in operation and usable will be HPPs (considering water inflow of Daugava river) to cover peak load in Latvian power system. Some reconstructions on hydro generators have been planned during December, January, February and March but it's not limiting the production of hydro power in second part of March and April. No additional news from producers about plans for new power plants constructed in this year and during winter period, therefore installed net power capacity will remain approximately 2.95 GW. In normal conditions about 15 % of installed capacity of wind can cover the peak load but in severe conditions no wind at all. Power systems service reserve is approx. 100 MW for whole year, which is estimated approx. as 6 % of peak load plus 10 % of installed capacity of wind.

Most critical periods
In case of severe conditions from week 10 till week 16 the Latvian power system might face some problems, but we hope that water inflow in Daugava River will be higher as expected and we can keep a balance during the whole winter period. A lack of capacity appears because one unit of RigaCHP2 (installed capacity 442 MW) is going under repair.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Due to cold weather conditions in winter period the interconnection capacity in the winter period usually is higher than during the summer period in normal load and severe load conditions, but Latvian TSO is ready for any restrictions regarding cross-border transfer capacity between Latvia and Estonia. In December, January, February are not planned any interconnections repair works in the Latvia area, therefore the necessary capacity from neighbouring countries could be imported. In March and April some repair works on interconnections in Latvia will be started and interconnection capacity to/from Lithuania and Estonia will be decreased. In March and April Latvian TSO foresees 700-1000 MW of hydro to cover the balance and ensure a huge amount of electricity export to neighboring countries. All maintenance works will go by schedule (monthly schedule) and the draft schedule is already agreed, but going to the next year any changes in maintenance schedule could be possible. The NTC values for the winter outlook are best estimated, but according to interconnection outages and maintenances those could be change, and will be published on Latvian TSO web page. Considering the Lithuanian electricity deficit whole year and continuous supply of electricity from third countries to Lithuania and Latvia, TSO is expecting high loop flows and transit flows via Latvian transmission network and therefore the congestion on cross-border Latvia-Estonia in normal and severe conditions could appeared. Following the conditions of the Baltic Capacity calculations and capacity allocation rules the transmission capacity on, which will not be used for trade on Latvia-Russia cross-border will be allocated for trade on cross-border EE-LV. It means the cross-border capacity between EE-LV in these cases will be increased. All capacities will be allocated for day ahead implicit trade through Nord Pool Spot. Cross-border capacities in winter are dependent on maintenances of interconnection lines and prognosis of loop flows.

Considering the strong interconnections between Baltic States and third countries and synchronous network operation between Baltic States and Russian and Belarussian power systems as well, Latvian electricity consumption during winter period could be covered with generation of Russia in case of unpredictable interconnection shortages and generation shortages should take place. Out of security of supply reasons Latvia power system is keeping a generation reserve for N-1 criteria whole year.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

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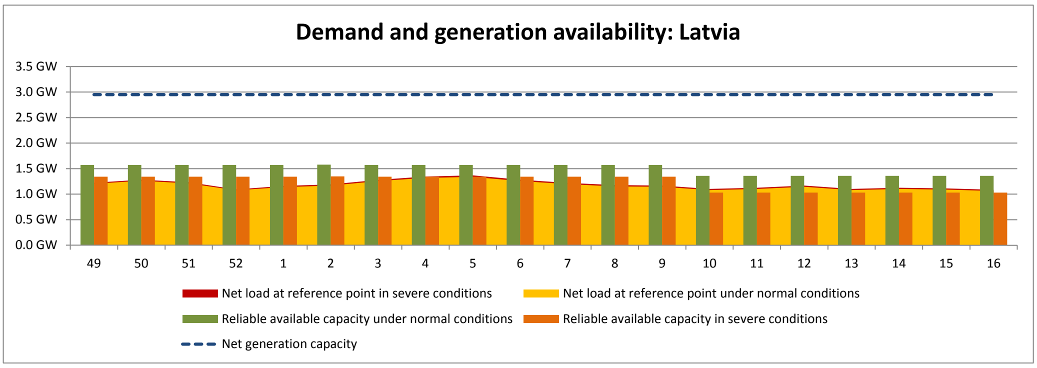
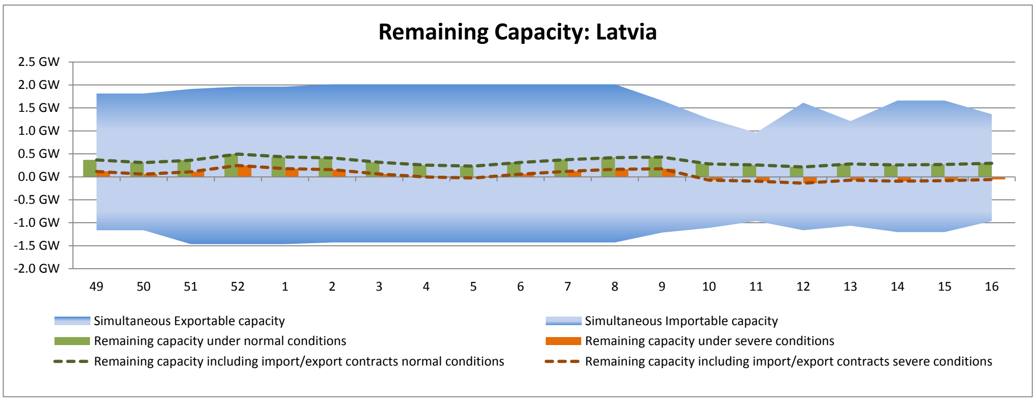
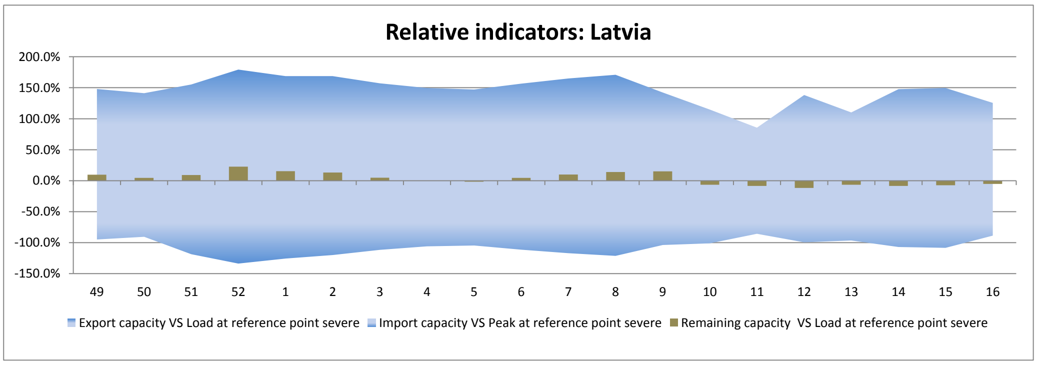
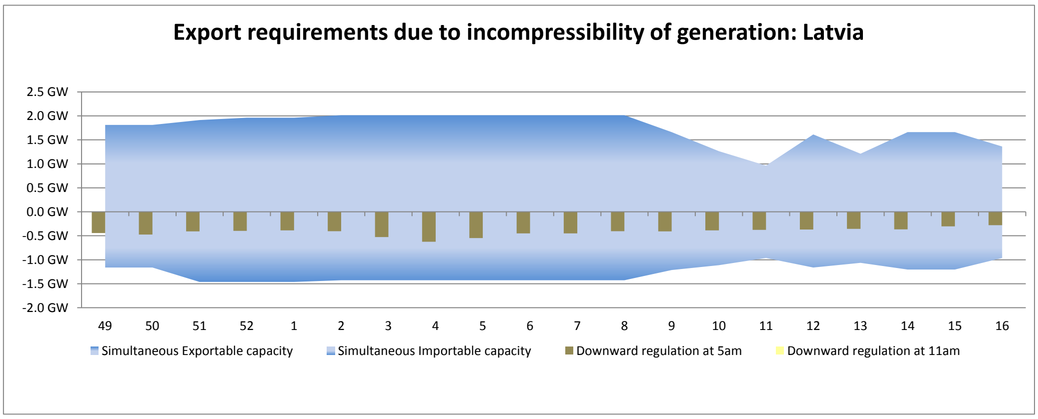
The inflexible generation in area of Latvia is too small to causes significant flow restrictions on cross-border interconnectors.









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Lithuania

In Lithuanian power system the required adequacy margin can be guaranteed by local generation units. The forecast average net generating capacity during the upcoming winter will be 3867 MW. The net generating reduction occure due to dismantling of two generating units in Lithuanian power plant. The maintenance of generation units in general is enough low and will not cause any risk for normal conditions.

The system balance is expected to be deficit due to prices differences with neighboring countries. The import of electricity from neighbouring countries will be relied upon cross-borders with Belorussia, Latvia and Kaliningrad area. The electricity generation from local thermal, hydro and wind power plants is expected to cover approximately 38% of demand, while 62% will be covered by imports. Available cross-border capacities for upcoming winter are enough to cover whole consumption under normal conditions and no specific risks are foreseen.

General situation
For the coming winter season the maintenance schedule in general is not intensive. According to the maintenance schedule the largest generation inaccessibility due to maintenance will be on weeks 49-7 when one generating unit of Lithuanian power plant will be on maintenance. This maintenance do not have any influence for system adequacy for normal condition.

Most critical periods
According to the last winter experience the most critical periods are when the weather is humid, windy and the temperature is a lower than 0°C. These circumstances are associated with a high risk of wind turbines icing. It is foreseen that additional regulating reserves will be needed to cover wind generation deficit. According to analysis, it is expected three extraordinary weeks: the week 52 and week 1 due to Christmas and New Year celebration and week 11 due to public holiday. It is foreseen that additional regulating reserves will be needed to cover potential consumption imbalances during these three weeks.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
From system adequacy point of view capacity of interconnectors does not play an important role for Lithuania PS because available generation capacity is sufficient to cover system demand. However, available generation is usually not competitive in the wholesale market, therefore large amount of Lithuania PS demand is covered by imported electricity. All import volume from third countries (Russia, Belarus) based on power flow calculations and allocated at Lithuania-Belarus interconnection highly depends on Estonia-Latvia interconnection capacity. Due to maintenance activities on Estonia-Latvia interconnection lines and higher ambient temperature, highest restrictions of the import capacity from third countries are foreseen from week 11 to week 16.

Moreover, import ability of Lithuania PS also depends on available generation in Kaliningrad region. Import restrictions are foreseen during weeks 49-50 and 15-16 when generation of Kaliningrad TPP is planned to be reduced due to maintenance activities.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
Whereas Lithuania is the importing country with fairly low amount of installed renewables, role of interconnectors to managing an excess of inflexible generation is very low.

Synopsis

Generation
According to preliminary plan for the upcoming winter the generation portfolio will consist of 15% of gas fired PP, 31% - mix fuel PP, 28% - renewable PP and 26% - hydro PP. In the beginning of 2015 Lithuania has four power plants which have the possibility to switch 1131 MW net generation capacity to oil fuel, and respectively guarantees to cover approximately 63% of forecasting maximum peak load.
We expect to produce more electricity from renewable power plants than in previous winter due to new installations of biomass power plants. 17% of generation portfolio expected to be covered by wind power

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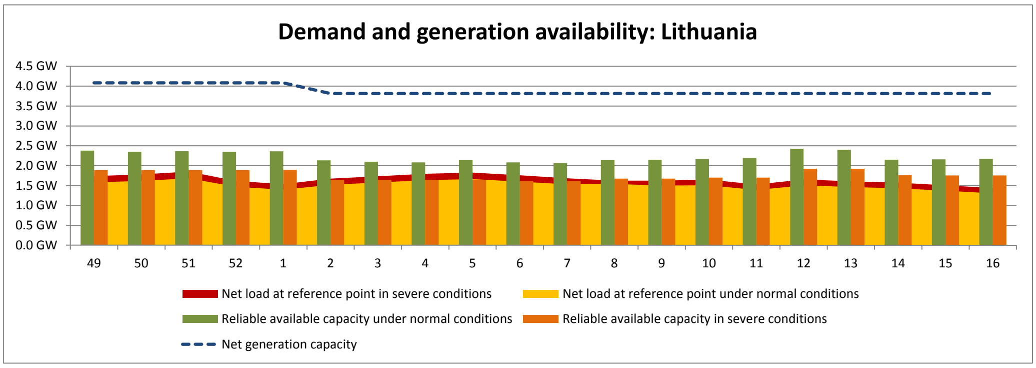
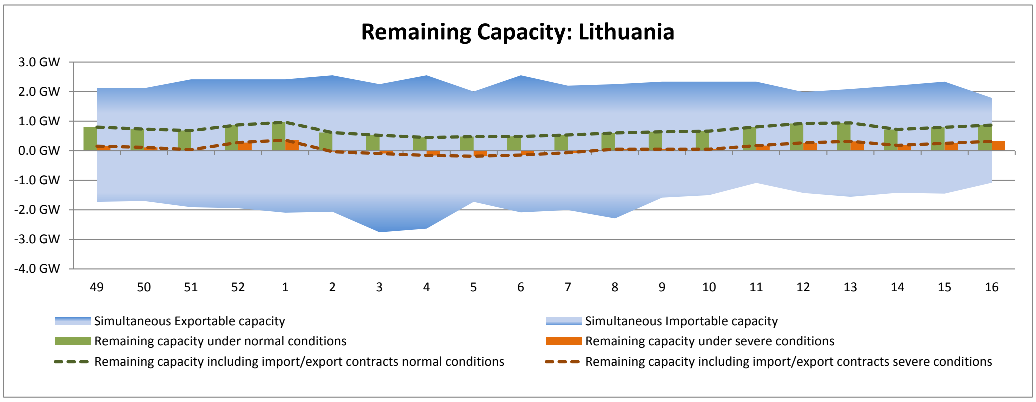
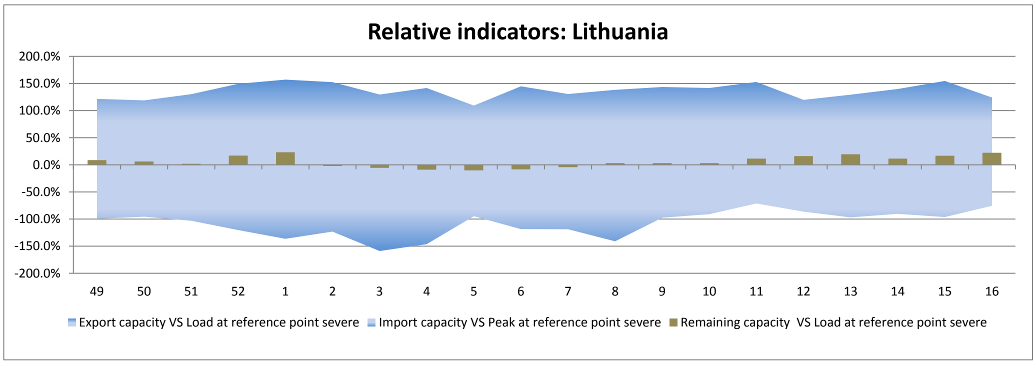
plants.

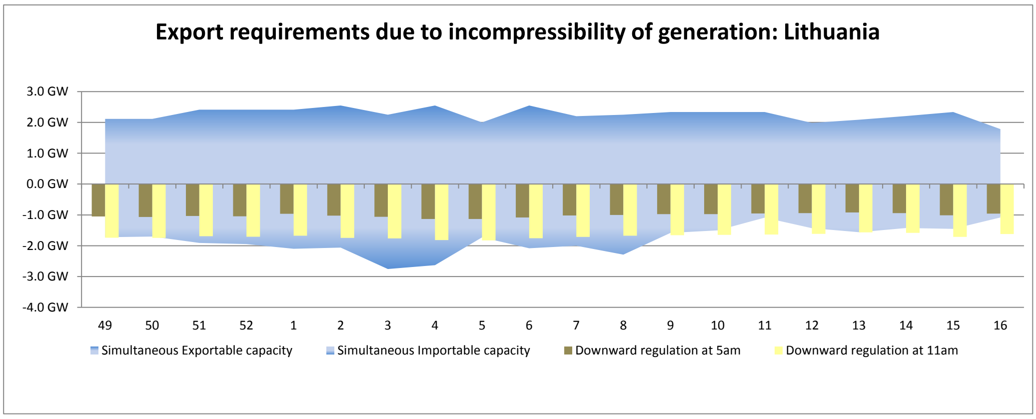
Demand

Peak load is expected in the second half of January. The maximum load for normal conditions is expected to be 1807 MW and for severe conditions is expected to be 1988 MW. The demand load is expected to be similar as previous winter.

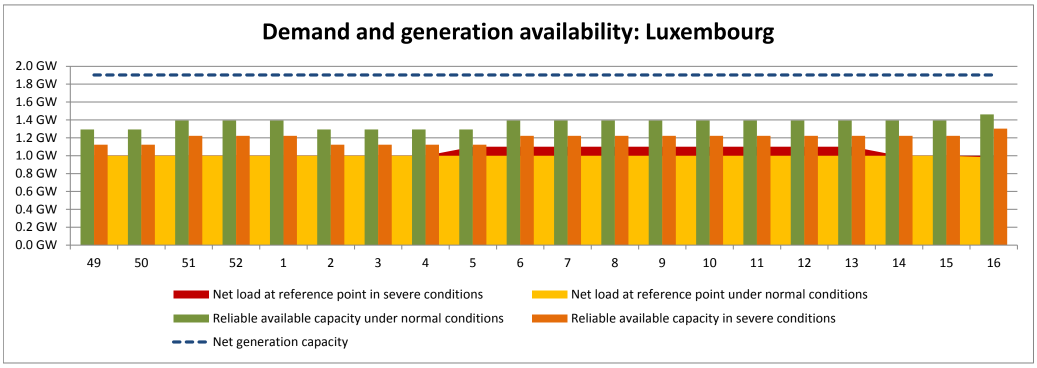


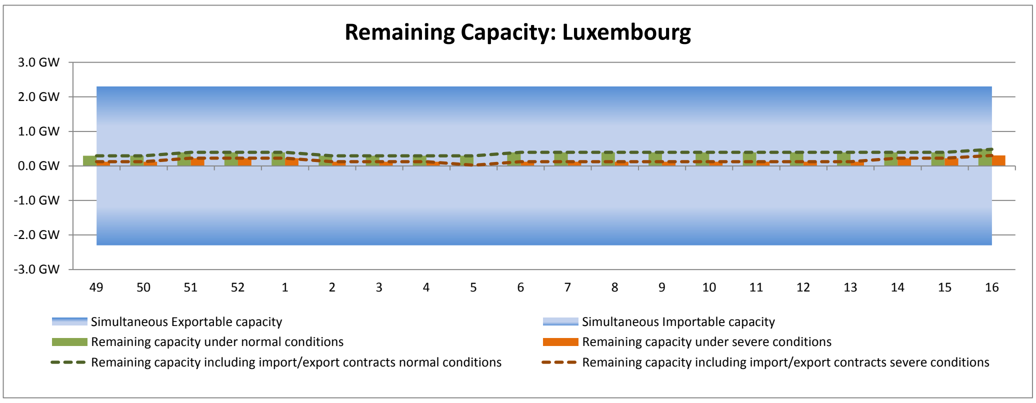


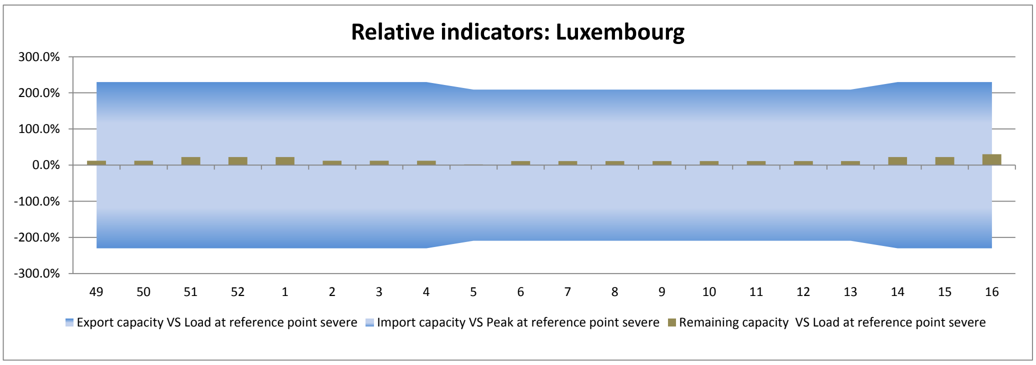


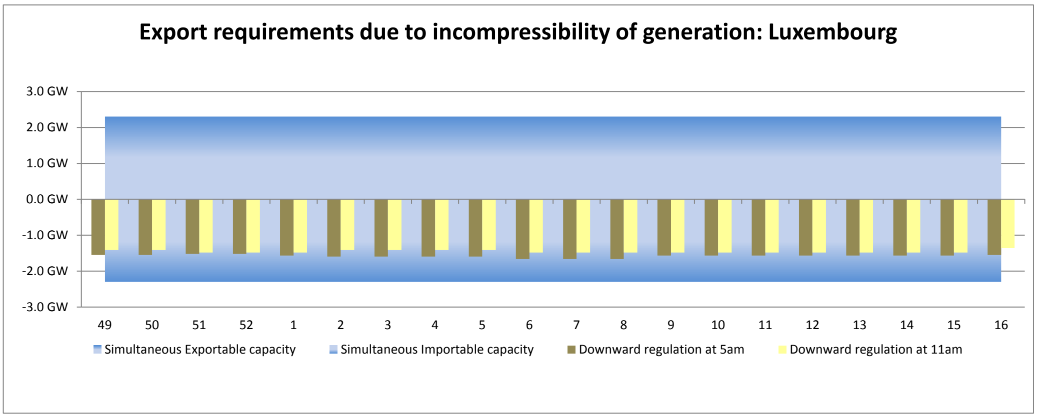


Luxembourg


Demand and generation availability: Luxembourg
2.0 GW
1.8 GW
1.6 GW
1.4 GW
1.2 GW
1.0 GW
0.8 GW
0.6 GW
0.4 GW
0.2 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Luxembourg
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Luxembourg
300.0%
200.0%
100.0%
0.0%
-100.0%
-200.0%
-300.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Luxembourg
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Montenegro

The operation of power system is expected to be secure and reliable over all winter period 2014/2015. Our best expectations are that generation-load balans problems, under normal conditions, are not expected in Montenegro during winter 2014/15.

General situation
During winter there are no planned high level of maintenance and hydro levels are expected to be normal, therefore we don't expect any issues.

Most critical periods
We don't expect any critical periods.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
In case of low availability of generation Montenegrin power system depends on imports of energy to cover difference between consumption and production.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
No major variations of the interconnection capacities are expected during winter 2013/14.

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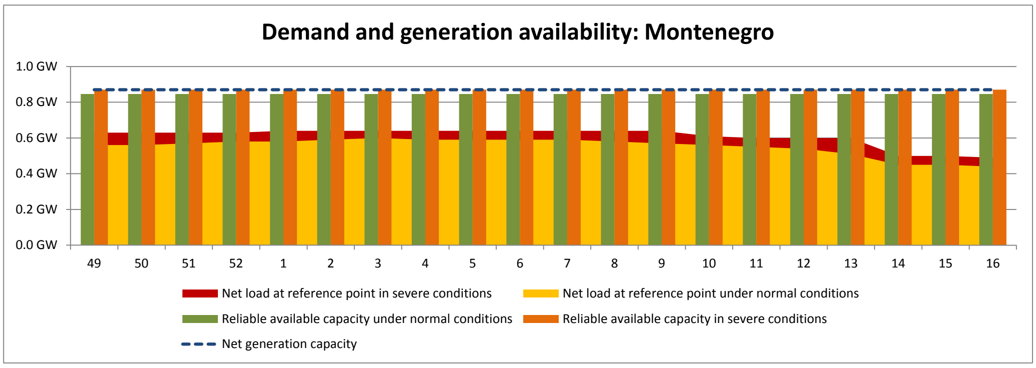
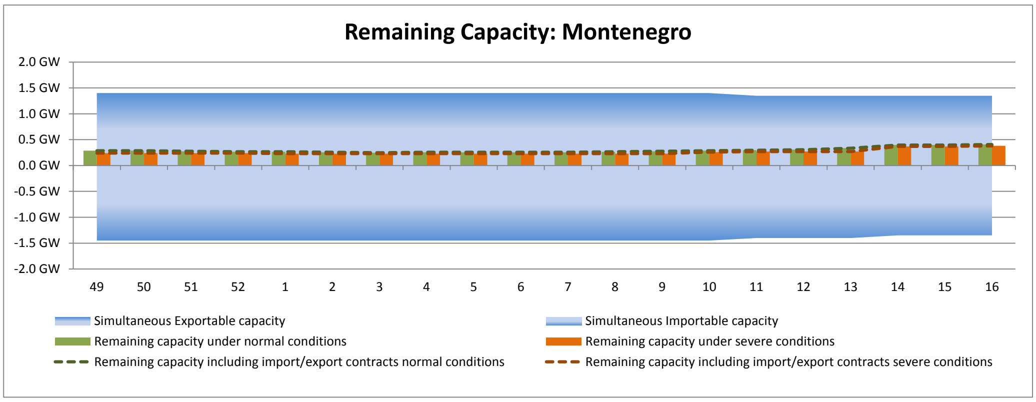
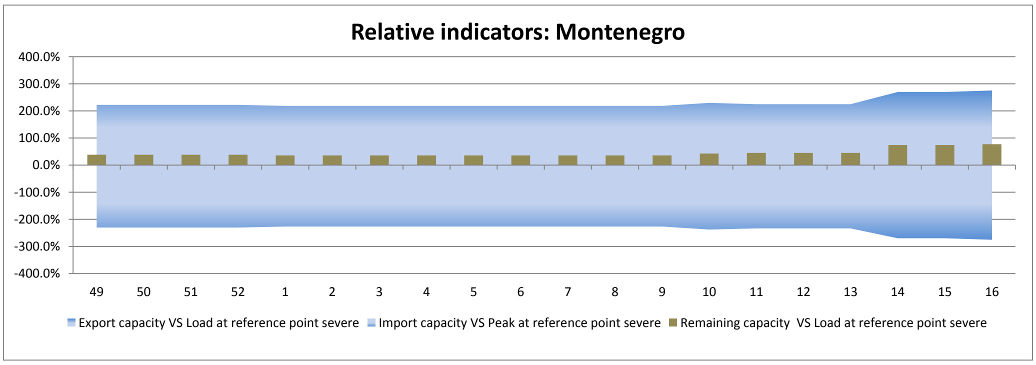
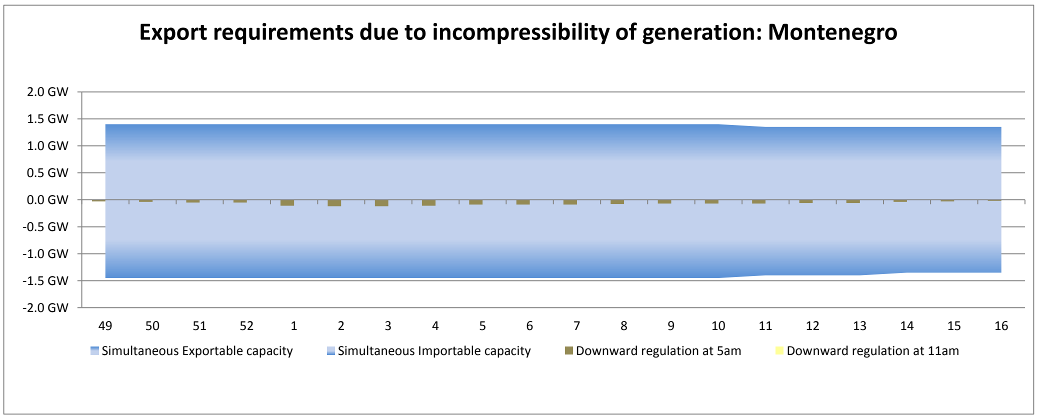

Demand and generation availability: Montenegro
1.0 GW
0.8 GW
0.6 GW
0.4 GW
0.2 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Montenegro
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
-1.5 GW
-2.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Montenegro
400.0%
300.0%
200.0%
100.0%
0.0%
-100.0%
-200.0%
-300.0%
-400.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Montenegro
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
-1.5 GW
-2.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

The Netherlands

For the coming winter TenneT does not expect any difficulties on generation or load balance. Under normal or severe conditions the amount of available generation capacity exceeds the demand peak. In close cooperation with our neighbouring TSOs, TenneT has enlarged the amount of Cross border capacity made available for the market for the day-ahead and intraday capacity trading.

General situation

In most years the peak load happened in the winter period in the late afternoon hours (17-18 hrs) in December or January, the historical peak load still remains within the calculated peak load under severe or normal conditions and under the total amount of installed capacity within the Netheralnds.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

National generation capacity is sufficient for peak demands and we do not rely on the import or export capacity for that. During the comming winter period no changes to import or export capacity are expected**.**

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

The amount of inflexible generation is managed by the Program Responsible Parties and can still be handled within the minimum demand periods. Any excess of generation capacity will lower the market prices and this will lead to export generation or shutdown of installations.

Synopsis

TenneT TSO B.V. performs studies on a national level in accordance with our National Grid Code for establishing the Total Transmission Capacity available on our border. So far there has not been a special scenario for the winter period or the winter adequacy forecast. To our opinion the supply-demand balance will be realised on the basis of the price-driven demand principle and it's not a task of the TSO to intervene in a good functioning market.

