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European Network of
Transmission System Operators
for Electricity

An Overview of System Adequacy:

SUMMER OUTLOOK REPORT 2013 AND WINTER REVIEW 2012/2013

MAY 2013

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1 INTRODUCTION

ENTSO-E adopts and publishes on an annual basis the "**Summer Outlook and Winter review**". This report assesses the adequacy of the power system for the summer period as well as the potential electricity issues it may be faced with during the summer period. It also provides an overview of the main events which occurred during the previous winter period.

The ENTSO-E summer outlook and winter review report is adopted as required by article 8 of the EC Regulation n. 714/2009. It sets ENTSO-E analysis and views for the coming summer period on the basis of a consolidated methodology on short term system adequacy reports. This is reflected in the questionnaire which highlights any potential electricity issues which the TSOs may face during the summer period as well as the measures which will be in place to respond to them.

The winter review report shows the main events which occurred during the winter period of 2012, according to TSOs, with reference to security of electricity supply (i.e. weather conditions, power system conditions, as well as availability of interconnections). The Winter review covers the period from 5th December 2012 (week 49) to 31st March 2013 (week 13). It outlines the main events during the previous winter in comparison with the forecasts presented in the ENTSO-E Winter Outlook report 2012-2013, published on 30th November 2012.

The summer outlook reports the outlook of the national and regional power balances between forecast generation and load at reference points on a weekly basis for the upcoming summer period, from 5 June (week 23) to 25 September (week 39). More information regarding reference points is provided in Section 3: Methodology.

The purpose of this report is to present TSOs' views on any matters concerning security of supply for the forthcoming summer period. It also sought 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 where excess inflexible generator output exceeds overnight minimum demands was performed in order to provide a level of confidence regarding the effects of intermittent generation such as wind and solar system operation. As an extension of the downward adequacy assessment, a new weekly reference point has been added, aiming at identifying any possible downward regulation issues in a low load – high RES in-feed situation (typically a sunny weekend day).

This report includes a significant enhancement of the Outlooks methodology with particular regard to the RES-E resources treatment. In order to harmonise as far as practicable the assumptions on intermittent energy sources, bearing in mind the necessary 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 specificities, the Pan European Assessments include a harmonised probabilistic approach using a Pan European Climate database[1] (PECD).

[1]Data from Technical University of Denmark

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2 EXECUTIVE SUMMARY

Summer Outlook

The ENTSO-E Summer Outlook reports the outlook of the national and regional power balances between forecast available generation and peak demand on a weekly basis for the upcoming summer period, from 5 June (week 23) until 25 September (week 39).

The summer 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 sufficient to accommodate them.

The ENTSO-E Summer Outlook 2013 shows that, on the whole, the balance between generation and demand is expected to be maintained during the summer period in case of normal weather conditions. Based on normal conditions for the demand, the majority of countries do not require imports to maintain their balance between demand and supply.

However, under severe weather conditions such as heat waves and high temperatures, demand increases from normal levels. In such a situation, from the data submitted by the TSOs, the analysis shows that reliability margins are reduced. Indeed, countries such as Hungary, Finland and Poland would require imports to maintain the demand and supply balance for all reference points during the entire summer period. The necessary amount of imports may exceed the reported cross-border capacity in Poland, under prolonged extreme weather conditions. However during such conditions the risk of unplanned flows through the Polish system, resulting from the wind generation in North Germany, is low. In such a situation, the import of power up to 1000 MW will be possible on the synchronous profile (in normal conditions there is no import capacity available on the yearly horizon). Additionally there could be the option to make use of units up to 300 MW capacity, which in the yearly planning are classified as non-usable capacity. In such severe conditions, the margins would also be reduced during weeks of the summer period in Denmark, Croatia, Latvia and the FYRO Macedonia.

The downward adequacy assessment covers the cases when due to low overnight demands, an excess of generation can be present in the system, especially when variable renewable generation and inflexible classical generation are at high output levels. The same case could occur during weekend daytime, characterised by low load and possibly high PV generation output. Therefore in this Summer Outlook, two different (one overnight and one daytime) reference points are examined for downward adequacy. Assumptions made for these downward assessments are based on different transmission conditions and may require specific operational measures.

In these cases, there could well be an excess of inflexible generation which would need to be exported or curtailed. When generation exceeds demand in a country due to one of the above reasons, cross border flows will occur in regions which can import the excess generation. When cross border capacities are fully used, then curtailment of renewables (or other inflexible generation) will occur due to the lack of appropriate infrastructure, including storage facilities, which may be used to balance the inflexible generation.

The Summer Outlook report 2013 highlights the fact that during certain weeks over the summer, it may be necessary to reduce excess generation in various countries as a result of insufficient cross border export capability. As an example it can be observed that the combination of high renewables in-feed and inflexible generation in Belgium, Ireland, Northern Ireland and Sweden leads to high exports to all surrounding countries in the overnight reference points, while around the daytime reference point, Belgium and Latvia may encounter similar problems. Based on the minimum NTCs provided, not all excess energy can be evacuated from these countries, and thus measures could be required to limit the generation surplus.

The main issues identified for the coming summer are related to the availability of power plants during a long-lasting hot summer period in case there are any problems with the cooling systems of the power plants, and the high renewable production during low load periods, in particular wind and photovoltaic, which could lead to a local lack of adequate regulating capacity. Some countries have reported lower than average hydro-reservoir levels, but their demand is expected to be covered using imports in case of reduced primary energy availability.

Winter Review

The Winter Review 2012/13 section in this report also outlines the events which occurred during the last winter period with reference to the weather conditions and the consequences for the power system in comparison to forecasts for the winter as published in December 2012 in the Winter Outlook 2012/13.

The Winter Review as it pertains to the period December 2012 to March 2013 shows that no extraordinary weather conditions affected simultaneously a wide area in Europe, as it occurred during Winter 2011/12. While in the southern part of Europe the winter was mild, in the northern part the winter was a bit colder than average, especially in the first part of December. In central Europe the time period January – March was slightly colder than average. In many countries a high amount of rainfall was observed which has a positive effect on hydro generation.

During the first half of December and the second half of January parts of the peak load reserve in Sweden were activated to maintain a sufficient margin between demand and generation, due to temperatures colder than normal.

In Belgium two nuclear power plants were not in operation during the whole winter, which led to a structural dependency on imports of up to 3500 MW, taking into account additional planned outages. On Friday the 11th January, Elia faced a further forced outage of a third nuclear power plant Tihange3 (1000MW). The unit came back on Saturday, on time to contribute to meet the highest load that occurred in both Belgium and France on January 17th. Due to a cold spell in combination with a forced outage of multiple units right before and during the evening peak, this day was the most critical day of the past winter for Belgium.

In Spain the wind production was much higher than average, and several wind production records were met.

The German control area was on the evening of December 24th massively oversupplied (up to 8 GW), resulting in strong negative prices for electricity. This also contributed to an unusually high upward frequency deviation (frequency reached a maximal value of 50.13 Hz). During this period of time the German demand for negative control reserve could not be satisfied by the procured reserves and emergency reserve had to be used. This unusually high demand for negative control reserve continued – to a lesser extent – until 5th January. Cross-border flows caused by this oversupply also affected Poland and the Czech Republic where a redispatch became necessary.

3 METHODOLOGY

3.1 SOURCE OF INFORMATION

The winter 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 winter period in comparison to the forecasts and risks reported in the last Winter Outlook. The TSOs mainly answer if their respective power system experienced any important or unusual events or conditions during the winter period as well as the identified causes and the remedial actions taken.

The summer outlook report is based on the information provided by ENTSO-E members before the beginning of April on both a qualitative and quantitative basis in response to a questionnaire which has been significantly improved in order to increase the level of detail in the analysis performed. It presents TSOs' views as regards any national or regional matters of concern regarding security of supply and/or inflexible generation surpluses for the coming summer 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.

3.2 DATA USED FOR THE REGIONAL ANALYSIS

Based on the successful experience of the winter outlook 2012-2013, an extensive regional analysis was also added to the well-known per-country analysis for the summer period. The aim of this investigation is to assess whether the country based adequacy still remains fulfilled when the larger, European scale is taken into account. In other words, it assesses whether the electrical energy will be available at certain points in time to allow the countries with a generation deficit to import the electric power needed from the surrounding countries.

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 data, a study was conducted to identify the most representative synchronous time for covering the global European peak load in summer. It was concluded that Wednesday, 12:00 CET most closely represents this situation, and therefore data was requested from TSOs for this time point. With regards to the regional analysis, the values which were actually used from the data collection spreadsheet can be found below:

- The Remaining Capacity for **normal** and **severe** conditions;
- Simultaneous importing and exporting capacity;
- A best estimate of the minimum NTC values towards and from individual neighbouring countries.

In addition, across the period of assessment for the next summer, 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 intermittent 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 during summer 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 nears 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. Compared to previous outlooks, additional quantitative data for this point in time was therefore requested from all TSOs to allow for a meaningful regional analysis.

For the regional downward analysis, the values which were actually used from the data collection spreadsheet can be summarized as:

- 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.

3.3 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[2] was used containing per-country load factors for solar, onshore wind and offshore wind per hour for the last 10 years.

The methodology that is currently used to achieve per country representative load factors for the two downward analysis scenarios can be described as follows:

- For every country and for solar, wind onshore and wind offshore individually, the 90th percentile of the load factor for the past three years, per month, and for the appropriate time period (day or night) was calculated.
- These per-country values are then scaled to achieve the 90th percentile of total renewable in-feed over Europe in Megawatts.

[2] Data from Technical University of Denmark

As such, a renewable in-feed scenario is created which represents a realistic distribution over the different countries and over the different primary energy sources, as well as a realistic global in-feed level considering all installed renewable capacity and load factors over Europe.

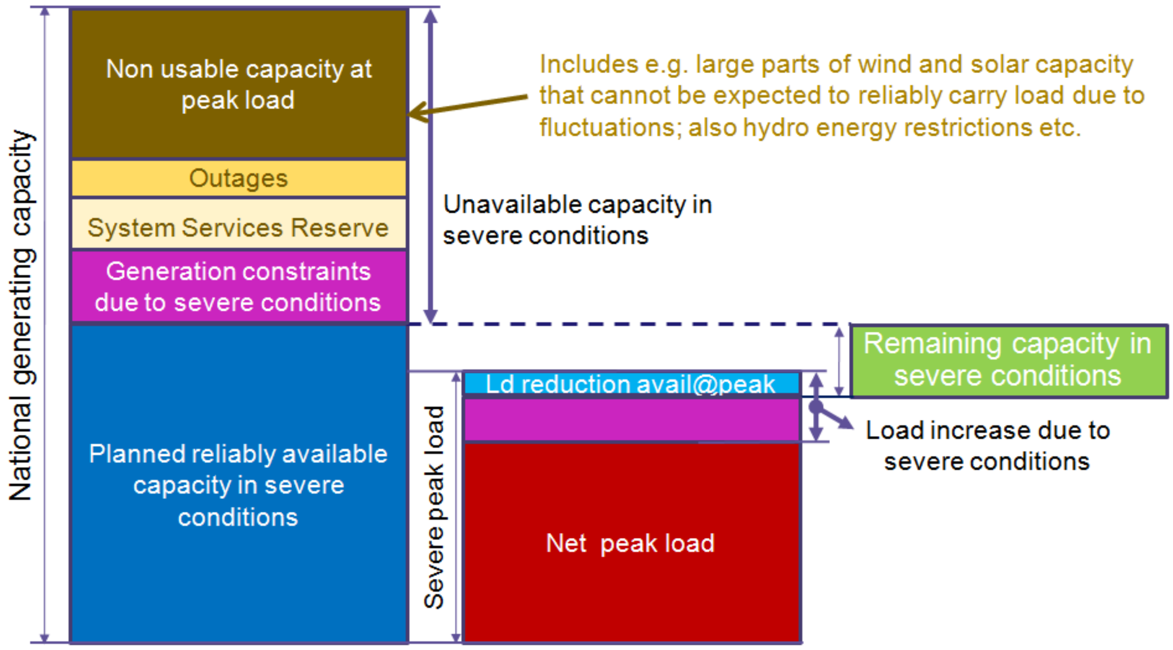
The methodology for the generation adequacy analysis is very similar to the one above, with the difference that for normal conditions the 50th percentile and for severe conditions the 10th percentile is used.

It is envisioned for the future outlooks to use the experience gained on this matter and further refine the applied methodologies.

3.4 AIMS AND METHODOLOGY

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 in the figure below:



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 or hydro output and an average outage level). A severe scenario was also built showing the sensitivity of the generation-load balance to high 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 in generation power plants due to extended drought).

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

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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.

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 source 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 or equal to the given NTC values;
- Total simultaneous imports and exports should be lower 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 RU, BY, UA, Burshtyn Island (part of the Ukrainian system that operates synchronously with Continental Europe), MA and TR 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.

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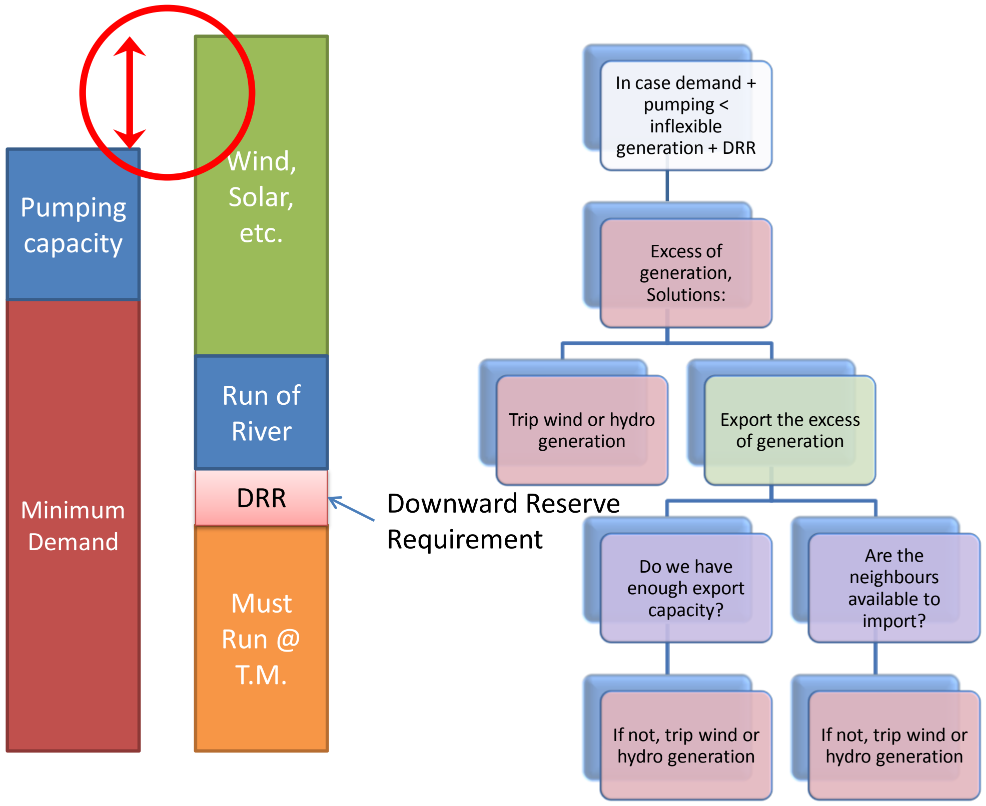
With regards to the downward regulation analysis, it is appreciated that downward regulation may not be a focus for some TSOs at present and hence a short explanation of the potential issue is provided in the diagram below.



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 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 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.

3.5 DEFINITIONS

- **Downward Regulation Reserve**: Level of capacity available to reduce generation output that TSO always needs to guarantee to be available.
- **Downward Regulation**: This is the minimum level of generation flexibility that is required by the TSO to be able to reduce output on the system.
- **Firm import/export contracts:** Bilateral contracts for importing or exporting of electrical energy, agreed for a certain period of time in advance.
- **Generation adequacy:** Generation adequacy of a power system is an assessment of the ability of the generation in the power system to match the consumption on the power system.
- **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 winter.
- **Load factor:** For various types of power plants (especially renewables), this is the ratio between the available output capacity and installed capacity over a period of time
- **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. Load includes network losses and excludes the pumps of the pumped-storage stations and generation auxiliaries.
- **Must Run Generation** is related to the generators which, for various reasons, must be connected to the transmission/ distribution grid. Some reasons include: network constraints (overload management, voltage control), specific policies, minimum number of units needed to provide system services, subsidies, environmental causes etc.
- **National Generating Capacity:** Sum of the individual net generating capacity of all power stations connected to either transmission or the distribution grid.
- **Net Transfer Capacity:** Maximum exchange program between two areas compatible with security standards applicable in both areas and taking into account the technical uncertainties on future network conditions.
- **Non-usable capacity at peak load under normal conditions**: Resulting from lack of primary sources (hydro, wind, sun), insufficient fuel availability due to actual contracts, mothballed plants not in operation during the summer.
- **Pumping Storage Capacity**: Type of hydroelectric power plant that uses low-cost electric power at the off-peak periods to pump the water into the higher elevation reservoir, and generate electric power at the periods of high demand.
- **Reference Points:** Reference points are the dates and times data are collected for:

  - Sundays of Summer on the 5th hour (from 04:00 CET to 05:00 CET) and on the 11th hour (from 10:00 CET to 11:00 CET)
  - Wednesday of Summer on the 12th hour (from 11:00 CET to 12:00 CET)
- **Reliably available capacity**: Part of National Generating Capacity actually available to cover the load at a reference point.
- **Remaining capacity for normal conditions:** Corresponds to the generating capacity available above net weekly peak load for the normal climatic conditions and is the basis of the TSO's appreciation of the generation adequacy for the current week.
- **Remaining capacity for severe conditions:** Corresponds to the generating capacity available above net weekly peak load for the severe climatic conditions and is the basis of the TSO's appreciation of the generation adequacy for the current week.
- **Run of River**: Type of hydroelectric power plant with limited amount of storage or no storage at all.
- **Severe conditions** are related to what each TSO would expect under a 1 in a 10 year scenario.[3] For example the demand will be higher than normal conditions and in certain regions the output from generating units such as wind may be very low or there may be restrictions in thermal plants that operate at a reduced output under very low or high temperatures.
- **Simultaneous exportable capacity: Exportable transmission capacity with other national systems expected to be available each week and a range of possible outcomes for interconnection power flow.**
- **Simultaneous importable capacity:** Importable transmission capacity with other national systems expected to be available each week and a range of possible outcomes for interconnection power flow.
- **System services reserve under normal conditions**: The amount of capacity required by the TSO to provide operating response/reserves under normal climatic conditions. 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:** Times in the outlook reports are expressed in Central European Time (CET=UTC+1). All the data and analyses provided are in accordance with this approach.
- **Weekly peak load for normal conditions:** Peak load excluding any demands on interconnectors and net of any demand management/demand side response in normal climatic conditions for the period.
- **Weekly peak load for severe conditions:** Peak load excluding any demands on interconnectors and net of any demand management/demand side response in severe climatic conditions for the period.

[3] It is difficult to be very specific and hence a description of the scenario being considered should be described by each TSO and if a TSO is not using a 1 in 10 year scenario e.g. only calculates at a 1 in 20 year demand level then this should be highlighted.

4 WINTER REVIEW

While in southern part of Europe the winter was mild, in the northern part the winter was a bit colder than average, especially in the first part of December and second half of January. In central Europe the time period January – March was slightly colder than average. In many countries a high amount of rainfall was observed which has a positive effect on hydro generation. As no extreme weather condition occurred, the load in Europe was mainly held at normal level. During the last winter in whole Europe no unexpected situation occurred.

Between Finland and Sweden problems with the HVDC-interconnection Fenno-Skan 1 existed through the whole winter period. This restricted import from Sweden to Finland. This did not endanger the system adequacy but caused at times price difference between Finland and Sweden. A cable fault on one of the interconnectors between Sweden and East Denmark also reduced the capacity between the two countries.
During the first half of December and the second half of January - which was colder than normal - some parts of the Peak Load Reserve in Sweden were activated to maintain a sufficient margin between demand and production.

In Belgium, two nuclear power plants were not in operation during the whole winter. With additional planned outages, this led to a structural dependency on imports of up to 3500 MW. With a cold spell about to start, Elia faced the additional forced outage of a third NPP Tihange3 (1000MW) on Friday the January 11th. The unit came back on Saturday. On January 17 the highest load occurred in both Belgium and France due to cold temperatures. The most stressed periods in France in terms of short term generation/demand balance were the second week of December and the end of February due to weather conditions.

The German control area was on the evening of December 24th massively oversupplied (up to 8 GW), resulting in strong negative prices for electricity. This also contributed to an unusually high upward frequency deviation (frequency reached 50.13 Hz in maximum). During this period of time the German demand for negative control reserve could not be satisfied by the procured reserves and emergency reserve had to be used. This unusually high demand for negative control reserve continued – to a lesser extent – until 5th January. This oversupply also affected the Poland and the Czech Republic where a redispatch became necessary.

In Spain the wind production was much higher than average, and several wind production records were met.

5 SUMMER OUTLOOK

5.1 GENERAL OVERVIEW

The coordination team which developed the regional analysis methodology is comprised of very 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.

Based on the data submitted by each TSO, Europe as a whole should have over 160 GW of spare capacity to meet demand and reserves under normal conditions in the ideal case of unlimited interconnection capacity. This value corresponds to nearly 39% of the sum of peak loads. The analysis is forecasting a minimal surplus of 100 GW under severe conditions (approximately 23% of peak load) under the same assumption (1 in 10 years). To put that into perspective, for the Winter Outlook report ENTSO-E analysis was forecasting a copperplate surplus of 28 GW under severe conditions.

Taking into account the cross border capacities, the analysis indicated that there is sufficient interconnection capacity between countries to take full advantage of this excess of generaton capacity to cover the demand in all countries.

As for the past Summer and Winter outlook reports, additional data was again requested to allow an analysis for downward regulation. In addition to the overnight minimum demand periods that were assessed in previous outlook reports, the daytime minimum demand combined with high photo-voltaic in-feed scenario was investigated.

Based on the data submitted by each TSO, Europe as a whole should have about 103 GW of downward regulation margin (about 34% of load) at the daytime minimum demand and in the ideal case of unlimited interconnection capacity. When the overnight minimum demand is considered, this downward regulation margin drops to about 77 GW (approximately 32% of load).

Taking into account the reported interconnection capacities and using a consistent scenario for the renewables in-feed, 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. Second the downward regulation margin will be looked at. 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.

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5.2 Individual Country Perspective Analysis

5.2.1 Generation Adequacy

Considering *normal conditions*, the majority of countries are expected to be able to balance load without the need of imports, as shown in green in Table 1.

Some countries are expected to have in *normal conditions* some weeks (orange in Table 1) in which imports are required in order to meet their demand and reserve requirements.

Table 1: Weekly importing needs under normal conditions

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL																	
AT																	
BA																	
BE																	
BG																	
BY																	
CH																	
CZ																	
DE																	
DK																	
EE																	
ES																	
FI																	
FR																	
GB																	
GR																	
HR																	
HU																	
IE																	
IT																	
LT																	
LU																	
LV																	
ME																	
MK																	
NI																	
NL																	
NO																	
PL																	
PT																	

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Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
RO																	
RS																	
SE																	
SI																	
SK																	
UA																	
CY																	

When severe conditions are considered, which in summer generally means high temperatures (1 in 10 years probability), low wind in-feed, and greater unavailability of thermal power plants, the number of countries that require imports grows, but the general situation remains comfortable.

TABLE 2: WEEKLY IMPORTING NEEDS UNDER SEVERE CONDITIONS

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL																	
AT																	
BA																	
BE																	
BG																	
BY																	
CH																	
CZ																	
DE																	
DK																	
EE																	
ES																	
FI																	
FR																	
GB																	
GR																	
HR																	
HU																	
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IT																	
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LV																	
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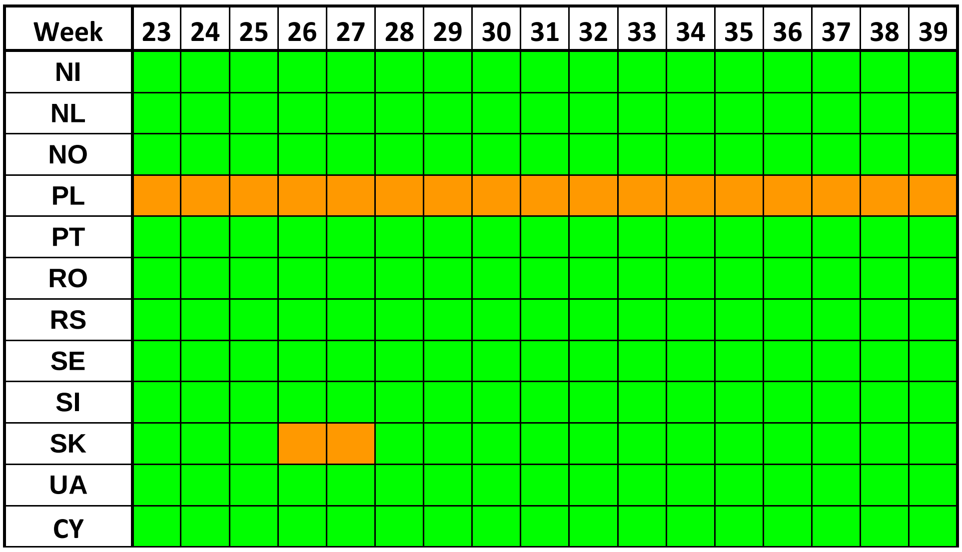

Most countries did not communicate an increased risk of generation adequacy issues for the coming summer. Some countries however provided specific comments on their situation. These comments are summarized below.

France

The main identified risks are:

- Producers could decide to mothball plants (CCGT) up to about 3.5 GW in total due to economic reasons. This new situation could generate local constraints in the south-east of France.
- In case of severe weather conditions (heat waves), environmental constraints could affect the availability of power plants.

Poland

Severe conditions, mainly in June and July, with extremely high temperature and dry weather, may cause not only an increase of the forecasted load but also a higher level of unavailability of units, which both decrease the remaining margin. :

To keep the balance at the safe level, the Polish TSO can use operational procedures to cope with power shortages. In addition, during severe conditions when the risk of unplanned flows through the Polish system resulting from the wind generation in North Germany is low, the import of energy up to 1000 MW will be possible on the synchronous profile (in normal conditions there is no import capacity available).

5.2.2 DOWNWARD REGULATION MARGIN

Table 3 and Table 4 below show the exporting needs at the Sunday, 11 AM and the 5 AM synchronous time point 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.

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 Belgium, Bulgaria, Germany, Spain, Latvia and Cyprus.