The specific TSO's task is balancing the system and supply emergency power when necessary. Nevertheless, there is no indication of lack of power based on weather conditions in the following winter period, as the Netherlands has not been suffering long period of harsh winters.

In most years the peak loads happened in the winter period in the late afternoon hours (17-18 hrs) in December or January, the historical peak load still remains within the calculated peak load under severe or normal conditions and under the total amount of installed capacity within the Netheralnds.
Due to the fact that the Netherlands has sufficient Gas supplies of its own, any crisis in Gas is not to be expected to have an effect on the Dutch electricity supply.
TenneT TSO B.V. provides on behalf the Ministry of Economic Affairs the report on Monitoring of Security of Supply 15 years ahead (Monitoring Leveringszekerheid). Visit our website for the latest report on Monitoring 2013-2029: www.tennet.eu

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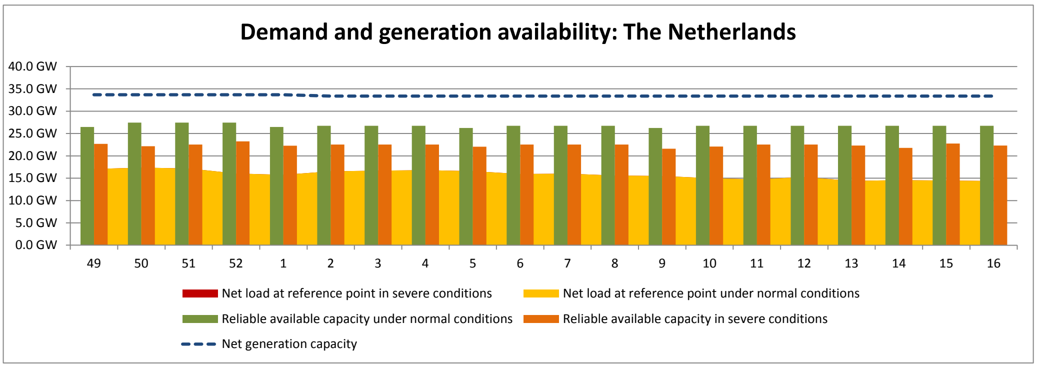
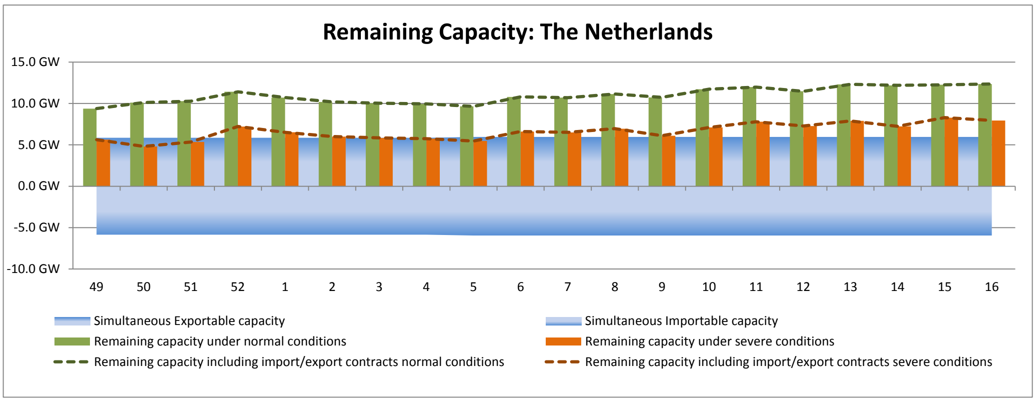
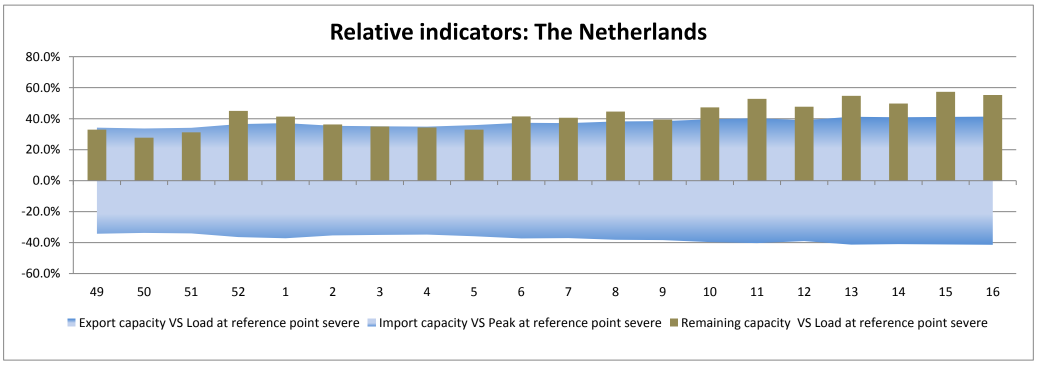
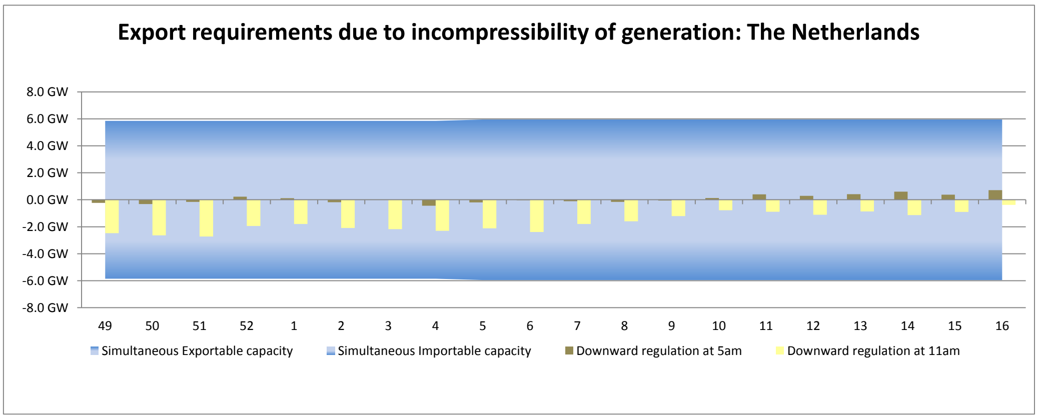
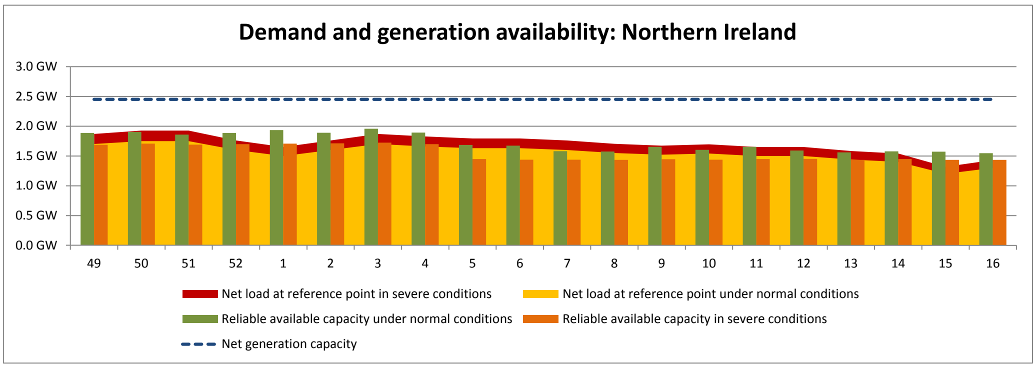

Demand and generation availability: The Netherlands
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

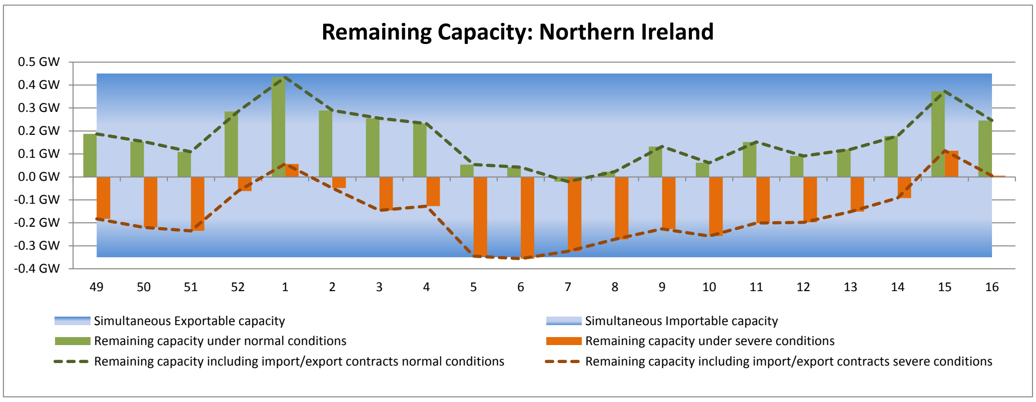

Remaining Capacity: The Netherlands
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

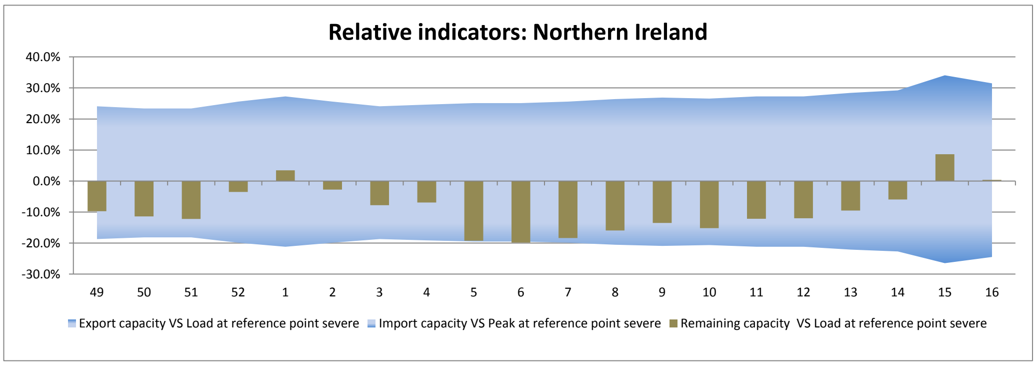

Relative indicators: The Netherlands
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

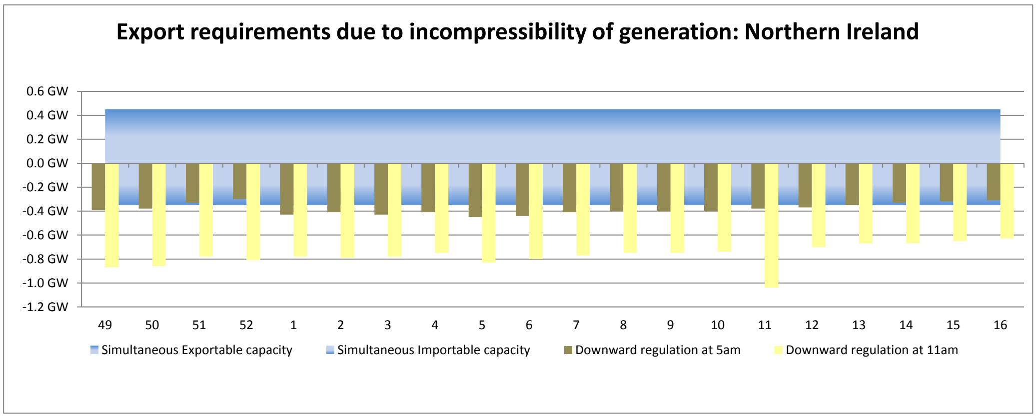

Export requirements due to incompressibility of generation: The Netherlands
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Northern Ireland









Norway

Norway are self-supplied with power during the coming winter, but in some weeks there may be some net imports.

General situation
The hydrological balance is above normal in the beginning of the winter. This is based on an improved hydro-balance during the last months.

Synopsis
Norway are self-supplied with power during the coming winter, but in some weeks there may be some net imports. The hydrological balance is above normal in the beginning of the winter.

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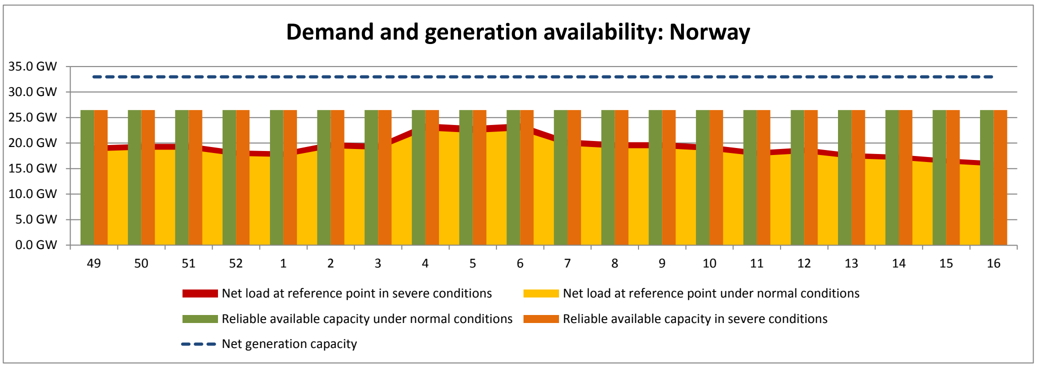
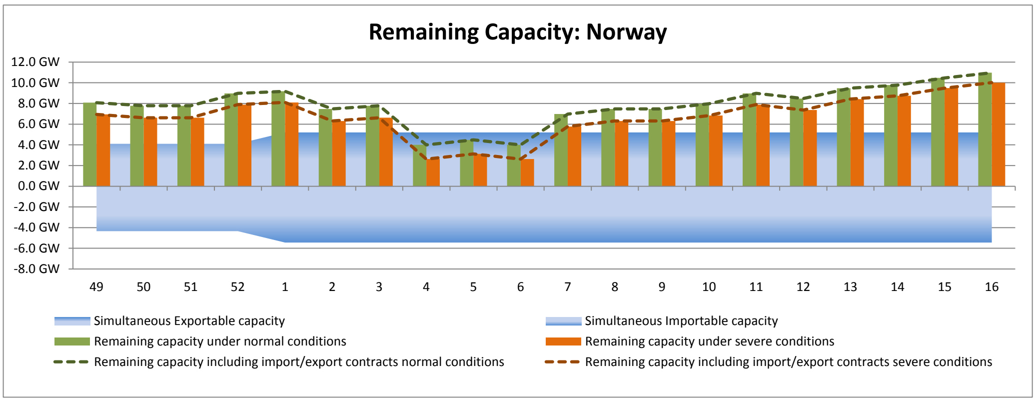
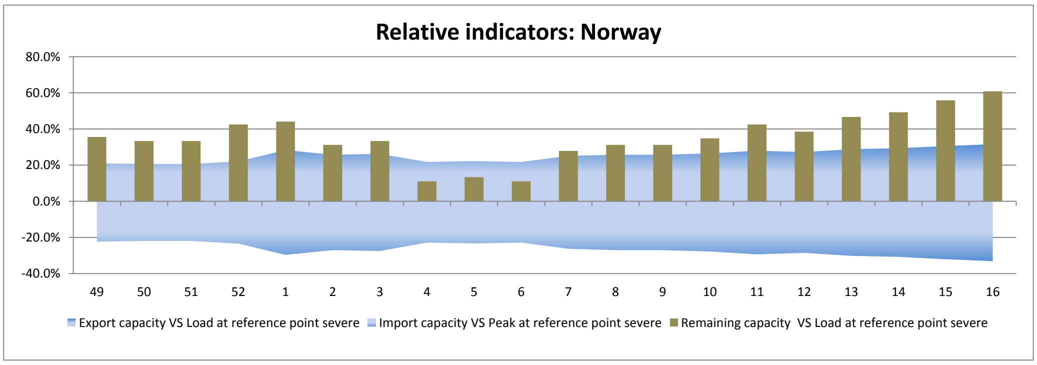
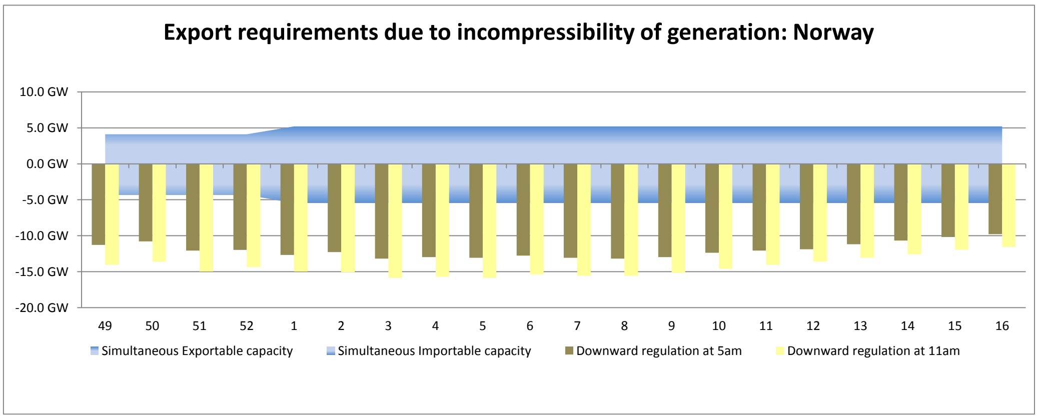

Demand and generation availability: Norway
35.0 GW
30.0 GW
25.0 GW
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Norway
12.0 GW
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
-8.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Norway
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Norway
10.0 GW
5.0 GW
0.0 GW
-5.0 GW
-10.0 GW
-15.0 GW
-20.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Poland

Power balance at 19:00 CET

In Poland forecast system balance plans (called yearly coordination plans) are done for the whole year on a monthly basis, till 30th November every year and published on PSE S.A. web site. Prepared data concerns average values from working days at peak time (during main winter months, means December, January and February peak time is taking place at 17:00 and load is higher than at 19:00 by at about 1-2,5%). On 26th every month PSE publishes monthly coordination plans, which include the precise information on peak time for all days of the next month. Further specification is done within the operational planning (weekly and daily). Plans prepared by PSE are single scenario plans.

Because of Outlook Reports require daily data, PSE has prepared special assessment for Winter Outlook, where daily data of NGC, maintenances, load and "best estimate of NTC" are available. It is important to underline that, there is still yearly planning horizon. Reserves (primary and secondary) are in line with Operational Handbook requirements. Outages and non-usable capacity under normal and severe conditions are estimated based on statistical data. Due to differences between ENTSO-E power balance methodology and methodology for constructing coordination plans result couldn't be compare in a direct way. In normal conditions PSE classifies 90% of wind NGC as non-usable capacity, for severe conditions it is 100%.

In normal conditions at all reference points PSE is forecasted the surplus power and does not expect any problems with balance the system this winter.

Under severe conditions, single days with negative power balance are forecasted and only on 8 April 2015 the possible negative balance exceeds available importable capacity. Such forecast takes into consideration both high demand and low generation availability, which usually take place simultaneously in the Polish system under long lasting severe conditions (low temperature, hydrological constrains after dry autumn/during dry winter), To keep the balance at the safe level, Polish TSO can use operational procedures, to cope with power shortage, e.g. activate an additional power in units, which are classified as non-usable capacity in yearly horizon forecast.

Power balance at minimum demand conditions

PSE does not prepare forecast for downward regulation capabilities in yearly and monthly horizon (only during daily planning), so provided data is a kind of estimation only. PSE can confirm that there are some stress days during the year (especially during Christmas, Easter and holidays in May), when low demand and simultaneously high wind condition could cause the balance problem in Polish power system, especially as wind generation factor used in national downward analysis amounts 85% of NGC.

Owing to the lasting increase of wind NGC in Poland and assumed pessimistic factor for wind utilisation (85%), the national downward analysis at 5 a.m. CET show possible stress with balance the system for some reference points, especially for two of them (as mentioned above): 24 and 31 December. Nevertheless possible problems will be manage during operational planning, when precise forecast of wind generation will be known. PSE has also operational procedures to keep system at safe level (including wind farms switching off as a last resort).

PSE does not expect problems with balance at 11:00 a.m. in Sundays. Solar generation is not a problem due to fact that NGC of solar is negligible in Polish balance.

Potential impact of a gas disruption

No special impact of the potential gas disruption on the polish electricity system is forecasted, mainly due to fact that energy generation from gas amounts at about 2% of total production.

Operational conditions

Referring to network conditions, for years PSE S.A. has been affected by unscheduled transit flows through the system from the west to the south. The flows limits capacity, which could be offer to the market on the

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borders and causes network problems in operation, like overloading of tie lines and internal elements, not fulfilment N-1 criteria on the borders.

To keep system safe in such situations PSE will take the following actions:
- Activate DC loop flow (HVDC rescheduling) PL→DE→DK→SE→PL.
- Activate internal redispatching.
- Activate cross-border redispatching.
- Activate multilateral redispatching.

In case of emergency situation, the agreements concluded between PSE S.A. and neighbouring TSOs for emergency energy delivery can be used.

Interconnection capacities
PSE provides aggregated NTC data for the whole 220/400 kV synchronous PL - DE/CZ/SK profile on the base of the Polish Grid Code that accounts for physical power flows in the interconnected systems of Continental Europe, i.e. unplanned flows through Polish system from the west to the south. Additional Polish connections in use are: DC cable to Sweden, 220kV line to Ukraine, on which import only is possible (Ukrainian units are connected synchronously to the Polish system).

As the "best estimate of NTC" for Winter Outlook PSE provides seasonal forecast of NTC, which takes into consideration unplanned transit flows through PSE control area. Additionally December's forecast include network constrains caused by planned switching off of the cross-border and / or internal lines (or other elements). Such constrains for 2015 will be agreed till end of November 2014. Both factors limit the transmission capacity in Polish system in the yearly planning horizon.

For the whole analysed winter period (in fact during the whole year) yearly forecast of NTC in import direction on PL – DE/CZ/CK profile amounts to zero. This is caused by low level of TTC, which is calculated on the basis of N-1 criterion, simultaneously with high level of TRM, resulting from transit flows through Poland. In other words all capacity possibly to be offered to the market players is already consumed by these transit flows.

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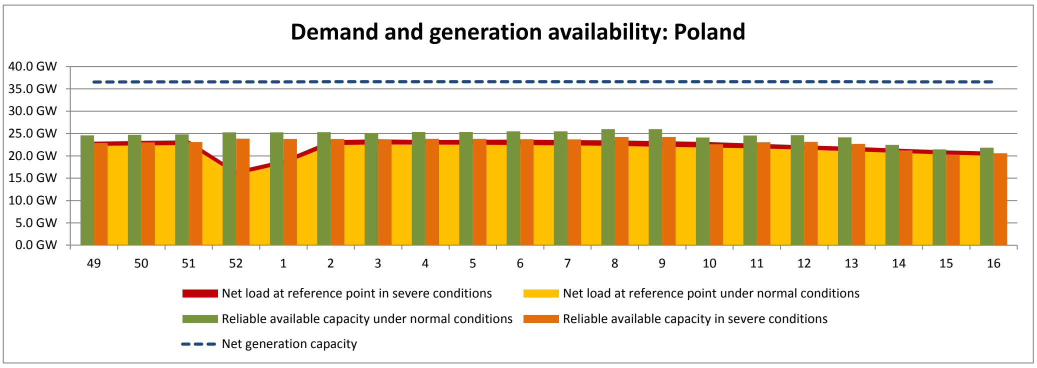

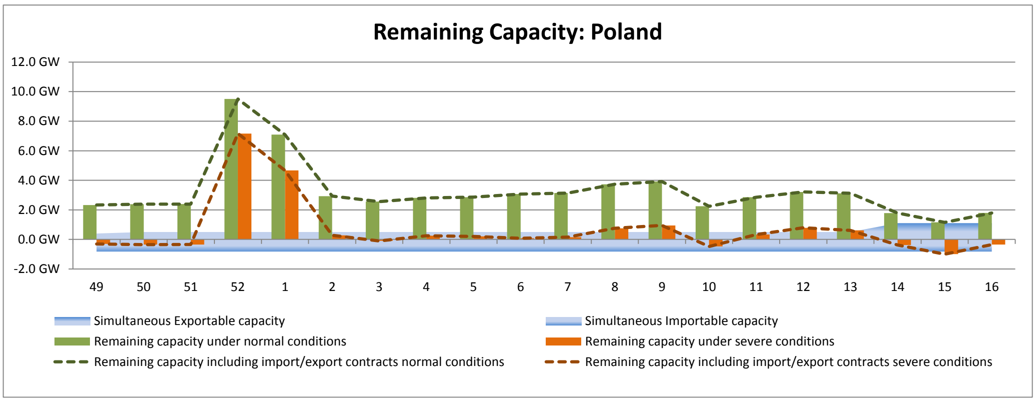

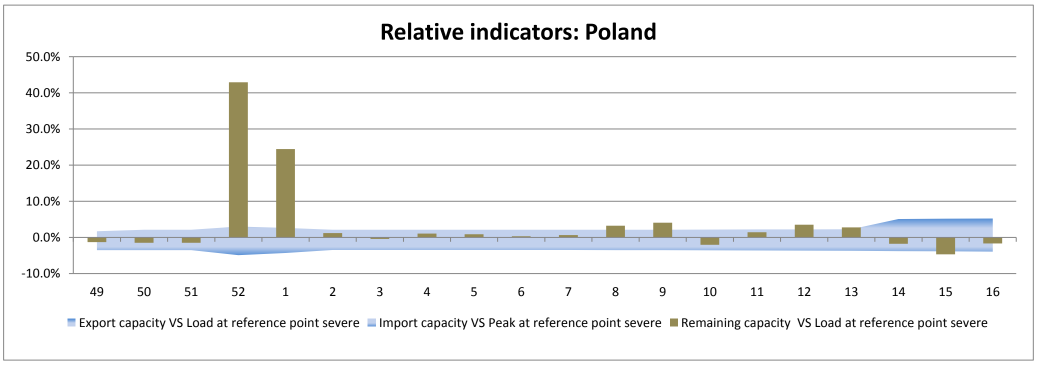

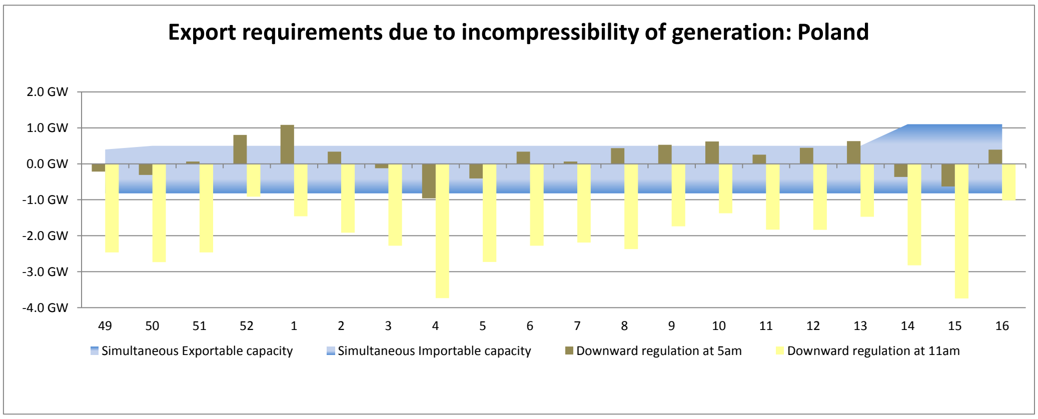

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Portugal

From the perspective of REN, in the next winter season, generation/demand balance is expected to be met without problems. Demand should have a small raise from last year levels, but the increase in NGC is sufficient to compensate this situation. Hydro storage is also on a comfortable level. Uncertainty arising from situation in Ukraine does not also poses a risk, as natural gas supplies for the national system have origin in 51% in the Maghreb pipeline with the rest coming from different sources around the world in LNG cargo ships that unload in our facilities in Sines.

Most critical periods
Although no critical situations were identified, we highlight the weeks 1 to 5 where, in severe scenario both from load and generation side, the margins could be lower than usual.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
From the adequacy point, the Portuguese system does not relies on import capacity, however, in certain market conditions, some significant power flow in the interconnections can be expected.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
Eventual issues with inflexible generation are expected to be managed without resorting to export capacity.

Synopsis
In the upcoming 2014/15 winter season, the Portuguese power system is expected to be in balance. Remaining capacity is considered sufficient to cover peak loads during the whole season, both in normal and severe condition and, with the comissioning of 170 MW reversible units in Baixo Sabor, operating response is also expected to have a great improve. Regarding system's downward regulation capability, our assessment has identified appropriate margins to deal internally with the excess of inflexible generation.