TABLE 3: WEEKLY EXPORTING NEEDS AT THE DAYTIME MINIMUM

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL	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
BA	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
BE	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange
BG	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange
BY	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
CZ	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
DE	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange
DK	green	green	green	green	green	green	green	orange	orange	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
ES	green	orange	orange	orange	green	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange
FI	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
GB	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
HR	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
IE	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
IT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
LT	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
LV	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange
ME	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
NI	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
NO	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
PT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
RO	green	green	green	orange	green	green	green	green	green	orange	orange	green	orange	orange	orange	orange	orange
RS	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
SE	green	green	green	green	orange	green	orange	orange	orange	orange	green	green	orange	green	orange	orange	green
SI	orange	orange	orange	green	green	orange	orange	orange	orange	green	orange	green	orange	green	green	green	green

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
SK																	
UA																	
CY																	

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 renewables (onshore and offshore wind) in-feed during (almost) all weeks are Belgium, Bulgaria, Denmark, Germany, Hungary, Northern Ireland, Ireland, The Netherlands, Romania, Sweden and Cyprus.

TABLE 4: WEEKLY EXPORTING NEEDS AT THE OVERNIGHT MINIMUM

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL																	
AT																	
BA																	
BE																	
BG																	
BY																	
CH																	
CZ																	
DE																	
DK																	
EE																	
ES																	
FI																	
FR																	
GB																	
GR																	
HR																	
HU																	
IE																	
IT																	
LT																	
LU																	
LV																	
ME																	
MK																	
NI																	
NL																	
NO																	

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
PL																	
PT																	
RO																	
RS																	
SE																	
SI																	
SK																	
UA																	
CY																	

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

Belgium

Elia's summer outlook will heavily depend on whether and when the 2 currently stopped nuclear units (Doel3, Tihange2) of 1000 MW each will return in service. The latest official information reports a possible return of these units in June.

The probability of experiencing significant levels of excess inflexible generation is quite high. It might be possible that Belgium structurally needs to export excess energy in case of high renewables in-feed through the whole assessed period. To mitigate this risk, Elia will maximize exporting capacities and has implemented mechanisms to give the right market incentives in case of such a situation.

Spain

At minimum demand periods, with high amounts of renewable production, power surpluses with spilling of RES can take place. The Spanish TSO has a specific control centre 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 worth mentioning is the importance of energy storage - mainly pump storage plants - in order to properly manage the excess of inflexible power.

Sweden

As approximately half of the domestic electricity production comes from hydropower there is usually no problem with inflexibility, although this should not be taken for granted any longer since more and more wind power is being installed in the synchronous area. For this reason Svenska Kraftnät, the TSO in Sweden, is working actively to overcome possible future inflexibility issues, although such problems have not been a serious threat yet.

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 paragraphs 3.2 and 3.3 was used.

5.3.1 GENERATION ADEQUACY

Based on normal conditions for generation and demand, the majority of countries do not require imports 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 orange 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 or a lack of energy.

TABLE 5: WEEKLY STRESS ASSESSMENT UNDER NORMAL CONDITIONS

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL																	
AT																	
BA																	
BE																	
BG																	
BY																	
CH																	
CZ																	
DE																	
DK																	
EE																	
ES																	
FI																	
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GB																	
GR																	
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HU																	
IE																	
IT																	
LT																	
LU																	
LV																	
ME																	
MK																	

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
NI																	
NL																	
NO																	
PL																	
PT																	
RO																	
RS																	
SE																	
SI																	
SK																	
UA																	
CY																	

While the majority of regions do not require imports for adequacy reasons, markets will determine the economic energy transfer based on the respective price differentials between regions, and hence various borders might 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 certain individual countries increases due to air-conditioning needs, whilst generation availability might be lower due to unfavourable meteorological conditions. The analysis indicated that even under severe conditions across all of Europe, demand is met and reserves can be maintained. The limited interconnection capacity remains to be a key issue in the power system of Poland.

TABLE 6: WEEKLY STRESS ASSESSMENT UNDER SEVERE CONDITIONS

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL																	
AT																	
BA																	
BE																	
BG																	
BY																	
CH																	
CZ																	
DE																	
DK																	
EE																	

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Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
ES																	
FI																	
FR																	
GB																	
GR																	
HR																	
HU																	
IE																	
IT																	
LT																	
LU																	
LV																	
ME																	
MK																	
NI																	
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NO																	
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SK																	
UA																	
CY																	

The map below 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, the need for importable energy is quite limited and geographically distributed, resulting in a low probability of potential issues regarding generation adequacy for the coming summer period.

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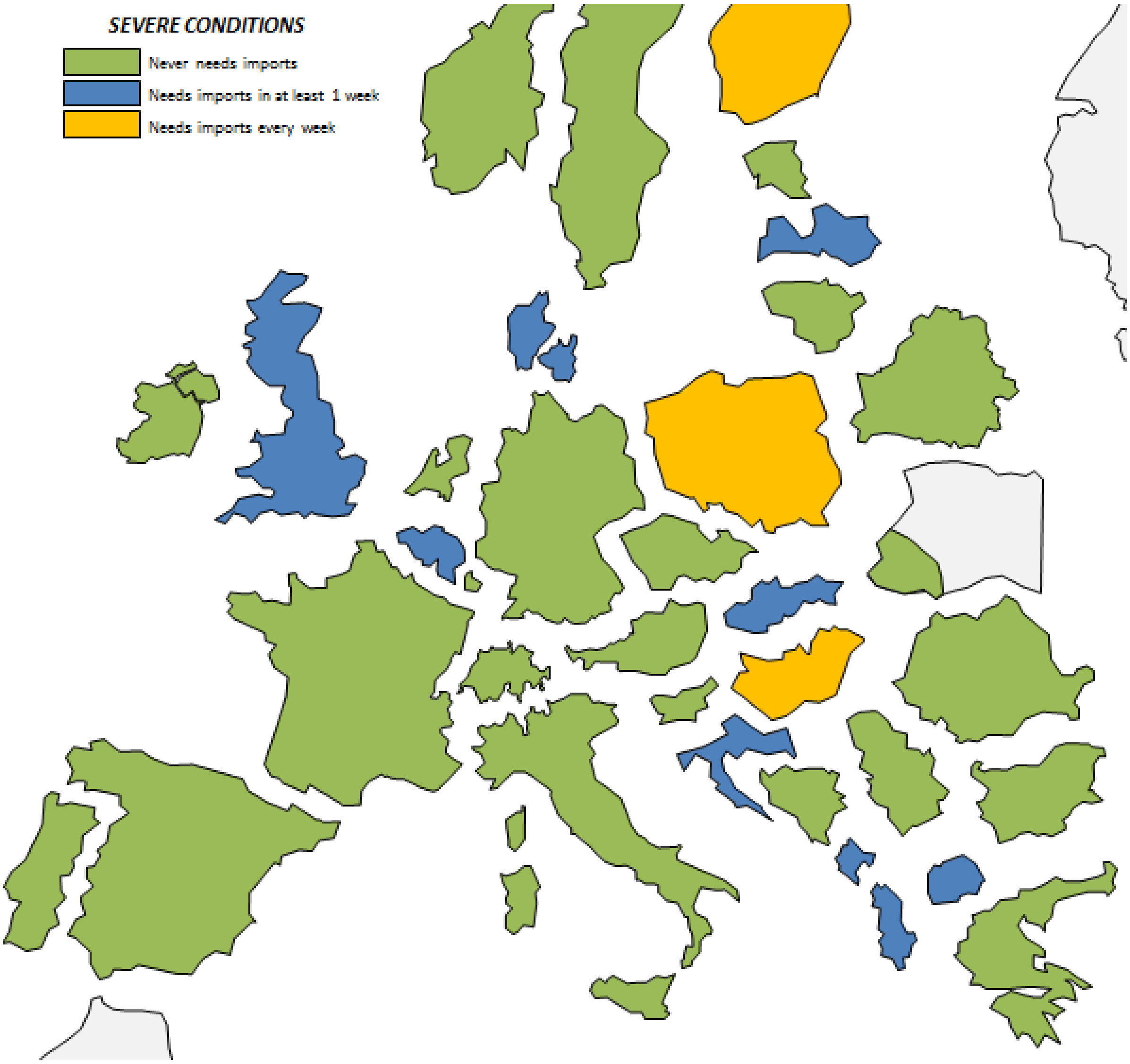

FIGURE 1: OVERVIEW OF THE IMPORT NEEDS FOR SEVERE CONDITIONS

5.3.2 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	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL	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
BA	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
BE	green	green	green	green	green	orange	orange	orange	orange	orange	orange	orange	green	green	green	green	green
BG	orange	orange	green	green	green	green	green	green	green	green	green	green	orange	orange	orange	orange	orange
BY	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
CZ	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
DE	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
DK	green	green	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
ES	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
FR	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
GR	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
HU	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
IE	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
IT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
LT	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
LV	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange	orange
ME	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
NI	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
NO	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
PT	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
RO	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green
RS	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green	green

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Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
SE																	
SI																	
SK																	
UA																	
CY																	

It can be observed that with a wind and solar output set at a representative level across the ENTSO-E region (see Chapter 8 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.

TABLE 8: WEEKLY STRESS ASSESSMENT FOR OVERNIGHT MINIMUM

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
AL																	
AT																	
BA																	
BE																	
BG																	
BY																	
CH																	
CZ																	
DE																	
DK																	
EE																	
ES																	
FI																	
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HR																	
HU																	
IE																	
IT																	
LT																	
LU																	
LV																	
ME																	
MK																	
NI																	

Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
NL																	
NO																	
PL																	
PT																	
RO																	
RS																	
SE																	
SI																	
SK																	
UA																	
CY																	

An analysis of the overnight minimum demand scenario yields the same results and conclusions as for the daytime scenario: sufficient interconnection capacity is available to export excess inflexible generation to neighbouring countries under the investigated hypotheses.

The maps below give another view on the data shown in

Table 7 and Table 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. As can be seen on these maps, the need for exportable energy is quite limited, resulting in a low probability of potential issues on a pan-European scale regarding an excess of inflexible generation for the coming summer period. However, a localization of potential excess energy is identified in the region Belgium, The Netherlands and possibly Germany.

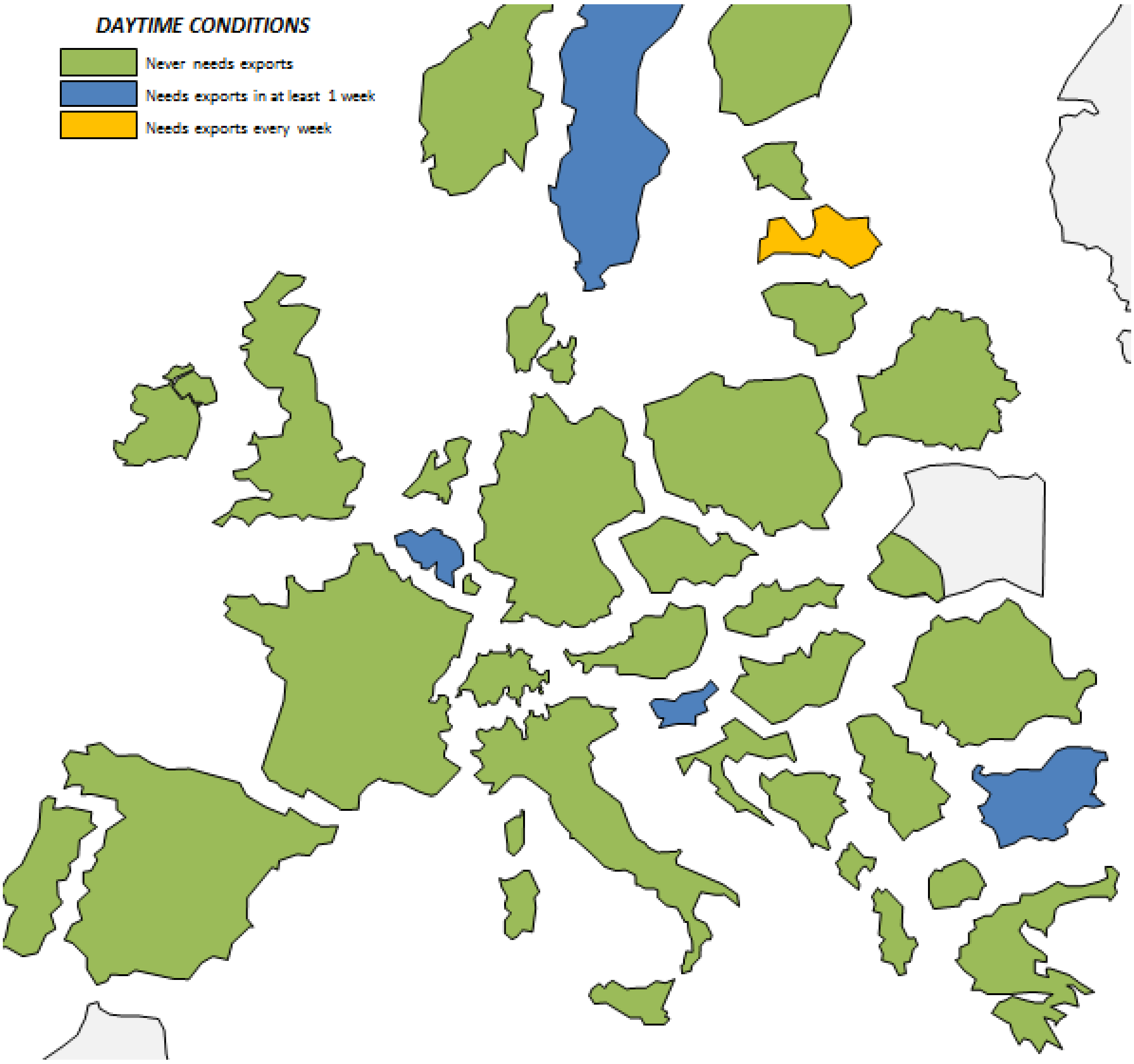

FIGURE 2: OVERVIEW OF THE EXPORT NEEDS FOR THE DAYTIME SCENARIO

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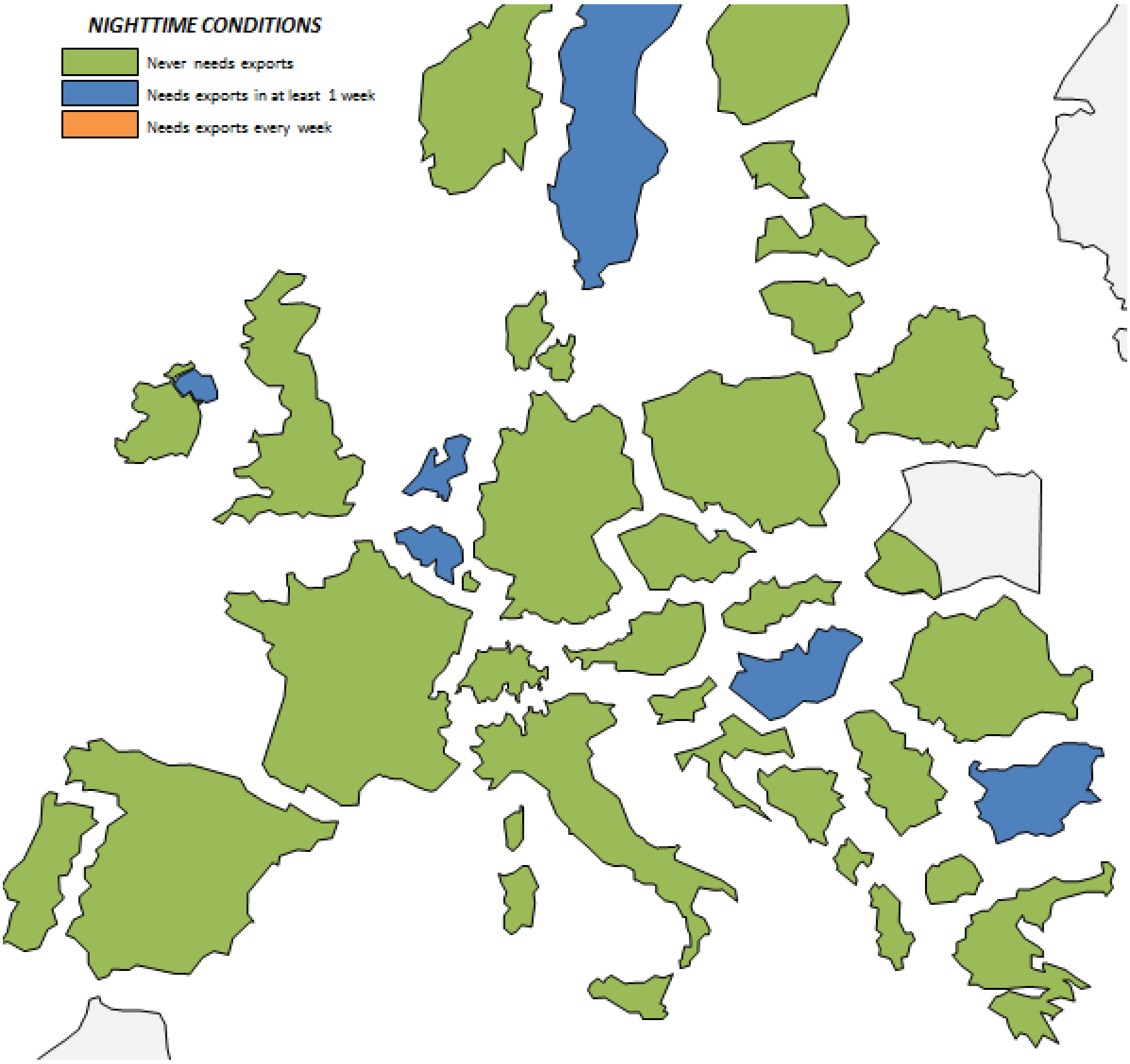


FIGURE 3: OVERVIEW OF THE EXPORT NEEDS FOR THE NIGHTTIME SCENARIO

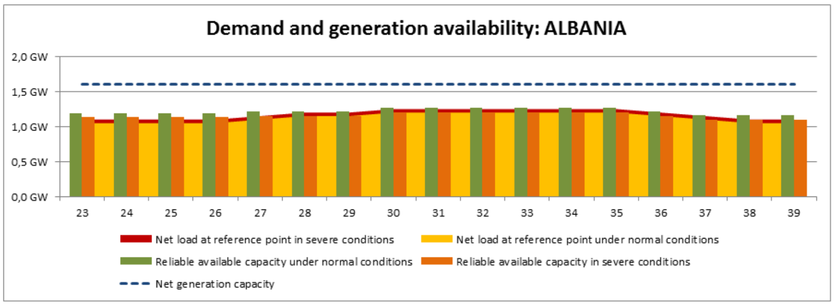
6 COUNTRY LEVEL

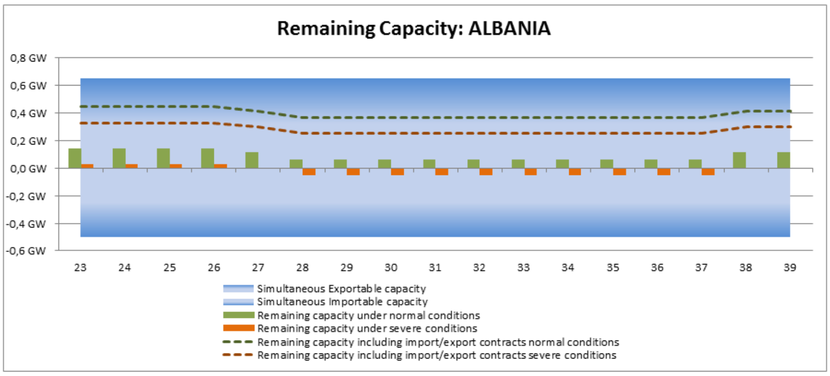
6.1 INDIVIDUAL COUNTRY RESPONSES TO SUMMER OUTLOOK

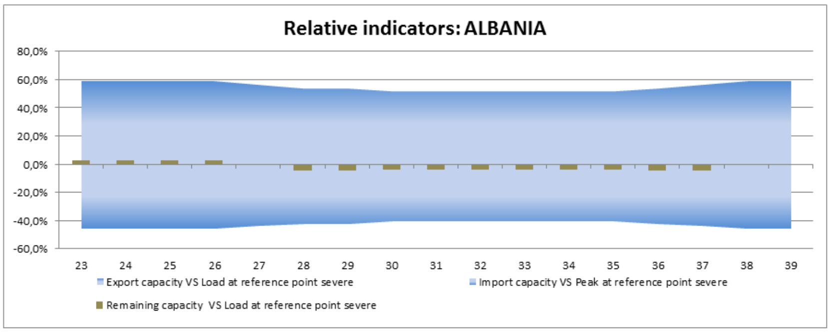
ALBANIA

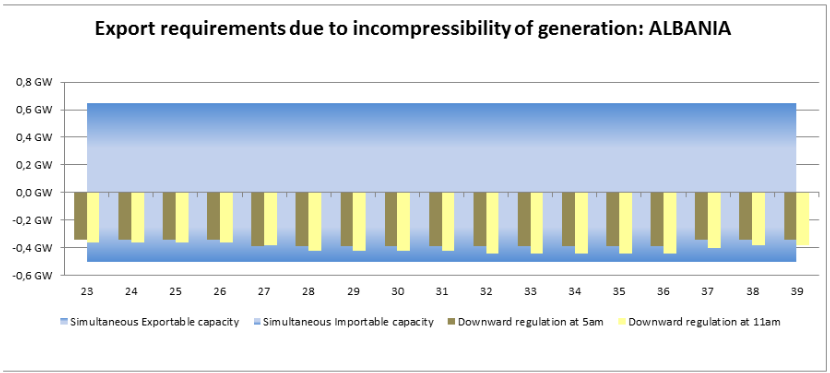
Synopsis

Taking into account the firm import contracts for this year, we do not anticipate significant balance problems in the Albanian Power System during the approaching summer period. In case of facing problems with unexpected high temperatures associated with increasing of demand, and potentially low inflows at Drin River Cascade, it will be requested to increase the import volume using the availability of interconnections. Our system is usually dependent upon imports of electricity, and it will be dependent upon imports also for the coming summer period. Physical imports are expected on 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/export capacity for the coming summer is approximately 500 MW. The simultaneous import and export capacity was obtained by adding the average NTC-values of all borders and multiplying this sum with a simultaneous coefficient of 0.7. The transfer capacities of imp/exp indicated in the worksheet represent about 60% of real transportable capacity that is calculated monthly for each border in collaboration with neighbouring TSOs, and afforded by monthly auctions. Available cross border capacity allows compensation of eventual energy deficit and transit of energy for successfully functioning of electrical market. The most of maintenance works in generation and transmission system are concentrated in the period of April – May and September – October, when the demand is relatively lower. The level of remaining capacity considered as necessary in order to ensure a secure operation for the next summer is around 100 MW. In Albania there are not yet intermittent energy sources like wind or solar, to be taken into account in our assessment. Distribution System Operator (DSO) which also holds the license for Retail Public Supply (RPS) has already concluded import contracts with traders, yearly based for 300 MW. This is the reason that in the worksheet we have not indicated the exporting countries, although the firm import contracts are in place. Under these conditions all criteria for the system adequacy will be met.









General situation

Most of the maintenance works in generation – transmission system are performed during summer period from April till October. The most critical period remains during months of July and August, depending from the temperatures, and due to that, the maintenance schedule of units and transmission elements is set to minimum. This period is also characterised by low hydro levels. Unfortunately, Albania has not TPP with gas and fulfilment of our needs for covering the demand is based on the electricity imports.

Most critical periods

The most critical period lays on months of July and August, depending from the weather conditions, due to strong relation between temperatures and electricity consumption. Based on the experience of last years, the most critical weeks are from 28 till 33.

Expected role of interconnections

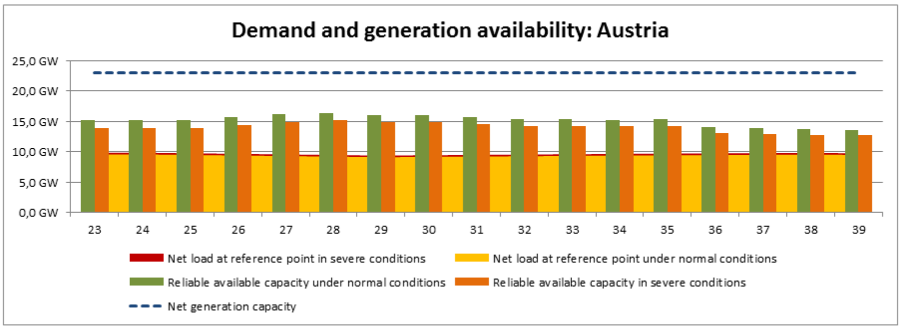
In general the interconnections are sufficient for fulfilling the need of electricity imports, and also for exports if it will be the case, and they are used as well for transits, mainly towards Greece. The maintenance works of the interconnectors is arranged to be in the period of April – May and September – October, when the demand is relatively lower, also in the neighbouring TSOs, thus the adequacy level will be maintained.

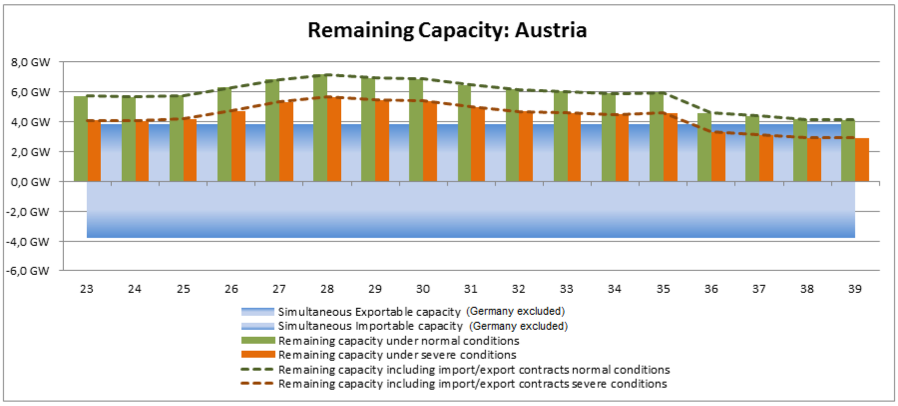
The export capacity of our interconnectors normally is around 600 MW, and on the other hand, Albania has not yet inflexible generation, thus it is not expected to have any problem with demand minimum periods.