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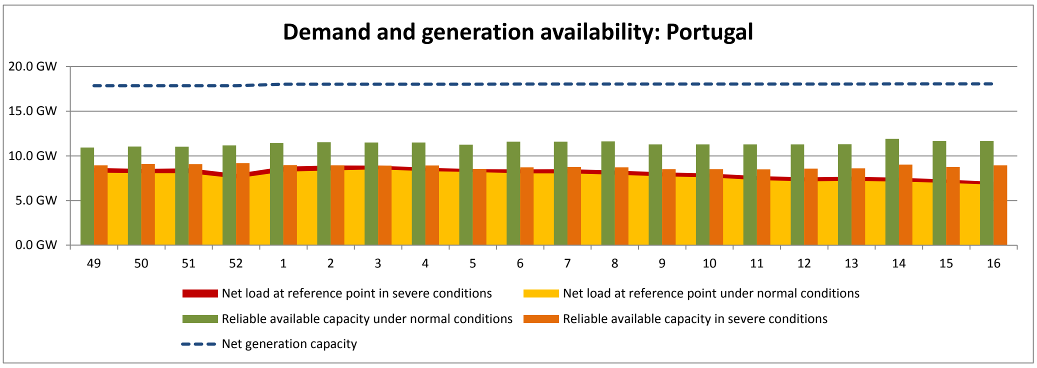
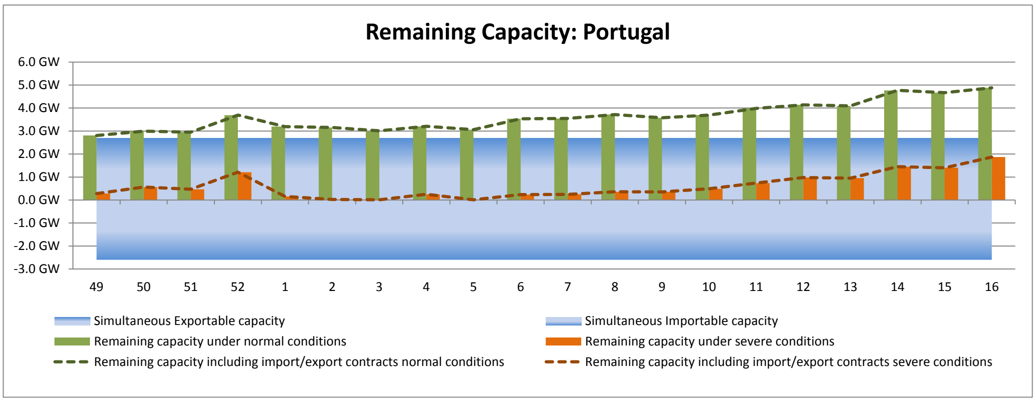
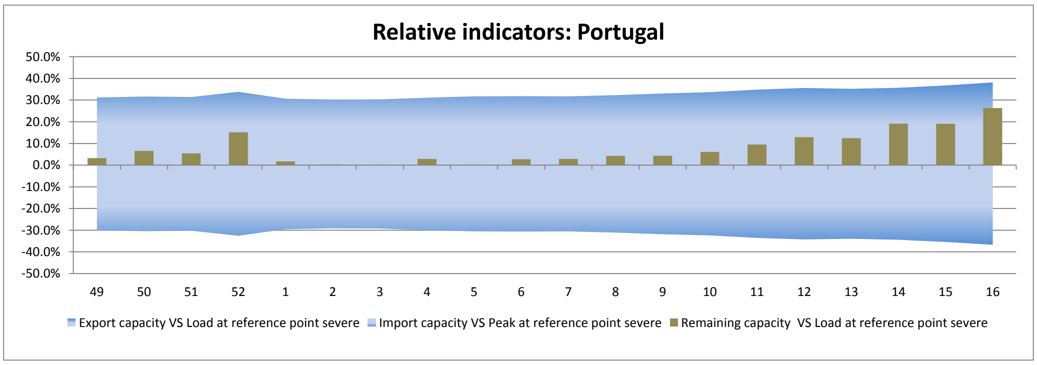
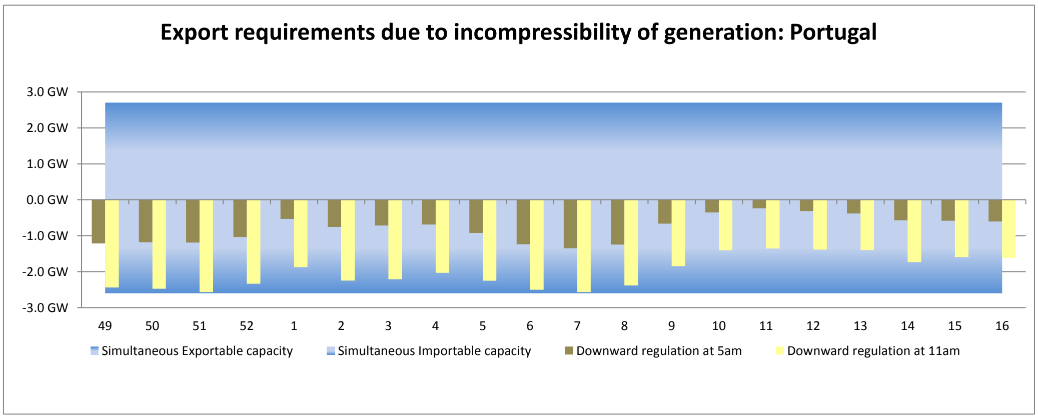

Demand and generation availability: Portugal
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Portugal
6.0 GW
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Portugal
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
-50.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Portugal
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Romania

The forecast for the becoming winter 2014/2015 does not indicate any problem which could affect the Romanian Power System adequacy for both normal and severe condition. However, in case of excess inflexible generation during the minimum demand, market rules are applied in order to maintain the generation-load balance and the exchange schedules.

General situation
The maintenance units program was performed mainly during the summer period. However we do not expect critical time intervals.

Most critical periods
During the winter 2014/2015, we do not expect critical time intervals. However, during the minimum demand at 11 CET in the weeks 3,10,11,12,13,15, if the wind and solar generation is at the level taken into account in the adequacy assessment, then the market rules are applied to reduce proportionally the must run and renewable generation (hydro, wind and solar).

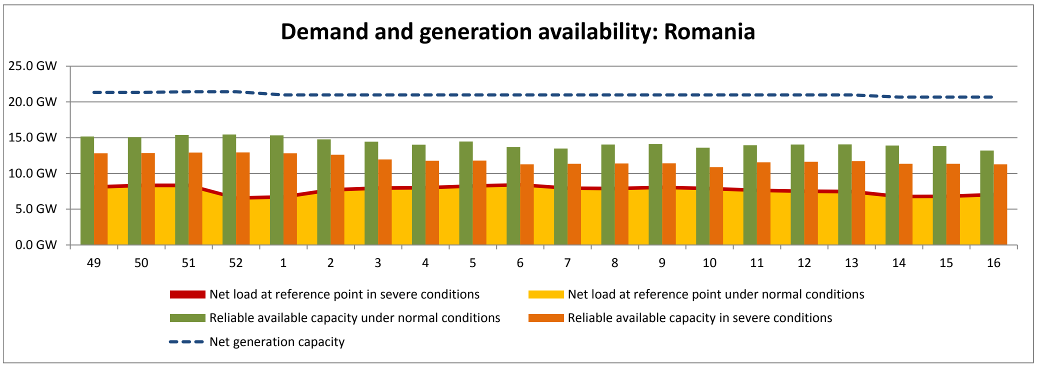
Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
For the coming winter the expected and the main role of the interconnectors between Romania and its neighbours is to facilitate the performing of the commercial exchange power. Usually the role of interconnections is to support the exports for commercial purposes. However, for certain hour intervals during the day imports may occur due to the market conditions. In case of generation adequacy problems there are bilateral agreements with certain neighbours in order to provide emergency exchange power.

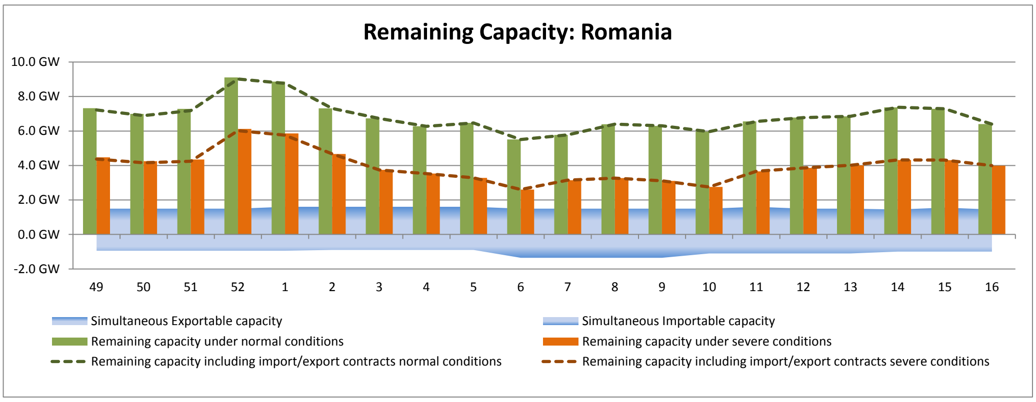
Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
As usual, the interconnection capacities will be used only in the range of the NTC values offered to the market. In the past it was observed that for a high renewables generation an incresed level of export was. On the other hand, there are market rules in order to avoid unplanned exports when it could be an excess of inflexible generation at minimum demand hour.

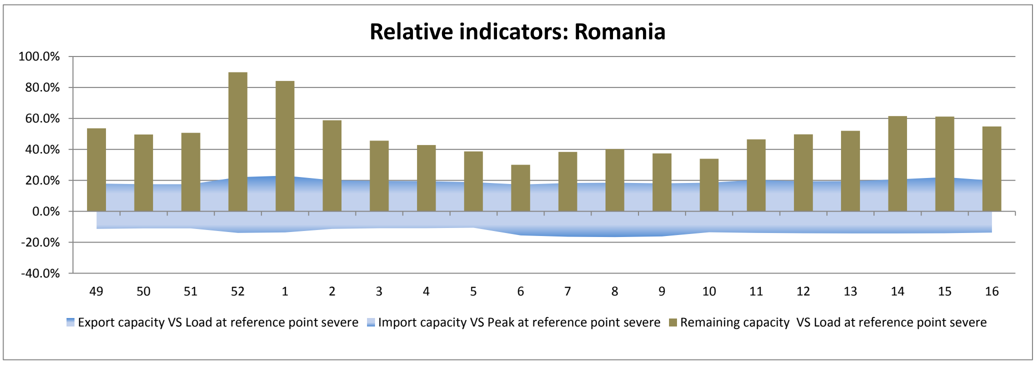
Synopsis
The forecast for the becoming winter 2014/2015 does not indicate any problem which could affect the Romanian Power System adequacy. The remaining capacity can cover any unit tripping which exceed the expected value for outages in either case for a normal or a severe winter.

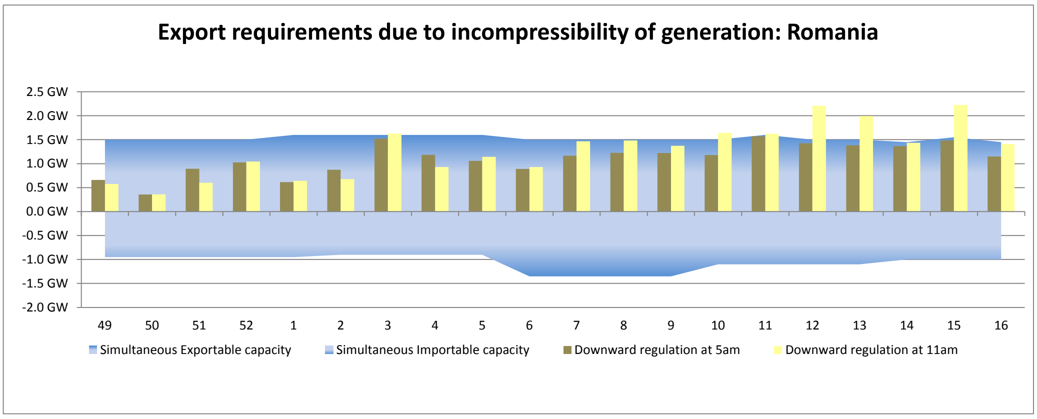
A load value higher than the estimation for a severe winter can be managed by the remaining capacity as well.

Framework and methodology of the assessments
At national level there is a Winter Program to ensure the Power System reliability and stability during the winter season, which is approved by the Romanian Government. The main purpose of the Winter Program is to evaluate the consumption for the time interval between October 2014 till March 2015 in order to cover its forecast in terms of quality and safety feeding in the context of the safe and stable operation of the Romanian Power System. They were considered two different scenarios for winter consumption growth, against the previous winter year 2013/2014. This program foresees the necessary fuel stocks to be realized during July-September 2014 for the proper operation of the thermal power plants during the winter season, taking into account also the necessary system reserves. Also this program foresees that the maintenance programs for the thermal power plants and hydro power plants to be carried out during the summer season. The Transelectrica' s responsibilities as Romanian TSO in terms of the Winter Program is to approve the carrying out of the maintenance plans for the generation units, in reliable operation conditions for the Power System. Also according with national regulatory frame Transelectrica is the administrator for balancing market, ancillary services market and cross-border capacities market.Transelectrica does not foresee any risk for the coming winter taking into account the realization of the Winter Program.


Demand and generation availability: Romania
25.0 GW
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Romania
10.0 GW
8.0 GW
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Romania
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Romania
2.5 GW
2.0 GW
1.5 GW
1.0 GW
0.5 GW
0.0 GW
-0.5 GW
-1.0 GW
-1.5 GW
-2.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Serbia

For the coming summer, EMS doesn't expect problems in covering demand in normal weather conditions. Problems in covering demand can occur at extremely high loads under severe weather conditions and then energy imports will be required.

There are no installed wind generation in our power system, hence power of must run thermal and hydro generation at low demands should be compensated by pumping storage. Only in case of high hydro levels or technical problems in generation and pumping units, generation exceeding at low overnight demands might occur, but rarely and for short periods.

General situation

Planned maintenance works during the summer were significantly disrupted by extreme flooding which hit region in May and caused forced shutdown of power units and damage of transmission system. Therefore, higher level of maintenance is planned up to almost mid-December and high energy imports are already purchased to compensate unavailable capacity for that month.

Hydro levels are high due to substantial rainfalls which hit the whole region during the spring and the summer.

Most critical periods

In period from December to February, under severe weather conditions, extremely low temperatures might cause very high loads which couldn't be covered from domestic generation and energy imports will be required to achieve generation-load balance. In that case, energy needs will be purchased on Serbian market or from neighbouring TSOs through contracts for exchange of emergency energy.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

In order to maintenance adequacy, energy imports will be required probably only in December under normal conditions and certainly under severe conditions in period from December to February. But taking into account that maintenance of interconnectors and significant internal lines are not performed during the winter seasons, there will be enough cross-border capacity to meet domestic and regional demand.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

In general, there are no needs for energy exporting at low demand periods. The surplus of energy is compensated by domestic pumping storage.

Synopsis

The coming winter is expected to be mild with above average temperatures and average precipitation. The Maintenance of power units and transmission network are planned to be completed before a significant increase of demand. Therefore normal conditions are expected during the whole coming winter and already arranged import contracts are expected to be enough for securing generation-load balance.

However, there are three risks that could cause problems in coming winter:

- Extreme weather condition. Very low temperatures for long period of time could cause extremely high loads since consumption in Serbia significantly depends on temperature.
- Gas supply shortage caused by Ukrainian crisis. From experience of gas crisis in 2009 it is estimated that gas shortage may increase electricity consumption up to 300 MW and further increase over this margin in winter peak is not possible due to constraints in distribution system.
- Restricted coal supply as consequence of flooded coal mines. If reparation of flooded coal mines will last much longer than expected, several units in thermal plants may be shut down due to restricted coal supply during the winter. Unavailability of certain units at higher loads may lead to voltage problems.

If any of these risks occur during the winter, additional energy imports will be required.

Framework and methodology of the assessments

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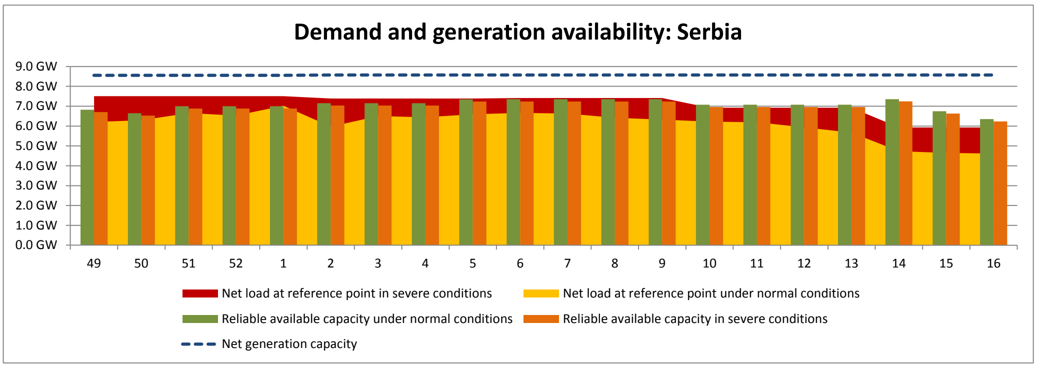
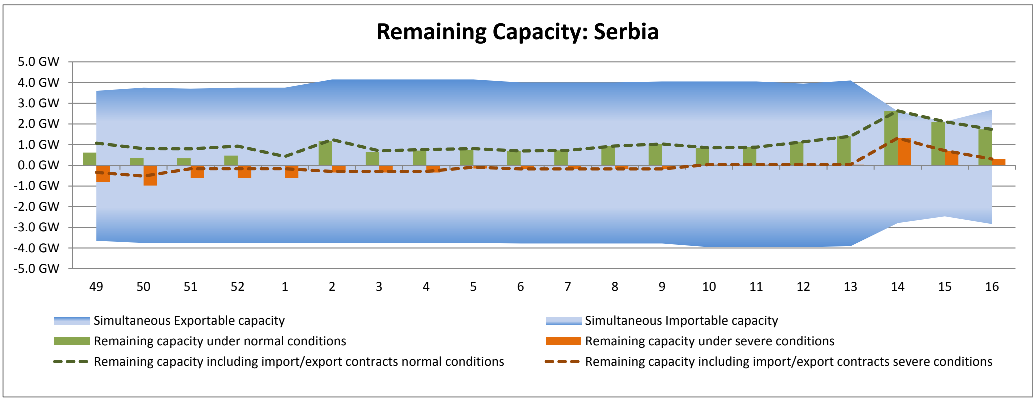
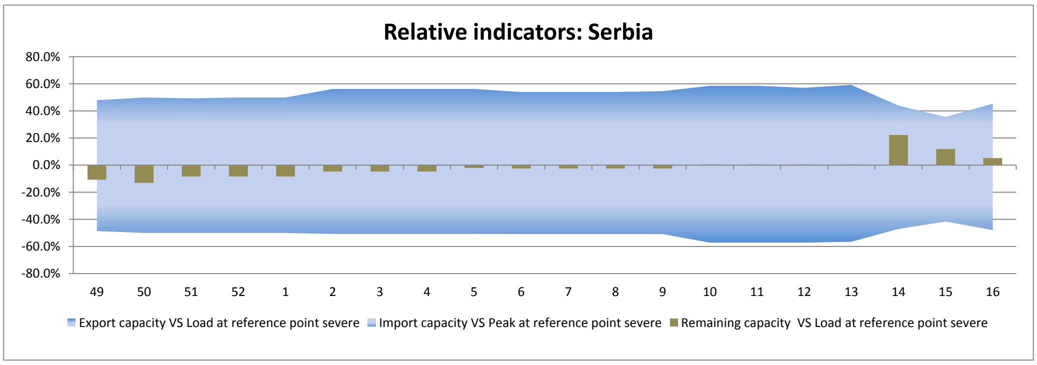
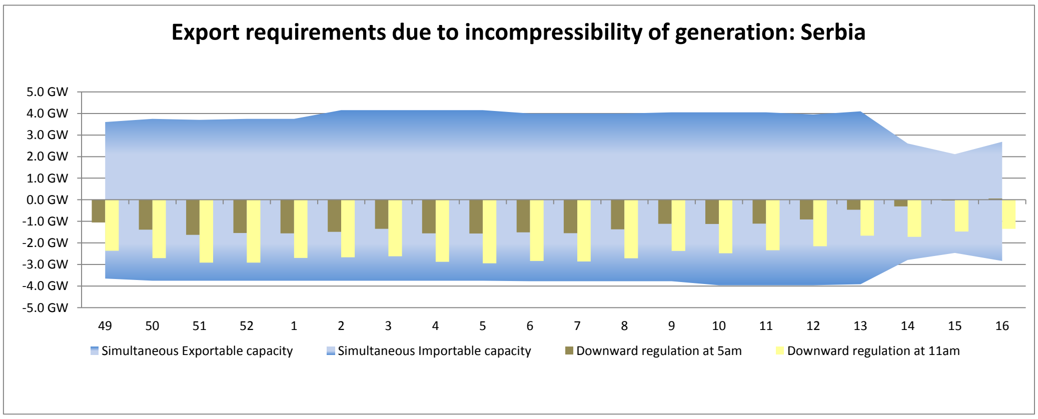
Load scenario under normal conditions is based on statistical hourly data from previous years taking into account forecasted consumption growth for 2014 and 2015.
For severe conditions, peak loads are the highest historic peak loads that occurred in certain month. The Maintenance and overhauls values are obtained from the official maintenance plan of the Electric Power Industry of Serbia.
The best estimated NTC values are obtained on bases of NTC values for 2013. Scope of maintenance for winter season are very low and don't affect much the NTC values.


Demand and generation availability: Serbia
9.0 GW
8.0 GW
7.0 GW
6.0 GW
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Serbia
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
-5.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Serbia
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
-80.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Serbia
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
-5.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Slovakia

We assume that the generation capacity will be sufficient to meet the expected peak demands for this winter and to ensure the appropriate level of security of supply. The weekly peak load is calculated for both, normal and severe conditions. The peak demand is expected to occur during the weeks 50-51 of 2014. The generation capacities are sufficient to cover peak loads under normal and severe conditions as well.

The analysis in the case of gas crisis follows:

The share of power plants that in the process of electricity production need natural gas in some way (start of the production, stabilization, etc.) is up to 26% (2106 MW) of the total installed power of power plants in Slovak Republic. However, the total loss of actual produced electricity is calculated from the actual produced electricity, not from the installed power, and this loss will represent only from 4.5% (September = 160 MW) to 6% (January/February = 245 MW) of the total load in the peak time. During the previous gas crisis (01/2009), households were not interrupted from natural gas supplies. Slovakia has reserves of natural gas for about three months in case of gas interruption from abroad. Analysis of electricity consumption during the gas crisis came to the conclusion that consumption of customers had no or insignificant increase of electricity consumption (some households changed the source of heating to electricity systems). Substitution of natural gas by electricity as the primary source for heating is not popular due to the price relations between electricity and gas in Slovak Republic. We expect similar scenario, therefore increase of electricity consumption in case of total interruption of natural gas supply from Ukraine is not expected until natural gas reserves run out. Moreover Slovakia has developed possibility of reversible flow of natural gas from west Europe since the last gas crises. Reversible gas flow from west Europe will save gas reserves. Cut off of gas supply from the Ukraine will have impact on ancillary services provision. Secondary control power is provided also on gas power plants in Slovakia. In case that gas power plants are not able to run the tertiary control have to be activated much more.

General situation
There are no planned outages and maintenance during the upcoming winter period.

Most critical periods
Remaining generation capacities are insufficient in the weeks 51 and 52 under severe weather conditions. The peak load in winter 2013/14 was 4 175 MW. When all influences were considered, it is anticipated that the peak demand for winter 2014/2015 will be approximately 4 350 MW. The scenario under severe conditions was also analysed. The maximum weekly peak load in severe conditions is expected 4 420 MW (the same level as last winter period). In case of electricity export or import, the cross-border capacities are sufficient in winter period.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
In winter periods, the power system of Slovakia is usually dependent upon imports of electricity from neighbouring countries (the share of imported electricity on the consumption in winter 2013/2014 was 4.9 %), and it will be probably the same also in the coming winter.

Framework and methodology of the assessments
The statistics of the last years were used for evaluating the outage rates and peaks loads. Generation capacities reflect the situation as of the end of 2013. Operation of nuclear, thermal, hydroelectric and renewable sources was identified according to experience from previous years.

The given NTC values take into account the planned maintenances of transmission lines.

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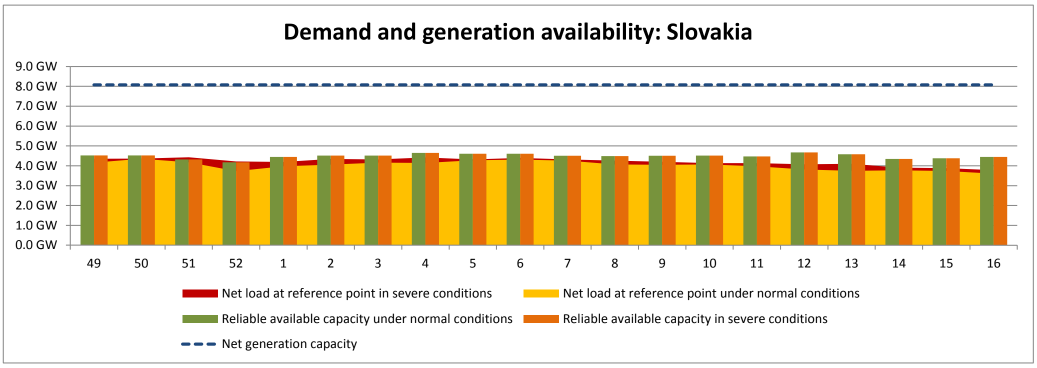
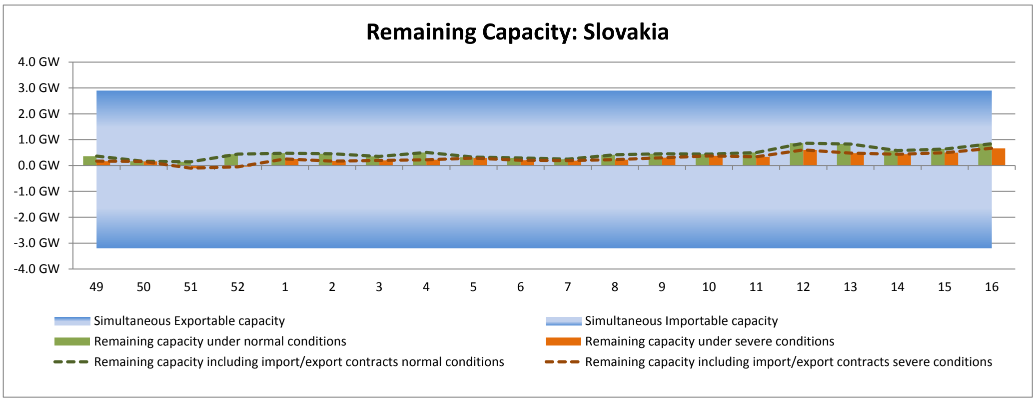
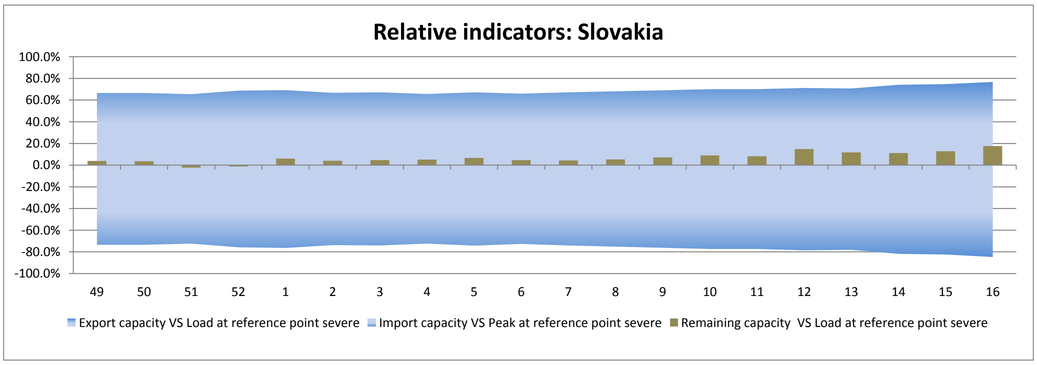
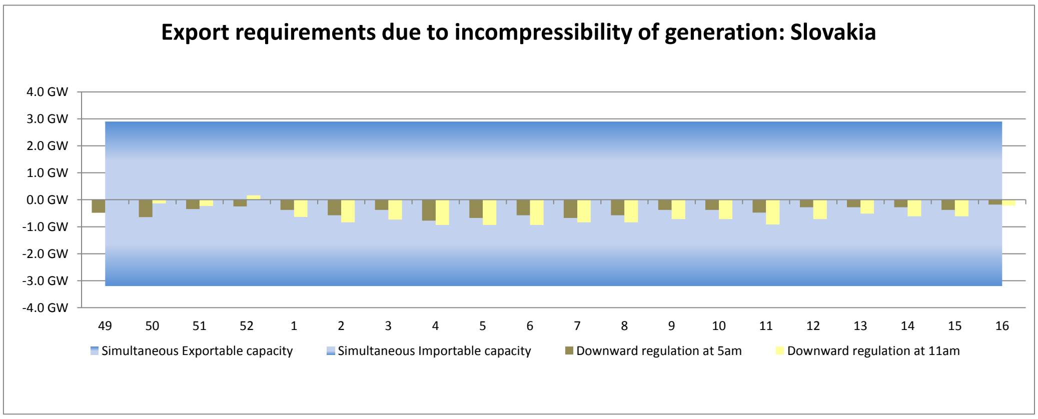

Demand and generation availability: Slovakia
9.0 GW
8.0 GW
7.0 GW
6.0 GW
5.0 GW
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Slovakia
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Slovakia
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
-80.0%
-100.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Slovakia
4.0 GW
3.0 GW
2.0 GW
1.0 GW
0.0 GW
-1.0 GW
-2.0 GW
-3.0 GW
-4.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

<u>Slovenia</u>

The RC is planned to be positive during the entire winter period. The lowest RC is expected during weeks 5 and 6. In this period, lower hydro production and higher consumption are expected due to low hydrology and low temperatures. Peak load in the winter period is expected in the second half of January and in February. No problems are expected in system operation security or security of supply.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

Imports will help to cover the load in peak time. There is sufficient import NTC available on the interconnectors.

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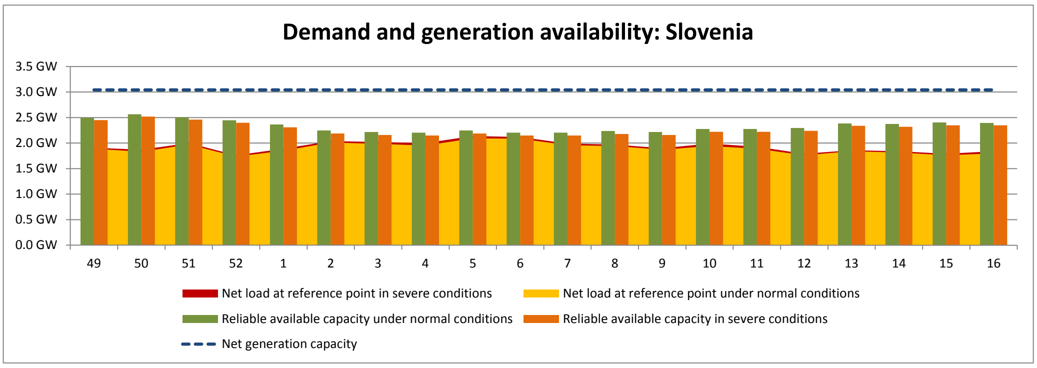

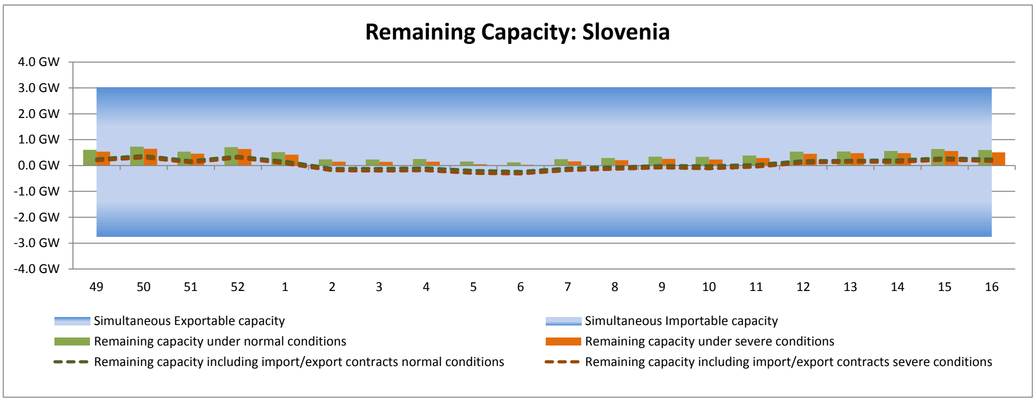

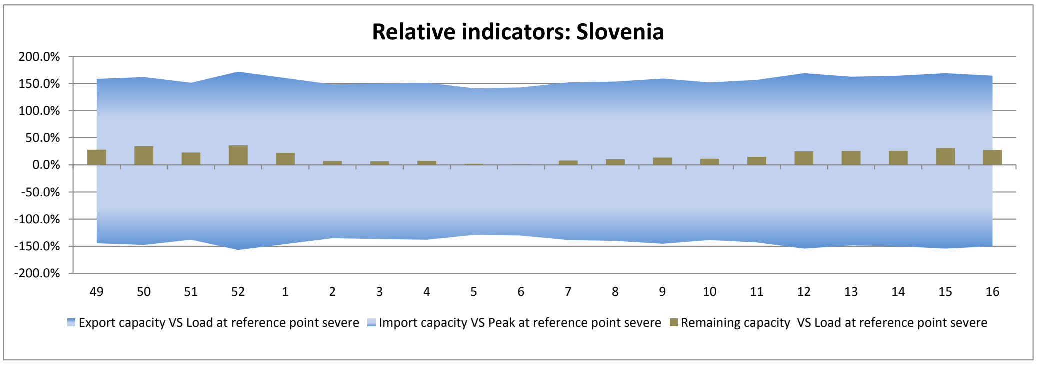

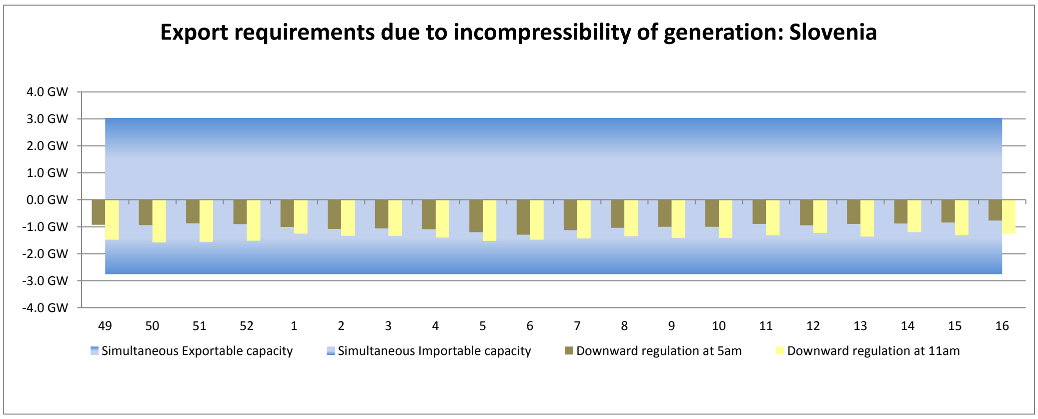

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Spain

From the point of view of generation adequacy, the situation in the Spanish peninsular system is not critical for the upcoming winter even considering very low wind generation (95% probability) and a high thermal forced outage rate. Even in extreme conditions problems concerning load meeting are very unlikely to happen at any week of the period. Good generation adequacy during peak demand hours can be expected regardless imports from neighbouring countries.

At minimum demand periods, with high amounts of renewable production, power surplus with spilling of RES can take place. The Spanish TSO has a specific control center for renewable sources (CECRE), which is permanently monitoring and supervising the renewable production in order to maintain a balanced situation.

The export capacity of interconnectors is a key factor in order to avoid spilling of renewable energy, mainly wind power. Another point of worthy mention is the importance of energy storage -mainly pump storage plants- in order to properly manage the excess of inflexible power.

General situation

From the point of view of generation adequacy, there's no dectected risk situation in the Spanish peninsular system for the upcoming winter. Good generation/demand adequacy can be expected regardless imports from neighbouring countries. If average conditions are considered, remaining capacity will be over 15900 MW. In the case of simultaneous extreme peak demand, very low wind generation (less than 5% of wind installed capacity), drought conditions and a high thermal forced outage rate, assesed remaining capacity is still over 8200 MW.

The demand values have been still decreasing during 2013 and the beginning of 2014, after the significant drop that took place during 2011 and 2012, due to the economical and financial crisis. It is expected that the demand in 2015 and ending of 2014 will slightly recover. Nevertheless, the demand peak values expected for winter, with low temperature values and a probability to be reached of 1 %, are the same as the expected for 2014.

The most important risk factors for the next winter in the Spanish system are hydro and wind conditions, sensitivity of load to temperature in extreme weather conditions and gas availability to combined cycle thermal plants during situations of low RES.

Most critical periods

Given that there's not risk situation concerning generation adequacy, the period with lowest remaining capacity is the first half of December, and March due to increased overhauls. Concerning minimum demand periods with high probability of RES spilling, March and April are the most critical months.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

Good generation/demand adequacy can be expected for peak demand hours regardless imports from neighbouring countries.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

The export capacity of interconnectors is a key factor in order to avoid curtailment of renewable energy, mainly wind power. However, given the short exporting capacity from the Iberian Peninsula to north Europe, it's necessary to point out the importance of demand management and energy storage –mainly hydro pump storage plants- in order to properly manage the excess of inflexible power at minimum demand periods. Nowadays the installed capacity of hydro pump storage plants in Spain is around 5000 MW.

Synopsis

From the generation adequacy perspective, there's no risk in the Spanish peninsular system for the upcoming winter. Good generation/demand adequacy can be expected regardless imports from neighbouring countries, and demand peak values are not expected to increase for upcoming winter. The demand values have been still decreasing during 2013 and the beginning of 2014, after the significant drop that took place during the

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last years, due to the economical and financial crisis. It is expected that the demand will recover slightly in 2014 and 2015. However, the demand peak values are not expected to increase. The hydro reserves are over their average level, due to the high infeeds that took place last spring. Given the characteristics of the Spanish hydro system, with a great inter-annual and monthly variability regarding hydro flows, a conservative estimation of available hydro power is advisable. The 90% percentile is considered an accurate estimation.

The wind power covers a big amount of Spanish generation, being the installed wind power capacity about 20% of total generating capacity. For the assesing of the wind power generation under extreme conditions during winter, historical data were used. Wind generation assesed is around 7% of available capacity. Wind generation has been above this rate during winter periods with a frequency of 95%.

Solar PV energy is not taken into account when calculating generation capacity for winter peak demand, given that winter peak demand values take place after the sunset. Only a residual value for thermal solar generation is taken into account (6 % of installed capacity).

The generating capacity of several power stations could be reduced due to network capacity constraints. However, these constraints have been significantly reduced with installation of operational inter-tripping equipment.

In the case of simultaneous extreme peak demand, very low wind generation (less than 8% of wind installed capacity), very drought conditions and a very high thermal forced outage rate, the values of remaining capacity would be still over 8200 MW.

At minimum demand periods, with high amounts of renewable production, power surplus with spilling of RES can take place. The Spanish TSO has a specific control center for renewable sources (CECRE), which is permanently monitoring the renewable production. Downward regulation reserves may be composed by renewable power plants; first thermal production is reduced upon security criteria compliance. If additional reduction is needed, RES Control Center (CECRE) sends a new setpoint and supervises renewable production to maintain a balanced situation. The export capacity of interconnectors is a key factor in order to avoid curtailment of renewable energy, mainly wind power. However, given the short exporting capacity from the Iberian Peninsula to north Europe, it’s necessary to point out the importance of demand management and energy storage –mainly hydro pump storage plants- in order to properly manage the excess of inflexible power at minimum demand periods. Nowadays the installed capacity of hydro pump storage plants in Spain is around 5000 MW.

Framework and methodology of the assessments

Among other reports, every month, a medium term system adequacy forecast report for the next 12 months is produced by the Spanish TSO.

Medium term system adequacy forecast is carried out using a hydrothermal coordination model with stochastic dynamic programming that minimizes variable operation costs. The analysis is based on a probabilistic tool where hydro stochastic behaviour and non planned thermal outages are considered. In addition, regional studies are performed looking for congestions. The medium term forecast considers several hydro conditions, available thermal capacity and wind production scenarios.

All scenarios are built under the following assumptions:

- Overhaul planning notified by generators.
- Guaranteed fuel (gas) supply to combined cycle and gas thermal plants.
- Low wind conditions: wind generation considered is around 5-6% of available capacity. Wind generation has been above this rate with a probability of 95%.
- Extremely severe conditions for the system are simulated as:
    - Extreme demand due to severe weather conditions.
    - No import capacity is considered in the study in severe conditions. So, it is not taken into account in the load – generation balance.

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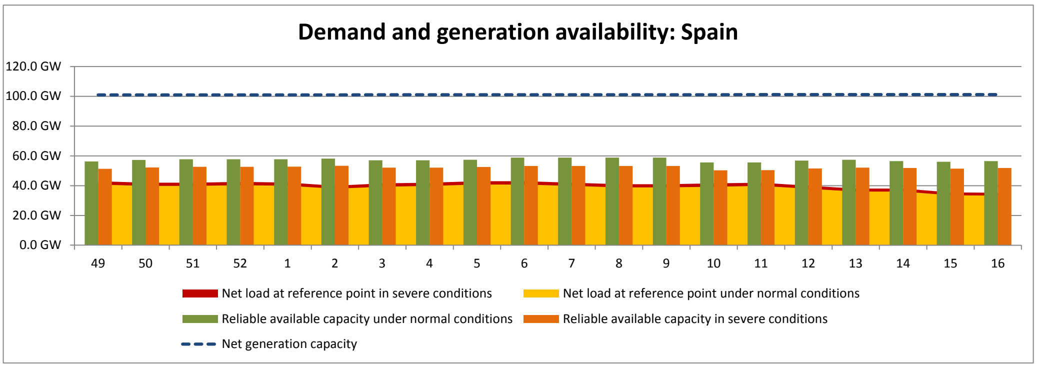

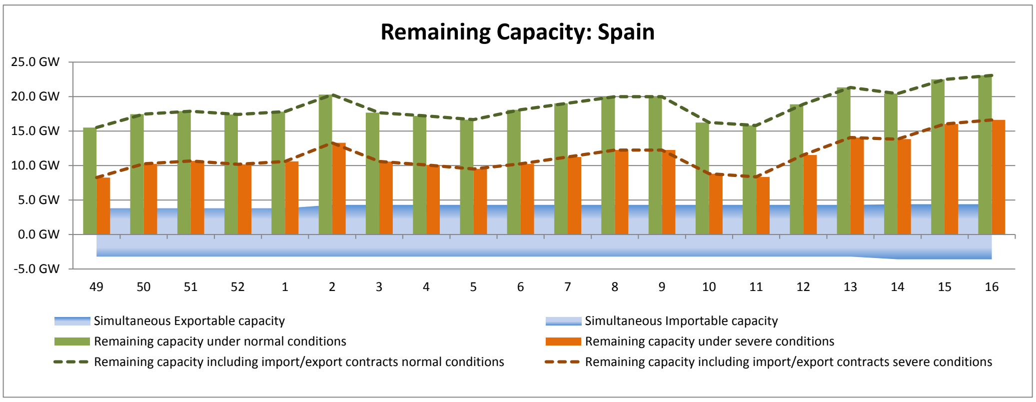

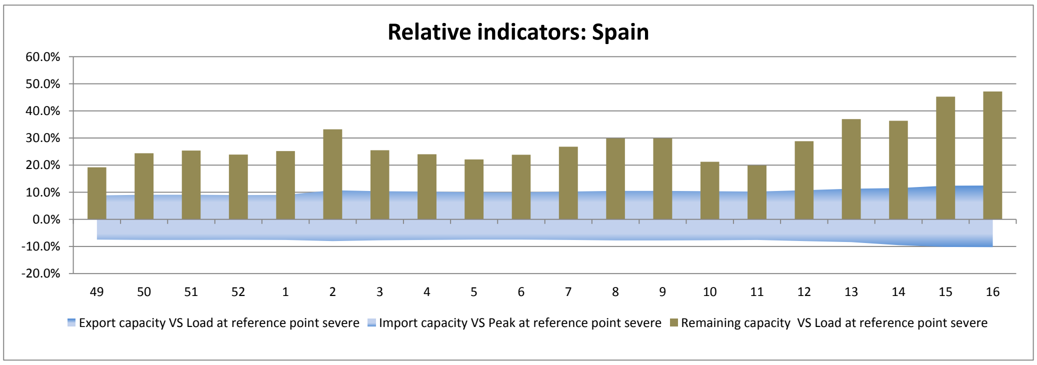

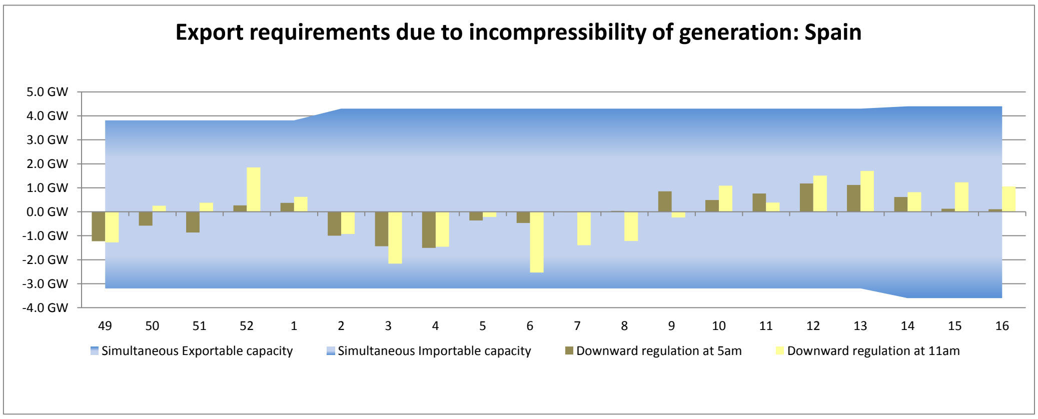

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Sweden

The domestic power balance is expected to be slightly positive in case of normal winter conditions, and slightly negative in case of severe winter conditions. Svenska kraftnät is not expecting any down regulation issues during the upcoming winter due to a high share of flexible hydro power.

General situation

Like last year, the most critical factor in predicting the Swedish domestic power balance is the availability of the Swedish nuclear power plants. Svenska kraftnät has past years estimated that the availability of Swedish nuclear power needs to be at least 80 % for Sweden to be self-supporting during peak load, and that analysis still holds.

The hydro power reservoir levels in Sweden are, at present in early autumn, approximately 10 percentage points below average. This is not alarmingly low and is very similar to last year's levels.

The transmission capacity from northern to southern Sweden is of great importance to the Swedish power balance (as almost all hydropower units are located in the north while most of the demand is located in the south). For that reason, Svenska kraftnät avoids all maintenance work which reduces the transfer capacity (from north to south) during the winter period as not to increase the risk of power shortages. A reduced availability of nuclear units also reduces the transmission capacity in the Swedish national grid, why it is of great importance to Svenska kraftnät that the nuclear plants (which are located in the middle/south) are available.

To secure the power adequacy Svenska kraftnät contracts a so called Peak Load Reserve for every winter, consisting of production and load reduction. The Peak Load Reserve can be activated on the Nordic electricity market, Nord Pool Spot (NPS), when there is a risk for curtailment. This happens very rarely (last time was 2009 and according to NPS there has been little risk of curtailment since then). The Peak Load Reserve is mainly activated by Svenska kraftnät during operation for balancing purposes. This winter the Peak Load Reserve consists of 720 MW production capacity and 624 MW load reduction. The Peak Load Reserve consists exclusively of reserve bids that most likely would not be available if it wasn't for the economic compensation they are credited.

Sweden will not be directly affected by a reduced gasflow.

Most critical periods

Maintenance work on grid elements or production units that might jeopardize generation adequacy or transfer capacity is avoided as far as possible during the winter period. The electricity demand in Sweden is strongly dependent on outside temperatures. Peak load occurs at periods with very cold weather and these periods might happen at any time between December and March, why it's difficult to point out in advance which weeks which are expected to be most critical.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export

Although Svenska kraftnät predicts Sweden to be independent of import during normal winter conditions (for the peak load hour), the interconnectors plays an important role. The interconnectors help to keep electricity prices on decent levels and are also very important for balancing purposes (to enable exchanging balancing power between the Nordic countries).

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods

Sweden does not have any problems with excess of inflexible generation at winter time.

Synopsis

For the upcoming winter, 2014/2015, the domestic power balance is expected to be slightly positive in case of normal winter conditions, and slightly negative in case of severe winter conditions. During the severe scenario approx.1.5 GW of import are needed at the most strained weeks. This is considered as sufficient due to the strong import capability. This results are not the same as in Svenska kraftnät's annual report (where a positive balance is expected during both scenarios), but the severity of the scenarios in both reports are note the same.

The peak load in Sweden is statistically occurring in between 17:00 and 18:00 CET, but the load at 19:00 is usually practically equal (99.6 % in average, looking at 2011 years data) so the scenarios in this report represents the most strained hours for the Swedish power balance very well.

Framework and methodology of the assessments

Weekly peak load figures comes from the domestic adequacy report and historical values. These numbers are updated once a year with a model based on the total electricity consumption the last 52 weeks. Weekly minimum demand is based on statistics. Planned maintenance is based on market messages to Nord Pool Spot. Outage rates are based on experience and previous studies.

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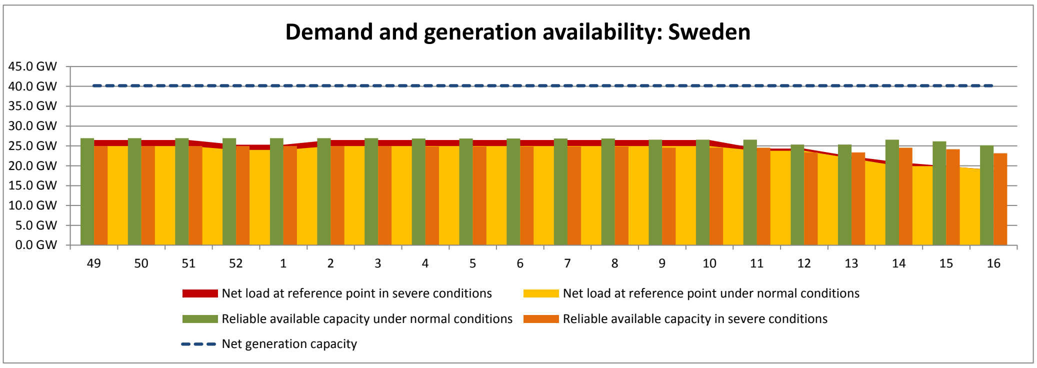
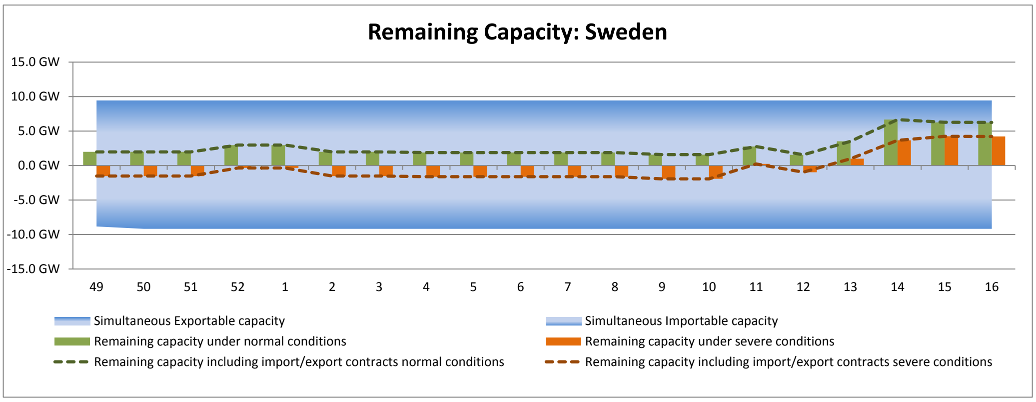
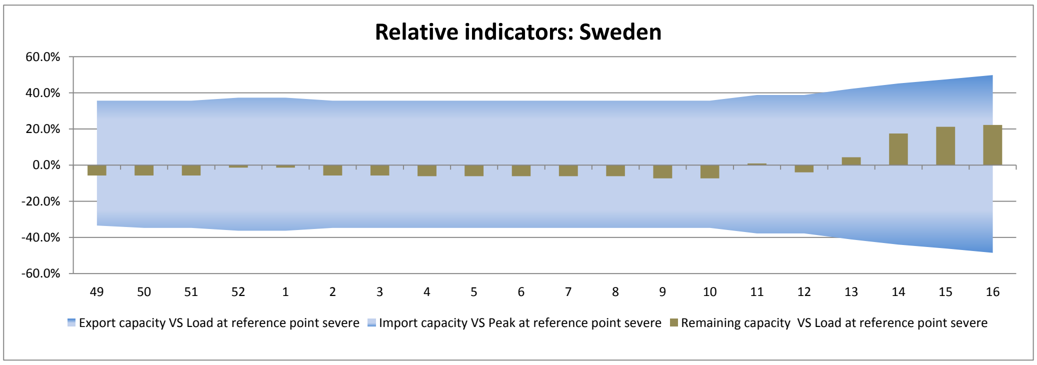
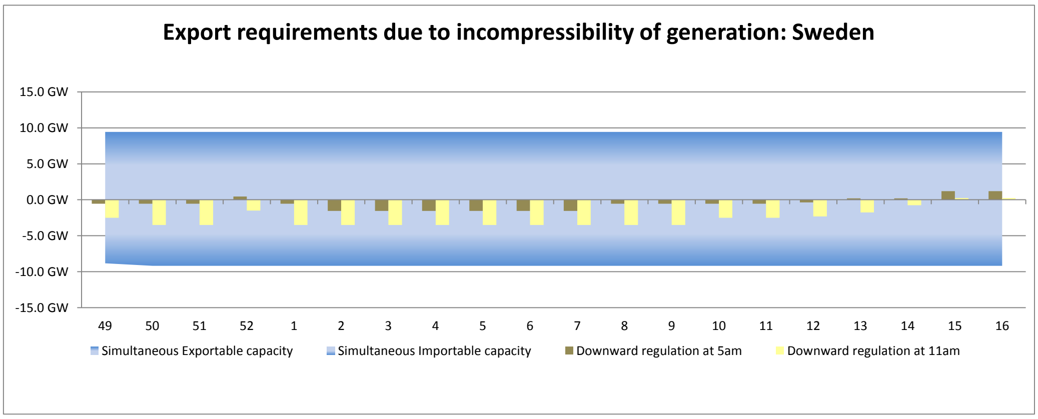

Demand and generation availability: Sweden
45.0 GW
40.0 GW
35.0 GW
30.0 GW
25.0 GW
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: Sweden
15.0 GW
10.0 GW
5.0 GW
0.0 GW
-5.0 GW
-10.0 GW
-15.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions


Relative indicators: Sweden
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Sweden
15.0 GW
10.0 GW
5.0 GW
0.0 GW
-5.0 GW
-10.0 GW
-15.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Switzerland

Using this adequacy methodology, no special problems concerning the generation - load balance or concerning inflexible generation at times of minimum demand are detected. However, because the current methodology from ENTSO-E is focused on capacity [MW] only it cannot reveal potential problems faced by hydro-dominant countries like Switzerland. In particular for Switzerland it is very important to also take into account energy constraints [MWh]. It is also because of this reason the typical winter deficit in Switzerland cannot be reflected with the numbers provided according to this methodology. Furthermore, this methodology does not provide any insight on overloads and voltage problems.

General situation
In the winter, the level of maintenance of generation units and of the branches of the transmission network is low.

Most critical periods
Using this adequacy methodology, no critical periods can be detected. However, because the current methodology from ENTSO-E is focused on capacity [MW] only it cannot reveal potential problems faced by hydro-dominant countries like Switzerland. In particular for Switzerland it is very important to also take into account energy constraints [MWh]. It is also because of this reason the typical winter deficit in Switzerland cannot be reflected with the numbers provided according to this methodology. Furthermore, this methodology does not provide any insight on overloads and voltage problems.

Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export
Switzerland is characterized by a balance that varies strongly between import and export, therefore the interconnections are very important, especially in the winter period for importing the energy deficit.

Expected role of interconnectors to managing an excess of inflexible generation at demand minimum periods
As mentioned above, Switzerland is not concerned by problem of inflexible generation, therefore the interconnectors are not needed for that particular reason.

Synopsis
Using the current adequacy method only based on capacities [MW], no critical periods can be detected (neither in normal conditions nor in severe conditions). Moreover, because of the rather low level of renewables, there shouldn't be any problems due to inflexible generation. However, because the current methodology from ENTSO-E is focused on capacity [MW] only it cannot reveal potential problems faced by hydro-dominant countries like Switzerland. In particular for Switzerland it is very important to also take into account energy constraints [MWh]. It is also because of this reason the typical winter deficit in Switzerland cannot be reflected with the numbers provided according to this methodology. Furthermore, this methodology does not provide any insight on overloads and voltage problems (in winter overloads typically occur during cold nights).

Framework and methodology of the assessments
The given NTC values are:

- bilateral NTC values: typical NTC values; physically two borders are relevant: the CH-IT border, resulting from a split of the Italian Northern Border, and the 'Swiss Roof' (CH-FR & CH-DE & CH-AT). The NTC of the Swiss Roof is then split onto the individual borders.
- simultaneous exporting / importing capacity: these values are not the sum of the corresponding bilateral NTC values, but are given by the physical limits of the Swiss transmission grid, i.e. +/- 5 GW.