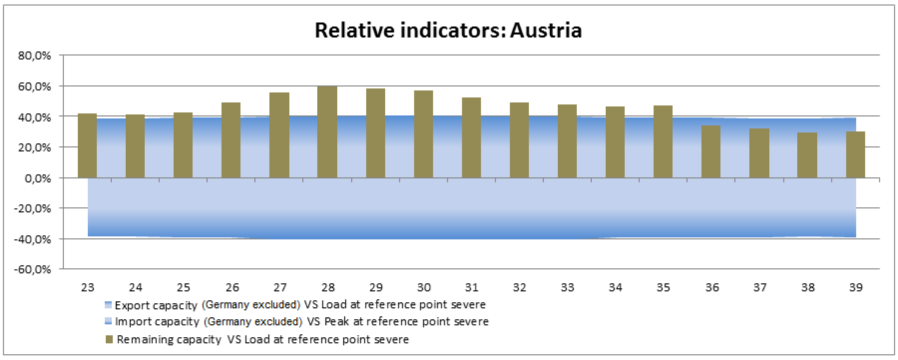
Framework and methodology of the assessments

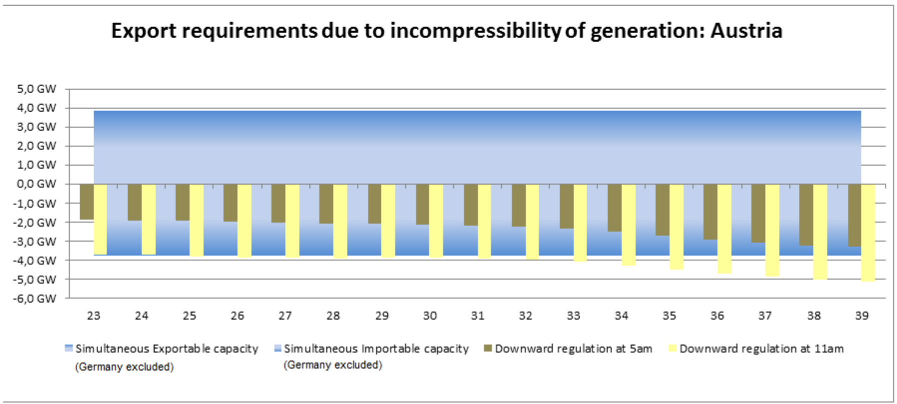
According to the Grid Code, OST's regular operation planning horizons are: year (Annual Operation Study, AOS), month, week and day. The AOS is based on a model combining stochastic and deterministic approach, and make use of information provided by grid users. In medium and short term, OST conducts studies 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 hydro-levels, demand and/or the availability of the power plants. The monthly peak load is calculated for both normal and severe conditions. The severe demand scenario is built considering a temperature higher by 5°C than the season normal temperature that is of about 30°C. A statistical approach is followed based on recorded hourly load and temperature data covering the period of last 10 years. The dependency of the load on the temperature averages to 10 MW/°C, and the load for severe conditions, in the assessment, is increased with 50 – 100 MW mainly in the period of July – August. In this assessment, the thermal power of 90 MW, is put at non-usable capacity due to information from generation company KESH-Gen, that intend to use it only in case of a very dry period.

AUSTRIA


Demand and generation availability: Austria
25,0 GW
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity (Germany excluded)
Simultaneous Importable capacity (Germany excluded)
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
80,0%
60,0%
40,0%
20,0%
0,0%
-20,0%
-40,0%
-60,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Export capacity (Germany excluded) VS Load at reference point severe
Import capacity (Germany excluded) VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


Export requirements due to incompressibility of generation: Austria
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity (Germany excluded)
Simultaneous Importable capacity (Germany excluded)
Downward regulation at 5am
Downward regulation at 11am

General situation

Average temperatures are expected for summer 2013. No increase of load is expected compared to summer 2012.

Most critical periods

Due to economic reasons almost no thermal production units are available for congestion management measures in the summer period. For this purpose only storage power plants are available.

The most critical periods are in May 2013. During 3 weeks (starting 7th of May) two strong circuits between St.Peter and Ernsthofen are not available as these lines along the Danube River will be empowered to 400kV. In order to have additional congestion management measures during this critical period of time APG contracted around 400MW of thermal power capacity that can be activated quickly.

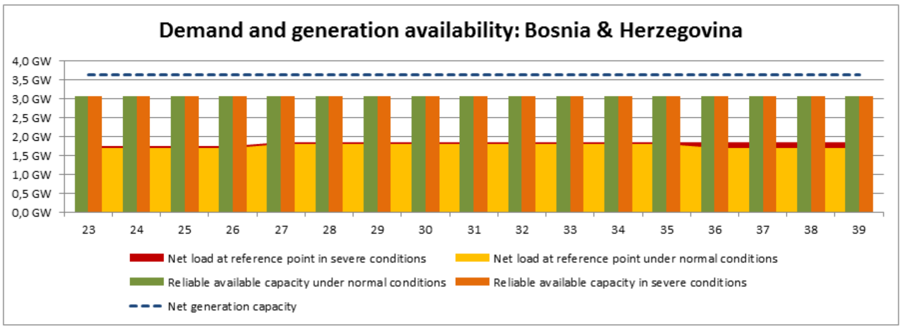
Framework and methodology of the assessments

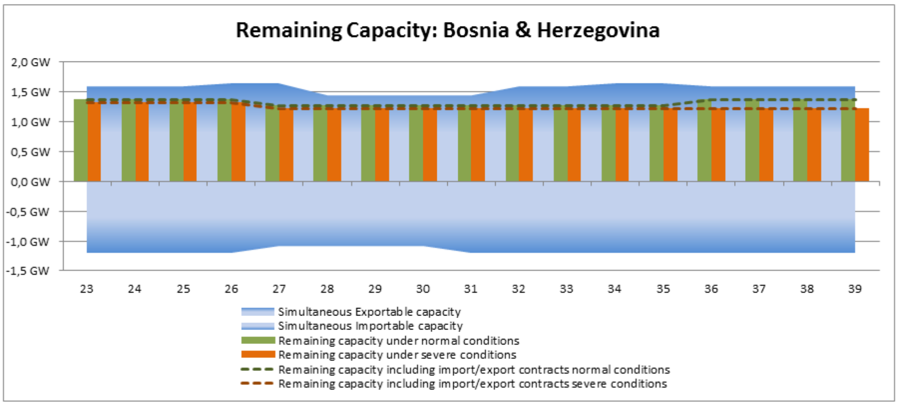
The calculation of load is based on monthly available data for the 3th Wednesday 11h 2012. No increase of load is expected under normal conditions. Under severe conditions an increase of 3% is expected compared to summer 2012.

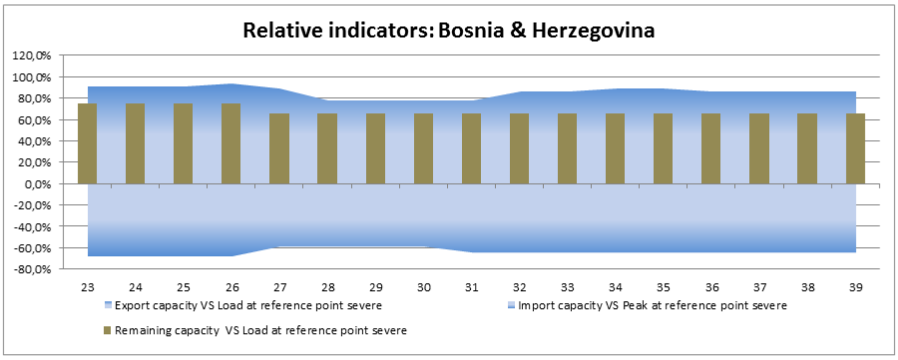
Pump storage power plants are considered as reliable available resources.

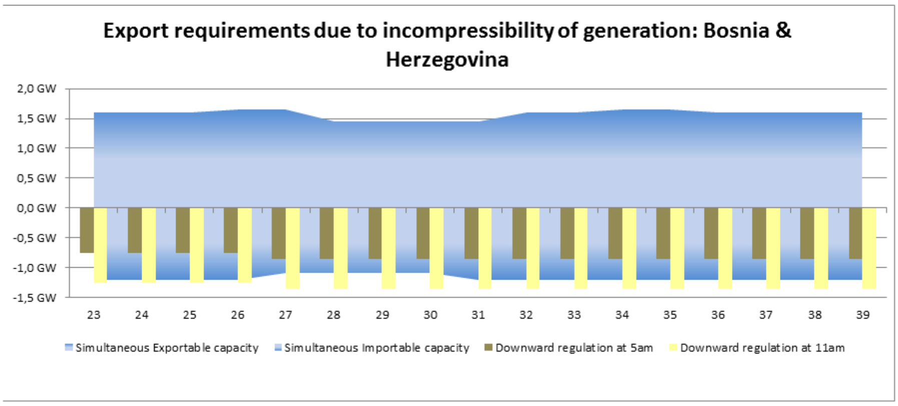
Even though thermal units will not be available for congestion management measures they are considered as fully reliable available capacities in terms of adequacy calculation.

BOSNIA & HERZEGOVINA

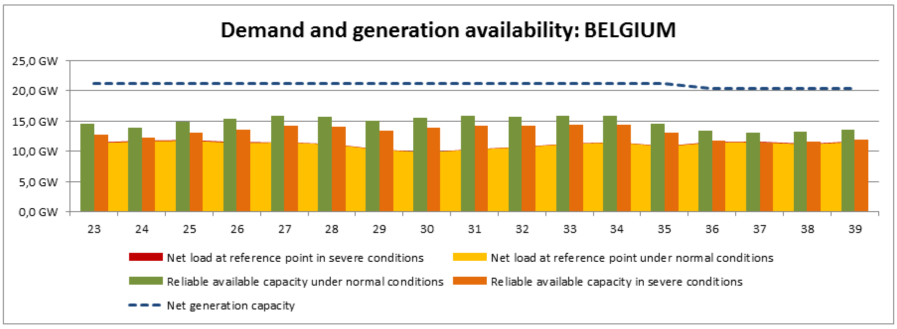


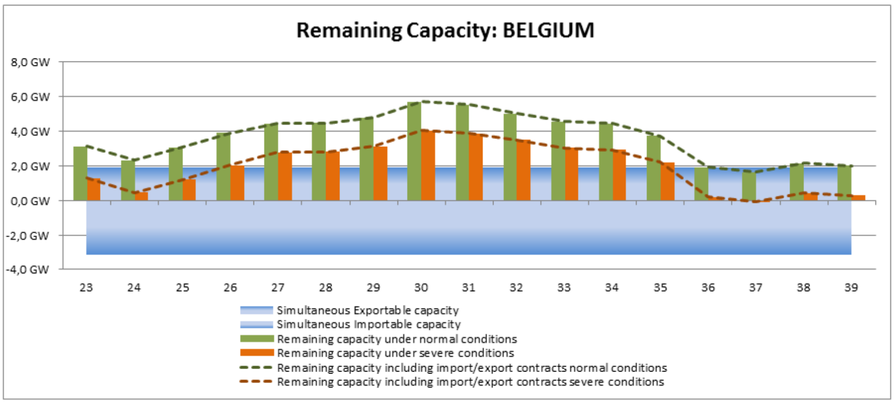


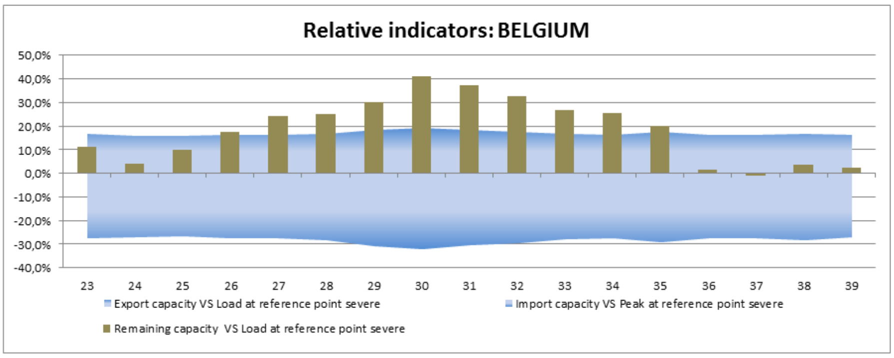


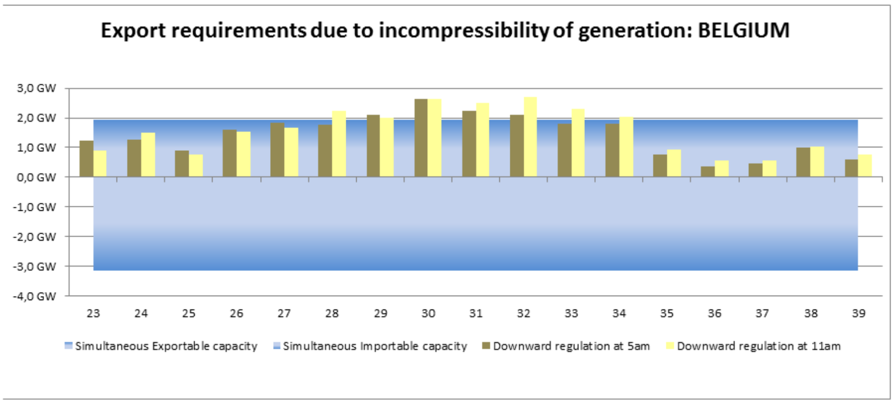


BELGIUM


Demand and generation availability: BELGIUM
25,0 GW
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
8,0 GW
6,0 GW
4,0 GW
2,0 GW
0,0 GW
-2,0 GW
-4,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
50,0%
40,0%
30,0%
20,0%
10,0%
0,0%
-10,0%
-20,0%
-30,0%
-40,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
3,0 GW
2,0 GW
1,0 GW
0,0 GW
-1,0 GW
-2,0 GW
-3,0 GW
-4,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Synopsis

Elia's summer outlook will heavily depend on whether and when the 2 currently stopped nuclear units (Doel3, Tihange2) of 1000 MW each will return in service. The latest official information reports a possible return of these units in June.

For the coming summer, no large issues are expected concerning the generation-load balance for upward regulation for Belgium under normal or severe conditions. However, at certain moments in time and depending on the previously mentioned situation, Belgium might have to rely on structural imports from neighbouring countries. Under normal circumstances importing the predicted amount of energy should not be an issue. In case of exceptional climatic conditions (e.g. extended periods of dry and hot weather) the available generation capacity could decrease significantly. If these circumstances occur, the safety level might be affected.

On the other hand, the probability of experiencing significant levels of excess inflexible generation is quite high. To mitigate this risk, Elia has implemented mechanisms to give the right market incentives in case of such a situation.

General situation

Traditionally, the level of maintenance on generation units scheduled during the summer period (especially July and August) is rather limited. However, there is still uncertainty regarding the unavailability of the two nuclear units that were shut down last summer. This decision will especially impact the downward adequacy assessment (i.e. an excess of inflexible generation), as the return of those units would inject 2000 MW of additional inflexible generation into the Belgian system. In the submitted quantitative data the return of those nuclear units was included as this reflects the latest official information at our disposal. The mentioned energy surpluses for the downward regulation assessment therefore reflect the worst case scenario for the Belgian system.

No new units are scheduled for commissioning this summer period. On the other hand, multiple thermal units will be closed on September 1st, meaning a loss of about 800 MW of installed power in the Belgian system.

Most critical periods

The most important risk that is identified relates to issues with an excess of inflexible generation. Whether or not and when this situation will actually be experienced depends highly on the in-feed of renewables (especially wind & solar), the overall European situation governing the commercial exporting possibilities and the possible return of the two nuclear units.

Expected role of interconnections

The possibility to import and especially export energy is an important factor for the Belgian system. Regarding imports to cover the need of additional energy, it is not expected that - from a generation adequacy point of view - high levels are needed to maintain system security during summer. The real-time exchanged energy is however dependent on the market situation, and can therefore be completely different from the strictly theoretical necessity of importing energy for maintaining generation adequacy.

On the other hand, should the specific situations mentioned above materialize, significant levels of inflexible energy would need to be exported out of the Belgian system, indicating a high use of the available exporting capacity.

Framework and methodology of the assessments

The desired safety level under standard conditions for the generation-load balance regarding upward regulation is reached during the whole summer period, for the 12:00 time of weeks 23 to 39 of 2013. The lowest remaining capacity in normal conditions is foreseen for September 11th 2013, namely a remaining capacity of 1.62 GW. This minimum is mainly due to the combined announced overhaul of several units, the closure of thermal units at the start of September (ca. 800 MW) and the decreasing levels of renewables in-feed. Important to note is that, should both nuclear units of Doel and Tihange that are unavailable since last summer remain unavailable for the summer period, the announced margin will decrease with 2000 MW (not including the impact on currently planned overhauls which might be cancelled in this situation).

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 and the DSO grids. The average outage rates of generation units were estimated based on historical data for the Belgian production park. Currently, load management under the form of interruptibility contracts is only available in normal circumstances for providing part of the manual Frequency Restoration Reserves, and these are therefore not included in the reported margins. Regarding the forecasted load, a structural increase of 0.61 % with respect to previous summer's load is assumed.

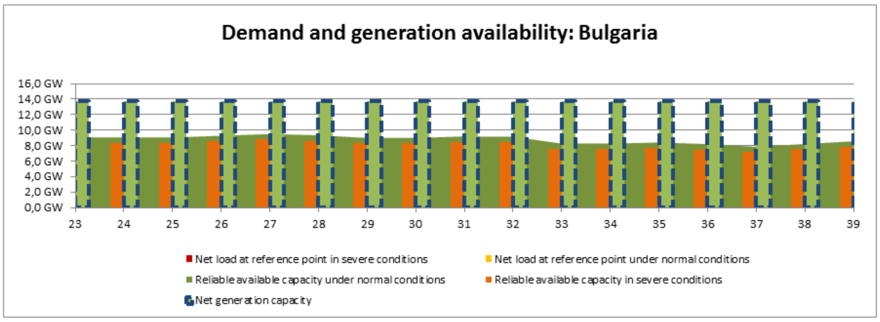
If an additional variation of 5% of the net generation capacity is taken into account to cope with severe variations of load and generation, margins will decrease significantly, resulting in a minimum remaining capacity which drops to -0.10 GW for week 37. Therefore, in this period and in case of severe conditions, net imports may be necessary to cover the Belgian load depending on the situation of the two nuclear units; which should not be an issue as long as there is no lack of energy on a European scale.

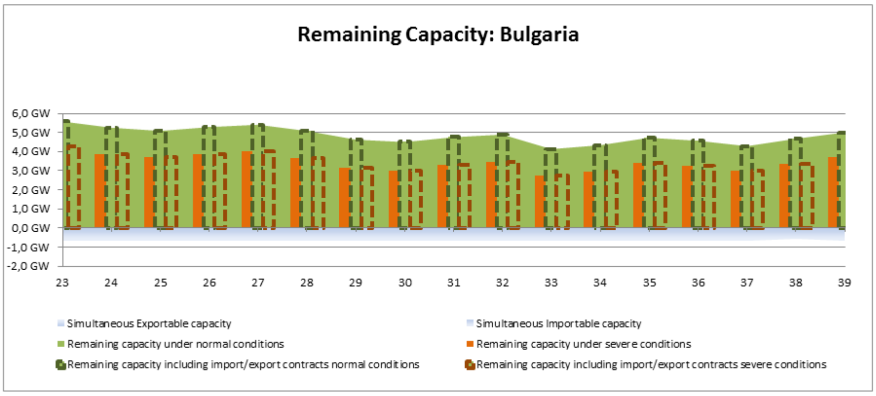
In case of exceptional climatic conditions (e.g. extended periods of dry and hot weather) the available generation capacity could decrease even more significantly. If these circumstances occur, the safety level might be affected.

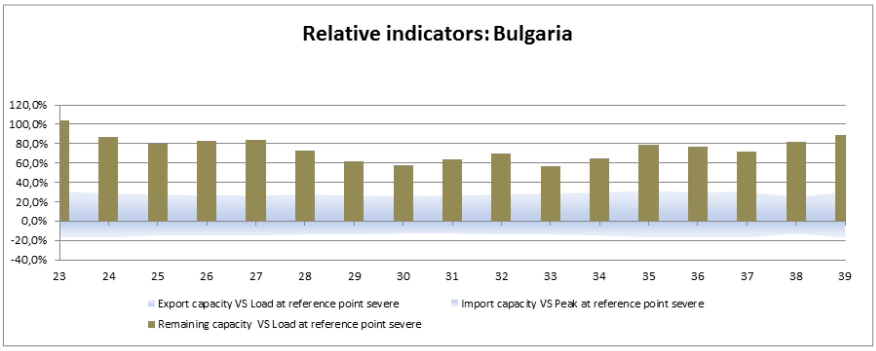
BULGARIA

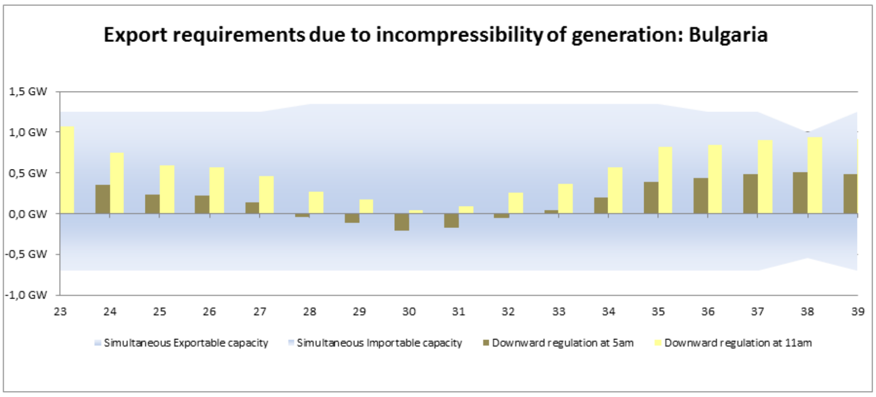
The high level of penetration of RES (mostly photovoltaic) combined with the low demand and the unusually low exports have become a pressing concern lately. The favourable weather conditions and the political and economic state of the country have led to a boost in

RES production and an overall drop in demand. Significantly reduced export quantities are another negative factor. If the status is kept this way the Bulgarian TSO might face.









Switzerland

Synopsis

Using the adequacy method, there are no periods of risk, and despite their continuous development, renewables still play a marginal role. Switzerland's strong interconnection with its neighbours also provides renewables transport capabilities.

Most critical periods

No weeks are considered as critical.

Expected role of interconnections

Interconnectors are vital for importing and exporting, as the Swiss balance varies strongly on a daily, weekly and yearly basis, not in order to maintain adequacy, but for commercial reasons.

Framework and methodology of the assessments

1. The requested data change very often. As you ask this from all ENTSO-E countries, the risk of misunderstandings is quite high. Therefore you should only change the requested data every other year.

2. outage rates based on statistical values, the same for both scenarios

3. the simultaneous NTC values were estimated (we didn't use the classical NTC values, because they are calculated bilaterally without taking other borders into account)

4. not relevant

5. not relevant

6. not relevant

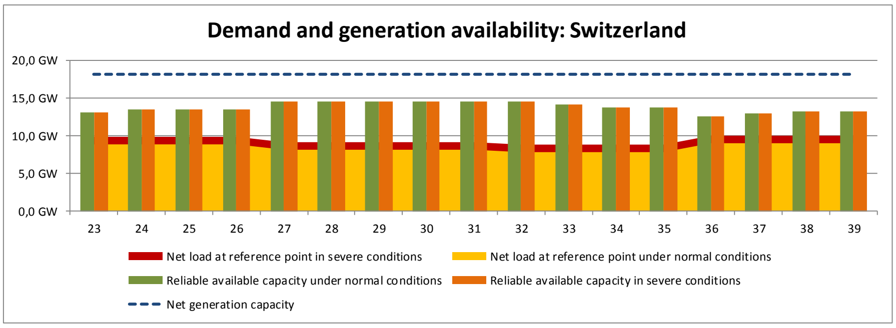
7. not relevant

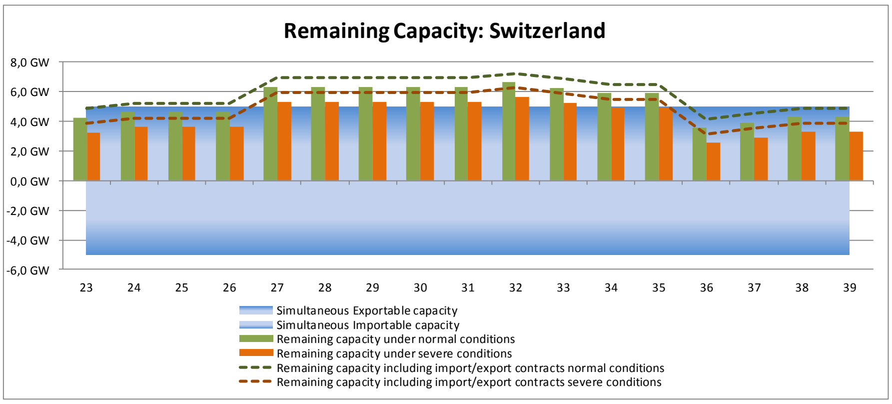
8. No.

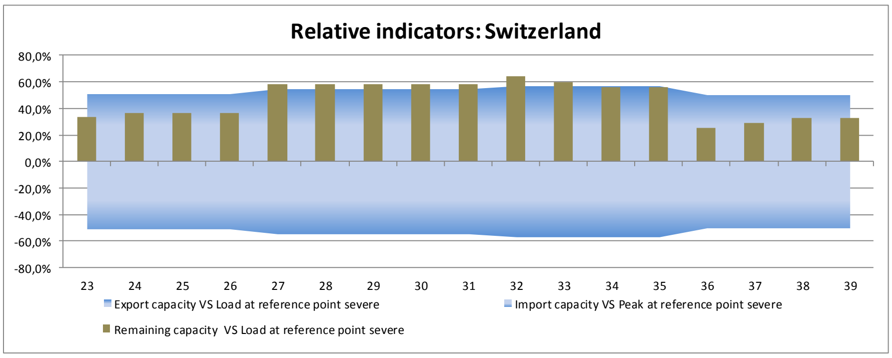
9. No.