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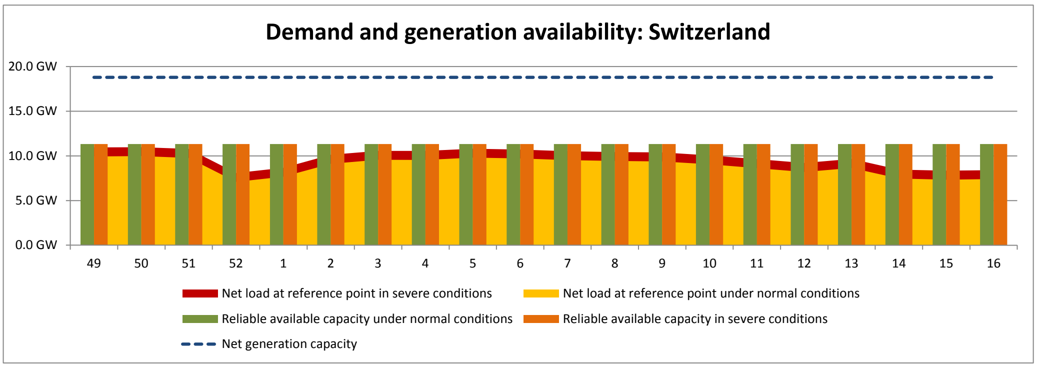
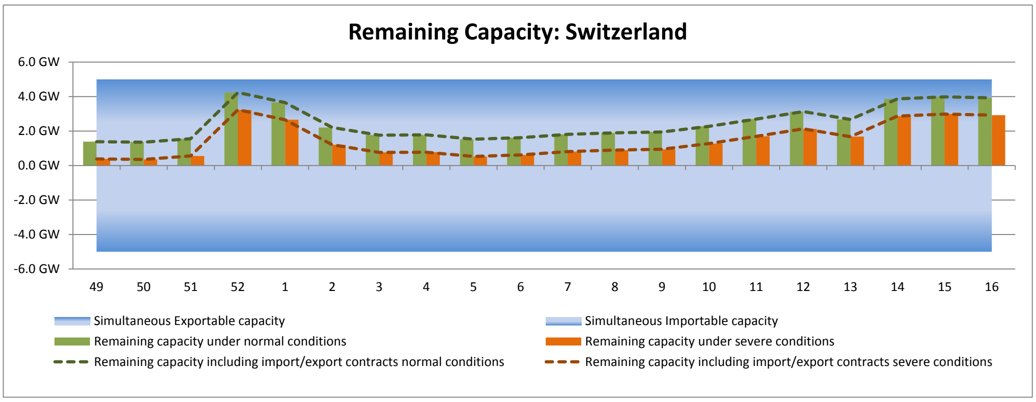
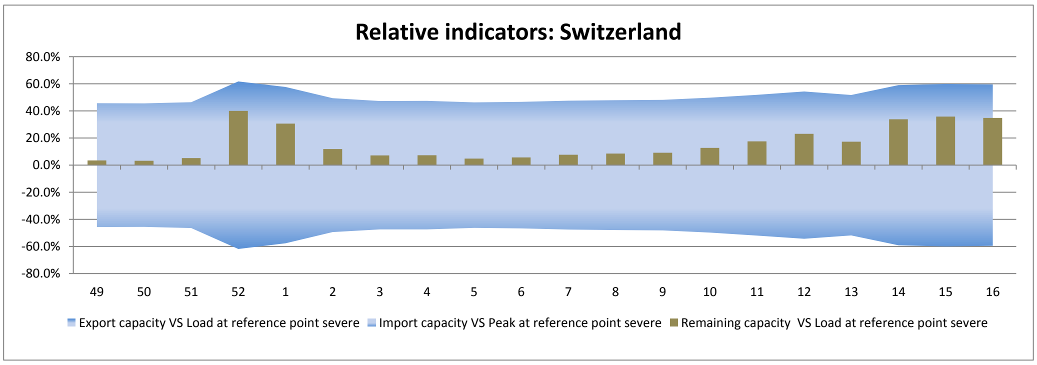
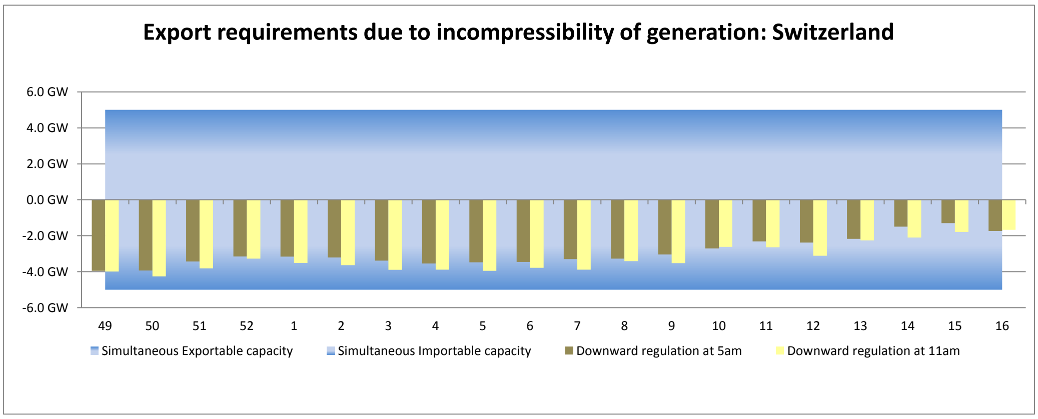
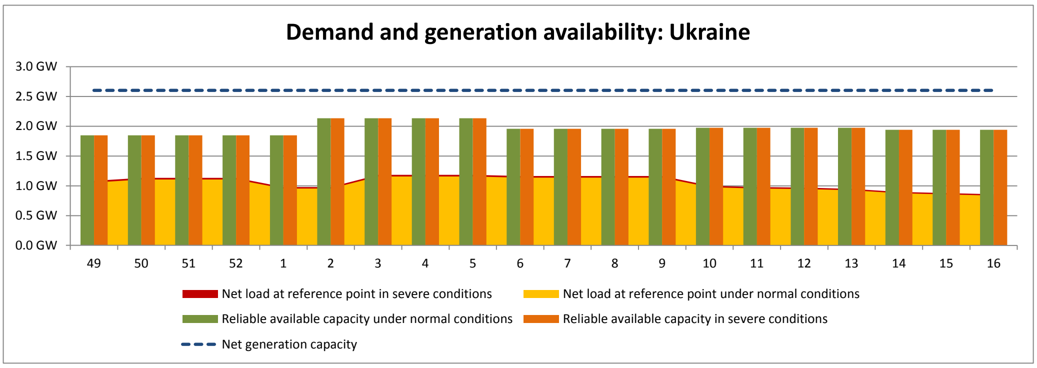

Demand and generation availability: Switzerland
20.0 GW
15.0 GW
10.0 GW
5.0 GW
0.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

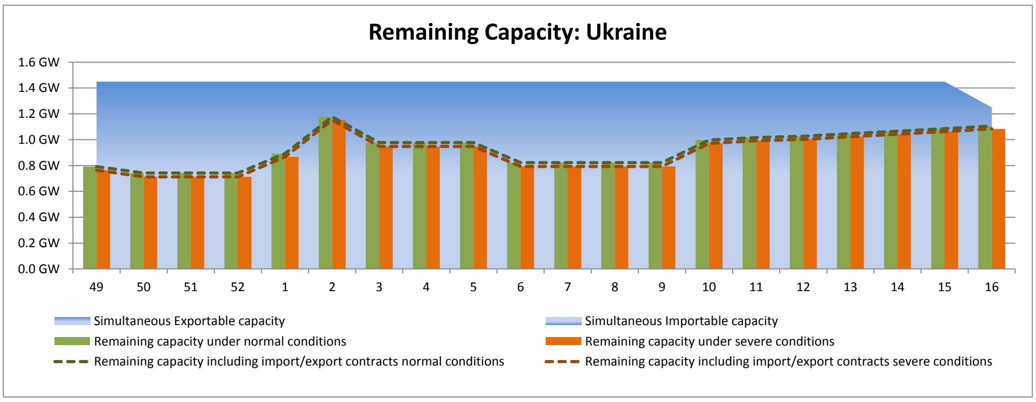

Remaining Capacity: Switzerland
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

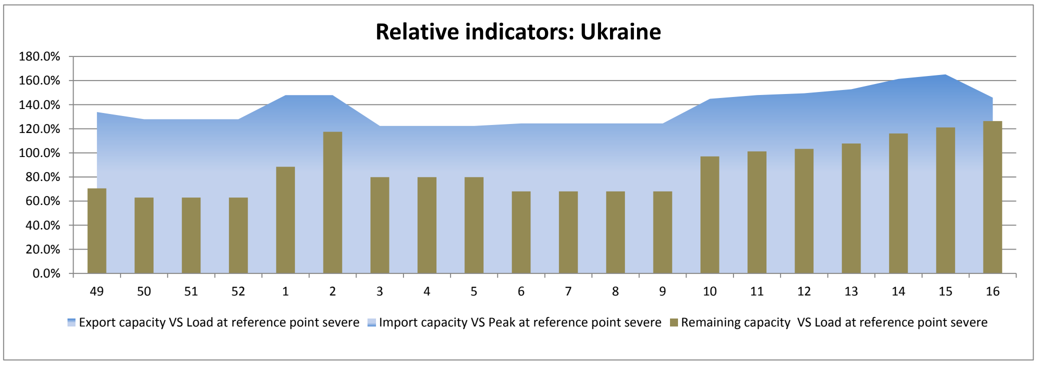

Relative indicators: Switzerland
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
-60.0%
-80.0%
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

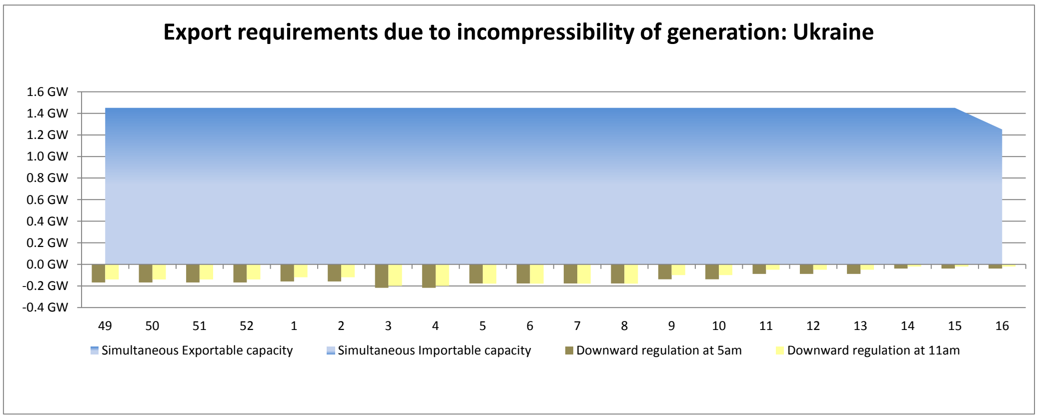

Export requirements due to incompressibility of generation: Switzerland
6.0 GW
4.0 GW
2.0 GW
0.0 GW
-2.0 GW
-4.0 GW
-6.0 GW
49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Ukraine West









7.2. Individual country responses to Summer Review

Albania

General comments on the main trends and climatic conditions

The summer season of this year is considered a normal one, related with ambient temperatures and with the main energetic parameters of our power system.

The hottest day of the last summer was 13 August, with a high temperature of 36°C. For reference, on that day the average high temperature is 32°C and the high temperature exceeds 35°C only one day in ten. The hottest month of the year was August with an average daily high temperature of 31°C.

Inflows in the Drin River cascade which is the main source of the country's generation, were somewhat above the predicted ones, which helped us maintain relatively high levels in the reservoirs of this cascade, and consequently to maintain a high level of energetic reserve of the country. Electricity consumption, except of May, was lower than anticipated due to many freshness days during that season.

Occurrence of the identified risks

No, the risk identified in the Summer Outlook Report did not occur. The temperatures were below the forecasted one, and the peak load was lower than the prediction.

Unexpected situations

During the summer we did not faced any unexpected situation that had put the power system in a difficult situation. Peak load and electricity consumption resulted in lower values than the expected ones. We did not face any problem with interconnection capacity; the maintenance of interconnectors accomplished according the schedule, and also the main part of the interior lines.

Effects of external factors on demand

We did not face effects of external factors on demand like demand reduction as a result of economic conditions, on the contrary, the demand is slightly increasing year by year.

Most stressed periods for system adequacy

Due to freshness weather, good inflows and available generation, we did not face any stressed period during the summer for system adequacy.

Specific events occurred during the summer

No specific events occurred during the summer period. The maintenance works accomplished according the plan.

Detailed review of the most stressed periods

Compared with the forecast of main energetic parameters made for the summer season, those that changed a little bit were the inflows in Drin River cascade that resulted higher, associated with generation increase and consequently with import decrease. Maintenance plan for power plants is realized according the schedule. About interconnection capacity we did not face any problem with the implementation of the transactions.

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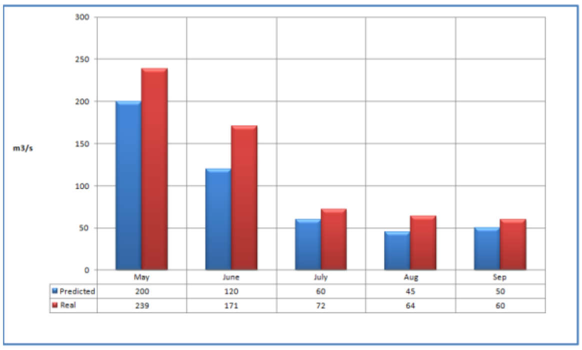
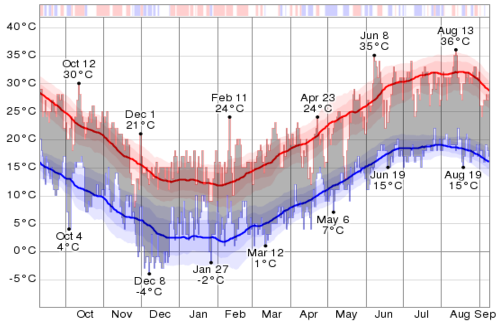
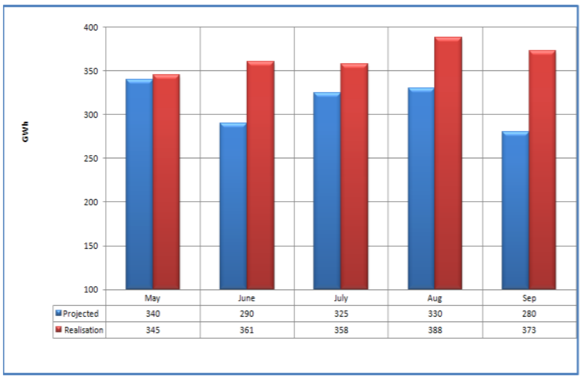
Monthly inflows at Fierza HPP



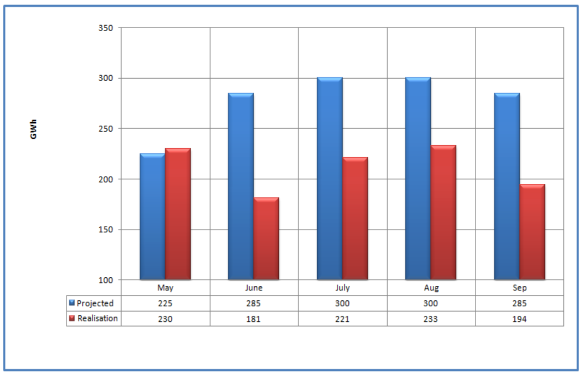
Temperatures registered during last 12 months



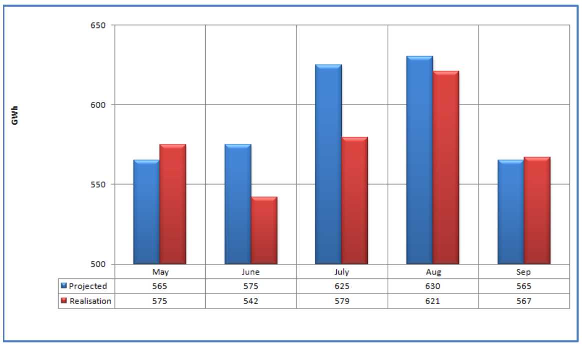
Monthly total production



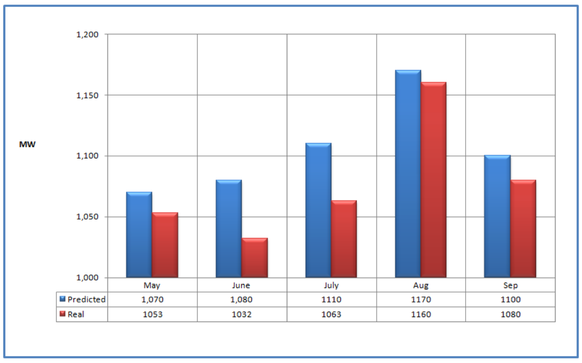
Monthly import



Monthly Consumption



Monthly Peak Load



Austria

General comments on the main trends and climatic conditions

During the previous summer period a mudflow destroyed one tower of a 220 kV Line (Tauern - Weissenbach) at 1 August 2014. The line was put back into operation at 21 of August 2014. This quick restoration was needed in order not to interfere with other important projects in the grid of APG.

Occurrence of the identified risks

As described in the Summer Outlook Report 2014 APG concluded contracts with several Austrian thermal power plants for higher operational flexibility. With this new measures risks were mitigated in the last summer.

Unexpected situations

During the previous summer period a mudflow destroyed one tower of a 220 kV Line (Tauern - Weissenbach) at 1 of August 2014. Therefore daily capacities were not placed on the market. The line was put back into operation at 21 of August 2014.

Effects of external factors on demand

No.

Most stressed periods for system adequacy

No periods of stress occurred during the summer period.

Specific events occurred during the summer

During the previous summer period a mudflow destroyed one tower of a 220 kV Line (Tauern - Weissenbach) at 1 of August 2014. The line was put back into operation at 21 of August 2014.

Belgium

General comments on the main trends and climatic conditions

Past summer was a normal summer without significant extreme weather conditions.

Occurrence of the identified risks

No significant risks were identified in the Summer Outlook Report for Belgium.

Unexpected situations

None.

Effects of external factors on demand

There were no extraordinary evolutions of demand experienced in the past summer.

Most stressed periods for system adequacy

Regarding adequacy of the Belgian system, no significantly stressed periods occurred.

Bosnia and Herzegovina

General comments on the main trends and climatic conditions

During the summer period of 2014, there were not unexpected situations that affected the power system in Bosnia and Herzegovina. The minimum load of 833 MW was registered on August 5 at 6:00, while maximum load was registered on 11 August at 15:00, and it was 1647 MW. Monthly power balances were positive during this period.

Occurrence of the identified risks

As it was planned the annual overhaul in TPP Gacko occurred on July 2014, but it did not affect the power system adequacy.

Bulgaria

General comments on the main trends and climatic conditions

The electricity demand for the summer period from June to August 2014 increased by 1.1 % compared with the same period in 2013 (comparison based on normal temperature-adjusted monthly consumptions).

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Temperatures were slightly on the cold side and no heat waves were obsereved. Substantial rainfall caused damaging floods in some parts of the country. The hottest working day was 14th August (Thursday) with temperatures: Tmin =20.0 C', Tave=26.9 C', Tmax=33.3 C'. For this day the peak load was 4688 MW (observed at 10:00 p.m. EET) and the daily consumption: 97618 MWh.

No balancing problems were experienced during the studied period and no generation was curtailed unlike last year.

Failure rates of units were as expected and maintenance schedules were strictly fulfilled. Water levels in the big reservoirs were slightly above target levels because of substantial rainfall during the period. Hydro plants operated normally in the peak zone of the daily load curve.

There were no critical outages in the transmission network. During the whole period Bulgaria exported electricity to neighbouring countries. There were no unplanned outages of all interconnection lines.

Croatia

General comments on the main trends and climatic conditions

Summer 2014 in Croatia was mainly without extremely high temperatures, with enough rainfalls. Weather conditions were milder in contrast to summer 2013.

Occurrence of the identified risks

The risks identified in the Summer Outlook Report 2014 for Croatia did not occur.

Unexpected situations

There was not any such situation.

Effects of external factors on demand

Milder weather this summer was the reason for the significantly lower consumption (peak demand and total value as well).

Most stressed periods for system adequacy

There is not any specially stressed period to be mentioned.

Specific events occurred during the summer

Contrary to summer 2013 and 2012 extremely high temperatures did not occur. Outage rate was also lower.

Cyprus

General comments on the main trends and climatic conditions

Climate conditions were normal.

Occurrence of the identified risks

No risks were identified.

Unexpected situations

No.

Effects of external factors on demand

Comparing the peak load of summer 2014 to the historical peak load of summer 2010 (before the economic crisis) there is significant decrease of 26%.

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Most stressed periods for system adequacy

No stressed periods were observed.

Specific events occurred during the summer

Not Applicable.

Detailed review of the most stressed periods

No stressed periods were observed.

Czech Republic

General comments on the main trends and climatic conditions

Summer conditions were influenced mainly by low temperatures in July and August.

Occurrence of the identified risks

No significant risks were identified in the Summer Outlook Report.

Unexpected situations

Unexpected situations did not occurred in the summer period.

Effects of external factors on demand

Besides already mentioned floods there were not any other significant external factors with effects on demand in CZ.

Most stressed periods for system adequacy

The stress period did not occur in summer period.

Specific events occurred during the summer

Specific events during the last summer period was low temperature in July and August.

Detailed review of the most stressed periods

The stress period did not occur in summer period.

Denmark

General comments on the main trends and climatic conditions

It was a summer without major problems, however, with many trade restrictions.

It has been a summer with a lot of lightning and thunder. That caused disconnection of a few 150 kV and 132 kV lines. However, no consumers had to do without supply as a cause of the disconnections.

There have been many planned disconnections as a consequence of project work. New 132 kV substations at Zealand and 150 kV substations in Jutland have been renovated/commissioned. The handover of the 132 kV grid in Copenhagen and the 150 kV grid at Funen is now completed. The handover of the grid at the west coast of Jutland (Denmark west) has commenced. Two new synchronous machines in the 400 kV substations Fraugde and Herslev have been commissioned. The cable laying of 150 kV installations in Jutland continues and has resulted in conversion of grids and substations in central Jutland. The project Kassø-Tjele continues to be on plan and also requires a bit of outage time. The project is expected to be completed at the end of 2014 and it means a new, powerful 400 kV double stretch from Kassø in southern Jutland to Tjele in central Jutland. The commissioning of Skagerrak 4 is on plan. Test during commissioning of Skagerrak 4 has resulted in quite a lot of outage time on Skagerrak.

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TenneT has constructed a new 400 kV substation just south of the Danish border. It means that the new 400 kV border connection now is called Kassø-Jardelund. In addition, annual inspection and maintenance on 400 kV, 150 kV and 132 kV installations has been carried out. However, this area did not experience much activity.

In general, the power balance has been fine over the summer. However, there have been a few days where it was a bit intense. This meant high prices for a few hours. The cause of it was planned outages/conversions not only in Denmark, but also at our neighbour TSOs. These inspections and maintenances/conversions have caused constraints on the international connections, and as mentioned, higher prices for a few hours. Keeping the voltage low has not caused much trouble. Increased amount of reactive components and a relatively large flow on our international connections meant that the voltage has been fine over the summer. However, there have been a few nights in July where the voltages have been difficult to keep down.

The international connections experienced a good deal of constraints. This is partly due to inspection and maintenance and project work at Energinet.dk, and partly extensive project work at all our neighbour TSOs. It has caused reduced net transfer capacity during a part of the summer months. Particularly the conversions of the North German grid has caused great restraints on the border to TenneT.

Estonia

General comments on the main trends and climatic conditions

The overall summer was quite dry and warmer than averagely, exeption was June which was colder than usual, average temperature was 13,2 °C (many years average is 14,5 °C). In July average temperature was 19,6 °C (many years average is 16,7 °C). In august average temperature was 17,5 °C (many years average is 15,8 °C). The load was not significantly different than expected and was similar to previous years. The peak load during summer period (01.06. until 01.09.) was 1,012 GW, occured on 05.06.2014 12:35 CET. The minimum demand was 0,48 GW, occured on 20.07.2014 04:15.

Occurrence of the identified risks

As expected the congestions on the boarder EE-LV occured, due to electricity deficit in Latvia and Lithuania. Countertrades in EE-LV boarder were performed during the needed hours.

Finland

General comments on the main trends and climatic conditions

In summer 2014, average temperature was close to long time average value in Finland. However, June was colder but July warmer than in average. Level of hydro reservoir remained below average whole of the summer.

There were no major deviations from expectations. Total consumption was at the same level as in previous summer. Several overhauls of both production units and transmission lines were carried out in summer time as predicted. All incidents were managed with normal system operation procedures.

Occurrence of the identified risks

No.

Unexpected situations

See answers below.

Effects of external factors on demand

There were no remarkable changes in demand.

Most stressed periods for system adequacy

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See answers below.

Specific events occurred during the summer

One of the two AC lines that connect Finland to Nordic synchronous system tripped and was unavailable for a one and half day at the beginning of July. At the same time, Estlink2 DC interconnector between Finland and Estonia was in maintenance. In addition, part of Russian import capacity was reduced due to maintenance of the DC connection. Total 2.7 GW import capacity was unavailable. The situation was managed by activating manual frequency restoration reserve and increasing import from Russia.

Detailed review of the most stressed periods

There are not typically adequacy problems Finland in summer period. There were no major deviations from expectations.

<u>France</u>

General comments on the main trends and climatic conditions

The summer climatic conditions were in the average (-0,4°C over the normal conditions). However the temperature were contrasted between the different months: June was hot and was the 5th hottest June month since 1900, July was cold and August was even colder. The precipitations were unusually heavy and frequent, especially on July and August. The nuclear power plant & photovoltaic levels were quite high and allowed France to globally export its electricity.

Because of the low consumption in France, the monthly balance of RTE was in high export during all summer. The hydraulic generation units could not be solicited because of a lack of ajustment offers (due to the respect of lake level).

Occurrence of the identified risks

As identified in the Summer Outlook Report, no difficult situation occurs during the summer concerning the balancing (No big heat wave and no lack of precipitation).

Effects of external factors on demand

On 17 August, the consumption reached its historical lowest level, below 30,000 MW. On average, the consumption on the July and August months were the lowest observed since 2002. The SMB & private individual consumption remained stable, whereas industry comsumption generally increased.

Most stressed periods for system adequacy

The most stressed period was the third week of august with a low consumption. This situation leads to high voltage on local areas, but there wasn't any consequence on the security of supply.

Specific events occurred during the summer

Decoupling of a nuclear power plant on 18 July that lead to difficulties to reconstruct margins. Local high voltage area at Vielmoulin substation on 17 August.

Detailed review of the most stressed periods

On 17 August, the load on Vielmoulin lines was very low and lead to two high voltage periods on the Vielmoulin substation where the voltage were greater than 420 kV for more than 20 minutes. In order to overcome this issue, the TSO realised a topologic network ajustment to unload the substation to return to normal voltage conditions. In terms of generation conditions, nuclear power generation reached more than 78% for the production. Fossil fuels were less sollicitated than the previous year, with a drop of 50% in comparison with 2013. Owing to excellent levels of sunshine, the photovoltaic fleet achieved its best historical monthly results in June, contrary to wind power generation that attained its lowest montly production since September 2013. France was a net exporter of electricity to all neighbouring countries: in July and August the export levels reached some thresholds that have not been achieved for many years.

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During the summer period, many network installations commissionning were performed and, in August, a new substation was implemented.

FYRO Macedonia

General comments on the main trends and climatic conditions

During the summer period this year in Macedonian Power System does not happened unexpected and unplanned events with significant (regional) character. All intended maintenace and overhauls works were completed in accordance with the plans. The realized load is lower in around 20% then the forecasted. This summer was with mild temperatures and mainly due to moderate temperatures during June and July respectively delayed use of air conditioners. Interconnection was available during the whole period and we did not face any difficulty with regards to NTC quantity, cross-border allocation or relationship with market participants. The realized load is lower in around 20% then the forecasted.

Germany

General comments on the main trends and climatic conditions

After a dry and mild spring, the summer 2014 continous with gentle temperatures. Therefore no problems with the cooling water supply of power plants occurred.

Occurrence of the identified risks

None of the risks identified in the previous Summer Outlook did actually occur.

Unexpected situations

No such situations occurred.

Effects of external factors on demand

No.

Most stressed periods for system adequacy

Not applicable.

Specific events occurred during the summer

No specific events ocurred.

Detailed review of the most stressed periods

During the last summer the installed capacity of PV plants has further increased to a value of about 36 GW. The German government has decided to stop subsidies for new PV plants when an installed capacity of 52 GW has been reached.

Greece

General comments on the main trends and climatic conditions

During last summer there were normal climatic conditions without something extreme and the temperature ranged to normal level for the season.

Occurrence of the identified risks

There was nothing important.

Unexpected situations

The only problem arised during the summer was the interconnection with Italy, due to the DC link between IPTO nad TERNA was out of operation from 2 January to 14 July 2014 and after that the HVDC Link GREECE- ITALY operated with no automatic regulation.

Effects of external factors on demand

The demand was lower comparing with previous years as we expected. The main reason was the very cool summer resulted in little use of air conditioners and the economic state of the country. The percentage reduction was 13% and 3% for July and August respectivly.

Most stressed periods for system adequacy

There was no stressed period refering the System adequacy.

Specific events occurred during the summer

The most important event was the loss of load (aprox.300MW) in the area Thessaloniki after the trip of two busses 150KV in the HV S/S Thessaloniki during the storm.

Detailed review of the most stressed periods

No stressed period.

Great Britain

General comments on the main trends and climatic conditions

Summer 2014 saw several spells of fine, settled weather in both June and July but no major heat-waves. However August was rather more unsettled and cooler with very heavy rainfall at times. A warm and dry June and July and a cool and wet August have resulted in overall summer statistics that are reasonably close to average. The UK mean temperature for summer 2014 was 14.8 °C which is 0.5 °C above the long term average but it was the coolest August since 1993. Rainfall totals for the summer were near average with June and July below average and August well above average. It was a relatively sunny summer with 116 % of average sunshine hours. June and July were sunnier than average. August sunshine totals were near average.

Occurrence of the identified risks

The summer went as planned with no significant notable events. The risks of localised Margin issues due to constraints were adequately managed and foot room was able to be provided on the minimum demands.

Unexpected situations

There was a planned maintenance outage on the French Interconnector (3 June to 21 June).

Effects of external factors on demand

The underlying level of demand on the daily peaks this summer has fallen by approximately a further 800MW. This excludes reductions due to embedded wind and solar PV that are weather related. The underlying reduction is assumed to be due to an increase in other embedded generation such as biomass and waste, as well as demand itself reducing due to efficiency initiatives and economic conditions.

Most stressed periods for system adequacy

There were no notable periods.

Specific events occurred during the summer

None.

Detailed review of the most stressed periods

There were no notable periods of system stress.

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Hungary

General comments on the main trends and climatic conditions

Summer of 2014 was calm for the Hungarian power system. There was no extremely high demand, the total demand was slightly higher than in the last year. Outages of generators were rather low. The grid was reliable and controllable.

Occurrence of the identified risks

We did not experience any significant event. Generator outages were under 500 MW in the whole summer period.

Unexpected situations

There aren't any unexpected situations.

Effects of external factors on demand

The effects of external factors on demand:

- climate change;
- holidays.

Specific events occurred during the summer

The imports from neighbouring states were higher than in the last year.

Detailed review of the most stressed periods

There wasn't any week, when the actual demand was more than 500 MW higher then the expected demand.

There weren't any significant outages. They were between 100 and 500 MW.

Ireland

General comments on the main trends and climatic conditions

Temperatures were above average for much of the summer whilst precipitation was mainly below average. June and July were dry months in comparison to a wetter August. Flooding was not as prevalent as in previous summers but 2 August was Dublin's wettest August day for 72 years and caused extensive flooding.

Occurrence of the identified risks

No, the system security was never under threat during the summer period. A warm summer contributed to normal demand levels. The maintenance outages of large generators were prudently managed to avoid any generation shortfalls.

Unexpected situations

A few sitiations occurred where generators tripped and were forced off at short notice which meant re-arranging other generator outages. However, these were managed effectively and due to the low demand in summer there was never any issues with regards to security of supply.

Effects of external factors on demand

Despite a recovering economy the electricity demand didn't significantly increase this summer due to the above-average temperatures. The August electricity demand growth rate was 1.32% in comparison to August 2013 whereas July's electricity demand dropped by 0.28%.

Most stressed periods for system adequacy

Week 27 was identified as a high-risk week as approximately 1134MW was due to be on scheduled outage. Despite this, there were no generation adequacy or security of supply issues in this week.

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Iceland

General comments on the main trends and climatic conditions

The installed generation capacity provided acceptable system adequacy during the summer period 2014.

No unusual or significant system events occurred during the summer 2014. Prevailing bottlenecks in the transmission system limit transmission of power between areas, but without causing shortage of power. The most stressed period is late winter/early spring.

The Icelandic TSO is working out plans for removing the bottlenecks by adding new connections between areas.

Occurrence of the identified risks

N/A

Unexpected situations

No.

Effects of external factors on demand

The public demand is on the rise by approx. 1.7% pr. year. It is worth to mention that there are a few small power intensive industry projects in the pipelines (around 100 MW). A project of this size amounts to a 5-10 years of increase in the domestic use.

Most stressed periods for system adequacy

N/A

Specific events occurred during the summer

No specific events registered.

Detailed review of the most stressed periods

No specially stressed periods expected or occurred during June-September.

Italy

General comments on the main trends and climatic conditions

The adequacy evaluations for 2014 summer period has not evidenced particular risk for capacity adequacy and load covering as well as with the national supply system's. A summer season, except May and June, recorded a values of the average temperatures below with respect to the same period of previous year with a consequent drop in demand. In addition, for the continuous rainy days, the hydro monthly energy capability factor, especially in last month of the summer, marks a high values of the corresponding ones recorded throughout the 2013. Thermal production compared with the programs has decreased significantly (-5,6%), while favorable wind conditions have contributed to an increase in wind power production (+4,9%). Overall, renewable have registered an increase of 3.8%. Nothing to remark for generation plants availability with respect to the generation overhauls (both planned/unplanned) consistent with forecast figures.

Italian northern interconnection has been characterized, for the most of the time, by import conditions from the four neighbouring systems bordering at the northern interconnection. In several occasions, in virtue of the high generation from renewable sources, the Italian interconnection has recorded export towards the neighbouring systems. In terms of physical flows, the interconnection recorded a variable performance of import/export balance of energy.

The HVDC cable interconnecting Italy with Greece came back in operation in mid-July, after a maintenance period, and has been basically characterized by export conditions towards the Greek system.

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Effects of external factors on demand

Over this period, thanks a season out of normal conditions, the total volume of demand decreasing of 2,9% respect the same period of 2013. In particular the month of July and August have recorded a significant decrease in temperatures compared the same period of previous year, with the result of a drop in of monthly electricity demand (-3,8% and -4,0% respectively). Particularly, over the summer, the peak of consumption has been reached on June 12th with 51.550 MW (-1,0% respect previous year). The balance of the physical exchanges showed a decrease of 7,4%.

Latvia

General comments on the main trends and climatic conditions

This summer was warm and dry and the average air temperature was by 1.2 C0 higher as normal. The average air temperature during the summer was 15.8 C0. In the summer the peak load is not so much related to the air temperature because cooling systems are not very wide used and do not influence a peak load very much. The warm and dry summer did not give an increase of peak load but quite contrary the peak load during the summer period half of a time was lover as expected in normal conditions. The peak load for severe conditions was exceeded only two times. The air temperature and climate conditions are mainly influencing water inflow in HPPs on Daugava river and the production of hydro. In this year is unexpected low production of hydro observed and the total production during this year is expected by 40-50% lower as average production among last three years. During the whole observed period the hydro production was lower as expected and only in three cases the production was higher as expected in normal conditions (500 MW of hydro). Almost a half of summer period the hydro production did not exceed expected hydro production for severe conditions (300 MW).

As we expected Latvian power system has a big amount of installed capacity of gas generation to cover a load in emergnecy and severe conditions but the gas power plants are not so competitive to work in normal conditions therefore almost whole summer Latvian power system was importing electricity from neighboring countries. The CHPs mostly were working in cogeneration mode and covering the heat demand and during the summer the expected production was low. During the summer the installed capacity of wind has been increased by around 15 MW but it did not give an increase in utilization of wind. The available capacity of wind was expected around 20 MW for peak load but in reality only from 5 till 10 MW of wind was generating. The income of wind was very insignificant share to cover a peak load. The system service reserve was adequate (100 MW) and the amount didn't change during the summer.

Occurrence of the identified risks

In cooperation with neighboring countries Latvian power system covered a balance.

Unexpected situations

Due to the very high electricity deficit in Latvia and Lithuania the electrical flows were from north to south and the congestions on the boarder EE-LV in Baltic States occured. The EE-LV boarder is the weakest point for electricity flows in Baltic States.

Specific events occurred during the summer

During the summer in 330 kV grid Latvian power system has 13 outages of overhead lines due to a single phase failure, including cross-border interconnectors as well, and 3 outages related to failure in transformers and auto transformers.

Lithuania

General comments on the main trends and climatic conditions

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In summer 2014 the total consumption increased 1.1%. The increase by 0.2% was due to maintenance of internal generation unit in one of the largest industrial company in Lithuania. The 0.9% of increased consumption was due to climate conditions. The average temperature in July was ~2 °C higher than it was in July 2013. The minimum load was reached in the end of June as was expected in Summer Outlook 2014. The minimum load was 755 MW and it was lower than expected under the normal conditions (780 MW forecast). The average summer balance portfolio consisted of 39% of local generation and 61% of imports from neighbouring countries. The largest part of imported electricity was from Russia.

Occurrence of the identified risks

The risk related with maintenance of interconnection lines did not occur. There were no any problems for balance responsible parties to fulfil their load balances.

Unexpected situations

There were no unexpected situations for system adequacy during the last summer period.

Effects of external factors on demand

The main reason influencing the variable load demand is the climate change. The weather this July was in average 2°C higher than in July of last year. There are no any identified effects for demand changing.

Most stressed periods for system adequacy

There were no stressed periods for system adequacy during the summer period.

Montenegro

General comments on the main trends and climatic conditions

The summer of 2014 in Montenegro was very unusual compared to previous years. During the whole summer, temperatures were below average.

Occurrence of the identified risks

We didn't foresee any risks.

Unexpected situations

There were no critical outages/events in the Montenegrin transmisson network during summer period.

Detailed review of the most stressed periods

The most of the planned works were completed in accordance to the maintenance schedule for 2014.

The Netherlands

General comments on the main trends and climatic conditions

The summer of 2014 was a relatively fluctuating summer, with some warmer (tropical) periods, but also lots of rain and the first colder month of the year (in accordance with normal monthly temperatures) being August.

There have not been any difficulties within the Dutch grid during this period. The expected summer period peak was around 16,250 MW, the actual peak was somewhat lower around 15,655 MW and occurred on 10 June (11-12 hrs). The maximum temperature on that day was 25,8 degrees Celsius. The lowest load during the summer period was reached on 22 June (8,136 MW).

Occurrence of the identified risks

No risk was identified.

Unexpected situations

No unexpected situations arised.

Specific events occurred during the summer

No specific events occorred.

Norway

General comments on the main trends and climatic conditions

The hydrological balanse is lower than normal because of lower perciptation than normal this summer.

Poland

Operational conditions last summer (mainly in June and July) were very difficult mainly due to the high unscheduled flows through Polish system.

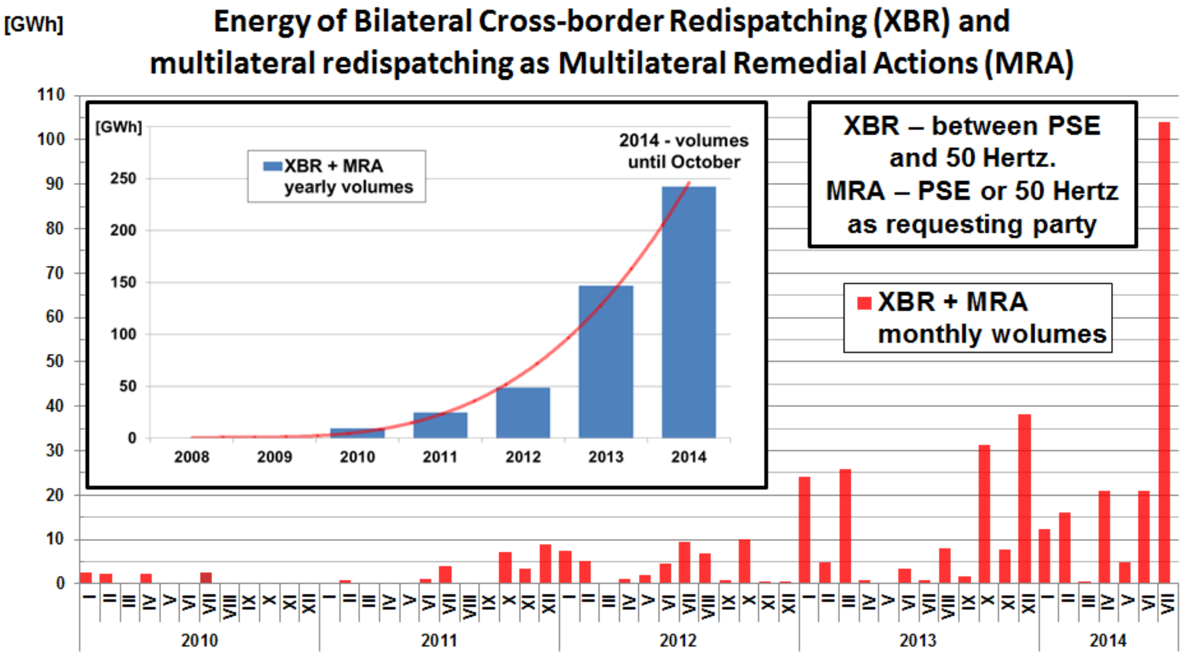
As usual Polish power system was affected by unscheduled transit flows through the system from the west to the south, but this summer the amount of unscheduled energy flows were extremely high. Such huge amount of unscheduled flows (transit flows and loop flows) caused overloading not only PL-DE profile, but also internal lines as well. To avoid not fulfilling N-1 criteria PSE used all available operational measures, both non costly and costly, like:

1. DC loop flow (HVDC rescheduling) PL→DE→DK→SE→PL.
2. Internal redispatching.
3. Bilateral cross-border redispatching.
4. Multilateral redispatching as Multilateral Remedial Actions (MRA).

In the mentioned period, DC loop flows were usually not possible due to full usage of PL-SE HVDC link in southbound direction.

The next measure which allows to reduce the unscheduled flows is bilateral cross-border redispatching. This measure consist in increasing generation in Poland with simultaneous decreasing generation in 50 Hertz. It was activated almost every day in July 2014 (27 days from among 31,39 times during June and July). The amount of monthly energy redispatched bilaterally in July amounted **104 GWh** and was almost three times higher than the historical one from December 2013. On 22 July bilateral redispatch on PSE western border reached the historically highest level of 1600 MW. It is worth saying that common TSC operational planning based on Day Ahead Congestion Forecast (DACF) and Intra Day Congestion Forecast (IDCF) allowed PSE to manage these situations by knowing in advance about the necessity to realize bilateral cross-border redispatching or MRA (as the last resort).

It is important to underline that this action requires available capacity in Poland, which is not always possible to realize, especially during tight power balance periods. This summer weather conditions allows PSE to use bilateral cross-border redispatching in most of cases, however there was a case, when all internal and bilateral measures were exhausted and last resort measure action – MRA was necessary to be activated. This situation occurred on 10 June when there was not enough generating capacity in Polish power system for upregulation in the framework of cross border redispatch due to tight balance in Polish system. The activated MRA was the last remedial action available for PSE that day and PSE had no more operational measures to fulfil N-1 criteria in case of higher unscheduled flows than the forecasted. The June 10th example shows, that exhaustion of operational measures is more and more probable. Year by year, due to unscheduled flows PSE observes the increase of energy used for remedial actions to fulfil N-1 criterion. Figure below is showing the energy volumes of bilateral and multilateral redispatching used for unloading Polish – German profile.



In Poland energy used for remedial actions is bought in the balancing market. Necessity of usage such big energy volume for redispatchings in July had significant influence on market prices.

Besides operational conditions new historical, morning peak load was registered in 2014, 30 July – at about 20.2 GW (net value) at 13:15.

Portugal

General comments on the main trends and climatic conditions

In the past summer season weather conditions were very atypical, with temperatures consistently below the normal values and with a higher than expected precipitation.

Occurrence of the identified risks

As result of the mild temperatures, load demand was lower than was pointed, even in the normal scenario. From the supply side, we also had an unexpected hydro generation availability, due both to precipitation and to some destocking performed on spanish reservoirs, thus the already confortable margins identified in the report were actually even larger.

Unexpected situations

There were no unexpected situations with impact to the normal system's operation during this summer.

Romania

General comments on the main trends and climatic conditions

In June 2014 the average air temperature was very close to the climatological norm and in July and August 2014 the average air temperature was higher than normal in most of the country. The average values recorded of temperature were close to those forecasted. In June 2014 the total amount of precipitation was higher than normal in the Southern part of the country, and for the rest most of them under normal. In July, the total amount of precipitation was higher than normal in most regions and in August total precipitation amounts were distributed unevenly across the country.

Occurrence of the identified risks

During the summer 2013 in the Romanian Power System did not appear significant or unusual events.

Unexpected situations

During the summer 2013 in the Romanian Power System did not appear significant or unusual events.

Effects of external factors on demand

N/A

Most stressed periods for system adequacy

Not the case.

Specific events occurred during the summer

Not the case.

Detailed review of the most stressed periods

There are no relevant data.

Serbia

General comments on the main trends and climatic conditions

The summer of 2014 in Serbia was very unusual compared to previous years. During the whole summer, temperatures were below average with heavy rain almost every week which occasionally caused floods but not extreme as those that hit region in May. Massive floods that hit Serbia in May caused serious damage to Serbian power and transmission systems and disturbed generation-load balance throughout summer. The major problem was that almost 50% of thermal capacities were forced to shut down either due to direct threat or because of flooding of surface coal mines. Although demand was well below average, substantial imports of energy were purchased for covering demand throughout the summer. Planned maintenance during the summer was significantly disrupted due to urgent works on repairing damage caused by floods.

Occurrence of the identified risks

We didn't foresee any risks in the Summer Outlook.

Unexpected situations

As mentioned above, effects of major flooding in May caused unexpected unavailability of substantial amount of generation in thermal power plants.

Effects of external factors on demand

In Serbian power system demand is very sensitive to climate change.

Specific events occurred during the summer

Major flooding which is described in general commentary.

Slovakia

General comments on the main trends and climatic conditions

The summer 2014 was slight colder than in the previous year. Average temperature during summer months from June to September was 18.2 °C (the year before it was 18.9 °C). First months of the summer period were very wet and cold, the average temperatures were following: June 17.8 °C, July 21.0 °C and August 18.0 °C (in the last year: June 18.6 °C, July 21.6 °C and August 21.4 °C). In the month August there was the highest difference of average monthly temperatures (3.4°C lower than in 8/2013). Only September was warmer (16.0 °C) in comparison with September 2013 (14.0 °C).

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The temperature still has main impact on the consumption. There was decrease of consumption (-1.5 %) and also decrease of production (-1.35 %) of electricity in Slovakia from June to September 2014, in comparison to the same period of summer 2013. Slight increase of production was from hydro (5.8 %) and non-identifiable (7.5 %) power plants, contrariwise decrease of production was recorded in thermal conventional (-9.3 %), nuclear (-2.0 %) and solar (-25.2 %) power plants. The summer peak load was recorded on Thursday, 25th September 2014 at 20:00, 3 649 MW (39th week), the predicted value of the summer peak was 3 780 MW in the 38th week.

The electricity was imported in months June and September 2014 to the power system of Slovakia. The share of imported electricity on the consumption in summer 2014 was about 2.7 %. Import of electricity (in total it was about 237 GWh) significantly increased in comparison to summer months 2014. In the summer before there was import of electricity only in June 2013 (143 GWh). In July and August 2014 there was an export (in total 266 GWh). Export of electricity shared about 3.0% of summer production 2014. In Summer 2014 Slovak TSO did not required any emergency assistance (import of electricity) from neighbouring TSOs.

Concerning new transmission system assets, the new circuit 400 kV lines (V409 and V410) between substations Lemešany - Voľa and Voľa - Veľké Kapušany and the new transformers (T401 and T402) in the substation Voľa were put into operation in June and July 2014. The new lines and transformers replaced the 220 kV level in the east part of the transmission system of Slovakia.

There were no critical outages and situations in the transmission network during the whole period.

Slovenia

General comments on the main trends and climatic conditions

We analyzed weather data for June, July and August 2014 for the central Slovenia.The average air temperature in June was 20,2 °C with its maximum and minimum values 26,5 °C and 14,1 °C. There were 5 days with thunder, total amount of precipitation was 131,4 mm. In July, the average air temperature was 20,8°C with the maximum and minimum values 26,5 °C and 15,8 °C. There were 10 thunder days and the belonging amount of precipitation was 130,3 mm. The average air temperature in August was 19,6 °C with its maximum and minimum values 25,1 °C and 15,1 °C. There were 7 thunder days and the amount of precipitation was 205 mm.

Occurrence of the identified risks

No risk were identified in the Summer Outlook 2014.

Unexpected situations

No unexpected situations arisen.

Effects of external factors on demand

The consumption in the summer period was lower than forecasted. The consumption of industrial consumers was lower for 2 % and the consumption of distribution companies was lower for 1,3 %. Total consumption of electrical energy on the transmission network in the summer 2014 period was 1,4 % (42 GWh) lower than forecasted.

Spain

General comments on the main trends and climatic conditions

In general, the temperatures were similar to the average values during summer (slightly lower during June, and similar to the average values during July and August). Water inflows were not high – as usual during summer – and were slightly lower than average. Wind production was similar to the average values during summer (19.5% of installed capacity on average).

Occurrence of the identified risks

Not significant operational risks had been foreseen. System operation and system adequacy functioned without any larger problems during summer.

Unexpected situations

Not really.

Effects of external factors on demand

The demand values have been very similar to last year, after the big previous drop due mainly to the economic and financial crisis. Besides, the temperature had a positive effect on demand during June (1.9%) and a negative effect during July (-2.6%) and August (-1.4%).

Most stressed periods for system adequacy

There has not been significant stress level for the system adequacy.

Specific events occurred during the summer

Nothing remarkable.

Detailed review of the most stressed periods

Actual demand (energy) was slightly lower than expected for the months of summer. Nevertheless, the demand monthly forecasts had a suitable accuracy (the average error was lower than 3 %). The summer peak demand was lower than the estimation for extreme conditions, and it was reached on July 2014 (37299 MW), due to the high temperatures on that period. However, this summer peak demand was much lower than the historical summer peak demand (41318 MW, reached during summer 2010).

Sweden

General comments on the main trends and climatic conditions

The summer of 2014 was one of the warmest summers ever recorded in most sites of Sweden. This led to a severe wildfire in the middle of Sweden (which although did not affect the national grid), as well as disturbances due to exploding equipment (due to latent manufacturing defects), lightning strokes, etc. The trend of decreased frequency qualitity in the Nordic region continues (mainly due to increased market trade and intermittent generation), why countermeasures on short and long term are being taken.

Occurrence of the identified risks

No particulat risks where foreseen in the previous Summer Outlook Report, although it where mentioned that a lot of grid maintenances where scheduled which reuiqred carefull planning of post fault remedial actions to be able to cope with local problems in case of failure. These maintenances has now been performed with good results.

Unexpected situations

Several disturbances occured and most of them where related to the extremely warm weather; exploding equipment (probably due to manufacturing defects which decreased the thermal withstand), cooling problems, downfallen/broken overhead lines and thunder strokes. All incidents where handeled without any widespread affect.

Effects of external factors on demand

The trend of decreasing electricity consumption continues (most likely due to economic circumstances).

Most stressed periods for system adequacy

The power balance where not the major problem during the summer of 2014, operational security (local fullfillment of N-1 sequrity) caused a greater problem during disturbance and maintenance intensive periods.

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Specific events occurred during the summer

The summer of 2014 was one of the warmest summers ever recorded in most sites of Sweden. This led to a severe wildfire in the middle of Sweden (which although did not affect the national grid) and disturbances due to exploding equipment (probably due to latent manufacturing defects). A majority of the disturbances normally occurs during the summer (due to weather conditions), so the increased outage rate was not a surprice.

Detailed review of the most stressed periods

The unusually warm weather led to cooling problems for both grid elements (transformers, shunt reactors, SVC's, etc) and productions units (some of the nuclear power plants and hydropower units reduced their power output as the cooling water was not cool enough). Another consequence where sagging of overhead lines (which led to earth-faults), exploding equipments (voltage- and current transformers which probably suffered from manufacturing defects), wildfire and that more countertrade than usual where required in order maintain operational security (as the thermal capacity of the grid decreases with increasing temperature). The warmest weather where recorded during the second half of June until (almost) the end of July, as well as in the end of August. No load shedding where required (as expected).

During nights and weekends situations with high voltages arose (also as expected), but these problems were handled by disconnecting parallel lines (which is a standard procedure for voltage control in Sweden). Problems with high voltages are becoming more frequent as more cables and non-syncronous generation are being installed. The powerflow on the Swedish interconnectors where mainly import from Norway and export towards Finland and Poland, while the interchange with Denmark and Germany where shifting between import and export.

Switzerland

General comments on the main trends and climatic conditions

The season was especially marked by extremely high precipitations.

Occurrence of the identified risks

No risks were identified with the current adequacy methodology. Typical summer overloads in the Alps that appear when the generation is high were observed.

Unexpected situations

The high precipitations led to very a high output of the hydro generation. In its turn, this - and the lower capacity of the grid due to the summer maintenance of lines - led to congestion in the Alps. In low consumption periods the voltages were sometimes were very high.

Effects of external factors on demand

There is no load shedding in Switzerland, the effect of climate change is still difficult to detect in demand and the effect of demand side management cannot yet be felt.

Most stressed periods for system adequacy

There were no stressed periods in terms of the the 'classical' system adequacy. The high precipitations lasted during all the considered period.

Specific events occurred during the summer

High precipitations.

Detailed review of the most stressed periods

This description does not concerned 'most stressed periods' but it is general.

The high precipitations in the Alps, coupled with the lowering of the capacity of the transmission grid due to the maintenance of lines, led to more congestion than usual in the Alps (congestion usually appears in the summer in peak situations in the Alps). As there is no load shedding, this problem is overcome by topological measures or in some cases by limiting the output of generation. The planned nuclear power plant overhauls took place, and did not have any particular effect on the system. The planned maintenance of lines took place in the summer. The interconnectors were used as usual for importing and exporting, but nothing particular in that respect should be mentioned.

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Appendix 1: Daily average temperatures for normal weather conditions – reference sets

Calculation of country's daily average temperatures from the PanEuropean Climatic Database (PECD)

The Pan - European Climatic Database (PECD) contains hourly temperatures of each country for the period 2000 – 2013 (14 years). The temperature values at the PECD are calculated at 2 m over the surface level. The country temperatures are computed as the geographical average of all the climatic nodes (MetCells) in that country. In the present version, the weight of the MetCell is equal. Population weighted normal daily average temperatures will be considered in the future, since it might be better suited to assess temperature dependence of demand.

The Daily Average Temperatures $DAT_{pecd\ i}$ are calculated as follows:

$$DAT_{pecd\ j} = (\sum(\sum HT_{pecd\ i\ j\ k})/24))/N_Y$$

$i = 1$ to N_Y (Number of historical years) , $j = 1$ to 365 , $k = 1$ to 24

These daily average temperatures serve as reference temperatures for temperature dependence of demand at so-called 'normal conditions'

Daily average temperatures for severe weather conditions

"Severe weather conditions" are associated with extremely low temperatures with relatively low probability of occurrence. A significant negative correlation between the electricity demand and the ambient temperature is expected at the so called "Heating period". This is the period of the year when we need to heat the spaces where we live and work. As a results simple practical definition of "severe weather conditions" is introduced. Therefore the daily average temperature valid for severe weather conditions is the temperature equal to the so called "temperature saturation point". This is the value below which, further decrease of the temperature does not cause increase of the electricity demand (practically all available heating devices have been switched on). This saturation temperature is a dynamic value which may change from year to year depending on the changes in the structure of the customers and the 'long-term' trend of the development of the electricity demand as a whole. The method for calculating the temperature saturation point is described in the "methodology for load sensitivity calculation" section below.

Methodology for load sensitivity calculation

Because of the clearly defined diurnal pattern of the activities typical for the residential and business customers, the temperature sensitivities of hourly loads experience similar profile – lower values during the night and higher values during the "active" hours of the day. The highest temperature sensitivity is observed for the peak loads during the working days and since this is the reference load for the short term and long term adequacy reports, the method for calculating the sensitivity of this type of load is presented below. The steps of calculation for any country are as follows:

1. Defining the peak load for every day of the reference year;
2. Removing values for Saturday, Sundays and official holidays for the assessed country from the time series of peak loads (P_{peak}) and daily average temperatures (T_{avd}) creating in this way resulting time series only for working days;
3. Arranging the daily average temperatures in ascending order with corresponding arrangement of the peak load values;

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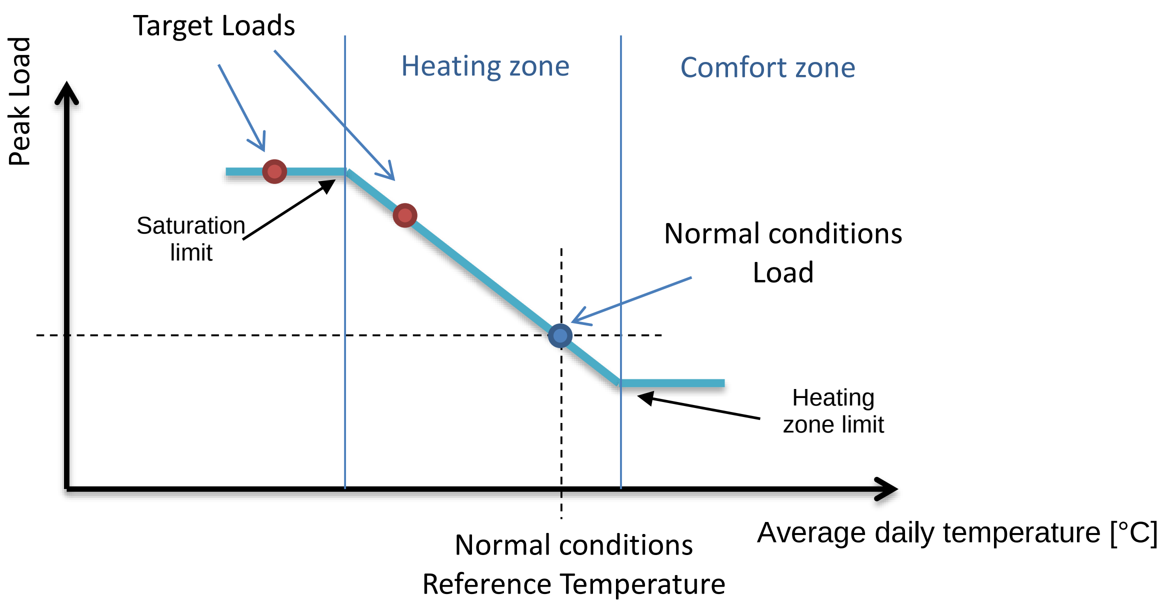
4. Using step-wise linear regression iteration procedure, the following two important points are defined:
   - **saturation temperature for heating zone** (**T_{satur}**) - this is the value below which further decrease of the temperature does not cause increase of the electricity demand (practically all available heating devices have been switched on).
   - **starting temperature for the heating zone** (**T_{start}**)- this is the value below which we start to feel the need to heat up our living and working spaces.
5. Modelling the relation between the peak load and the daily average temperature in the range **T_{start} - T_{satur}** by simple linear regression:

$$P_{peak} = a + \underline{b} * T_{avd}$$

where the regression coefficient **b** being the **peak load temperature sensitivity** valid for the heating zone.