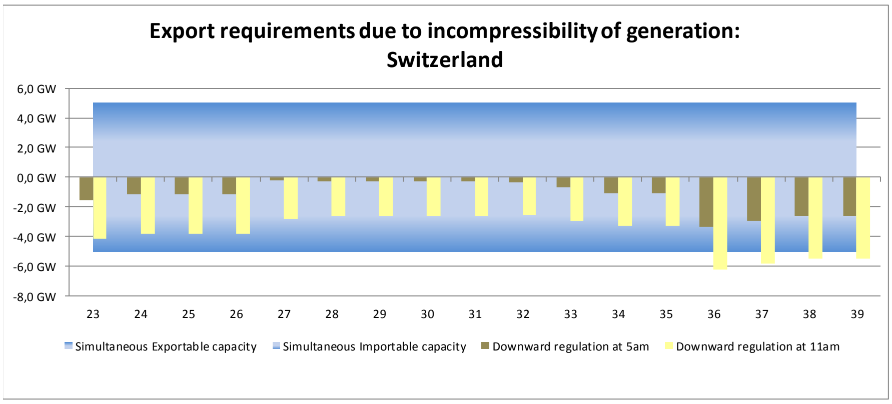
10. long term contracts

11. No.

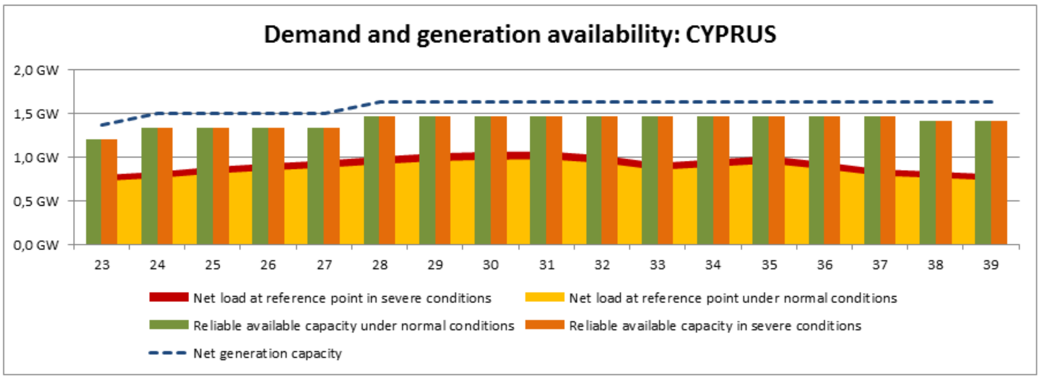

Demand and generation availability: Switzerland
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

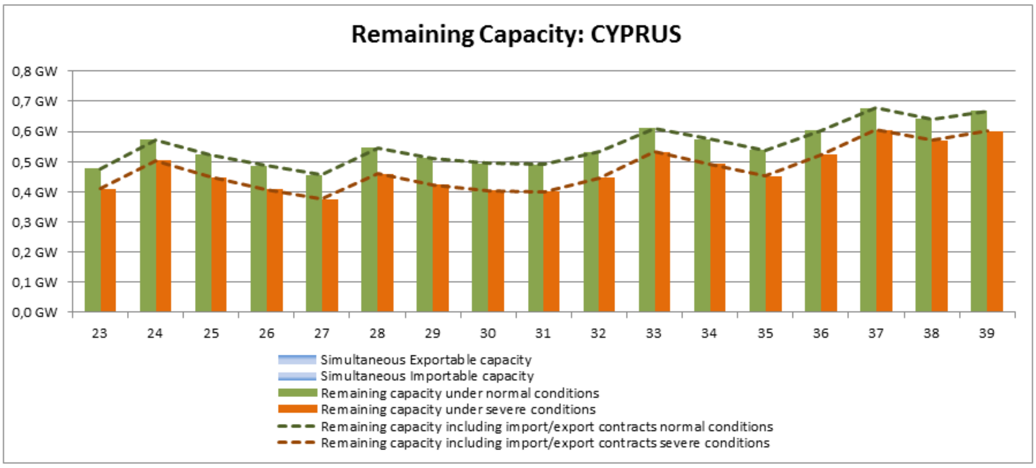

Remaining Capacity: Switzerland
8,0 GW
6,0 GW
4,0 GW
2,0 GW
0,0 GW
-2,0 GW
-4,0 GW
-6,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

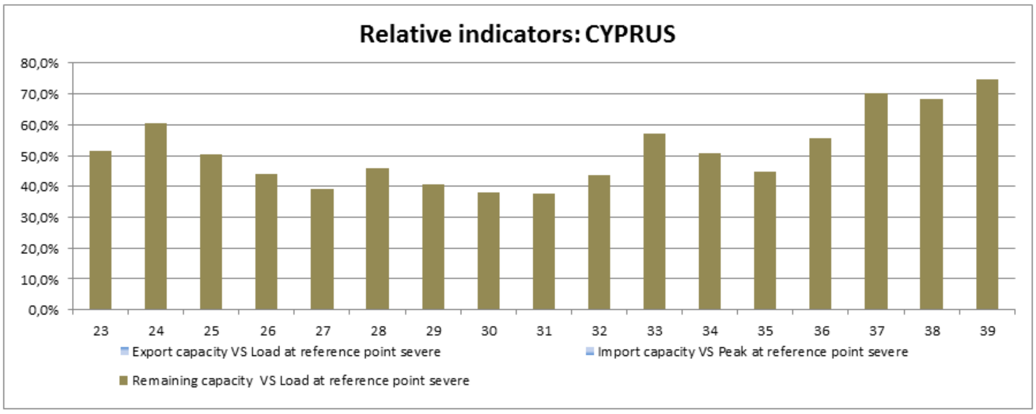

Relative indicators: Switzerland
80,0%
60,0%
40,0%
20,0%
0,0%
-20,0%
-40,0%
-60,0%
-80,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe


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
-8,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

CYPRUS







Synopsis

Following the loss of Vasilikos Power Station due to an explosion at a nearby naval base, in July 2011, the generation capacity in Cyprus was substantially reduced. This inadequacy has almost been restored. The effects of the economic crisis in the island, resulted at a reduction of the peak load demand at around 20%, as compared to the previous year. The generation capacity is at present adequate enough to cover the most critical periods of the year that occur during summer period.

General situation

During summer period, the unit generators maintenance is kept to minimum in order to have available all the generators for meeting the yearly peak demand.

Most critical periods

The most critical periods of the peak demand are expected to be week 30-32 of 2013. However, no generator capacity adequacy problems are expected.

Expected role of interconnections

Cyprus is an isolated system and therefore this aspect is not applicable.

Framework and methodology of the assessments

The load forecasting is carried out considering a reduction of the order of 20% as compared to the demand of the previous year. This is a direct result of the economic crisis. National generation adequacy is reviewed on a weekly basis by taking into consideration the unit availability and the approved maintenance programme.

CZECH REPUBLIC

Synopsis

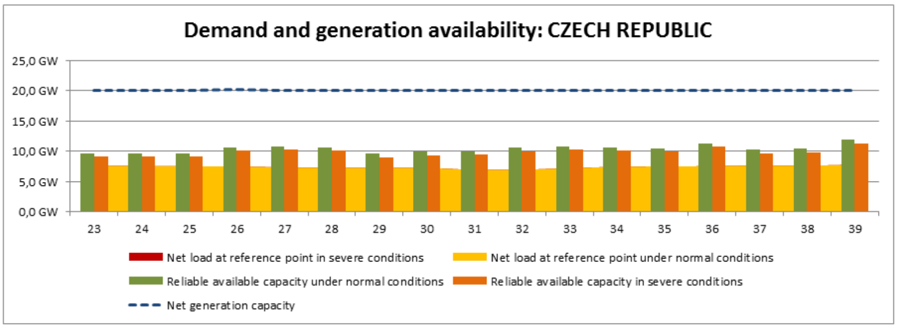
Availability of generation capacities and expected load is adequate during whole summer period. Load scenario is based on continuing stagnation of the electricity consumption in CR. In power balance we included commissioning of new generation capacity. For this reason it was reserved sufficient range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

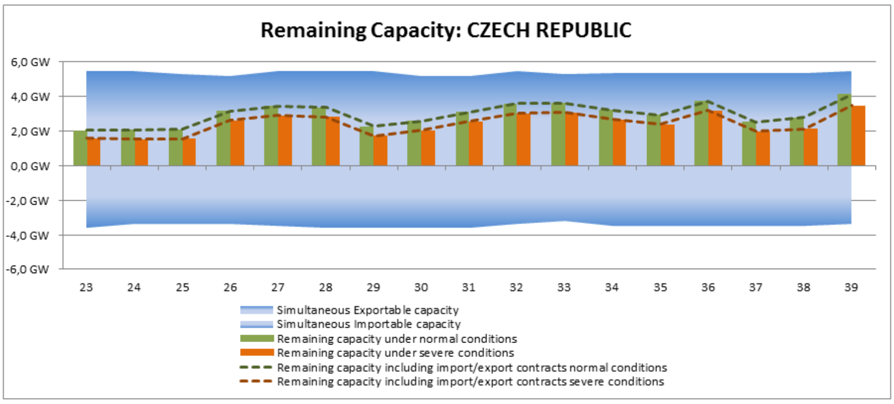
General situation

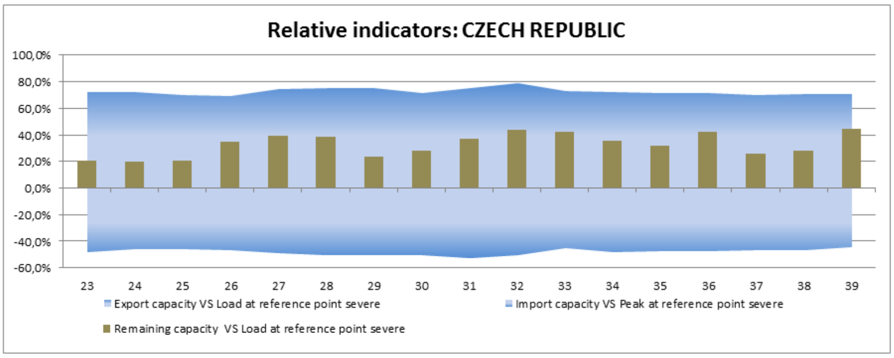
Level of generation capacity maintenance is in accordance to the standard revision plans. Therefore we don't expect during the summer period any problems with limited availability, excluding standard revision 325 MW of pump storage unit in July. Hydro inflows in reservoirs are calculated at 50% probability and we do not expect any congestion for run of river power plants production. Production of gas power plants is in summer limited due to the low market prices. Therefore usage of gas storage capacity has very low sensitivity to new commissioned generation. Gas power plants in Czech Republic are prevailingly used for peaking or regulation reserves.

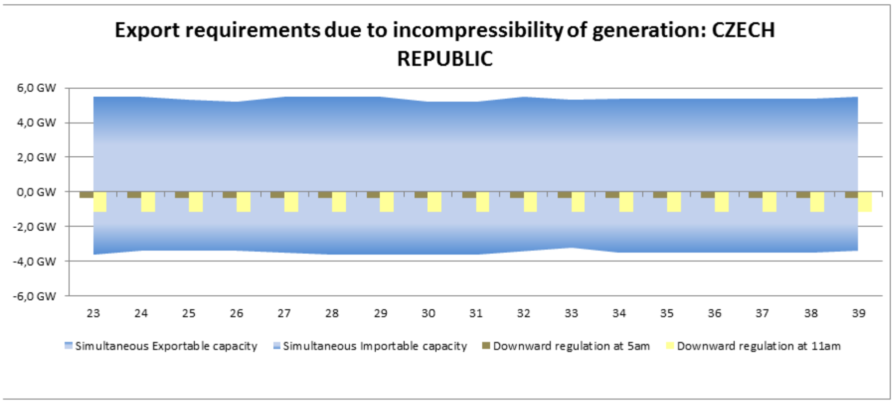
Most critical periods

Yearly load minimum can be considered as a most critical period in summer. Based on the load prognoses in normal weather conditions it is expected in week 31-32. To avoid excess of inflexible operation during this period has been taken relevant measures to reserve sufficient volume of ancillary services especially for the downward regulation (MR-) focusing on weekends and off-peaks. Exports in this period will create necessary condition for the operation of generation units with adequate regulation range.









Expected role of interconnections

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

Additional transit (export or import) possibilities are low especially in situations with sudden power balance changes. Based on this remaining capacity on the interconnector is maximally utilized to maintain excess of inflexible generation and with particular constrains on weekends and public holidays in summer period.

Framework and methodology of the assessments

We use methodology of ENTSO-E.

GERMANY

Synopsis

The common evaluation of the German TSOs gives an overview of the security of electricity supply for the coming summer 2013.

Compared to the last summer outlook reports the data basis for German adequacy evaluations has been expanded through the incorporation of available distribution system operator data (as in the last winter outlook report). This leads to an increase of both installed generation capacity and load as given in the data table. Hence these values are not directly comparable to previous summer outlook data.

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 shutdown of 5 GW nuclear capacity in southern Germany is still one of the topics that bother the German TSOs. The shutdown in 2011 still causes a regional shortage of available active and especially reactive power. This can lead to voltage problems during the summer. New power plant projects are delayed and some power plant operators have announced to examine the efficiency of their power plants which could possibly lead to a further decommissioning of generation units soon. Right now the problem is not so much a problem of capacity, but rather a problem of regional distribution of power plants in Germany.

RES are continued to be installed at great speed. For southern Germany this attributes largely to distributed PV generation. The installed capacity of PV generation in Germany is expected to reach about 37 GW in the coming summer. Due to this fast development the knowledge about actually installed capacity might be incomplete, which could lead to problems for the feed-in forecast. In the meantime, the German government has decided to stop subsidies for new PV plants when an installed capacity of 52 GW has been reached.

The shutdown of the nuclear power plants causes a shortage of available reactive power. In the frame of their extensive grid analyses, German TSOs have identified the risk of high voltages for scenarios of very low load combined with a high PV feed-in in Southern Germany. Thus, in the summer period the German TSOs may be faced with problems to meet (n-1)-security rules affecting the violation of permitted voltage limits. On the other hand, the voltage situation is expected to improve through extensive installation of further compensation equipment by the German TSOs that will be completed before summer.

Where long periods of high temperatures occur, heat crises are also possible. Sustained hot and dry spells could lead to problems with cooling water for major power plants.

If necessary, German TSOs expect to make use of the full range of topological and market related remedial actions.

German TSOs may be forced to cancel planned outages of network elements due to conditions worse than anticipated, especially if important nuclear power plants in southern Germany might trip. Topological remedies are prepared to remedy load flow problems or exceeding of operational voltage limits. Furthermore German TSOs are prepared to take re-dispatch measures, even on a preventive basis.

General situation

No specifics foreseen.

Most critical periods

Specifically, the time around Whitsunday could be critical for voltage problems in case of low demand, no PV feed-in in the south of Germany but a moderate in-feed of wind energy, as described in the synopsis above.

More generally, a longer dry period could lead to problems with cooling water.

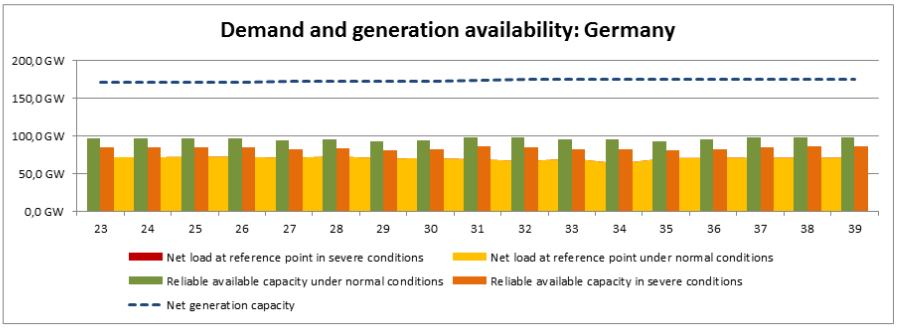
Expected role of interconnections

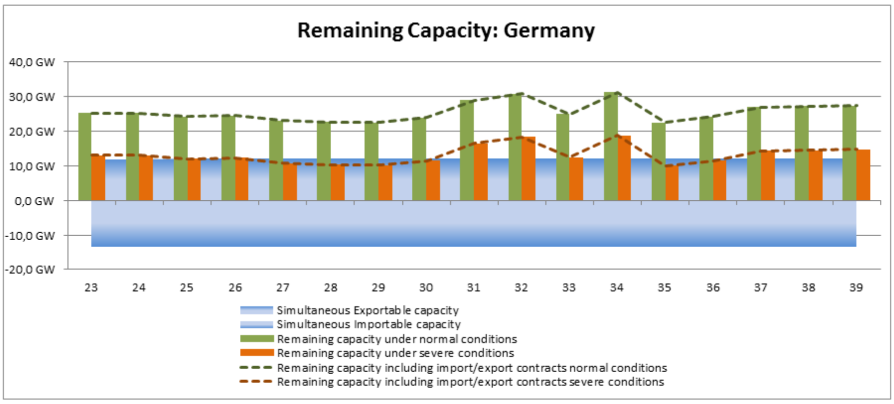
Due to the international expansion of the German Grid Control Cooperative the interconnectors are getting more important also for exchanging balancing power.

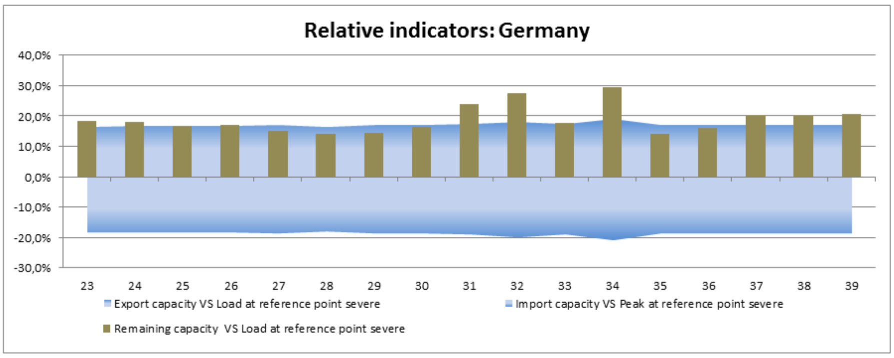
The interconnectors are getting more and more important to handle situations with a high renewable feed-in and a low regional (national) demand.

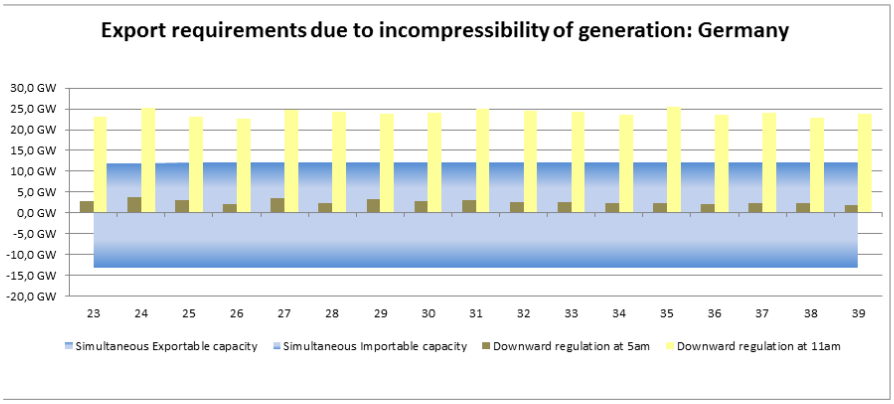
Framework and methodology of the assessments

The data base includes TSO-connected generation and available DSO-connected generation (see synopsis). Percentages of non-usable capacity are based on statistical evaluation of historical data.

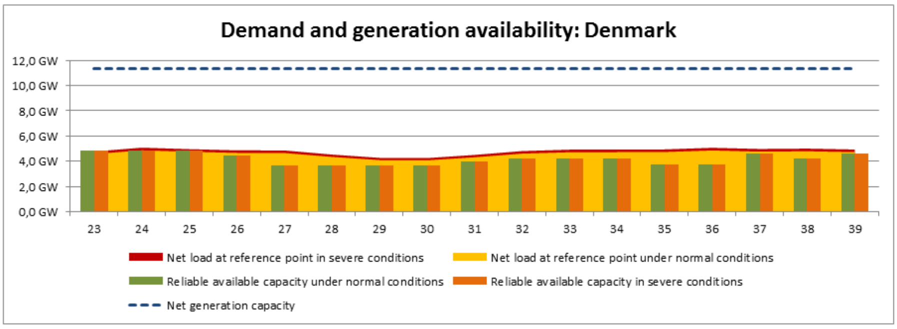

Demand and generation availability: Germany
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

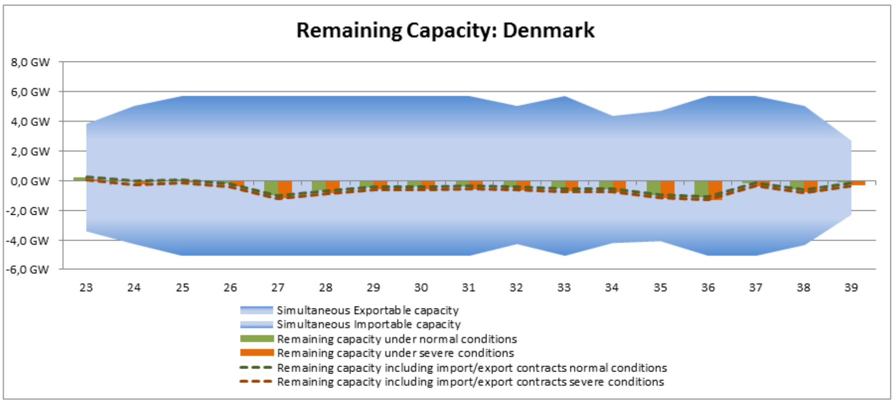

Remaining Capacity: Germany
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts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

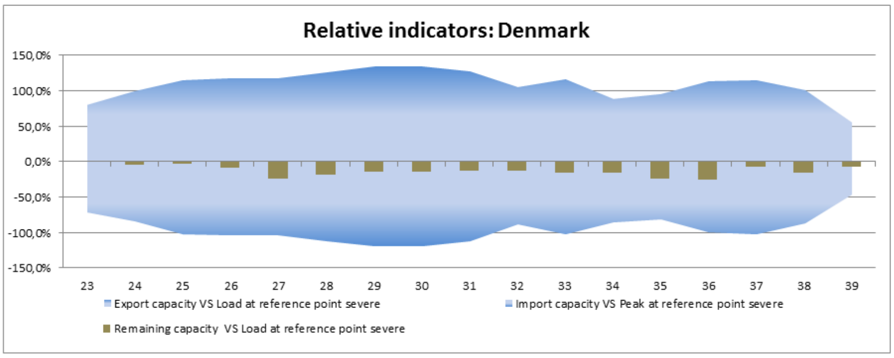

Relative indicators: Germany
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

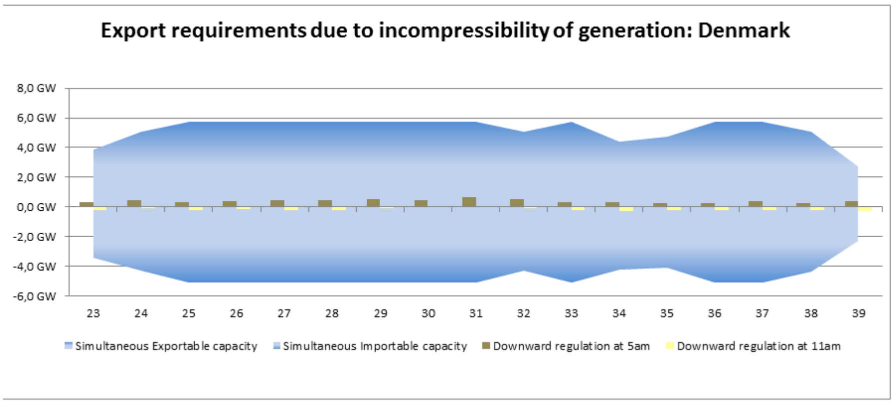

Export requirements due to incompressibility of generation: Germany
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

DENMARK


Demand and generation availability: Denmark
12,0 GW
10,0 GW
8,0 GW
6,0 GW
4,0 GW
2,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Synopsis

No Downward Regulating Reserve has been specified for Denmark. Energinet.dk has no such reserves. However - if down-regulation is necessary and no capacities are available at the regulating power market, the offshore wind can be curtailed.

Mothballed production units are not included.

General situation

The inspection and maintenance plan for the summer looks fine. There are no large-scale overhauls besides normal maintenance. No large-scale overhauls are expected on the interconnections to Norway, Sweden and Germany. Furthermore, the inspection and maintenance plans for the power stations look good, therefore, it is not expected that the power balance will be strained over the summer.

However, some projects may require some outage time. The project of constructing a new double 400kV interconnection from Kassø-Tjele continues over the summer. This may lead to a few disconnections causing constraints.

Furthermore, the 132kV section from Ishøj to Spanager is going to be renovated as a consequence of a new rail line. The renovation will commence in late summer.

At Zealand a new synchronous machine will be installed in May. The synchronous machine will help stabilising the transmission grid at Zealand.

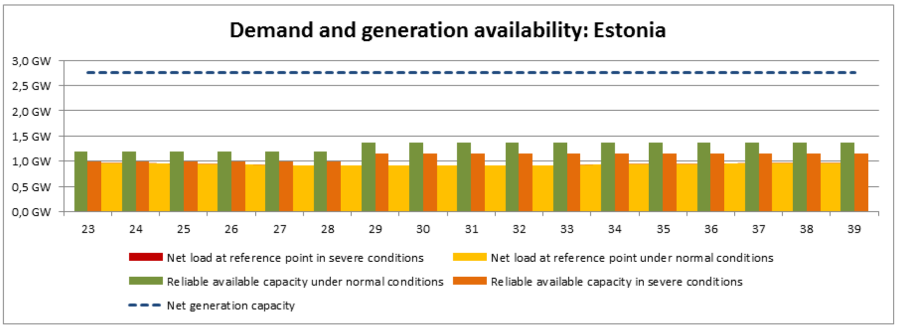
Framework and methodology of the assessments

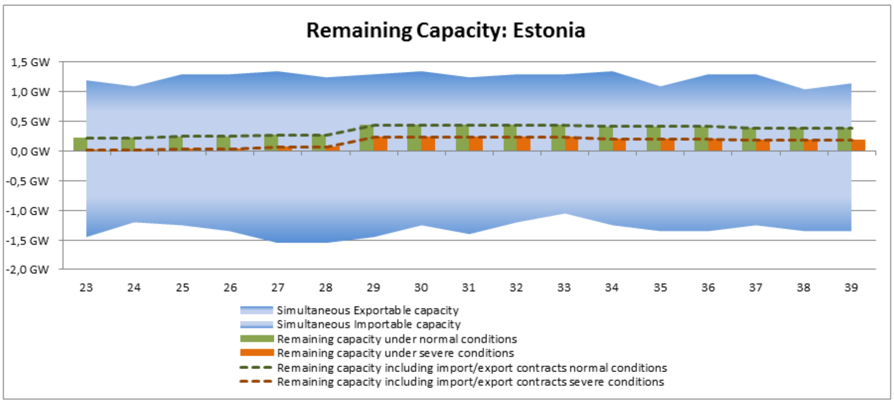
Capacities are taken from our national datasets.