In this calculation the rescaled values of the daily average temperatures T_{avd} from the PECD are used.

The figure below provides a visual explanation of the main points above



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Appendix 2: Capacity factors used for the renewable in-feed for upward regulation analyses

Table 10 - CAPACITY FACTORS USED FOR THE NORMAL CONDITIONS UPWARD ADEQUACY ANALYSIS[14]

WIND ONSHORE

Country	49 S	50 S	51 S	52 S	1 S	2 S	3 S	4 S	5 S	6 S	7 S	8 S	9 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S
AT	24%	24%	24%	26%	28%	26%	22%	29%	32%	36%	24%	23%	21%	21%	30%	27%	17%	14%	16%	12%
BA	18%	25%	23%	30%	18%	22%	19%	24%	21%	32%	22%	24%	17%	27%	21%	19%	20%	11%	15%	11%
BE	25%	21%	21%	23%	22%	23%	27%	26%	24%	29%	17%	16%	21%	20%	20%	16%	15%	18%	12%	13%
BG	20%	20%	19%	23%	18%	23%	20%	30%	29%	30%	26%	23%	22%	24%	24%	20%	20%	16%	19%	20%
CH	30%	24%	27%	29%	26%	21%	18%	27%	24%	31%	18%	15%	17%	21%	24%	18%	15%	16%	16%	11%
CZ	21%	23%	22%	23%	26%	22%	24%	27%	26%	31%	19%	20%	21%	16%	28%	21%	17%	15%	16%	15%
DE	23%	19%	19%	23%	25%	20%	24%	23%	23%	27%	17%	17%	22%	19%	22%	19%	17%	19%	13%	14%
DK	27%	14%	22%	24%	19%	32%	25%	25%	22%	26%	16%	16%	25%	24%	28%	21%	19%	20%	20%	12%
EE	35%	25%	26%	31%	31%	25%	36%	19%	23%	21%	18%	19%	19%	23%	21%	20%	16%	17%	20%	17%
ES	34%	25%	31%	33%	35%	24%	20%	32%	33%	28%	23%	30%	26%	34%	20%	30%	29%	24%	29%	26%
FI	22%	20%	26%	27%	26%	20%	27%	23%	23%	21%	18%	20%	20%	18%	20%	21%	17%	15%	13%	16%
FR	32%	24%	28%	27%	34%	24%	24%	29%	23%	30%	23%	20%	23%	28%	25%	26%	23%	26%	23%	19%
GB	39%	35%	26%	35%	37%	36%	41%	41%	38%	40%	27%	21%	36%	26%	35%	27%	21%	27%	20%	18%
GR	35%	41%	40%	38%	41%	36%	37%	37%	40%	39%	37%	34%	37%	42%	37%	26%	30%	27%	27%	31%
HR	19%	26%	23%	27%	18%	19%	19%	23%	24%	26%	25%	27%	18%	28%	20%	18%	14%	10%	13%	11%
HU	14%	21%	19%	22%	14%	16%	12%	25%	24%	27%	20%	21%	20%	22%	25%	26%	20%	16%	22%	17%
IE	38%	41%	31%	36%	48%	41%	50%	33%	33%	38%	22%	22%	32%	27%	38%	27%	18%	26%	23%	18%
IT	24%	30%	26%	29%	29%	24%	19%	30%	28%	29%	21%	26%	24%	33%	25%	16%	20%	17%	21%	20%
LT	32%	22%	25%	26%	28%	25%	29%	21%	25%	23%	20%	20%	28%	25%	22%	26%	17%	14%	20%	16%
LU	25%	20%	21%	23%	21%	17%	16%	22%	21%	24%	19%	16%	20%	20%	21%	20%	19%	19%	15%	16%
LV	28%	22%	22%	23%	26%	23%	24%	18%	18%	16%	17%	13%	19%	19%	19%	21%	14%	12%	17%	13%
ME	16%	24%	20%	30%	20%	21%	22%	21%	15%	31%	20%	24%	23%	28%	20%	14%	15%	9%	15%	11%
MK	22%	20%	23%	22%	19%	20%	20%	24%	24%	32%	23%	22%	25%	27%	26%	20%	24%	17%	22%	20%
NI	32%	35%	27%	31%	40%	32%	44%	33%	40%	38%	22%	21%	34%	25%	34%	24%	18%	21%	20%	16%
NL	25%	22%	20%	23%	25%	27%	29%	28%	27%	30%	19%	18%	24%	21%	22%	16%	13%	18%	13%	15%
NO	37%	29%	33%	33%	36%	37%	38%	30%	35%	33%	29%	28%	28%	33%	29%	26%	18%	22%	20%	17%
PL	28%	19%	23%	27%	28%	27%	25%	28%	26%	34%	19%	18%	28%	24%	30%	26%	25%	16%	20%	17%
PT	24%	21%	25%	36%	30%	16%	15%	19%	23%	19%	17%	27%	20%	21%	14%	21%	28%	22%	20%	24%
RO	26%	25%	28%	26%	22%	28%	20%	31%	31%	33%	24%	25%	27%	29%	31%	29%	29%	20%	21%	22%
RS	20%	19%	18%	21%	18%	20%	18%	23%	22%	28%	19%	22%	16%	24%	21%	20%	22%	17%	22%	18%
SE	24%	20%	32%	28%	32%	31%	33%	27%	24%	23%	26%	26%	25%	27%	26%	26%	20%	19%	18%	15%
SI	25%	34%	29%	28%	29%	26%	24%	35%	31%	36%	30%	28%	25%	28%	26%	31%	21%	19%	17%	18%
SK	17%	20%	19%	20%	19%	15%	15%	24%	23%	23%	20%	20%	19%	19%	22%	21%	19%	13%	22%	16%

WIND OFFSHORE

Country	49 S	50 S	51 S	52 S	1 S	2 S	3 S	4 S	5 S	6 S	7 S	8 S	9 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S
AT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BE	60%	36%	35%	49%	57%	41%	56%	62%	64%	74%	36%	34%	55%	34%	45%	28%	31%	34%	25%	27%
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CZ	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DE	57%	40%	46%	63%	50%	56%	57%	46%	52%	62%	37%	31%	51%	43%	53%	41%	39%	44%	27%	27%
DK	57%	35%	49%	54%	40%	60%	55%	56%	49%	61%	37%	32%	56%	46%	63%	46%	45%	43%	38%	29%
EE	41%	32%	33%	30%	40%	29%	44%	22%	23%	25%	19%	19%	20%	25%	27%	20%	15%	17%	20%	19%
ES	44%	31%	36%	38%	46%	26%	29%	34%	38%	34%	30%	32%	31%	35%	26%	30%	30%	29%	29%	24%
FI	34%	29%	40%	34%	32%	29%	42%	33%	27%	24%	23%	23%	23%	19%	23%	27%	20%	19%	14%	17%
FR	69%	43%	46%	51%	62%	43%	60%	59%	50%	60%	46%	35%	47%	42%	46%	45%	38%	39%	34%	27%
GB	58%	48%	40%	49%	57%	48%	58%	58%	55%	55%	37%	30%	49%	39%	45%	35%	29%	36%	27%	25%
GR	25%	28%	26%	32%	31%	27%	37%	26%	26%	24%	33%	21%	24%	29%	24%	8%	18%	13%	10%	13%
HR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
IE	49%	44%	37%	39%	50%	45%	58%	42%	48%	47%	29%	24%	41%	25%	37%	25%	19%	30%	17%	15%
IT	35%	41%	44%	37%	35%	29%	25%	46%	35%	39%	33%	38%	36%	42%	34%	21%	33%	26%	32%	28%
LT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LV	38%	23%	30%	26%	44%	31%	45%	25%	18%	28%	20%	19%	26%	28%	22%	22%	14%	13%	20%	15%
ME	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NI	54%	50%	40%	37%	68%	58%	63%	53%	67%	57%	33%	27%	56%	32%	47%	28%	22%	28%	23%	20%
NL	50%	43%	40%	51%	58%	50%	57%	62%	58%	68%	36%	33%	46%	34%	44%	30%	24%	36%	23%	28%
NO	57%	37%	49%	46%	38%	49%	56%	42%	43%	49%	43%	36%	23%	50%	40%	39%	23%	39%	26%	28%
PL	35%	23%	27%	33%	31%	35%	34%	35%	35%	35%	19%	18%	34%	22%	35%	26%	22%	25%	22%	16%
PT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RO	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SE	40%	26%	32%	37%	35%	38%	42%	40%	36%	39%	30%	32%	41%	30%	39%	36%	23%	25%	29%	24%
SI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

SOLAR

Country	49 S	50 S	51 S	52 S	1 S	2 S	3 S	4 S	5 S	6 S	7 S	8 S	9 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S
AT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	10%	12%
BA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	7%	8%
BE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	17%	23%	24%
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
CH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	14%	16%
CZ	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	10%	13%
DE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	15%	19%
DK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	13%	17%
EE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
ES	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	5%	7%	9%	29%	32%	33%
FI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
FR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	21%	24%	26%
GB	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	6%	21%	27%	29%
GR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	3%
HR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	8%	11%
HU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	6%	8%
IE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	4%	10%	21%	31%	27%
IT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	13%	14%
LT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	4%
LU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	22%	23%
LV	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%
ME	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	5%	6%
MK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	4%
NI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	21%	24%
NO	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	9%	12%
PL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	5%	9%
PT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	4%	6%	9%	12%	16%	33%	37%	37%
RO	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%
RS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	4%	6%
SE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	5%	7%
SI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	10%	12%
SK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	6%	8%

[14] Values that are statistically expected to be exceeded in 50% of the relevant hours.

Table 11 - CAPACITY FACTORS USED FOR THE SEVERE CONDITIONS UPWARD ADEQUACY ANALYSIS[15]

WIND ONSHORE

Country	49 S	50 S	51 S	52 S	1 S	2 S	3 S	4 S	5 S	6 S	7 S	8 S	9 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S
AT	4%	6%	7%	5%	5%	3%	6%	9%	8%	10%	4%	5%	3%	4%	6%	3%	3%	1%	3%	2%
BA	2%	4%	4%	5%	2%	4%	2%	2%	5%	10%	4%	3%	3%	4%	4%	3%	3%	2%	2%	2%
BE	1%	1%	3%	4%	1%	3%	4%	1%	1%	2%	2%	1%	3%	2%	2%	1%	1%	1%	2%	1%
BG	3%	4%	6%	4%	4%	4%	4%	4%	7%	7%	7%	5%	6%	4%	4%	5%	5%	4%	4%	5%
CH	4%	4%	5%	4%	7%	2%	3%	5%	3%	5%	2%	4%	3%	4%	4%	3%	2%	2%	3%	1%
CZ	2%	3%	4%	4%	5%	1%	2%	4%	5%	6%	2%	2%	3%	2%	6%	2%	2%	1%	2%	1%
DE	5%	4%	4%	6%	6%	4%	5%	3%	4%	5%	4%	4%	4%	6%	7%	4%	3%	4%	4%	3%
DK	3%	1%	1%	1%	1%	2%	2%	4%	1%	4%	1%	1%	2%	2%	2%	3%	1%	1%	2%	2%
EE	5%	2%	5%	4%	5%	5%	3%	2%	5%	5%	2%	2%	2%	4%	3%	2%	1%	2%	2%	2%
ES	12%	6%	13%	12%	13%	7%	6%	8%	9%	6%	6%	8%	7%	9%	6%	9%	11%	8%	10%	8%
FI	5%	4%	7%	5%	12%	4%	5%	5%	7%	8%	6%	4%	4%	6%	5%	5%	5%	4%	2%	4%
FR	10%	11%	10%	8%	13%	7%	9%	11%	10%	11%	8%	8%	8%	10%	8%	9%	7%	7%	8%	6%
GB	9%	10%	8%	9%	7%	11%	11%	8%	9%	8%	5%	6%	12%	6%	12%	8%	5%	8%	4%	6%
GR	8%	10%	8%	10%	10%	10%	9%	11%	15%	9%	14%	9%	13%	14%	12%	9%	10%	11%	12%	11%
HR	2%	5%	5%	5%	3%	3%	4%	5%	7%	8%	4%	4%	3%	5%	3%	3%	3%	2%	2%	2%
HU	2%	2%	3%	2%	2%	1%	1%	5%	2%	4%	3%	4%	2%	3%	3%	3%	3%	2%	3%	3%
IE	3%	8%	5%	5%	7%	7%	9%	3%	5%	5%	2%	3%	6%	2%	5%	3%	2%	3%	2%	2%
IT	4%	8%	6%	9%	6%	3%	5%	6%	7%	8%	6%	8%	5%	9%	5%	4%	5%	4%	4%	6%
LT	5%	1%	3%	3%	5%	2%	3%	1%	3%	3%	3%	1%	2%	3%	5%	6%	3%	2%	3%	2%
LU	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
LV	5%	1%	3%	2%	4%	3%	2%	1%	2%	2%	1%	1%	1%	2%	3%	2%	1%	0%	2%	1%
ME	0%	2%	1%	2%	1%	3%	1%	2%	2%	6%	4%	2%	1%	2%	2%	2%	1%	1%	1%	2%
MK	2%	3%	3%	2%	1%	3%	2%	4%	3%	6%	4%	4%	3%	4%	5%	4%	4%	3%	3%	4%
NI	2%	5%	2%	3%	5%	6%	8%	4%	3%	1%	1%	1%	3%	1%	4%	4%	1%	3%	1%	1%
NL	3%	2%	1%	3%	2%	5%	4%	2%	2%	2%	1%	2%	3%	3%	3%	1%	1%	1%	1%	1%
NO	14%	11%	13%	15%	18%	18%	11%	14%	12%	17%	12%	12%	11%	15%	11%	10%	6%	8%	6%	4%
PL	8%	4%	5%	5%	6%	4%	5%	6%	5%	8%	3%	3%	5%	4%	5%	8%	6%	2%	5%	5%
PT	3%	3%	5%	6%	5%	2%	2%	3%	3%	3%	2%	3%	3%	4%	2%	4%	6%	4%	3%	4%
RO	6%	7%	9%	6%	6%	6%	5%	8%	8%	10%	8%	7%	7%	7%	7%	8%	7%	3%	5%	6%
RS	3%	5%	5%	3%	2%	5%	3%	5%	3%	7%	5%	5%	4%	5%	6%	4%	5%	3%	3%	5%
SE	9%	7%	9%	10%	12%	11%	10%	11%	6%	10%	10%	7%	7%	9%	9%	10%	7%	6%	5%	6%
SI	4%	5%	5%	7%	4%	3%	6%	6%	7%	8%	4%	6%	4%	4%	4%	4%	2%	2%	2%	2%
SK	3%	4%	5%	3%	3%	3%	3%	4%	3%	6%	3%	3%	2%	3%	4%	5%	3%	1%	3%	2%

WIND OFFSHORE

Country	49 S	50 S	51 S	52 S	1 S	2 S	3 S	4 S	5 S	6 S	7 S	8 S	9 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S
AT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BE	4%	6%	3%	9%	4%	4%	9%	4%	4%	4%	2%	1%	4%	4%	2%	0%	2%	1%	0%	0%
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CZ	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DE	8%	5%	4%	6%	5%	8%	9%	9%	2%	7%	5%	5%	9%	6%	6%	8%	3%	7%	5%	4%
DK	12%	6%	6%	6%	4%	9%	8%	11%	4%	13%	7%	5%	9%	8%	7%	12%	5%	5%	8%	5%
EE	8%	2%	6%	2%	4%	3%	2%	2%	2%	3%	4%	1%	1%	3%	2%	1%	0%	1%	1%	1%
ES	13%	11%	15%	10%	17%	6%	7%	9%	11%	8%	10%	12%	7%	13%	7%	9%	10%	7%	13%	7%
FI	4%	3%	4%	5%	11%	3%	3%	6%	5%	4%	6%	3%	3%	3%	3%	3%	2%	2%	2%	4%
FR	8%	8%	8%	8%	10%	8%	15%	10%	10%	11%	6%	4%	7%	7%	6%	7%	8%	4%	7%	5%
GB	13%	13%	10%	12%	6%	11%	13%	12%	12%	12%	7%	6%	21%	9%	13%	7%	5%	10%	6%	7%
GR	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
HR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
IE	6%	9%	7%	6%	7%	5%	10%	3%	4%	5%	4%	2%	6%	2%	5%	2%	2%	2%	1%	1%
IT	4%	7%	5%	8%	5%	3%	3%	6%	5%	5%	6%	6%	3%	13%	5%	5%	7%	4%	5%	6%
LT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LV	5%	1%	1%	2%	2%	1%	2%	1%	2%	1%	1%	0%	1%	1%	3%	1%	0%	1%	1%	0%
ME	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NI	5%	8%	5%	5%	7%	7%	11%	3%	6%	3%	2%	2%	6%	1%	6%	3%	2%	4%	1%	2%
NL	6%	5%	4%	5%	3%	7%	7%	8%	5%	7%	3%	3%	9%	7%	8%	4%	2%	4%	3%	3%
NO	9%	4%	12%	7%	4%	9%	11%	8%	5%	8%	7%	8%	4%	7%	6%	4%	2%	5%	5%	4%
PL	6%	1%	1%	1%	0%	4%	3%	4%	1%	4%	1%	2%	3%	1%	2%	2%	2%	0%	0%	0%
PT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RO	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SE	12%	7%	10%	9%	11%	13%	9%	14%	8%	10%	8%	7%	7%	12%	12%	9%	8%	6%	8%	7%
SI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

SOLAR

Country	49 S	50 S	51 S	52 S	1 S	2 S	3 S	4 S	5 S	6 S	7 S	8 S	9 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S
AT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CZ	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ES	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
FI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
FR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GB	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
GR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
IE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	6%
IT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LU	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LV	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ME	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NO	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	4%
RO	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SI	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

[15] Minimum values that are statistically expected to be exceeded in 90% of the relevant hours.

Appendix 3: Capacity factors used for the renewable in-feed for downward regulation analyses

Table 11 - FACTORS USED FOR THE DAYTIME DOWNWARD ADEQUACY ANALYSIS[16]

	Wind Onshore					Wind Offshore					Solar				
Country	*December*	*January*	*February*	*March*	*April*	*December*	*January*	*February*	*March*	*April*	*December*	*January*	*February*	*March*	*April*
AT	69%	49%	64%	66%	40%	0%	0%	0%	0%	0%	35%	41%	50%	60%	61%
BA	72%	44%	52%	61%	33%	0%	0%	0%	0%	0%	40%	38%	52%	62%	61%
BE	80%	80%	61%	55%	34%	98%	98%	98%	98%	81%	11%	17%	20%	47%	54%
BG	58%	45%	53%	54%	44%	0%	0%	0%	0%	0%	45%	44%	56%	63%	64%
CH	72%	58%	54%	54%	27%	0%	0%	0%	0%	0%	37%	47%	55%	63%	60%
CZ	65%	40%	53%	51%	31%	0%	0%	0%	0%	0%	22%	24%	36%	54%	60%
DE	67%	46%	46%	43%	25%	96%	89%	95%	84%	82%	15%	17%	28%	45%	56%
DK	87%	61%	71%	57%	46%	98%	93%	95%	90%	81%	12%	11%	26%	41%	57%
EE	83%	66%	44%	66%	39%	93%	87%	61%	79%	58%	6%	9%	29%	31%	59%
ES	63%	69%	63%	55%	37%	75%	74%	80%	64%	47%	32%	33%	47%	54%	51%
FI	63%	47%	40%	49%	38%	86%	72%	69%	83%	51%	1%	3%	15%	29%	43%
FR	62%	54%	48%	53%	32%	98%	96%	94%	84%	66%	20%	26%	36%	51%	51%
GB	77%	71%	60%	74%	49%	94%	90%	79%	82%	72%	7%	8%	14%	31%	40%
GR	64%	69%	68%	68%	58%	98%	97%	98%	98%	90%	46%	48%	59%	64%	64%
HR	52%	47%	48%	56%	37%	0%	0%	0%	0%	0%	39%	38%	53%	62%	60%
HU	73%	51%	65%	69%	45%	0%	0%	0%	0%	0%	32%	40%	47%	62%	61%
IE	93%	88%	58%	79%	65%	98%	96%	66%	92%	76%	4%	7%	14%	35%	36%
IT	47%	46%	49%	55%	36%	89%	80%	81%	77%	60%	42%	44%	55%	62%	59%
LT	78%	67%	54%	65%	40%	0%	0%	0%	0%	0%	8%	17%	42%	31%	60%
LU	71%	55%	46%	62%	26%	0%	0%	0%	0%	0%	6%	18%	20%	57%	57%
LV	72%	56%	47%	59%	40%	97%	89%	65%	74%	55%	7%	17%	35%	31%	58%
ME	77%	60%	64%	67%	40%	0%	0%	0%	0%	0%	44%	48%	57%	65%	64%
MK	72%	54%	57%	65%	51%	0%	0%	0%	0%	0%	49%	50%	62%	66%	64%
NI	95%	92%	62%	89%	60%	98%	98%	87%	98%	86%	7%	8%	14%	31%	40%
NL	78%	64%	60%	57%	31%	96%	94%	88%	88%	78%	14%	13%	18%	46%	55%
NO	58%	62%	52%	56%	44%	88%	94%	83%	83%	79%	4%	8%	24%	35%	41%
PL	63%	59%	55%	54%	29%	98%	92%	94%	76%	70%	15%	22%	30%	44%	60%
PT	78%	86%	73%	68%	54%	0%	0%	0%	0%	0%	29%	29%	45%	54%	47%
RO	58%	43%	60%	50%	43%	0%	0%	0%	0%	0%	36%	41%	47%	61%	63%
RS	65%	52%	61%	56%	39%	0%	0%	0%	0%	0%	38%	43%	50%	62%	62%
SE	51%	54%	35%	51%	34%	87%	76%	61%	64%	46%	4%	7%	18%	37%	44%
SI	70%	60%	55%	68%	46%	0%	0%	0%	0%	0%	43%	43%	56%	63%	62%
SK	62%	51%	68%	71%	46%	0%	0%	0%	0%	0%	30%	39%	45%	60%	62%

[16] Maximum values that are statistically not expected to be exceeded in more than 10% of the relevant hours.

Table 12 - FACTORS USED FOR THE NIGHTTIME DOWNWARD ADEQUACY ANALYSIS[17]

	Wind Onshore					Wind Offshore				
Country	*December*	*January*	*February*	*March*	*April*	*December*	*January*	*February*	*March*	*April*
AT	70%	56%	68%	72%	46%	0%	0%	0%	0%	0%
BA	78%	47%	50%	64%	40%	0%	0%	0%	0%	0%
BE	85%	72%	57%	56%	43%	98%	98%	97%	98%	90%
BG	58%	46%	60%	56%	43%	0%	0%	0%	0%	0%
CH	77%	50%	56%	58%	40%	0%	0%	0%	0%	0%
CZ	62%	51%	55%	51%	38%	0%	0%	0%	0%	0%
DE	65%	47%	54%	43%	32%	97%	93%	94%	85%	87%
DK	78%	63%	68%	54%	48%	97%	95%	94%	87%	85%
EE	87%	68%	43%	70%	40%	97%	83%	65%	78%	63%
ES	66%	66%	66%	57%	44%	70%	73%	81%	67%	45%
FI	58%	54%	40%	57%	36%	89%	69%	66%	89%	60%
FR	67%	55%	52%	55%	38%	98%	97%	87%	87%	73%
GB	80%	79%	58%	70%	51%	93%	89%	78%	84%	79%
GR	63%	69%	68%	68%	61%	98%	98%	98%	98%	94%
HR	51%	45%	51%	54%	41%	0%	0%	0%	0%	0%
HU	70%	54%	59%	69%	63%	0%	0%	0%	0%	0%
IE	89%	82%	54%	84%	61%	96%	96%	81%	91%	79%
IT	49%	53%	57%	59%	47%	94%	83%	84%	86%	59%
LT	81%	68%	57%	65%	53%	0%	0%	0%	0%	0%
LU	67%	48%	57%	56%	38%	0%	0%	0%	0%	0%
LV	73%	60%	40%	60%	43%	97%	91%	67%	83%	62%
ME	75%	56%	69%	70%	45%	0%	0%	0%	0%	0%
MK	67%	47%	66%	61%	50%	0%	0%	0%	0%	0%
NI	93%	93%	65%	95%	55%	98%	98%	95%	98%	84%
NL	83%	63%	61%	55%	39%	97%	92%	85%	92%	84%
NO	58%	60%	51%	56%	43%	92%	92%	84%	85%	81%
PL	61%	63%	60%	54%	42%	98%	95%	94%	69%	73%
PT	84%	82%	76%	69%	59%	0%	0%	0%	0%	0%
RO	60%	45%	61%	53%	56%	0%	0%	0%	0%	0%
RS	60%	50%	62%	62%	46%	0%	0%	0%	0%	0%
SE	56%	53%	38%	53%	35%	76%	79%	62%	66%	49%
SI	65%	62%	63%	64%	48%	0%	0%	0%	0%	0%
SK	64%	50%	68%	69%	60%	0%	0%	0%	0%	0%

[17] Maximum values that are statistically not expected to be exceeded in more than 10% of the relevant hours.

Appendix 4: Load and generation constraints under severe conditions[18]

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Albania																				
Net generation capacity	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**
Reliable available capacity under normal conditions	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Reliable available capacity in severe conditions	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
Net load at reference point under normal conditions	1.35	1.37	1.40	1.50	1.46	1.38	1.39	1.40	1.42	1.45	1.44	1.43	1.41	1.38	1.35	1.32	1.29	1.26	1.22	1.20
Net load at reference point in severe conditions	1.38	1.40	1.43	1.54	1.55	1.43	1.45	1.46	1.47	1.48	1.47	1.46	1.45	1.41	1.39	1.35	1.31	1.29	1.25	1.22
Austria																				
Net generation capacity	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**	**24.40**
Reliable available capacity under normal conditions	15.86	15.99	15.92	15.37	16.53	16.44	16.68	16.73	16.59	16.68	16.48	16.62	16.63	16.21	16.35	16.28	16.47	15.55	13.69	13.90
Reliable available capacity in severe conditions	14.86	14.96	14.88	14.33	15.50	15.41	15.64	15.66	15.50	15.58	15.36	15.50	15.51	15.08	15.21	15.11	15.26	14.30	12.41	12.57
Net load at reference point under normal conditions	10.44	10.42	10.33	10.33	10.37	10.40	10.37	10.56	10.55	10.63	10.67	10.56	10.49	10.46	10.26	10.03	9.96	9.73	9.34	9.17
Net load at reference point in severe conditions	10.96	10.94	10.85	10.85	10.89	10.92	10.88	11.09	11.08	11.17	11.20	11.09	11.02	10.98	10.77	10.53	10.46	10.22	9.80	9.63
Belgium																				
Net generation capacity	**21.95**	**21.98**	**22.01**	**22.04**	**22.07**	**22.09**	**22.12**	**22.15**	**22.18**	**22.21**	**22.24**	**21.82**	**21.85**	**21.88**	**21.91**	**21.94**	**21.97**	**22.00**	**22.03**	**22.05**
Reliable available capacity under normal conditions	11.61	11.65	11.67	10.65	10.66	12.53	12.53	12.54	12.55	12.46	12.47	12.05	12.06	11.67	11.67	11.84	11.87	10.84	10.87	10.90
Reliable available capacity in severe conditions	9.34	9.38	9.38	8.41	8.42	10.52	10.52	10.52	10.53	10.59	10.59	10.19	10.19	9.76	9.77	9.92	9.94	8.91	8.94	8.97
Net load at reference point under normal conditions	12.31	12.28	11.76	9.49	9.66	12.80	12.55	12.46	12.69	12.76	12.96	12.21	12.20	11.99	11.28	10.74	10.22	10.83	10.56	10.48
Net load at reference point in severe conditions	12.89	12.86	12.34	10.06	10.16	13.51	13.26	13.17	13.33	13.40	13.60	12.85	12.84	12.59	11.88	11.33	10.81	11.33	11.06	10.97
Bosnia and Herzegovina																				
Net generation capacity	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**
Reliable available capacity under normal conditions	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08
Reliable available capacity in severe conditions	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08
Net load at reference point under normal conditions	2.10	2.10	2.10	2.20	2.20	2.20	2.20	2.10	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	1.90	1.90	1.90	1.90
Net load at reference point in severe conditions	2.17	2.17	2.17	2.27	2.27	2.27	2.27	2.17	2.17	2.17	2.17	2.07	2.07	2.07	2.07	2.07	1.97	1.97	1.97	1.97
Bulgaria																				
Net generation capacity	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.44**	**13.46**	**13.46**	**13.46**	**13.47**	**13.47**	**13.47**	**13.47**	**13.47**
Reliable available capacity under normal conditions	8.14	8.14	8.14	8.14	8.14	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.27	7.92	7.92	7.93	7.93	7.84	7.84	7.84
Reliable available capacity in severe conditions	7.35	7.35	7.35	7.35	7.35	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.47	7.20	7.20	7.21	7.21	7.12	7.12	7.12
Net load at reference point under normal conditions	5.45	5.44	5.52	5.64	5.76	5.96	6.15	6.30	6.58	6.48	6.09	5.68	5.49	5.33	5.01	4.90	4.70	4.60	4.54	4.48
Net load at reference point in severe conditions	6.30	6.16	6.13	6.22	6.32	6.50	6.67	6.85	7.19	7.15	6.83	6.51	6.43	5.28	5.20	5.36	5.39	5.51	5.68	6.08
Croatia																				
Net generation capacity	**4.17**	**4.17**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**
Reliable available capacity under normal conditions	3.27	3.27	3.33	3.33	3.33	3.32	3.22	3.22	3.22	3.32	3.32	3.32	3.32	3.22	3.22	3.22	3.22	3.22	3.22	3.22
Reliable available capacity in severe conditions	3.12	3.02	3.18	3.08	3.08	3.07	2.97	2.97	3.12	3.07	3.07	3.07	3.07	2.97	2.97	2.97	2.97	2.97	2.97	2.97
Net load at reference point under normal conditions	2.70	2.68	2.77	2.62	2.60	2.51	2.52	2.54	2.75	2.61	2.58	2.48	2.53	2.55	2.48	2.38	2.49	2.30	2.30	2.42
Net load at reference point in severe conditions	2.97	2.95	3.05	2.88	2.86	2.76	2.77	2.79	3.03	2.87	2.84	2.73	2.78	2.81	2.73	2.62	2.74	2.53	2.53	2.66
Cyprus																				
Net generation capacity	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**
Reliable available capacity under normal conditions	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Reliable available capacity in severe conditions	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Net load at reference point under normal conditions	0.61	0.64	0.65	0.66	0.68	0.68	0.69	0.69	0.69	0.69	0.68	0.66	0.64	0.62	0.59	0.58	0.57	0.55	0.54	0.53
Net load at reference point in severe conditions	0.64	0.67	0.68	0.69	0.72	0.72	0.72	0.73	0.72	0.72	0.71	0.69	0.68	0.65	0.63	0.61	0.60	0.58	0.57	0.56
Czech Republic																				
Net generation capacity	**21.33**	**21.33**	**21.33**	**21.33**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**	**21.34**
Reliable available capacity under normal conditions	12.14	12.02	12.20	12.25	12.52	12.77	12.52	12.69	12.80	12.72	12.78	12.54	12.46	12.08	12.12	12.13	12.60	11.99	11.53	11.53
Reliable available capacity in severe conditions	11.91	11.79	11.97	12.02	12.29	12.54	12.29	12.46	12.57	12.49	12.55	12.31	12.23	11.85	11.89	11.90	12.37	11.76	11.30	11.30
Net load at reference point under normal conditions	9.28	9.28	9.08	7.80	7.97	9.71	9.88	9.89	9.76	9.78	9.78	9.71	9.49	9.27	9.19	9.16	9.00	9.04	8.74	8.62
Net load at reference point in severe conditions	9.28	9.28	9.08	7.80	7.97	9.71	9.88	9.89	9.76	9.78	9.78	9.71	9.49	9.27	9.19	9.16	9.00	9.04	8.74	8.62
Denmark																				
Net generation capacity	**12.02**	**12.02**	**12.02**	**12.02**	**12.02**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**	**12.25**
Reliable available capacity under normal conditions	5.09	5.09	5.09	5.09	5.09	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	4.75	4.75	4.50
Reliable available capacity in severe conditions	5.09	5.09	5.09	5.09	5.09	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	4.75	4.75	4.50
Net load at reference point under normal conditions	5.40	5.47	5.44	4.75	5.42	5.34	5.41	5.44	5.26	5.37	5.27	5.34	5.22	5.16	5.07	4.89	4.79	4.44	4.18	4.18
Net load at reference point in severe conditions	5.63	5.70	5.67	4.95	5.65	5.57	5.64	5.67	5.48	5.60	5.49	5.57	5.44	5.38	5.28	5.10	4.99	4.63	4.36	4.36
Week	**49**	**50**	**51**	**52**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**

[18] All data in GW

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Estonia																				
Net generation capacity	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**
Reliable available capacity under normal conditions	1.78	1.78	1.78	1.78	1.78	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.78	1.78
Reliable available capacity in severe conditions	1.68	1.68	1.68	1.68	1.68	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.67	1.67
Net load at reference point under normal conditions	1.30	1.35	1.35	1.35	1.40	1.45	1.45	1.50	1.50	1.50	1.50	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.20	1.15
Net load at reference point in severe conditions	1.37	1.42	1.42	1.42	1.47	1.52	1.52	1.58	1.58	1.58	1.58	1.52	1.47	1.47	1.42	1.42	1.37	1.31	1.26	1.21
Finland																				
Net generation capacity	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**	**17.80**
Reliable available capacity under normal conditions	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	12.57	11.97	11.87	11.87	11.87
Reliable available capacity in severe conditions	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	11.90	11.80	11.80	11.80
Net load at reference point under normal conditions	12.40	12.70	12.70	11.70	12.60	13.00	13.30	13.30	13.50	13.30	13.10	13.00	12.60	12.20	11.90	11.90	11.50	11.30	11.00	10.70
Net load at reference point in severe conditions	14.20	14.70	14.70	13.40	14.70	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.60	14.20	13.90	13.50	13.00	12.60	12.20	11.90
France																				
Net generation capacity	**124.47**	**124.47**	**124.47**	**124.47**	**124.70**	**124.70**	**124.70**	**124.70**	**124.96**	**124.96**	**124.96**	**124.96**	**124.92**	**124.92**	**124.92**	**124.92**	**124.92**	**123.46**	**122.71**	**122.46**
Reliable available capacity under normal conditions	91.76	94.33	95.63	95.97	95.95	96.60	97.61	96.55	96.85	95.63	95.64	94.10	92.74	90.86	90.61	89.56	86.17	80.78	80.83	70.18
Reliable available capacity in severe conditions	91.65	94.33	95.63	95.97	95.95	96.60	97.61	96.55	96.85	95.63	95.64	94.10	92.74	90.86	90.61	89.56	86.17	80.78	80.83	70.18
Net load at reference point under normal conditions	76.38	78.20	79.55	74.41	73.29	80.84	80.40	79.51	78.25	76.71	75.03	73.69	72.13	70.36	68.33	66.05	63.69	65.29	62.02	59.43
Net load at reference point in severe conditions	89.49	92.46	95.19	92.64	90.73	97.38	98.24	99.27	101.14	99.11	95.40	91.83	88.10	87.27	81.45	81.06	80.32	79.08	72.35	69.88
FYR of Macedonia																				
Net generation capacity	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**
Reliable available capacity under normal conditions	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
Reliable available capacity in severe conditions	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
Net load at reference point under normal conditions	1.29	1.33	1.36	1.48	1.44	1.15	1.35	1.24	1.42	1.33	1.21	1.18	1.19	1.18	1.21	1.06	1.09	0.88	0.86	1.07
Net load at reference point in severe conditions	1.35	1.39	1.42	1.55	1.50	1.20	1.41	1.30	1.48	1.39	1.27	1.23	1.25	1.24	1.27	1.11	1.14	0.92	0.90	1.12
Germany																				
Net generation capacity	**186.06**	**186.06**	**186.06**	**186.06**	**186.06**	**186.02**	**186.02**	**186.02**	**186.02**	**186.80**	**186.80**	**186.80**	**186.80**	**187.19**	**187.19**	**187.19**	**187.19**	**187.25**	**187.25**	**187.25**
Reliable available capacity under normal conditions	91.97	91.97	92.01	92.01	92.01	91.33	91.33	91.84	91.84	91.67	91.46	91.58	91.35	91.29	89.92	89.53	88.78	86.54	86.67	83.81
Reliable available capacity in severe conditions	90.05	90.05	90.09	90.09	90.09	89.39	89.39	89.90	89.90	89.70	89.48	89.61	89.38	89.30	87.94	87.55	86.79	84.52	84.65	81.79
Net load at reference point under normal conditions	78.80	76.67	74.25	62.14	74.05	76.40	77.01	77.13	76.09	75.43	76.00	75.83	75.54	75.06	74.31	74.92	73.52	74.52	73.05	72.12
Net load at reference point in severe conditions	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76	80.76
Great Britain																				
Net generation capacity	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**	**72.91**
Reliable available capacity under normal conditions	54.92	54.68	56.62	56.56	55.85	56.31	56.28	55.53	56.10	55.98	56.08	55.81	55.96	54.69	55.52	54.33	53.91	54.80	52.22	53.05
Reliable available capacity in severe conditions	53.83	53.59	55.53	55.47	54.76	55.22	55.19	54.44	55.01	54.89	54.99	54.72	54.87	53.60	54.43	53.24	52.82	53.71	51.13	51.96
Net load at reference point under normal conditions	51.70	52.80	52.90	50.10	47.90	51.90	52.40	52.20	51.70	51.50	50.90	50.60	49.50	48.60	48.40	47.10	46.00	43.90	41.90	40.70
Net load at reference point in severe conditions	53.05	53.75	54.35	50.55	49.05	52.85	54.35	53.05	52.15	53.05	51.15	50.15	49.45	50.15	50.15	48.95	47.15	43.90	41.90	40.70
Greece																				
Net generation capacity	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**	**17.24**
Reliable available capacity under normal conditions	10.06	10.06	10.48	11.01	11.01	11.04	10.51	10.51	10.51	10.63	10.63	10.35	10.16	10.26	10.16	10.09	10.17	10.18	10.62	10.73
Reliable available capacity in severe conditions	9.17	9.17	9.59	10.12	10.12	10.15	9.62	9.62	9.62	9.74	9.74	9.46	9.27	9.37	9.27	9.20	9.28	9.24	9.68	9.58
Net load at reference point under normal conditions	8.00	8.20	8.40	8.60	8.90	8.80	8.60	8.40	8.40	8.40	8.40	8.40	8.40	8.00	8.00	7.80	7.40	7.00	6.60	6.30
Net load at reference point in severe conditions	8.50	8.80	9.10	8.70	9.20	8.80	8.60	8.60	8.70	8.60	8.60	8.70	8.30	8.10	8.30	7.90	7.80	7.70	7.40	7.30
Hungary																				
Net generation capacity	**8.81**	**8.81**	**8.81**	**8.81**	**8.81**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**	**8.69**
Reliable available capacity under normal conditions	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	5.97	5.97	5.57	5.34	5.12	4.91
Reliable available capacity in severe conditions	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	6.05	5.97	5.97	5.57	5.34	5.12	4.91
Net load at reference point under normal conditions	5.82	5.82	5.82	4.77	4.77	5.57	5.77	5.77	5.77	5.67	5.57	5.57	5.47	5.47	5.37	5.37	5.37	5.27	5.17	5.17
Net load at reference point in severe conditions	6.12	6.12	6.12	5.07	5.07	5.87	6.07	6.07	6.07	5.97	5.87	5.87	5.77	5.77	5.67	5.67	5.67	5.57	5.47	5.47
Ireland																				
Net generation capacity	**9.03**	**9.03**	**9.03**	**9.03**	**8.91**	**9.03**	**9.02**	**9.02**	**9.02**	**8.99**	**8.99**	**8.99**	**8.99**	**8.99**	**8.99**	**8.99**	**8.99**	**8.99**	**8.98**	**8.58**
Reliable available capacity under normal conditions	6.71	6.71	6.71	6.71	6.47	6.71	6.69	6.69	6.69	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.23	6.62	6.61	5.80
Reliable available capacity in severe conditions	6.08	6.08	6.08	6.08	5.84	6.08	6.07	6.07	6.07	6.04	6.04	6.04	6.04	6.04	6.04	6.04	5.65	6.04	6.03	5.25
Net load at reference point under normal conditions	4.81	4.73	4.77	4.54	4.88	4.81	4.80	4.77	4.72	4.71	4.62	4.51	4.53	4.52	4.48	4.32	4.24	3.97	3.77	3.82
Net load at reference point in severe conditions	4.81	4.73	4.77	4.54	4.88	4.81	4.80	4.77	4.72	4.71	4.62	4.51	4.53	4.52	4.48	4.32	4.24	3.97	3.77	3.82
Week	**49**	**50**	**51**	**52**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Italy																				
Net generation capacity	**118.02**	**118.10**	**118.18**	**118.27**	**118.35**	**118.44**	**118.52**	**118.61**	**118.69**	**118.78**	**118.86**	**119.20**	**119.29**	**119.37**	**119.46**	**119.55**	**119.72**	**119.80**	**119.89**	**119.98**
Reliable available capacity under normal conditions	50.59	50.72	50.15	50.51	50.55	51.45	51.68	51.99	52.00	51.99	51.67	51.28	50.85	50.27	49.61	48.89	48.28	48.34	49.00	49.13
Reliable available capacity in severe conditions	50.46	50.62	50.06	50.43	50.47	51.37	51.59	51.89	51.89	51.86	51.51	51.09	50.62	50.01	49.34	48.61	48.01	48.11	48.82	49.01
Net load at reference point under normal conditions	47.50	47.70	47.20	38.50	38.50	46.70	47.90	47.90	47.90	47.90	46.90	45.70	45.70	45.50	44.50	44.30	44.00	43.10	41.90	41.90
Net load at reference point in severe conditions	48.55	48.32	47.52	38.64	38.57	46.81	48.15	48.38	48.71	49.11	48.59	47.95	48.56	49.02	48.15	48.07	47.63	45.96	43.95	43.09
Latvia																				
Net generation capacity	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**	**2.95**
Reliable available capacity under normal conditions	1.57	1.57	1.57	1.57	1.57	1.58	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Reliable available capacity in severe conditions	1.34	1.34	1.34	1.34	1.34	1.35	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Net load at reference point under normal conditions	1.20	1.26	1.21	1.08	1.14	1.17	1.26	1.32	1.34	1.26	1.20	1.15	1.14	1.08	1.10	1.14	1.08	1.10	1.09	1.06
Net load at reference point in severe conditions	1.23	1.28	1.23	1.09	1.16	1.19	1.28	1.35	1.37	1.28	1.22	1.18	1.17	1.10	1.13	1.17	1.10	1.13	1.11	1.09
Lithuania																				
Net generation capacity	**4.08**	**4.08**	**4.08**	**4.08**	**4.08**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**
Reliable available capacity under normal conditions	2.38	2.35	2.37	2.34	2.36	2.13	2.10	2.08	2.14	2.09	2.07	2.14	2.15	2.17	2.19	2.43	2.40	2.15	2.16	2.17
Reliable available capacity in severe conditions	1.89	1.89	1.89	1.89	1.89	1.64	1.64	1.64	1.64	1.62	1.62	1.68	1.68	1.70	1.70	1.93	1.93	1.76	1.76	1.76
Net load at reference point under normal conditions	1.58	1.62	1.69	1.47	1.40	1.52	1.58	1.64	1.66	1.60	1.53	1.54	1.50	1.51	1.39	1.51	1.46	1.43	1.37	1.31
Net load at reference point in severe conditions	1.74	1.78	1.85	1.62	1.54	1.67	1.74	1.80	1.83	1.76	1.69	1.63	1.62	1.65	1.53	1.66	1.61	1.58	1.51	1.44
Luxembourg																				
Net generation capacity	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**	**1.90**
Reliable available capacity under normal conditions	1.29	1.29	1.39	1.39	1.39	1.29	1.29	1.29	1.29	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.46
Reliable available capacity in severe conditions	1.12	1.12	1.22	1.22	1.22	1.12	1.12	1.12	1.12	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.30
Net load at reference point under normal conditions	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Net load at reference point in severe conditions	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.00
Montenegro																				
Net generation capacity	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**
Reliable available capacity under normal conditions	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Reliable available capacity in severe conditions	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Net load at reference point under normal conditions	0.56	0.56	0.57	0.58	0.58	0.59	0.60	0.59	0.59	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.51	0.45	0.45	0.44
Net load at reference point in severe conditions	0.63	0.63	0.63	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.61	0.60	0.60	0.60	0.50	0.50	0.49
The Netherlands																				
Net generation capacity	**33.66**	**33.66**	**33.66**	**33.66**	**33.66**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**	**33.37**
Reliable available capacity under normal conditions	26.45	27.45	27.45	27.45	26.45	26.72	26.72	26.72	26.22	26.72	26.72	26.72	26.22	26.72	26.72	26.72	26.72	26.72	26.72	26.72
Reliable available capacity in severe conditions	22.70	22.16	22.52	23.25	22.25	22.54	22.54	22.54	22.04	22.54	22.54	22.54	21.59	22.09	22.54	22.54	22.31	21.77	22.75	22.31
Net load at reference point under normal conditions	17.07	17.35	17.17	16.04	15.74	16.54	16.69	16.78	16.58	15.93	16.03	15.58	15.49	14.99	14.74	15.26	14.41	14.53	14.46	14.37
Net load at reference point in severe conditions	17.07	17.35	17.17	16.04	15.74	16.54	16.69	16.78	16.58	15.93	16.03	15.58	15.49	14.99	14.74	15.26	14.41	14.53	14.46	14.37
Norway																				
Net generation capacity	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**	**32.96**
Reliable available capacity under normal conditions	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47
Reliable available capacity in severe conditions	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47
Net load at reference point under normal conditions	18.40	18.70	18.70	17.50	17.30	19.00	18.70	22.47	22.00	22.47	19.50	19.00	19.00	18.50	17.50	18.00	17.00	16.70	16.00	15.50
Net load at reference point in severe conditions	19.53	19.85	19.85	18.58	18.37	20.17	19.85	23.85	23.35	23.85	20.70	20.17	20.17	19.64	18.58	19.11	18.05	17.73	16.99	16.46
Poland																				
Net generation capacity	**36.53**	**36.57**	**36.57**	**36.57**	**36.57**	**36.59**	**36.59**	**36.59**	**36.59**	**36.60**	**36.60**	**36.60**	**36.60**	**36.60**	**36.60**	**36.60**	**36.60**	**36.55**	**36.55**	**36.55**
Reliable available capacity under normal conditions	24.57	24.72	24.82	25.25	25.25	25.31	25.13	25.33	25.33	25.50	25.47	25.98	25.98	24.11	24.54	24.62	24.16	22.45	21.45	21.80
Reliable available capacity in severe conditions	22.87	23.01	23.10	23.84	23.75	23.77	23.58	23.79	23.79	23.72	23.70	24.20	24.21	22.60	23.04	23.12	22.67	21.21	20.23	20.59
Net load at reference point under normal conditions	22.24	22.33	22.43	15.75	18.16	22.38	22.57	22.52	22.47	22.43	22.33	22.24	22.06	21.87	21.69	21.41	21.04	20.66	20.29	20.01
Net load at reference point in severe conditions	23.17	23.36	23.45	16.67	19.09	23.49	23.68	23.54	23.59	23.63	23.54	23.45	23.26	23.08	22.71	22.33	22.06	21.59	21.22	20.94
Portugal																				
Net generation capacity	**17.84**	**17.84**	**17.84**	**17.84**	**18.02**	**18.02**	**18.02**	**18.02**	**18.02**	**18.03**	**18.03**	**18.03**	**18.03**	**18.04**	**18.04**	**18.04**	**18.04**	**18.05**	**18.05**	**18.05**
Reliable available capacity under normal conditions	10.94	11.05	11.02	11.18	11.43	11.52	11.49	11.49	11.24	11.58	11.59	11.62	11.29	11.29	11.27	11.29	11.30	11.90	11.65	11.66
Reliable available capacity in severe conditions	8.95	9.09	9.06	9.19	8.95	8.95	8.91	8.92	8.53	8.72	8.76	8.73	8.52	8.51	8.49	8.57	8.61	9.01	8.75	8.95
Net load at reference point under normal conditions	8.13	8.05	8.07	7.49	8.24	8.37	8.49	8.29	8.19	8.04	8.04	7.90	7.71	7.59	7.29	7.15	7.21	7.14	6.98	6.78
Net load at reference point in severe conditions	8.67	8.53	8.60	7.99	8.80	8.92	8.90	8.67	8.51	8.49	8.52	8.37	8.16	8.02	7.75	7.59	7.66	7.56	7.35	7.08
Week	**49**	**50**	**51**	**52**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**

Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Romania																				
Net generation capacity	**21.32**	**21.33**	**21.42**	**21.42**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.97**	**20.68**	**20.68**	**20.68**
Reliable available capacity under normal conditions	15.16	15.07	15.36	15.43	15.33	14.76	14.44	14.02	14.47	13.68	13.47	14.03	14.11	13.60	13.95	14.04	14.07	13.91	13.84	13.19
Reliable available capacity in severe conditions	12.82	12.84	12.92	12.94	12.83	12.62	11.95	11.78	11.79	11.27	11.34	11.40	11.42	10.89	11.56	11.62	11.73	11.35	11.36	11.28
Net load at reference point under normal conditions	7.84	8.08	8.08	6.32	6.47	7.45	7.71	7.75	8.00	8.17	7.70	7.63	7.81	7.63	7.39	7.26	7.22	6.53	6.55	6.79
Net load at reference point in severe conditions	8.34	8.58	8.58	6.82	6.97	7.95	8.21	8.25	8.50	8.67	8.20	8.13	8.31	8.13	7.89	7.76	7.72	7.03	7.05	7.29
Serbia																				
Net generation capacity	**8.55**	**8.55**	**8.55**	**8.55**	**8.55**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**	**8.57**
Reliable available capacity under normal conditions	6.82	6.64	7.00	7.00	7.00	7.15	7.15	7.15	7.35	7.35	7.35	7.35	7.35	7.07	7.07	7.07	7.07	7.36	6.75	6.35
Reliable available capacity in severe conditions	6.70	6.53	6.88	6.88	6.88	7.04	7.04	7.04	7.23	7.24	7.24	7.24	7.24	6.96	6.96	6.96	6.96	7.24	6.63	6.23
Net load at reference point under normal conditions	6.21	6.29	6.66	6.53	7.03	5.97	6.51	6.45	6.60	6.66	6.63	6.42	6.32	6.23	6.19	5.93	5.67	4.73	4.64	4.61
Net load at reference point in severe conditions	7.51	7.51	7.51	7.51	7.51	7.38	7.38	7.38	7.38	7.42	7.42	7.42	7.42	6.92	6.92	6.92	6.92	5.93	5.93	5.93
Slovakia																				
Net generation capacity	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**	**8.07**
Reliable available capacity under normal conditions	4.52	4.52	4.32	4.17	4.45	4.52	4.51	4.65	4.61	4.60	4.51	4.49	4.50	4.51	4.47	4.68	4.58	4.35	4.38	4.45
Reliable available capacity in severe conditions	4.52	4.52	4.32	4.17	4.45	4.52	4.51	4.65	4.61	4.60	4.51	4.49	4.50	4.51	4.47	4.68	4.58	4.35	4.38	4.45
Net load at reference point under normal conditions	4.16	4.35	4.18	3.73	3.97	4.06	4.16	4.14	4.28	4.31	4.26	4.07	4.05	4.07	3.97	3.81	3.75	3.77	3.74	3.60
Net load at reference point in severe conditions	4.36	4.36	4.42	4.22	4.19	4.34	4.32	4.42	4.32	4.40	4.32	4.26	4.20	4.14	4.14	4.07	4.10	3.91	3.88	3.78
Slovenia																				
Net generation capacity	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**
Reliable available capacity under normal conditions	2.50	2.57	2.51	2.45	2.37	2.25	2.22	2.21	2.25	2.21	2.21	2.24	2.22	2.28	2.28	2.30	2.39	2.38	2.41	2.40
Reliable available capacity in severe conditions	2.45	2.52	2.46	2.40	2.31	2.19	2.16	2.15	2.19	2.15	2.15	2.18	2.16	2.22	2.22	2.24	2.34	2.32	2.35	2.35
Net load at reference point under normal conditions	1.89	1.83	1.97	1.74	1.85	2.01	1.98	1.95	2.09	2.09	1.96	1.94	1.87	1.94	1.89	1.76	1.84	1.81	1.76	1.80
Net load at reference point in severe conditions	1.91	1.87	2.00	1.76	1.89	2.04	2.02	2.00	2.14	2.12	1.99	1.97	1.90	1.99	1.93	1.79	1.86	1.84	1.79	1.84
Spain																				
Net generation capacity	**100.96**	**100.96**	**100.96**	**100.96**	**100.96**	**100.96**	**100.97**	**100.99**	**101.00**	**101.02**	**101.03**	**101.05**	**101.06**	**101.07**	**101.09**	**101.10**	**101.12**	**101.13**	**101.15**	**101.16**
Reliable available capacity under normal conditions	56.26	57.25	57.67	57.67	57.71	58.18	56.98	56.98	57.40	58.83	58.83	58.84	58.84	55.57	55.61	56.79	57.32	56.43	56.02	56.41
Reliable available capacity in severe conditions	51.26	52.25	52.67	52.67	52.70	53.29	52.08	52.09	52.51	53.24	53.25	53.25	53.25	50.31	50.36	51.53	52.06	51.83	51.42	51.81
Net load at reference point under normal conditions	40.75	39.80	39.80	40.28	39.90	37.90	39.33	39.80	40.75	40.75	39.80	38.85	38.85	39.33	39.80	37.90	36.00	36.00	33.53	33.34
Net load at reference point in severe conditions	43.00	42.00	42.00	42.50	42.10	40.00	41.50	42.00	43.00	43.00	42.00	41.00	41.00	41.50	42.00	40.00	38.00	38.00	35.40	35.20
Sweden																				
Net generation capacity	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**	**40.18**
Reliable available capacity under normal conditions	26.96	26.96	26.96	26.96	26.96	26.96	26.96	26.86	26.86	26.86	26.86	26.86	26.56	26.56	26.56	25.36	25.36	26.56	26.16	25.16
Reliable available capacity in severe conditions	24.95	24.95	24.95	24.95	24.95	24.95	24.95	24.85	24.85	24.85	24.85	24.85	24.55	24.55	24.55	23.35	23.35	24.55	24.15	23.15
Net load at reference point under normal conditions	24.97	24.97	24.97	24.00	24.00	24.97	24.97	24.97	24.97	24.97	24.97	24.97	24.97	24.97	23.80	23.80	21.85	19.89	19.89	18.92
Net load at reference point in severe conditions	26.47	26.47	26.47	25.30	25.30	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	26.47	24.32	24.32	22.36	20.90	19.92	18.94
Switzerland																				
Net generation capacity	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**	**18.78**
Reliable available capacity under normal conditions	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33
Reliable available capacity in severe conditions	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33
Net load at reference point under normal conditions	9.94	9.97	9.77	7.09	7.67	9.12	9.56	9.55	9.80	9.71	9.52	9.43	9.38	9.05	8.63	8.20	8.65	7.46	7.34	7.40
Net load at reference point in severe conditions	10.94	10.97	10.77	8.09	8.67	10.12	10.56	10.55	10.80	10.71	10.52	10.43	10.38	10.05	9.63	9.20	9.65	8.46	8.34	8.40
Ukraine (Wext Power System)																				
Net generation capacity	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**
Reliable available capacity under normal conditions	1.85	1.85	1.85	1.85	1.85	2.13	2.13	2.13	2.13	1.96	1.96	1.96	1.96	1.97	1.97	1.97	1.97	1.94	1.94	1.94
Reliable available capacity in severe conditions	1.85	1.85	1.85	1.85	1.85	2.13	2.13	2.13	2.13	1.96	1.96	1.96	1.96	1.97	1.97	1.97	1.97	1.94	1.94	1.94
Net load at reference point under normal conditions	1.06	1.11	1.11	1.11	0.96	0.96	1.16	1.16	1.16	1.14	1.14	1.14	1.14	0.98	0.96	0.95	0.93	0.88	0.86	0.84
Net load at reference point in severe conditions	1.08	1.13	1.13	1.13	0.98	0.98	1.19	1.19	1.19	1.16	1.16	1.16	1.16	1.00	0.98	0.97	0.95	0.90	0.88	0.86
Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16