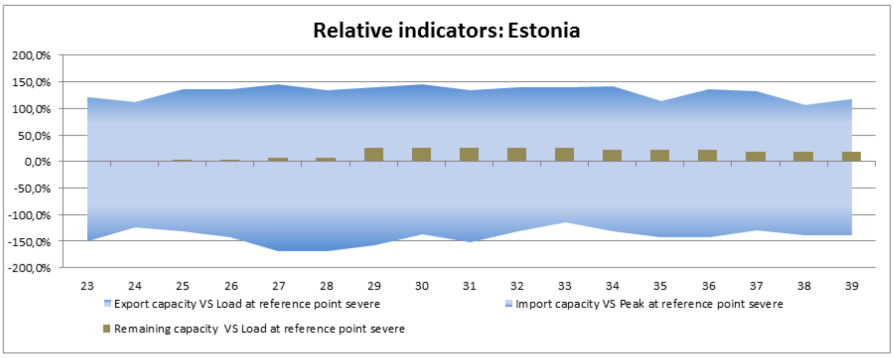
Restrictions on capacities (production and Interconnectors) are taken from NordPoolSpot.

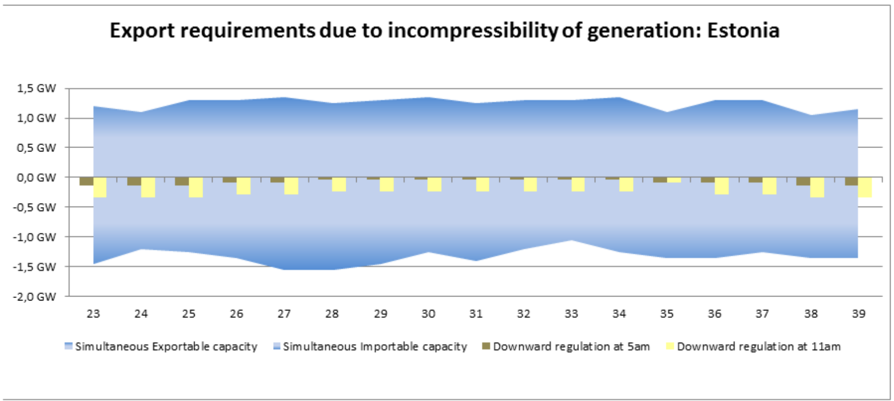
Load is taken from hourly market simulation model result.

ESTONIA


Demand and generation availability: Estonia
3,0 GW
2,5 GW
2,0 GW
1,5 GW
1,0 GW
0,5 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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: Estonia
1,5 GW
1,0 GW
0,5 GW
0,0 GW
-0,5 GW
-1,0 GW
-1,5 GW
-2,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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: Estonia
200,0%
150,0%
100,0%
50,0%
0,0%
-50,0%
-100,0%
-150,0%
-200,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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: Estonia
1,5 GW
1,0 GW
0,5 GW
0,0 GW
-0,5 GW
-1,0 GW
-1,5 GW
-2,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

General situation

During summer period there are lot of maintenance planned in transmission lines and also production unit. The situation with production capacities is expected to be better starting from second half on July. In case of hot weather condition and large energy deficit in Lithuanian and Latvian power system, there might occur some stressed period for Latvia and Estonia interconnection. In case of significant congestion in interconnection Estonia/Russia-Latvia transmission lines maintenances will be limited during the stressed period.

Most critical periods

There are expected some shortages of transmission capacity Estonia-Finland and Estonia-Latvia caused by renovations and maintenance of 330kV lines. In interconnection between Estonia and Finland there are expected to be large limitations in export capacity during week 22 and week 37. Also there is planned Estlink 1 yearly maintenance in week 23 and then the capacity in both directions is 0 MW. In interconnection between Estonia and Latvia there are expected to be numerous limitations throughout the summer, but the largest limitations are planned in September and at the end of August.

Expected role of interconnections

Due to energy deficit in Lithuania, it is expected that there might occur some congestion in Estonia-Latvia boarder, as it has happened in previous summers. In severe conditions counter trades between Estonia and Latvian TSO are made. For night time, when temperatures are lower capacity of interconnections can be increased and additional capacity can be given to the market in Estonia-Latvia cross-border.

The part of inflexible generation in Estonia is not that big to cause any problems, even at minimum demand periods.

Framework and methodology of the assessments

The statistics of last years are used for evaluating the outage rates and peaks loads. The NTC values are given considering the planned maintenances in transmission lines.

SPAIN

Synopsis

From the point of view of generation adequacy, there’s no detected risk situation in the Spanish peninsular system for the upcoming summer. Good generation/demand adequacy can be expected regardless imports from neighbouring countries. If average conditions are considered, remaining capacity will be over 18000 MW. In the case of simultaneous extreme peak demand, very low wind generation (less than 6% of wind installed capacity), drought conditions and a high thermal forced outage rate, assessed remaining capacity is still over 13000 MW.

The demand values have been still decreasing during 2013, after the significant drop that took place during 2011 and 2012, due to the economic and financial crisis. It is expected that the demand during 2013 will remain low, even with a slight further drop. The demand peak values expected for summer, with high temperature values and a probability to be reached of 3%, are 2 % lower than in 2012.

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

Generation-Demand Balance

Due to the high water inflows at the end of the last winter in Spain, the hydro reserves are over their average level. Nevertheless, 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 high amount of Spanish generation, being the installed wind power capacity about 20% of total generating capacity. For the assessing of the wind power generation under extreme conditions during summer, historical data were used. Wind generation assessed is around 5-6% of available capacity. Wind generation has been above this rate during summer periods with a frequency of 95%.

Solar energy is taken into account when calculating generation capacity for summer peak demand, given that installed capacity is higher than 6000 MW and summer peak demand values take place near to the peak demand. Solar generation considered is around 30 % of available capacity (95% when assessing the downward regulating capabilities).

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.

At minimum demand periods, with high amounts of renewable production, power surplus with spilling of RES can take place. In order to permanently keep balance and security of the system, the Spanish TSO has a specific control centre 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 Centre (CECRE) sends a new set point 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.

Most critical periods

The lowest remaining capacity at peak demand hours is expected to be met during the first weeks of the summer period, especially if high temperatures are reached. Nevertheless, there's not a risk situation or a low capacity detected.

Expected role of interconnections

Good generation/demand adequacy can be expected for peak demand hours regardless of imports from neighbouring countries. However, as pointed out before, the export capacity of interconnectors is a key factor in order to avoid curtailment of renewable energy.

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 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.

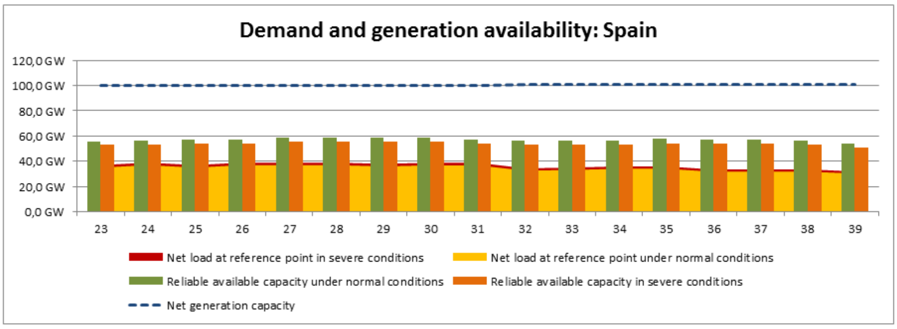
• Guaranteed fuel (gas) supply to combined cycle and gas thermal plants.

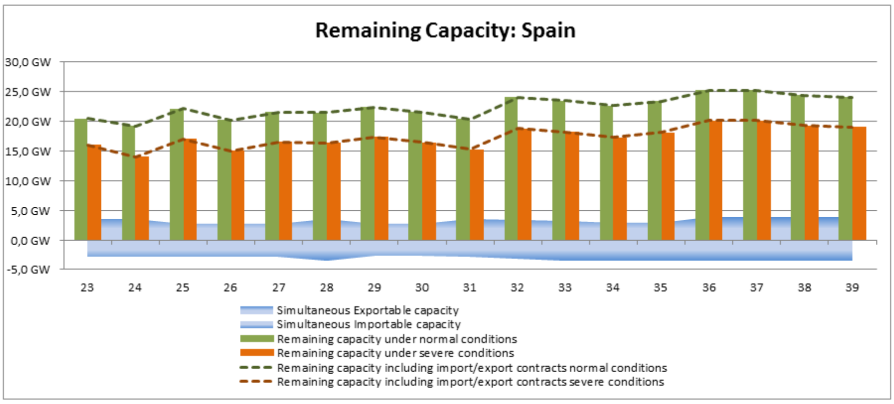
• Low wind conditions: wind generation considered is around 5-6% of available capacity. Wind generation has been above this rate with a probability of 95%.

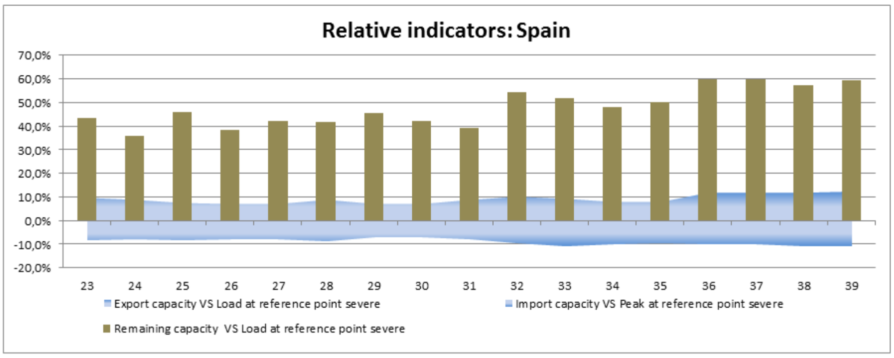
Extremely severe conditions for the system are simulated as:

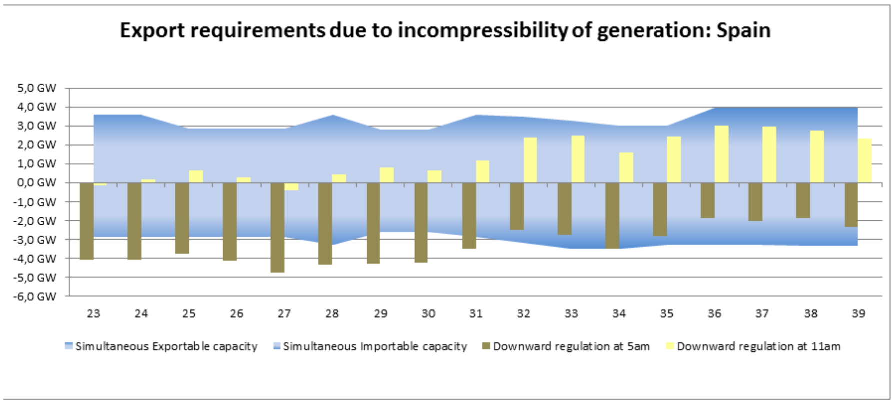
• Extreme demand due to severe weather conditions, typically very high temperatures

• No import capacity is considered in the study in severe conditions. So, it is not taken into account in the load – generation balance.


Demand and generation availability: Spain
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: Spain
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: Spain
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: Spain
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

FINLAND

Synopsis

Summer is not forecasted as a critical period on the Finnish power system. The typical peak load in summer is 60 to 70% of corresponding winter peak. On the other hand combined power and heat power plants (CHP), especially for district heating, produce remarkably less electricity than in winter. Furthermore, overhauls of thermal generation units are scheduled for the summer period decreasing the available generation capacity.

There are no changes to be expected during the coming summer compared to previous one. Both load and generation are estimated to remain at the same level as last year.

The remaining capacity is negative all the summer during high demand hours. The deficit is met with import from neighbouring systems.

Interconnections with Sweden and Estonia will export or import electricity depending on markets. Import from Russia is expected to continue during the summer season, the amount is defined by the prices. Total import capacity is sufficient to meet the needs. Maintenance periods result in capacity limitations in interconnections with Estonia and Russia. The necessary maintenance of interconnections with Sweden is carried out outside the summer period. The limitations will not risk the system adequacy.

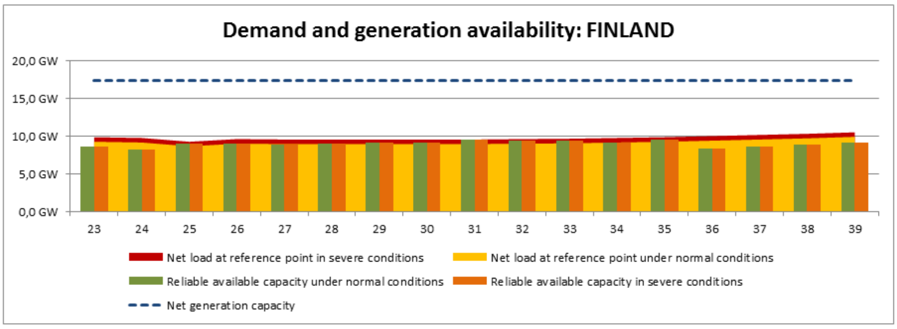
Most critical periods

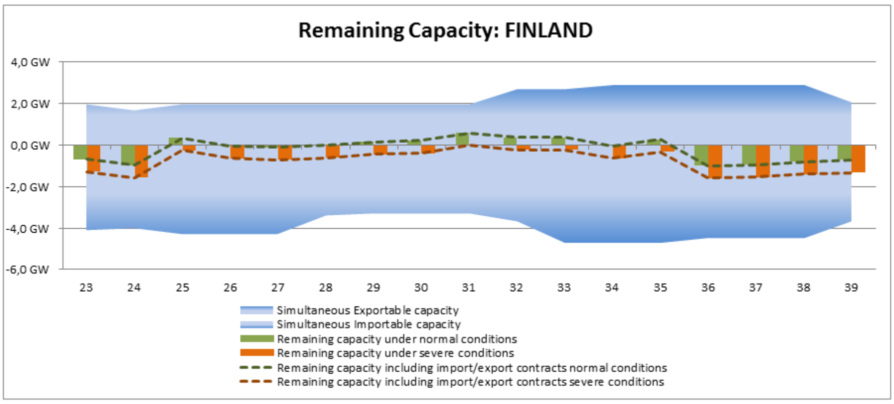
Most critical periods are the first and last weeks of the Summer Outlook period due to the maintenance of nuclear units. In addition the biggest coal-fired unit will have maintenance during the last weeks of the study period. Still, the import capacity is sufficient to meet this deficit and import is assumed to be available.

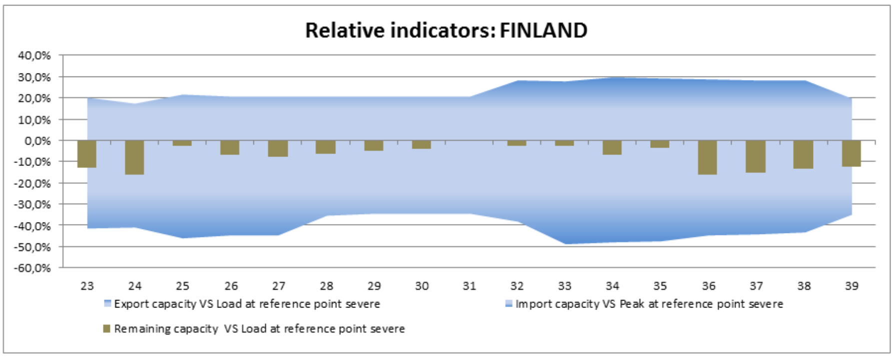
Expected role of interconnections

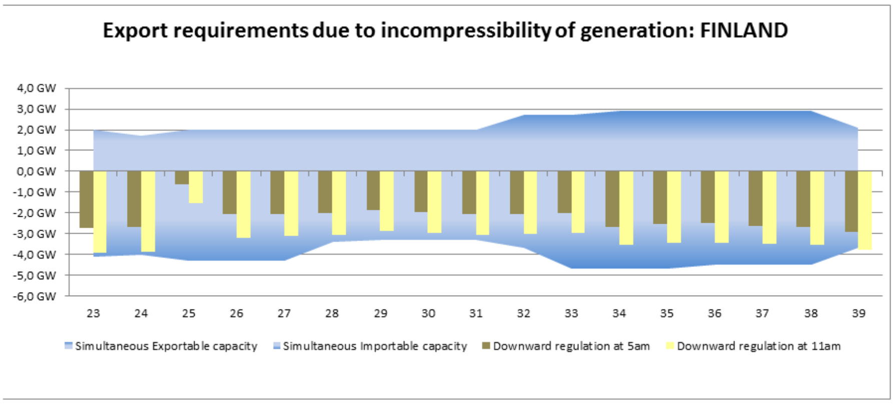
The remaining capacity is negative all the summer during high demand hours. This means that interconnections are needed during these hours. The import capacity is sufficient to meet this need.

Demand exceeds the must run generation even during the lowest demand hours. Hence, there is no necessity for export during low load hours.

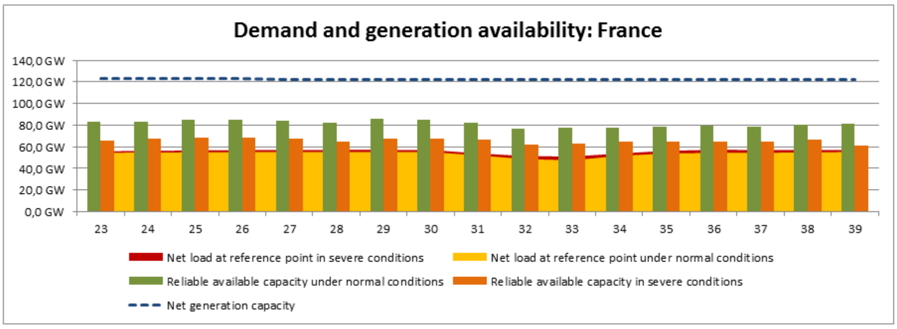

Demand and generation availability: FINLAND
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

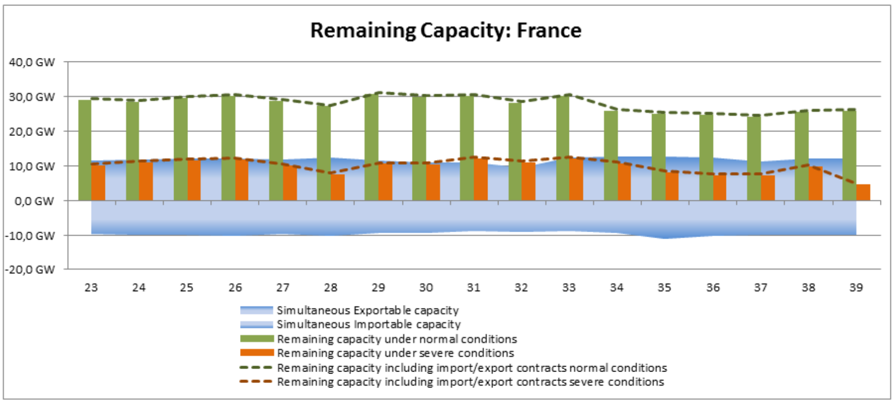

Remaining Capacity: FINLAND
4,0 GW
2,0 GW
0,0 GW
-2,0 GW
-4,0 GW
-6,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

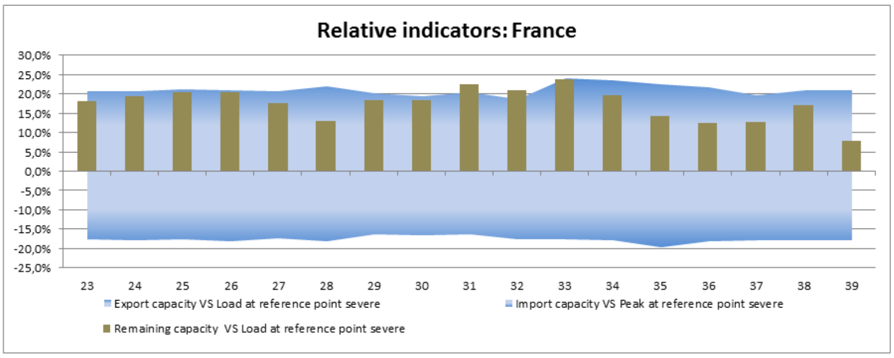

Relative indicators: FINLAND
40,0%
30,0%
20,0%
10,0%
0,0%
-10,0%
-20,0%
-30,0%
-40,0%
-50,0%
-60,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

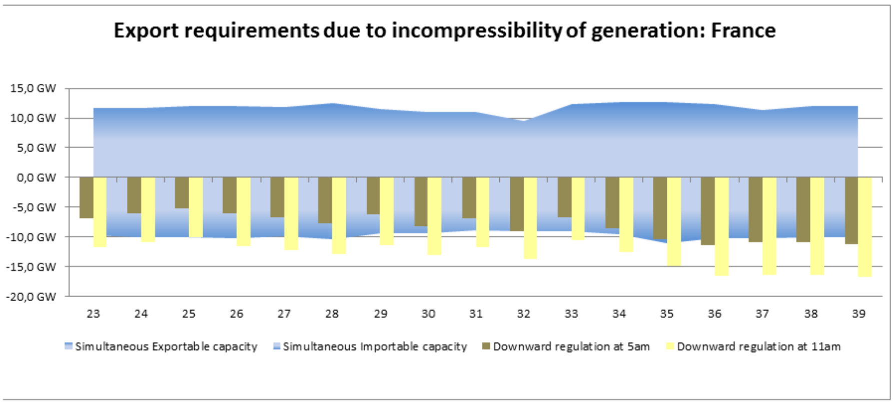

Export requirements due to incompressibility of generation: FINLAND
4,0 GW
3,0 GW
2,0 GW
1,0 GW
0,0 GW
-1,0 GW
-2,0 GW
-3,0 GW
-4,0 GW
-5,0 GW
-6,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

FRANCE









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Synopsis

The risk related to security of supply is mainly low in France this summer.

Mothballed plants (CCG) close to 3.5 GW could be decided by producers due to economic reasons. This new situation could generate local constraints in the south east of France.

General situation

The available generation is higher than last year. The hydro level is at the same level as last year.

From the week 23 to 31, the available capacity is up to 80 GW for a weekly peak load close to 55 GW. From week 32 to the end of the summer period, the available capacity is close 76 GW for a weekly peak load close to 55 GW.

Most critical periods

Regarding the remaining capacity during the period, there are no critical weeks. From the 34th week to the end of the period, the remaining capacity is less than 30 GW. The main explanation is the nuclear maintenance level (9 to 13).

Expected role of interconnections

We don't identify any risk of security of supply. As a consequence, the role of interconnector is to optimize the generation.

Framework and methodology of the assessments

Regarding the average outage rates, we modify the spread sheet in order to take into account weekly outage rate. Moreover the initial formula was false because the outage rate has to be implemented on the available capacity (and not on the installed generation capacity). As a consequence we indicate directly the volume of outage.

We mention in the line relative to firm contracts the volume of emergency agreement that RTE could exchange with other TSO. Please note that these agreements don't reduce the NTC.

GREAT BRITAIN

General situation

Positive margins between generation availability and peak normal demand are forecast to be adequate for the summer. Assuming normal demands there would be a slight erosion of operating reserve in some weeks of the spring, summer and autumn if there were normal generator breakdown rates, full interconnector exports and low wind conditions. Uncertainty is naturally higher (but manageable) around the output of wind farms and around the output of the stations which are expected to re-commission or continue commissioning during the spring and summer.

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Total generator availability has decreased over the last year. Grain (oil), Fawley (oil), Didcot (coal), Cockenzie (coal), Derwent (gas), Kingsnorth (coal) and part of Uskmouth (coal), have closed. This has been partially offset by increases due to new wind farm capability, Pembroke (gas), West Burton B (gas), the re-commissioning of Medway, Glendoe and Shoreham and the commissioning of the East West Interconnector. Demand levels are forecast to be similar to 2012 and still significantly lower than those experienced in 2005 - 2008. The net result is that margins are forecast to be adequate for the coming summer.

2013 sees the continuation of major works associated with the Transmission Investment for Renewable Generation (TIRG) works. This work, being carried out by the relevant Transmission Owners, is to construct or rebuild major sections of the transmission system in Scotland and the North of England, to deliver additional transmission capacity to transport energy from new renewable generation (wind) in Scotland. The network outages to undertake the work will reduce the available transmission system capacity and is being conducted in parallel with the ongoing connection of new generation. This brings forward the decarbonisation benefit of the renewable generators being connected, but means that it is likely that wind generation output will continue to need to be curtailed going forwards.

Expected role of interconnections

Our analysis on normal peak demand periods suggests that GB is unlikely to be reliant on interconnectors to maintain adequacy. Prices indicate a strong spread in favour of flows to GB across both IFA and BritNed throughout the summer. Further increases in renewable penetration on both sides of the interconnectors mean that flows will become more dependent on renewable output in short term timescales. We expect exports on both of the Irish interconnectors. Assuming normal demands there would be a slight erosion of operating reserve in some weeks of the summer if there were normal generator breakdown rates, full interconnector exports and low wind conditions.

Negative margins have been analysed during minimum demand periods and adequate margins are forecast assuming normal inflexible generation output and normal demand. Our minimum demand analysis suggests that interconnectors would not be needed to manage an excess of inflexible generation. Our analysis suggests that some imports could be accommodated with negative margins being maintained, however this analysis assumes that those wind farms which are flexible contribute to balancing supply with demand. If interconnectors were at float then the likelihood that wind farms would need to contribute towards balancing supply with demand would be small.

Most critical periods

There are no periods which are considered as most critical.

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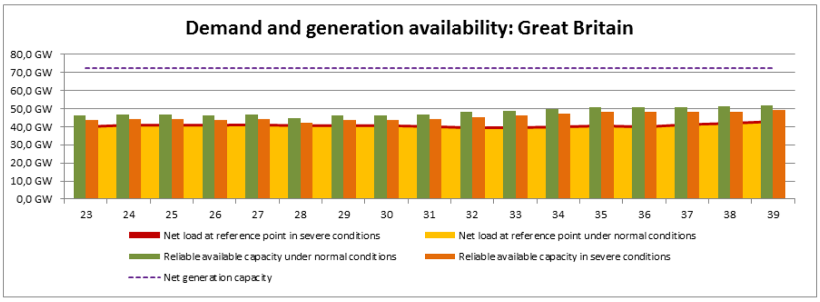
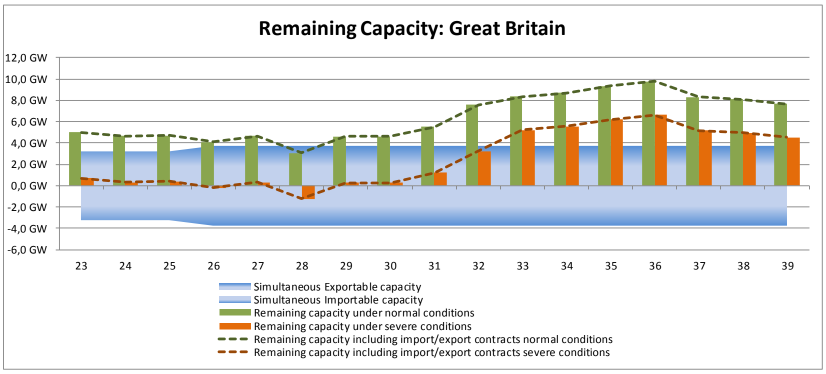
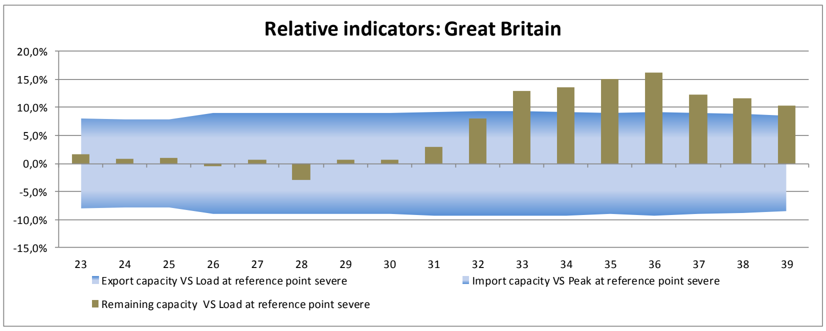
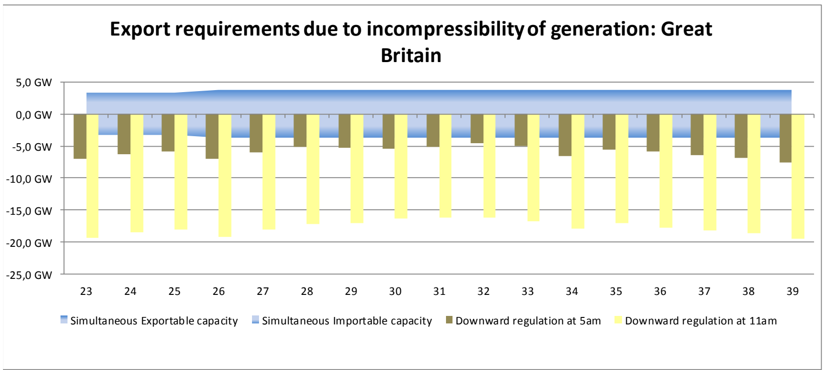








Framework and methodology of the assessments

The framework used for the summer positive adequacy assessment is as follows: normal demands are forecast; levels of operating reserve are calculated; generators submit their availability; breakdown rates (for most generators) and expected load factors (for generators with intermittent fuel sources) are calculated for all generation technology types based on data in the last three years; these breakdown rates / load factors are applied to the generator capacity; the resultant generation profile, together with the range of interconnector flows, is compared with the demand and operating reserve requirements. The framework used for the summer negative adequacy assessment is as follows: normal demands are forecast; levels of negative and positive reserve are calculated; interconnector load factors are estimated, generators submit their availability; load factors are calculated for inflexible generation technologies; these load factors are applied to the generator availability profile; the resultant inflexible generation profile, together with the flexible generation required to provide reserve, is compared with the forecast demand and pumping demand.

GREECE

Synopsis

The Greek system is expected to be in balance in the upcoming summer 2013. The commissioning of a new unit in the system, the high hydraulic storage of hydropower stations and the strengthening of the northern interconnections ensure the adequacy and security of the Greek interconnected System. However during extremely high temperatures we will need to maximize our import capacity from our interconnections.

General situation

The most important thing is the big amount of solar production especially in the beginning of June given the expected low demand due to non-use of air condition. (The air condition consumption is increasing after 10th of June). On the other hand there is no problem about hydro level etc.

Most critical periods

For this summer no week will be critical due to there is a lot of installed capacity in our system.

Expected role of interconnections

The interconnections can play a significant role especially during the period with low demand. In this case IPTO could export energy to other more expensive countries. ,

The DC -link with Italy in normal operation is export so it is difficult to help to managing of inflexible generation at off peak-hours. Unfortunately, for the north Interconnections, we expect the same behaviour due to the construction of their markets.

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 study for Transmission System Expansion Plan issued by IPTO and published upon approval of the Regulatory Authority for

Energy and the Ministry of Development of Greece. 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.

IPTO performs on a regular basis studies for the assessment of midterm generation adequacy, usually focusing on a five year period, taking into account the most recent information available to IPTO regarding the foreseen evolution of loads and expansion of the generation system. The main purpose of these studies is to evaluate the possible risk concerning the ability of the generation system to cover the future demand, as well as determining necessary enhancements of the generation system, thus providing signals to the market. Based on the adequacy assessment, IPTO may take emergency measures, such as call for tenders for new generating or reserve capacity.

Due to the random nature of parameters involved in the operation of a generation system (evolution of loads, unit availability, hydraulic conditions, etc.), adequacy is assessed through the commonly used reliability indices LOLP (Loss of Load Probability) and EUE (Expected Unserved Energy).

Annual production simulation is performed, in order to calculate the above-mentioned reliability indices, for every year of the period under consideration. Furthermore, the additional capacity, if any, required for meeting the forecasted demand with the desired level of reliability is determined. Simulation is performed by the probabilistic production costing model which simulates the operation of a power system for a given time horizon and computes the energy balance, the cost of operation, the polluting emissions and finally the generation reliability indices.

A large number of scenarios are examined in order to evaluate the impact of parameters with significant uncertainties, such as hydraulic conditions, RES generation, and availability of imports through interconnections with neighbouring counties.

IPTO uses the power balance studies to assess the system adequacy in very short term, so the required information, on a weekly basis for the winter period, is not currently available.

To underline the most critical periods of next summer, this report focuses on the monthly peak demand. The power balance is based on the results of the UCTE System Adequacy Report – Forecast 2008-2020 and on the IPTO energy management studies for the generation adequacy report, in addition to the experience of IPTO's personnel responsible for the System Operation.

Best estimate of the minimum NTC for IPTO that we anticipate is given in the excel spreadsheet.

Concerning the national generating capacity, the total net output thermal capacity will be increased by one unit of 430 MW, in relation to the previous year. This new thermal unit in the combination with the high hydraulic storage of hydropower stations and the strengthening of the northern interconnection lines ensure the balance of Greek system.

A provisional overhaul schedule of the thermal power plants for the next year is communicated to IPTO by the generators. The final schedule is agreed between IPTO and the generators, having taken into account the forecasts carried out by IPTO. The overhauls of the thermal power plants are avoided during periods of high demand, such as July and August.

In this assessment, the unavailability of the thermal power plants due to forced outages has been calculated according to the provisions of the new ‘Grid Operating and Power Exchange Code’. The forced outage rate of the thermal generating units is expressed by the Equivalent Demand Forced Outage Rate (EFORd). According to the calculations, a usually made assumption of two typical large units of 300MW each is considered out of operation due to forced outages.

The non-usable capacity includes mainly capacity of wind power plants. The water reserves are in the sufficient level. The water management aims at saving the water reserves to use them at the peak demand and only for irrigation requirements. As for the capacity of the wind power plants, an average of 78% is non-usable at the winter peak.

The monthly peak load is calculated both for normal and severe conditions. Monthly peaks, as well as yearly peaks highly depend on weather conditions, mostly temperature. A statistical approach is followed based on recorded hourly load and temperature data covering the period since 1997. For the winter peak load, the dependency of the load on the temperature averages 150 MW/C.

The load is the sum of two components. The first one reflects the load sensitivity to the weather (temperature, humidity), while the other one is dependent on miscellaneous effects (financial and human activities). The net monthly peak load calculated for normal conditions represents the 90% probability of not exceeding forecasted maximum, while in severe conditions the respective probability is 97.7%. The losses of the transmission system are included in the monthly peak load.

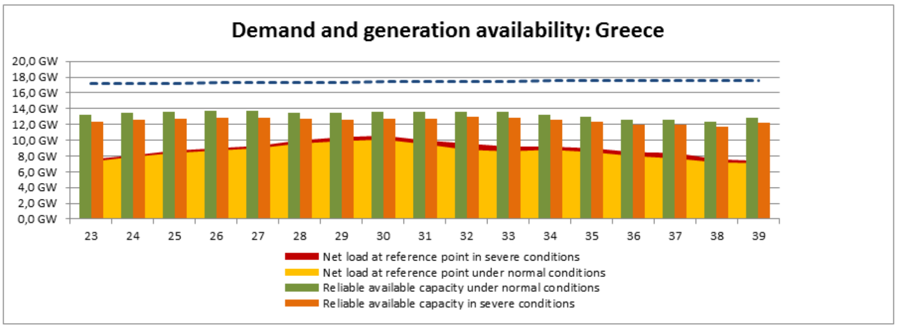
The financial crisis has lowered the expectations to electricity consumption which has improved the balance.

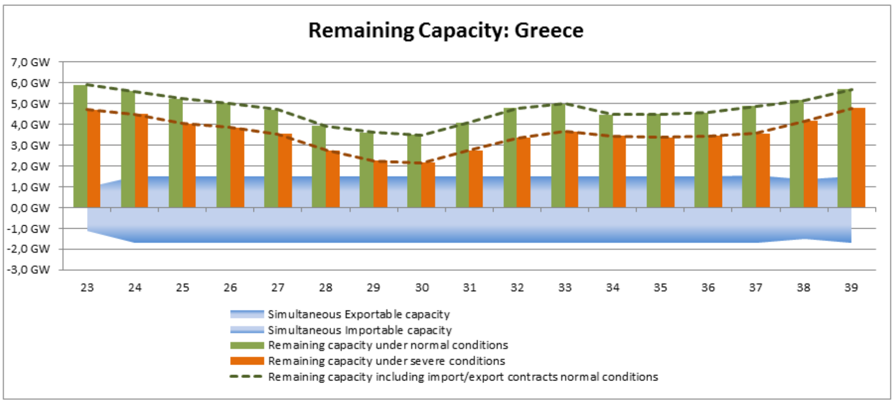
Load reduction is available upon decision of the Ministry of Development and the Regulatory Authority for Energy. System services include primary, secondary and tertiary reserve according to the UCTE OH Policy 1.

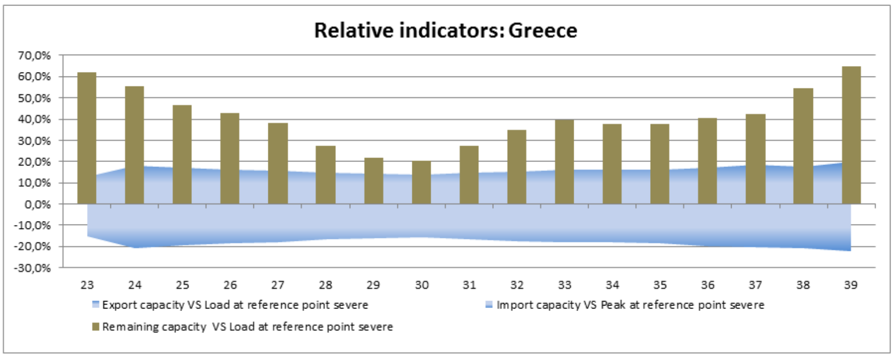
The NTC values were submitted by making estimations according to:

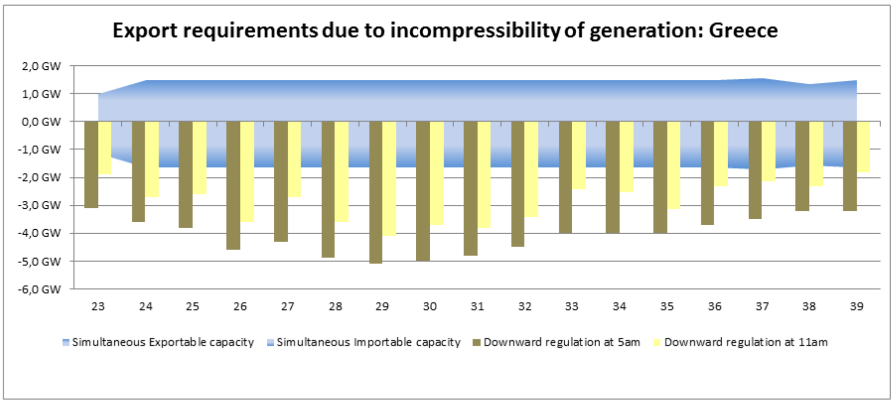
- The total NTC values (yearly + monthly + daily) of the last 3 months, both for imports and for exports, per direction and per border

- The total NTC values (yearly + monthly + daily) of the same period (winter months) of the last year, winter 2011, both for imports and for exports, per direction and per border

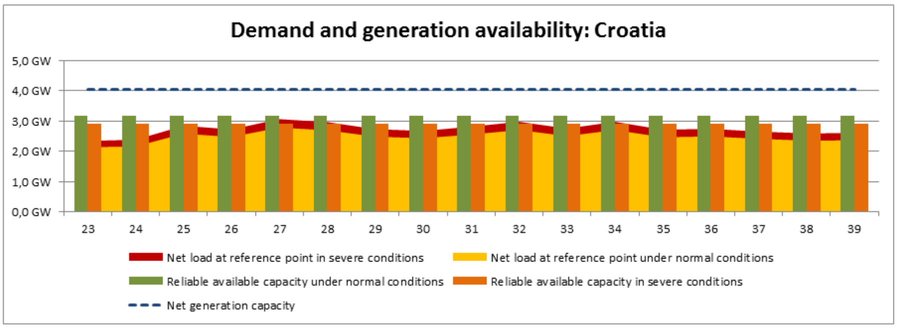


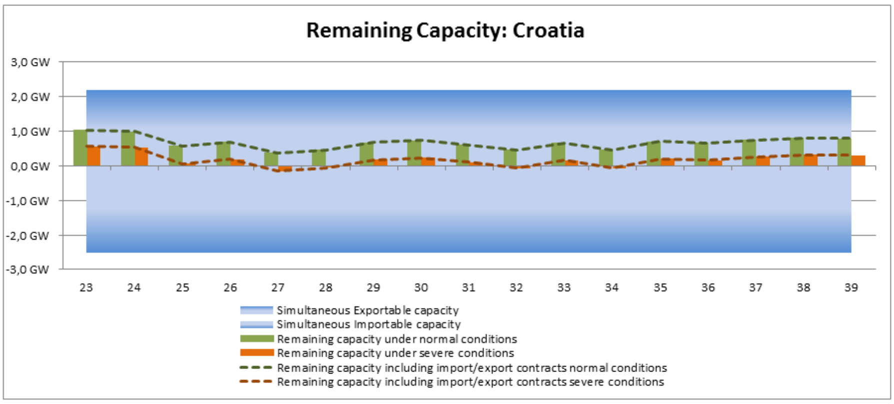


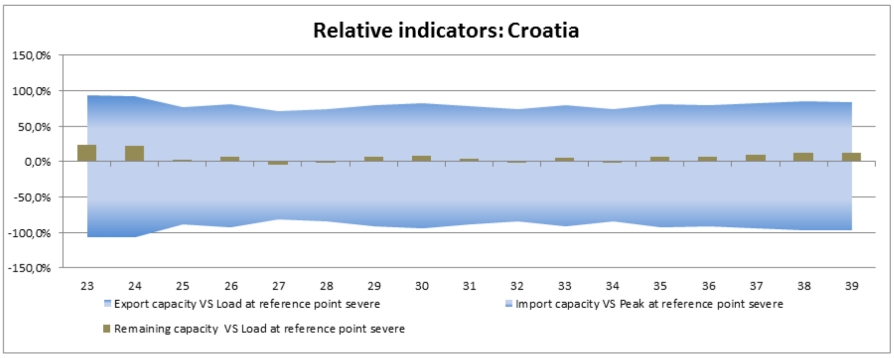


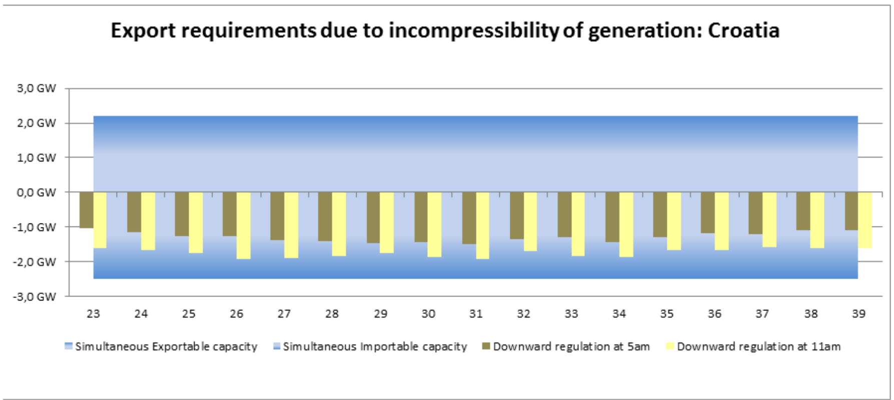


CROATIA


Demand and generation availability: Croatia
5,0 GW
4,0 GW
3,0 GW
2,0 GW
1,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
3,0 GW
2,0 GW
1,0 GW
0,0 GW
-1,0 GW
-2,0 GW
-3,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
150,0%
100,0%
50,0%
0,0%
-50,0%
-100,0%
-150,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
3,0 GW
2,0 GW
1,0 GW
0,0 GW
-1,0 GW
-2,0 GW
-3,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

General situation

Some maintenance is planned in thermo and hydro power plants during the summer. The capacities of the generating units to be maintained are shown in Summer Outlook Report's parts B and C (Non-usable capacity at peak load (all power stations)...). Regarding the tie-lines, one of the most important maintenances is that of 400 kV tie-lines on border between Croatia and Hungary (lines Žerjavinec - Hévíz and Ernestinovo - Pécs).

Most critical periods

Generally, the periods of high loads are the most critical. In Croatia the highest loads appear when the weather is very hot so the additional problem is transmission of energy due to the decreased transmission capacity of the lines.

Expected role of interconnections

In spite of favourable conditions in hydro accumulations Croatia has to import energy in order to cover the consumption. The interconnectors are not only important for the supply of Croatian consumers, but also for the electricity transits.

The necessary for the additional export in a case of demand minimum is not expected.

HUNGARY

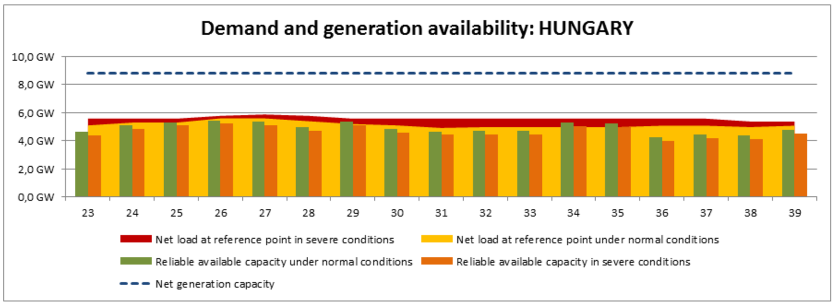
Synopsis

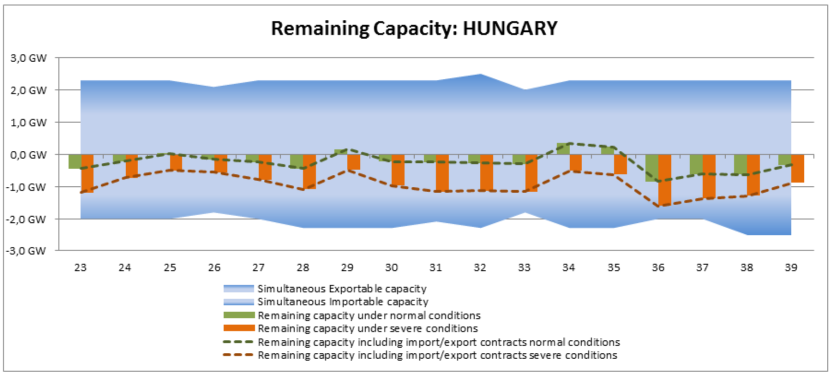
In spite of the growing uncertainty on both generation and demand side, as a result of liberalisation on the one hand, and promotion of intermitted generation on the other, the Hungarian power system is expected to be on the safe side during the next summer period.

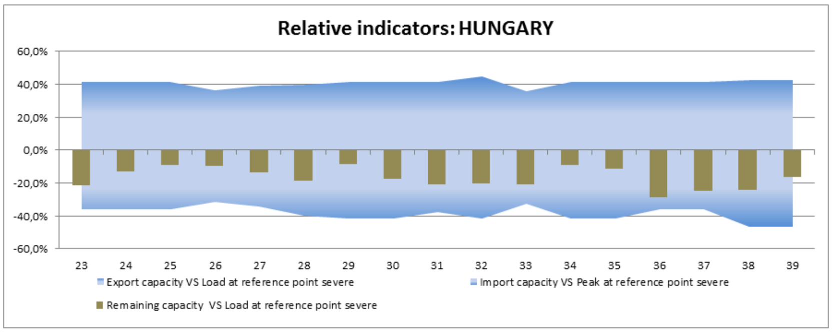
However, there are a few risks that must be carefully managed by the TSO. These risks are:

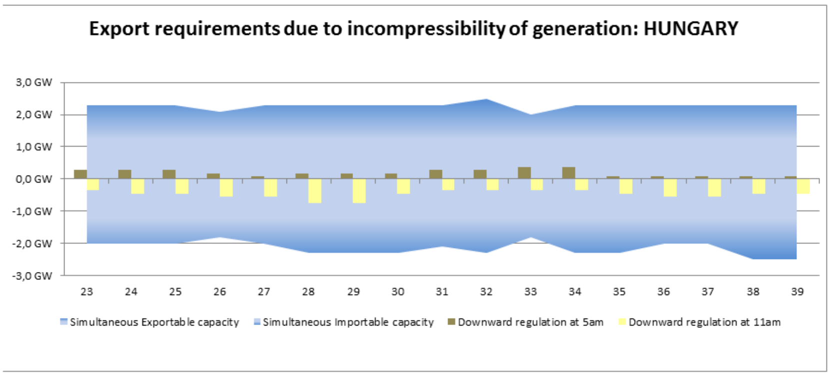
- Availability of the power plants during long-lasting hot summer period in case there is any problem with the cooling system of the power plants. The required level of remaining capacity can only be guaranteed by a certain amount of import, which is higher under severe conditions. Cross-border exchange is a matter of economy for market players. Their decision-making can be influenced by contractual conditions, e.g. on reserves.
- Overall cross-border capacity is satisfactory; however, allocation of cross-border capacity rights on the respective border sections may be an issue.

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


Demand and generation availability: HUNGARY
10,0 GW
8,0 GW
6,0 GW
4,0 GW
2,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

General situation

The level of maintenance is relatively high during the summer, it is between 500 and 1000 MW, which is 5-10% of the Hungarian installed capacity. The most critical periods are the weeks of September.

Most critical periods

In accordance with the constantly growing demand, there is no period of time when the import could be ignored. The unavailable capacity is increasing by 1240 MW, which strengthens the dependence on the import.

Expected role of interconnections

After liberalisation, import is mainly an issue of the traders, available interconnection capacity is satisfactory. Access is possible via yearly, monthly, daily and even intraday capacity tenders, auctions. The only limitation is due to high transit flows through the interconnections.

Critical factors of the summer period are availability of generation capacities in large power plants due to planned maintenance, terminated operation of co-generation units, as well as uncertainties in operation strategy of intermittent generators (renewables, co-generation gas engines).

Framework and methodology of the assessments

See above.

ICELAND

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

The summer period is used for scheduled maintenance on the generating units. The maintenance is in general scheduled such that it does not jeopardize the power and energy balances.

The installed generation capacity connected to the Icelandic transmission system is 2.4 GW, of which 77% is hydro based and 23% based on geothermal energy. No new generating capacity is planned this summer.

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.

IRELAND

General situation

A large portion of the hydro units will be on scheduled maintenance for large portions of the summer. However, as these form a small proportion of our overall system generation it should not have a detrimental effect on the system as a whole. During August and especially in early September will be the period when the majority of our scheduled outages for larger units will take place. Despite this, there should be no issues in meeting required demand levels and there will be a significant generation margin. As the year thus far has been a relatively wet year in comparison to last year, it is not envisaged that there will be any low hydro level incidents. However, due to the large volume of rainfall on the country, the peat harvest over the past year has been affected. There is a possibility this will lead to lower outputs from Ireland's peat stations and forced outages of the units for a certain period of the summer. Should this event occur there will still be an excess of generation margin to the system.

Most critical periods

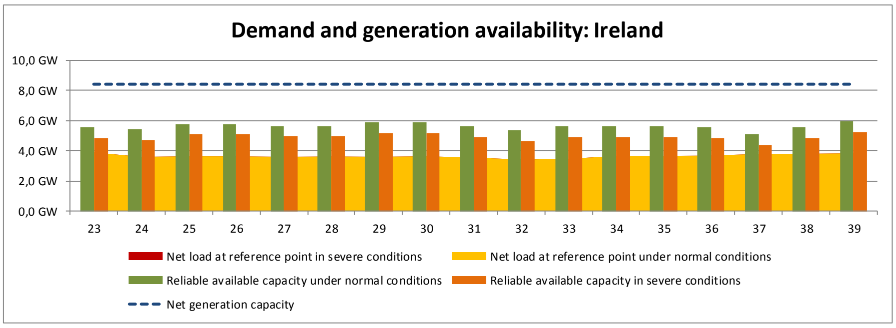
The most critical period will be during Week 37 when approximately 900MW, or 10.4% of our installed capacity, will be on scheduled outage.

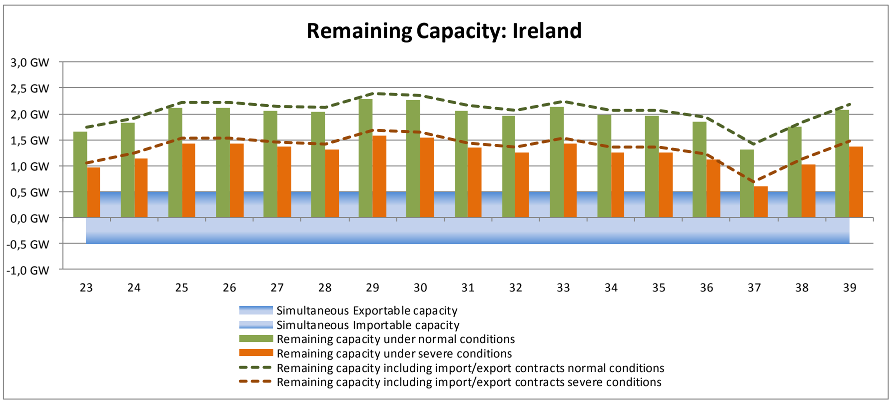
Expected role of interconnections

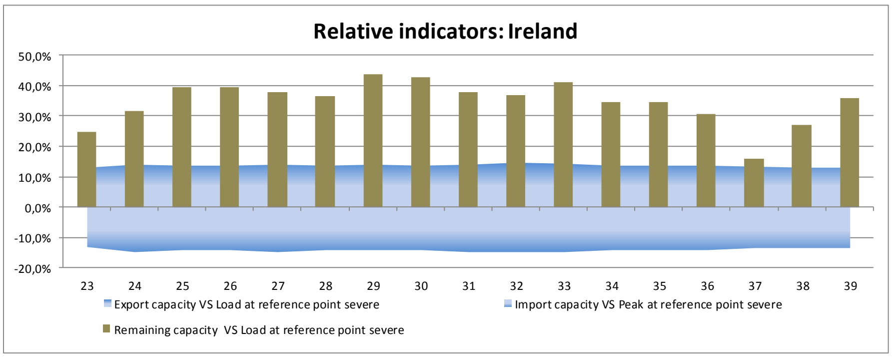
The East-West Interconnector (EWIC) should be fully available during the summer period with the exception of the 3 day outage in early September. This should provide Ireland with the capability to export or import 500MW of power. Due to current electricity prices in both Ireland and Great Britain, it is likely that that the flow on the interconnector will be primarily imports from Great Britain into Ireland.

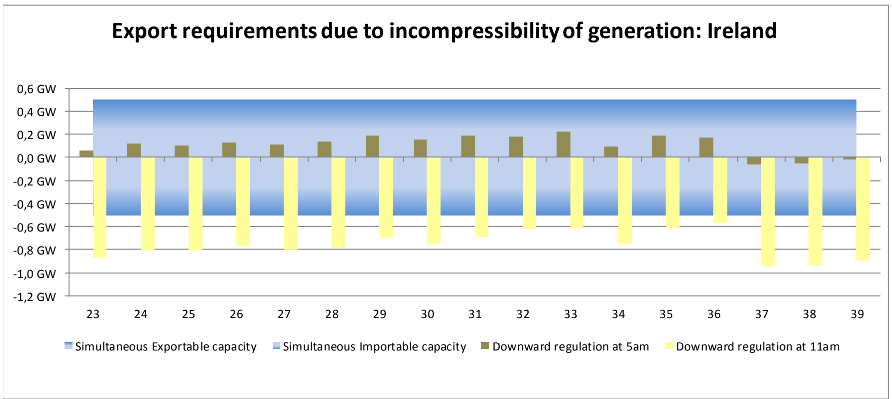
Framework and methodology of the assessments

The generator capacities, generator margins and provisionally scheduled outages of generator units are stored in a Margins system. 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.

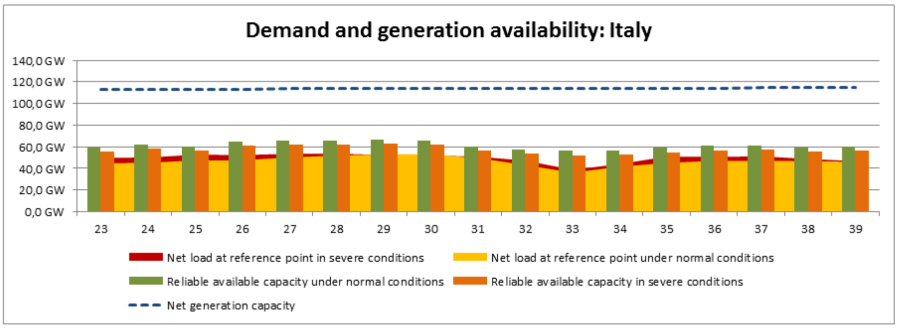

Demand and generation availability: Ireland
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

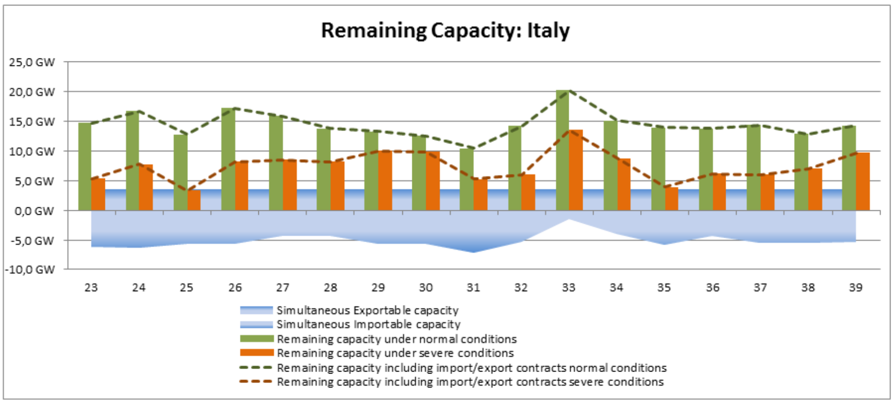

Remaining Capacity: Ireland
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts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

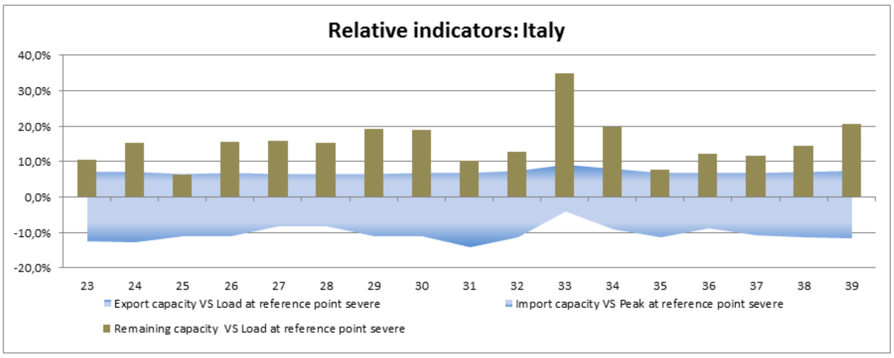

Relative indicators: Ireland
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

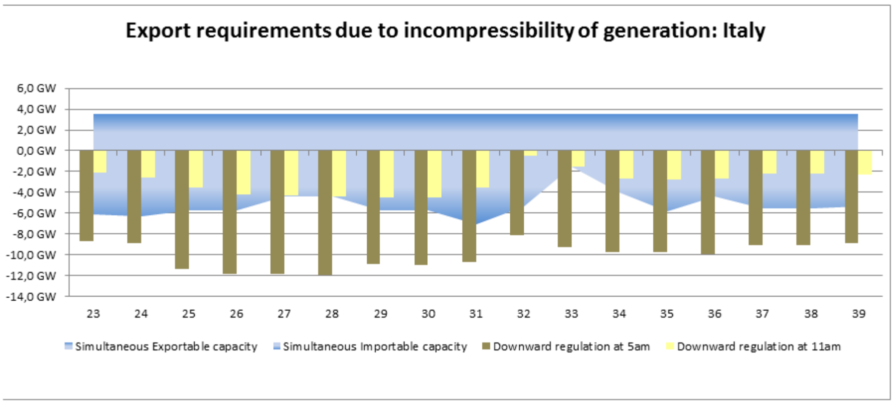

Export requirements due to incompressibility of generation: Ireland
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

ITALY


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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
25,0 GW
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
-5,0 GW
-10,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
-12,0 GW
-14,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

General situation

Margins are expected to be comfortable across the whole summer period in normal conditions with high PV infeed during daytime and conventional generation capacity that will cope well with the evening peak load (very high ramp rate in the evening could be an issue). Italy are facing up with the decommissioning or mothballing of a large number of old mainly oil-fired power plants, partly already in place or firmly planned but partly unknown in timing and amount.

Also under severe conditions the general situation expected in the summer is not critical, but some problems may arise in the Sicily island.

There are some risk factors such as:

- 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, that could lead to a lack of adequate downward regulating capacity;
- Voltage regulation problem and congestions: high voltage problems can arise especially in the south due to low load, reduced flows along EHV and high renewable production. Market and physical congestion, especially from South to North, will be common during the summer.
- Shortage of gas supply in case of concurrent unplanned outages of several import sources, which mainly can influence the availability of CCGT power plants that cover up to 50% of the demand.

In order to cope with this risks Terna prepares preliminary action and emergency plans and, in case of need, adopt the appropriate countermeasures (e.g. during high renewable/low load periods, in order to guarantee the system security could adopt enhanced coordination with DSO and special remedial actions, such as the curtailment of inflexible generation. Further special actions, such as some NTC reductions, could be planned in cooperation with neighbouring TSOs).

Most critical periods

While week 25 is expected to be the most critical for upward regulation under severe conditions, with, generally, the evening peak more critical than the morning one, the worst weeks for downward regulation are expected to be the 32nd and 33rd due to very low load levels.

Expected role of interconnections

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

During high renewable/low load periods, in order to guarantee the system security Terna could adopt special remedial actions, such as the curtailment of not flexible generation and some NTC reductions, to be planned in cooperation with neighbouring TSOs. In some

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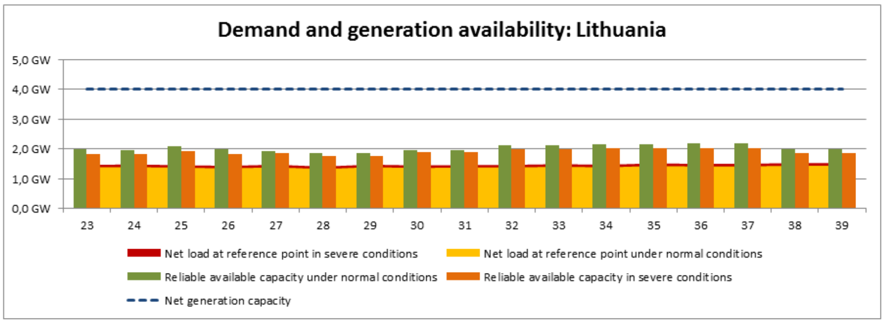
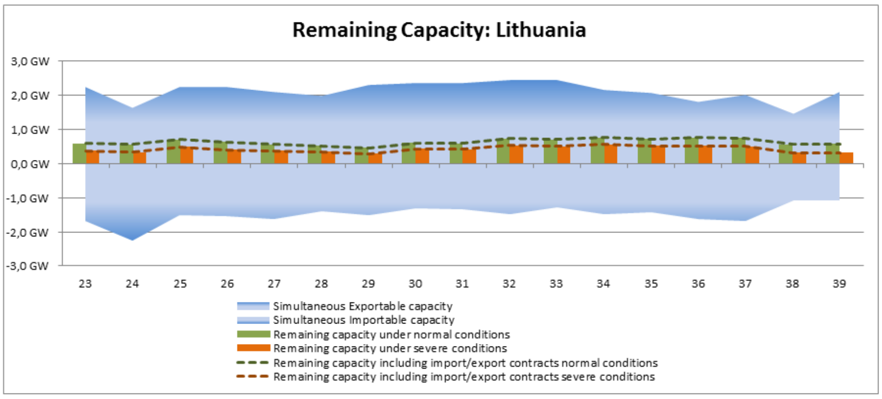
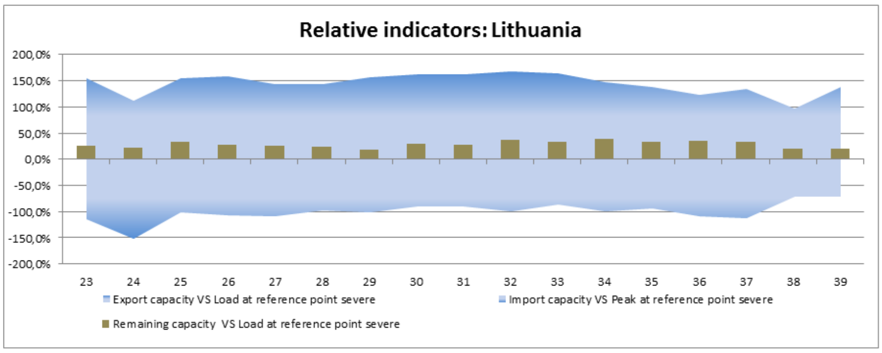
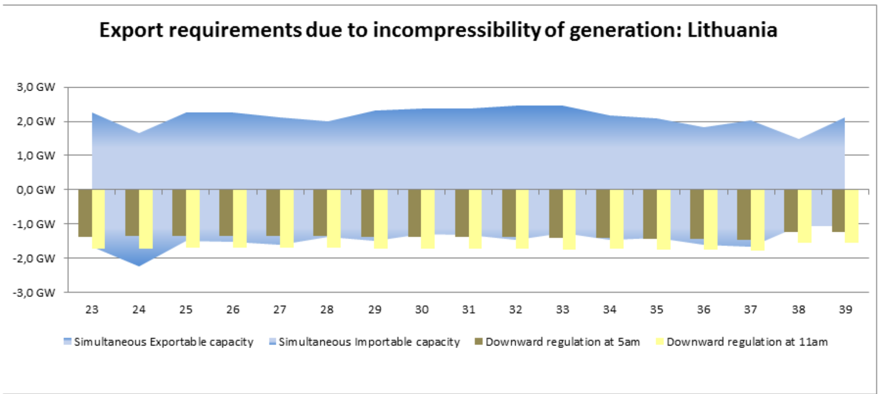
situations the need for reducing the import of energy or, in extreme cases, of exporting to the neighbouring countries could arise.

LITHUANIA









Synopsis

The system balance is expected to be deficit due to price differences with the neighbouring 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 40% of demand, while 60% will be covered by imports. Available cross-border capacities for upcoming summer are enough to cover whole consumption under normal conditions therefore no specific risks are foreseen. The electricity import at the minimum demand can be set to minimum and there is no problem for inflexible generation units.

Generation

According to preliminary plans for the upcoming summer the generation portfolio will consist of 53% of gas fired PP, 3% - oil fired PP, 18% - mix fuel PP, 17% - renewable PP and 9% - hydro PP. If any limitations of gas supply occur, Lithuania has the possibility to switch 730 MW generation capacity to oil fuel, and respectively guarantees to cover approximately 50% of peak load.

We expect to produce more electricity from renewable power plants than previous summer due to new installations of wind, solar and biomass power plants. 12% of generation portfolio will be covered by wind since highest utilization of installed wind capacity is reached. Nevertheless the instability of wind generation is taken into account while assessing required system services in the system and adequacy level.

Demand

Peak load is expected at the end of September for normal conditions is expected to be 1440 MW and for severe conditions is expected to be 1530 MW. And the minimum peak load is expected in the first half of July for normal conditions is expected to be 790 MW and for severe conditions is expected to be 839 MW. Total consumption is expected to be 1.2% higher than previous year.

General situation

In the beginning of this year two generating units of Lithuanian's power plant was conserved. The 580 MW of net generating capacity are mothballed and in two months these two units can be restored.

For the coming summer season the maintenance schedule is less intensive then was in previous years. According to the maintenance schedule the largest generation inaccessibility due to maintenance will be on 28-29 weeks when largest CHP power plants will be on yearly maintenance. However no major risk is foreseen during this period.

The Lithuanian Power System also depends on hydrological circumstances. In drought case the low level of water in rivers reduces the generation of electricity in hydro power plants. The limited operation of HPP makes influence on Lithuanian's power balance and balancing reserves and can result in severe conditions.

Most critical periods

The analysis shows that 33 week of the summer is expected to be not typical since nonworking day on Thursday will affect the level of consumption during whole week. It is foreseen that additional regulating reserves will be needed to cover potential consumption imbalances during 33 week.

Expected role of interconnections

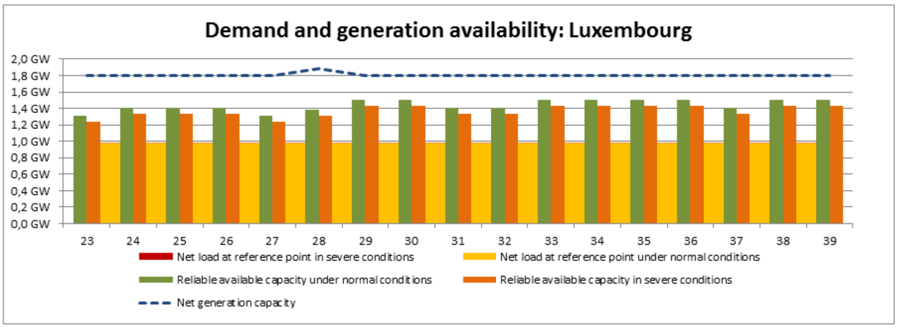
Capacity of the interconnectors for Lithuania PS plays an important role from import ability point of view. Although interconnectors of Lithuania are well developed, restriction for import ability is foreseen for whole summer period. Main reasons for those restrictions are reduction of import from 3th countries which is allocated on Lithuania – Belarus interconnection, due to reduction of Latvia – Estonia interconnection capacity because of higher temperature in summer period. The highest restriction of import from 3th countries via Lithuania – Belarus interconnection is planned for 33 week. The highest restriction of total import to Lithuania is planned for 38 week, due to reduction of import from Kaliningrad region to 0 MW.

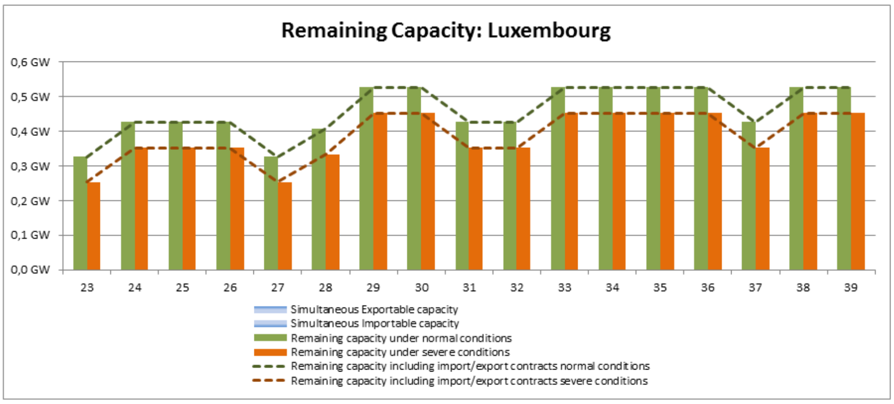
Whereas Lithuania PS is an importing country with fairly low amount of installed renewables, role of interconnectors to manage an excess of inflexible generation are very low.

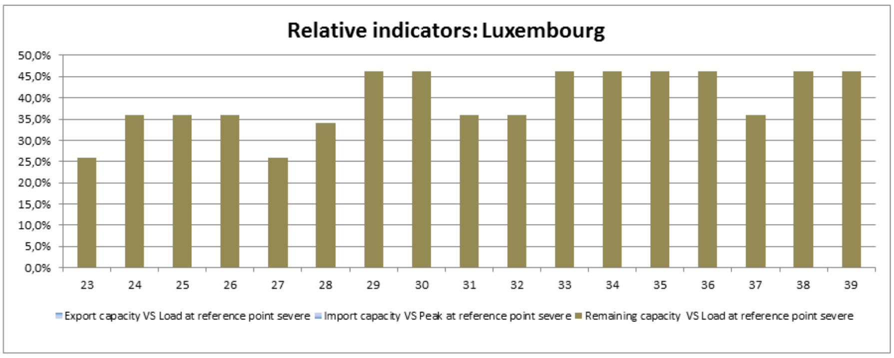
Framework and methodology of the assessments

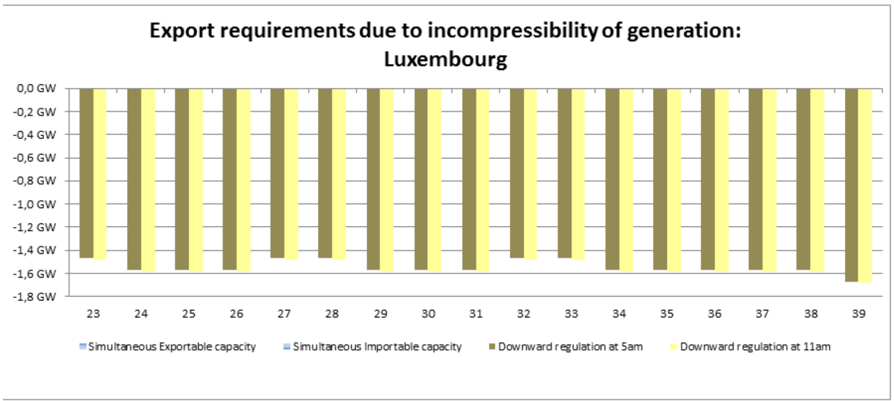
The framework under normal conditions is set on the statistical data of previous year.

LUXEMBOURG

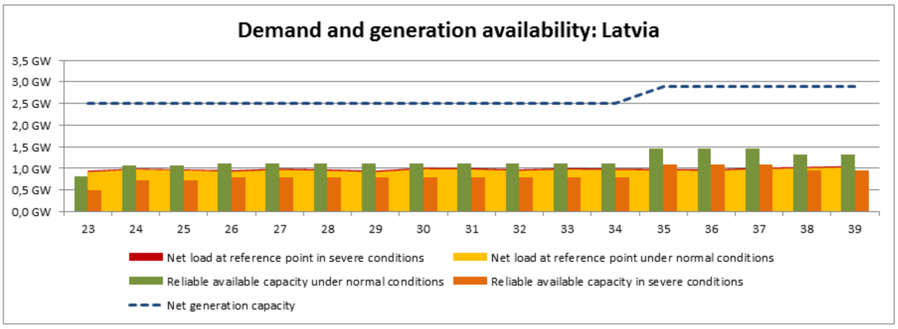

Demand and generation availability: Luxembourg
2,0 GW
1,8 GW
1,6 GW
1,4 GW
1,2 GW
1,0 GW
0,8 GW
0,6 GW
0,4 GW
0,2 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

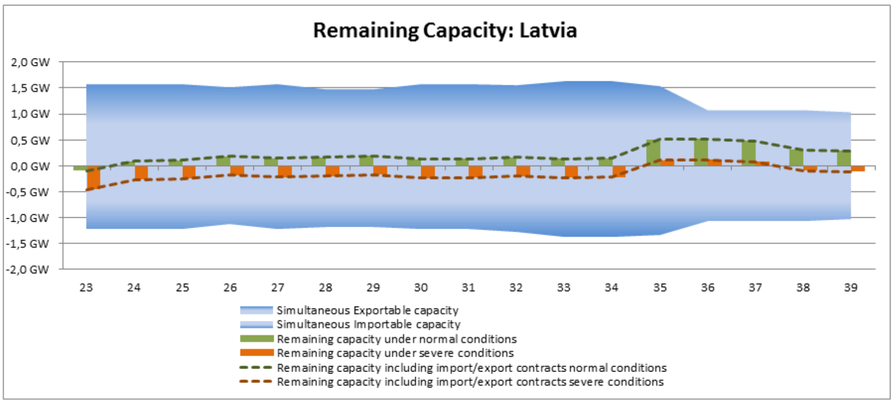

Remaining Capacity: Luxembourg
0,6 GW
0,5 GW
0,4 GW
0,3 GW
0,2 GW
0,1 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

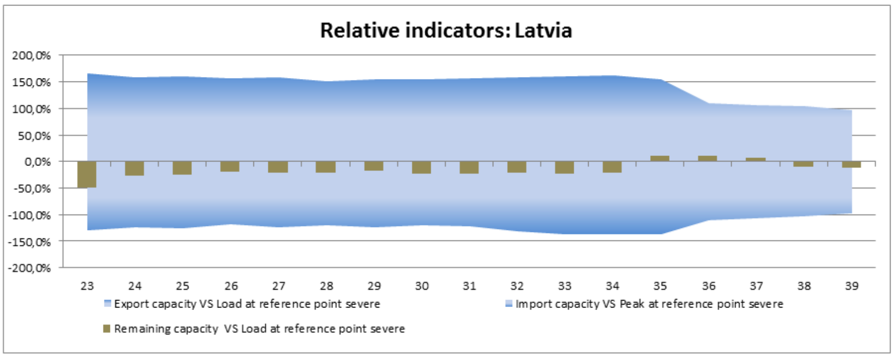

Relative indicators: Luxembourg
50,0%
45,0%
40,0%
35,0%
30,0%
25,0%
20,0%
15,0%
10,0%
5,0%
0,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

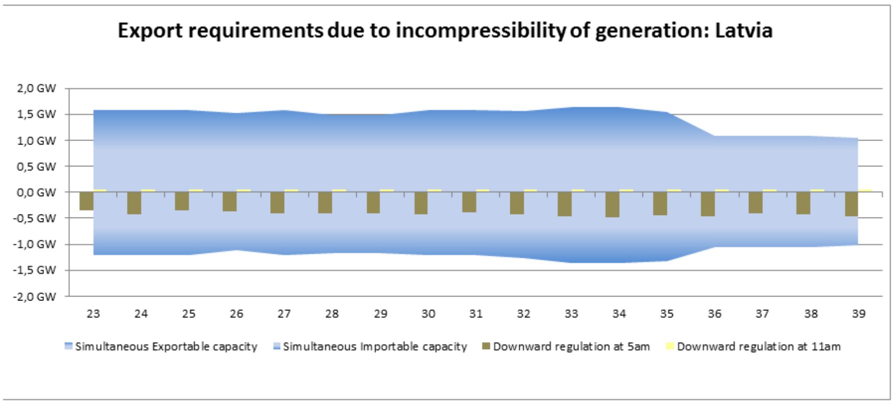

Export requirements due to incompressibility of generation: Luxembourg
0,0 GW
-0,2 GW
-0,4 GW
-0,6 GW
-0,8 GW
-1,0 GW
-1,2 GW
-1,4 GW
-1,6 GW
-1,8 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

LATVIA









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General situation

From June till August the installed capacity of gas will be close to 0.7 GW and from August the capacity will exceed 1 GW. From the point of view of system security of supply and adequacy TSO can use all net capacity of gas power plants independent on gas prices in market to cover a load in the Latvian power system. Until the summer we are expecting about 20 MW increase of installed capacity of onshore wind energy plants and the total installed capacity will be approx. 80 MW. TSO has assumed that the non-usable capacity of wind in normal conditions is approx. 80-90 % of installed capacity but in severe conditions it is 100 % - no wind at all. The highest installed capacity in Latvia power system is on hydro power plants (1576 MW) but it is limited and mostly dependent on water inflow in Daugava River. TSO is expecting that in the normal conditions approx. 300-400 MW can cover the peak load but in the severe conditions only up to 200 MW can be usable. During the summer almost always approx. 400-500 MW of installed capacity of hydro is in maintenance. The services reserve of Latvian power system is 100 MW all the time.

Most critical periods

In the case of high grow up of economics until the summer when the power system will get closer to the severe conditions the critical period for Latvian TSO will be from June till August and in October. In August the new one additional generation block with the installed capacity 442 MW in Riga CHP2 will be commissioned which allows covering the load in both conditions. However in the worst case we will cooperate with our neighbours and keep the power system in balance together.

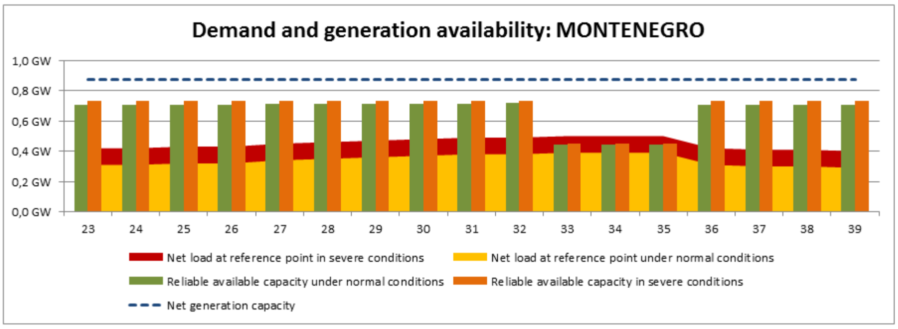
Expected role of interconnections

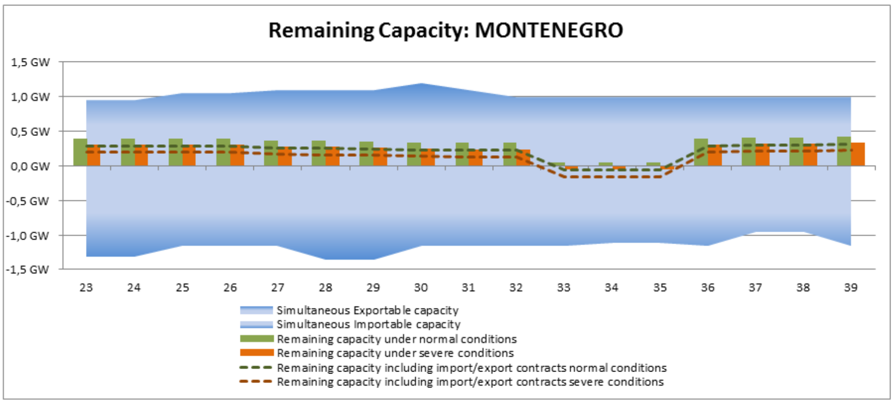
The risks with transmission capacities in Latvian-Lithuanian cross-border did not experience usually and all international electricity offers and trades will go according to plan. In the coming summer the cross-border capacity between Lithuania and Latvia will be decreased due to maintenance works on tie lines. Considering to the Lithuanian electricity deficit which is on-going throughout the year and the large amount of electricity import from 3rd countries, the Latvian TSO is expecting congestion possibilities on the Estonia-Latvia border as well as on the Lithuania - Latvia boarder. During the summer the electricity supply on the cross-border Estonia-Latvia will be limited and counter-trade between the Latvian and Estonian TSOs could be in place. To keep the security of supply in Latvia power system and to solve the congestion possibilities on the Estonia-Latvia border, Latvian TSO has rights on the fast hydro reserves on Daugava River.

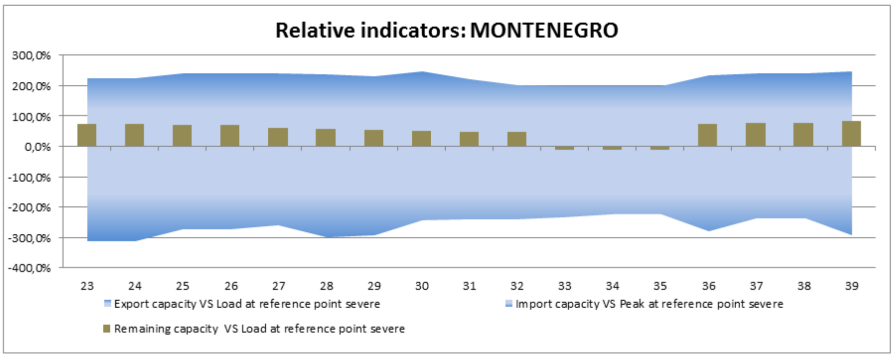
Framework and methodology of the assessments

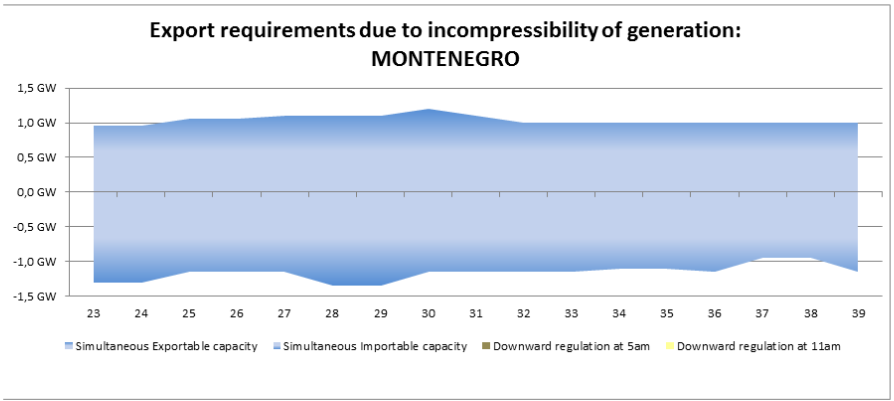
TSO use annual data statistics and the information of previous year.

MONTENEGRO


Demand and generation availability: MONTENEGRO
1,0 GW
0,8 GW
0,6 GW
0,4 GW
0,2 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
1,5 GW
1,0 GW
0,5 GW
0,0 GW
-0,5 GW
-1,0 GW
-1,5 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
300,0%
200,0%
100,0%
0,0%
-100,0%
-200,0%
-300,0%
-400,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
1,5 GW
1,0 GW
0,5 GW
0,0 GW
-0,5 GW
-1,0 GW
-1,5 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

General situation

Most of maintenance and overhauls works are planned during summer period.

Most critical periods

The main period of stress is August 2013, when the load is max, and the temperatures are high. The main factor can be high demand and bad hydrological conditions,

Expected role of interconnections

No major variations of the interconnection capacities are expected during the summer 2013.

MACEDONIA

General situation

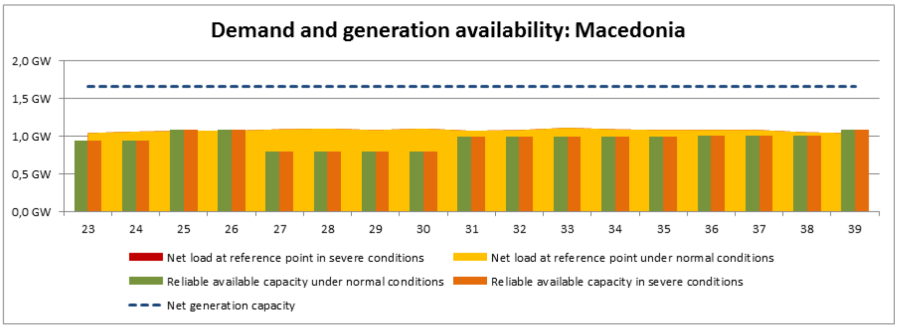
The water reservoirs are on very high level, because of the good hydrological conditions this year, so the HPP will also contribute to the security of the system.

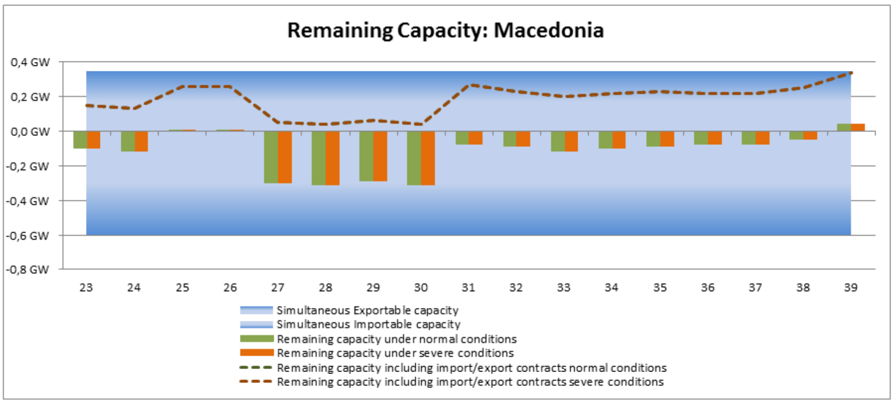
Most critical periods

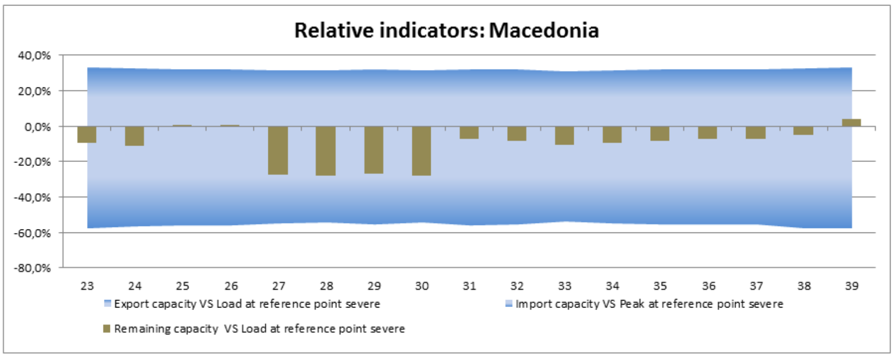
We don't expect critical periods.

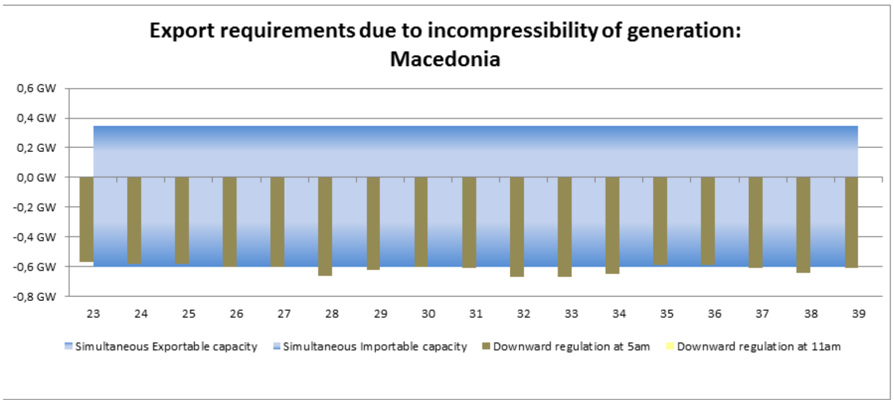
Expected role of interconnections

Macedonian transmission network has well developed interconnections with neighbours: Serbia, Bulgaria and Greece. So, the operation of power system is secure. The overhauls of the interconnections and power plants will be according to the plans which were coordinated with the other countries in the SEE region. The data about NTC are harmonized with our neighbours (BG, RS and GR). These are best estimate of minimal value. On the day, the value may be higher or lower, according to harmonized calculations between neighbours and due to system conditions.

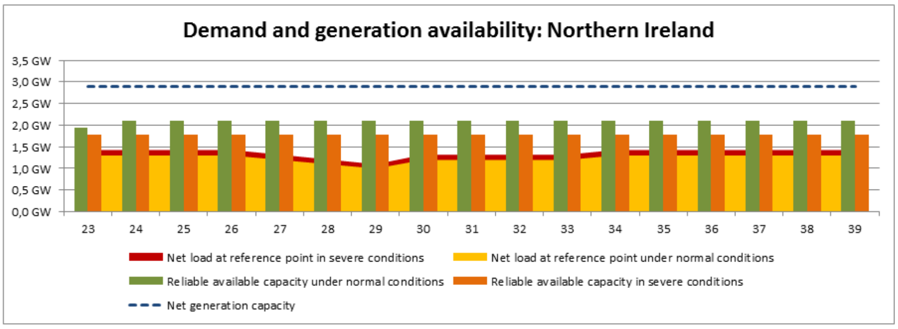

Demand and generation availability: Macedonia
2,0 GW
1,5 GW
1,0 GW
0,5 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

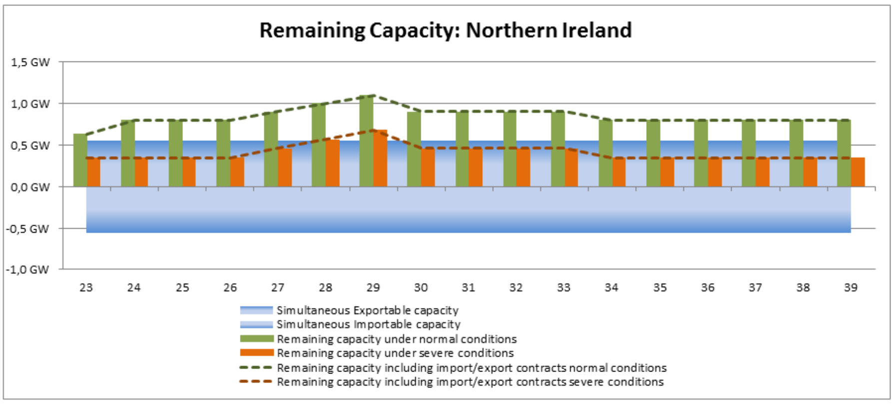

Remaining Capacity: Macedonia
0,4 GW
0,2 GW
0,0 GW
-0,2 GW
-0,4 GW
-0,6 GW
-0,8 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

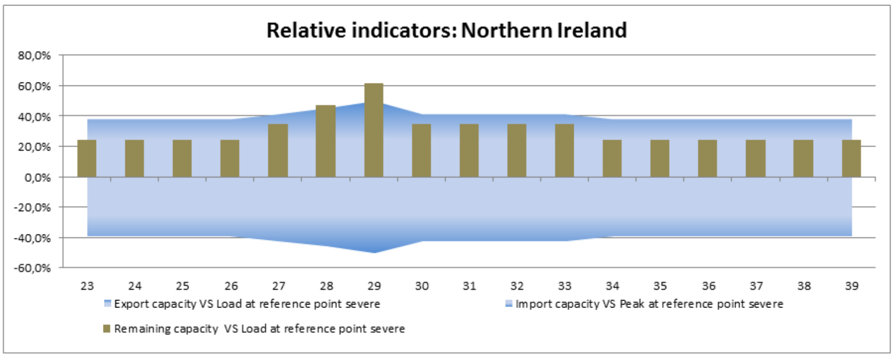

Relative indicators: Macedonia
40,0%
20,0%
0,0%
-20,0%
-40,0%
-60,0%
-80,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

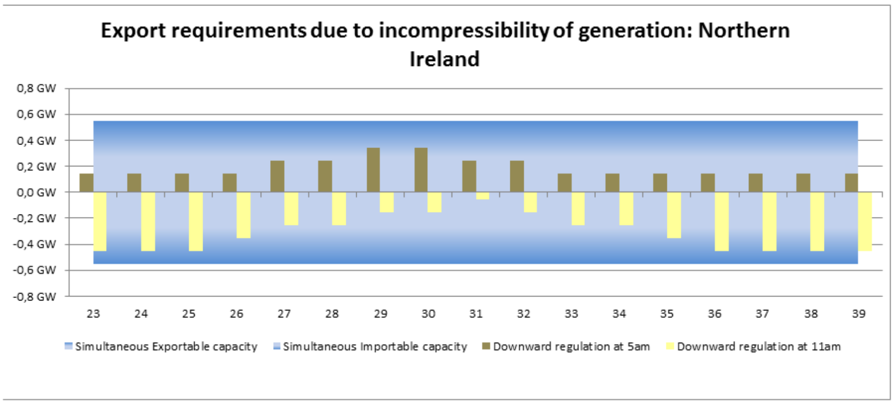

Export requirements due to incompressibility of generation: Macedonia
0,6 GW
0,4 GW
0,2 GW
0,0 GW
-0,2 GW
-0,4 GW
-0,6 GW
-0,8 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Northern Ireland









Synopsis

SONI do not anticipate any significant generation adequacy shortfalls on the Northern Ireland system this summer with sufficient capacity being available to meet demand even with a number of planned generation outages. It is expected that the Northern Ireland Security of Supply Standard of 4.9 hours/year Loss of Load Expectation (LOLE) will be maintained throughout the summer period and there are no events envisaged that could be regarded to represent a high risk to SONI.

At times, to ensure that peak demand is met in Northern Ireland, SONI may be dependent upon imports on the Moyle interconnector with Great Britain (GB) and/or the North-South tie line with the Republic of Ireland.

The growing amount of wind and other renewable generation in Northern Ireland and on the island of Ireland as a whole will be a challenge to manage going forward. At periods of high wind and low load it has been necessary at times to curtail wind generation. This may be an increasingly common occurrance as more wind capacity is connected to the system.

SONI and EirGrid have established a joint programme of work entitled “Delivering a Secure Sustainable Electricity System (DS3)”. This work programme includes enhancing the portfolio performance, developing new operational policies and system tools to efficiently use the plant portfolio to the best of its capabilities, and regularly reviewing the needs of the system as the portfolio capability evolves.

More information on this is available via the following link: Delivering a Secure Sustainable Electricity System (DS3).

The Northern Ireland (NI) and Ireland (IE) regions currently share reserve requirements and operate in a single electricity market. The response for the two regions has therefore been coordinated as much as possible.

SONI do not anticipate any significant generation adequacy shortfalls on the Northern Ireland system this summer with sufficient capacity being available to meet demand even with a number of planned generation outages.

It is expected that the Northern Ireland Security of Supply Standard of 4.9 hours/year Loss of Load Expectation (LOLE) will be maintained throughout the summer period and there are no events envisaged that could be regarded to represent a high risk to SONI.

At times, to ensure that peak demand is met in Northern Ireland, SONI may be dependent upon imports on the Moyle interconnector with Great Britain (GB) and/or the North-South tie line with the Republic of Ireland.

In stable economic conditions, there is a normal underlying annual growth rate of 1.5% for electricity demand. However, with the ongoing uncertainty in both the local and world economies, this growth rate has varied greatly over past few years and is expected to

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continue to vary in the short to medium term. Therefore the Northern Ireland demand forecast is temperature corrected and growth rates applied are in line with latest forecasted economic growths.

For the period covered in this report, the latest SONI demand forecast indicates that the peak demand is expected to occur in Week 37 (1359MW), while the minimum demand will occur in Week 28 (484MW).

It should also be noted that there is no significant 'air conditioning' load in Northern Ireland that would affect either the peak demand figure or the time that the peak demand occurs.

The primary intermittent energy source in Northern Ireland is wind generation. For our capacity adequacy studies, we assume a wind capacity credit figure of 113 MW available from an anticipated installed capacity of 488 MW of wind by the end of the summer period.

For more information as to how the wind capacity credit is determined, go to:

http://www.eirgrid.com/media/Wind%20power%20generation%20analytical%20report,%202007%20update.pdf

The growing amount of wind and other renewable generation in Northern Ireland and on the island of Ireland as a whole will be a challenge to manage going forward. At periods of high wind and low load it has been necessary at times to curtail wind generation. This may be an increasingly common occurrance as more wind capacity is connected to the system. This is demonstrated by the fact that the minimum demand forecasted for the summer is 484MW (Week 28) while there is a 'must run' capacity of 440MW in Northern Ireland.

Both SONI and EirGrid are at the forefront of facilitating the integration of this growing amount of renewable energy on the all-island system and significant work is required to manage this. Accordingly, SONI and EirGrid have established a joint programme of work entitled "Delivering a Secure Sustainable Electricity System (DS3)". This work programme includes enhancing the portfolio performance, developing new operational policies and system tools to efficiently use the plant portfolio to the best of its capabilities, and regularly reviewing the needs of the system as the portfolio capability evolves.

More information on this is available via the following link: Delivering a Secure Sustainable Electricity System (DS3).

Note:

363 MW of generation is included in the 'oil category' for Northern Ireland - however, it should be noted that this is distillate oil and not heavy fuel oil.

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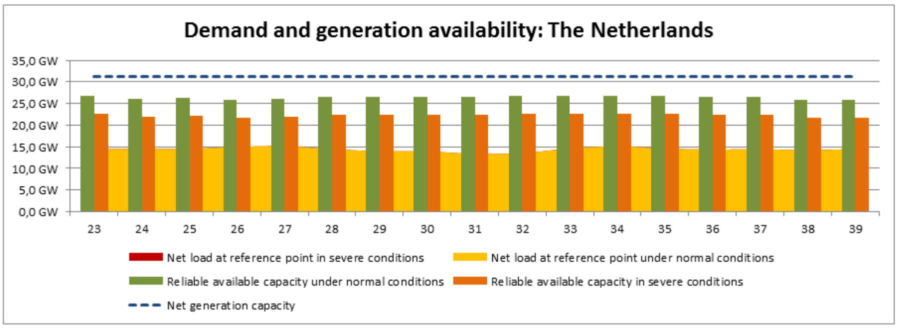
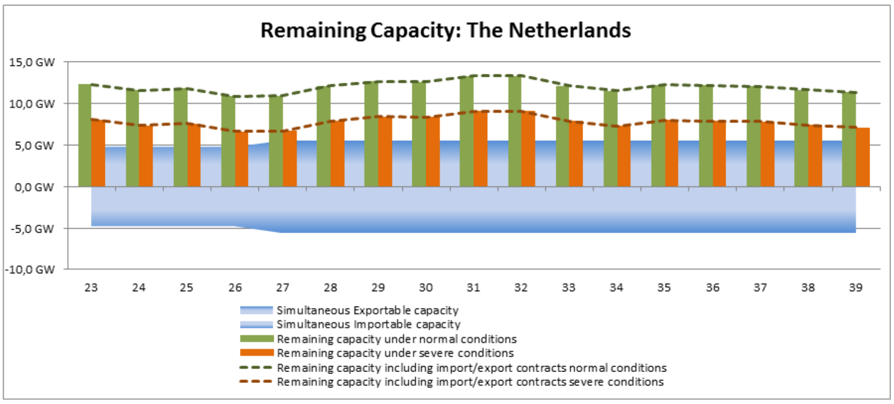
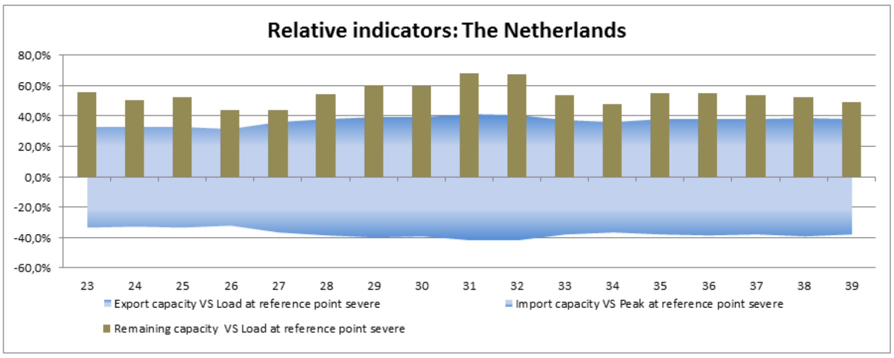
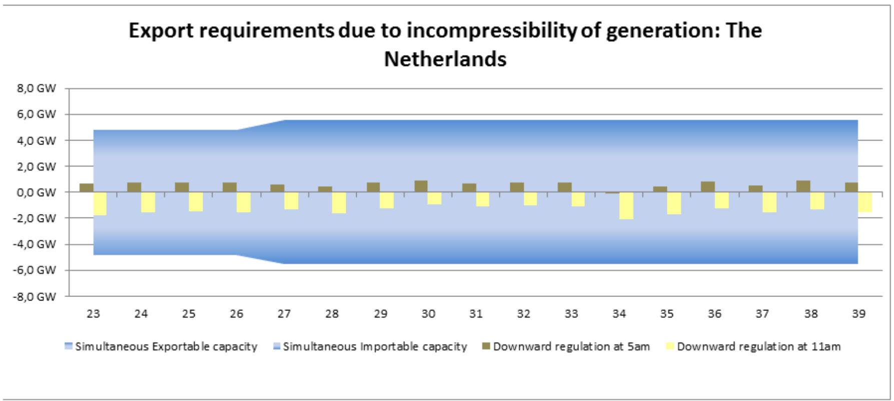
THE NETHERLANDS









Synopsis

TenneT does not foresee any significant generation shortages during the summer of 2013. Sufficient generation capacity will be available and no large amounts of outages during this period are reported.

Apart from this, sufficient export and or import capacity is available.

An official summer adequacy forecast is not done so far. To our opinion the supply-demand balance will be realized 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 summer period.

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 / Security of Supply). Visit our website for the latest report www.tennet.eu.

Most critical periods

An official summer adequacy forecast is not done so far. To our opinion the supply-demand balance will be realized 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 summer period.

Expected role of interconnections

Sufficient export and or import capacity is available to fulfil the needs.

Sufficient export and or import capacity is available to fulfil the needs for managing the inflexible generation at demand minimum periods.

Framework and methodology of the assessments

No specific summer forecasts with regard to security of supply or adequacy assessments on a weekly basis will be executed by TenneT TSO B.V.

The development on interconnection capacity (expansion) and the building of new power plants have decreased the necessity of short range adequacy assessments in The Netherlands.

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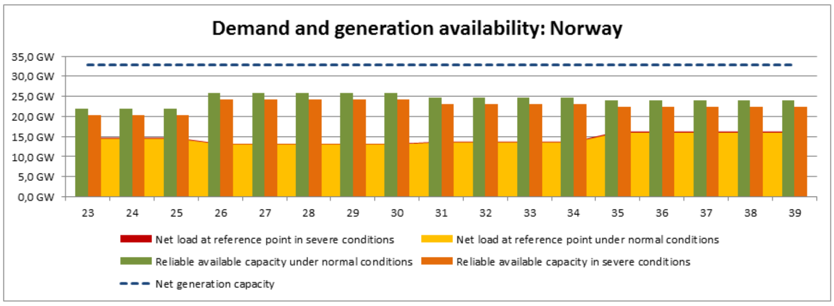
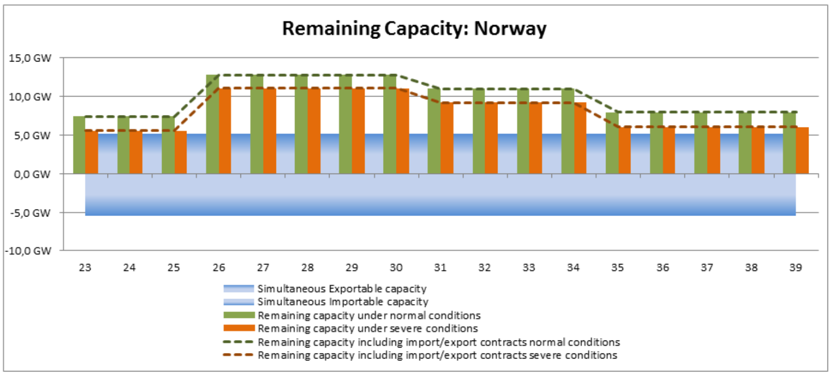
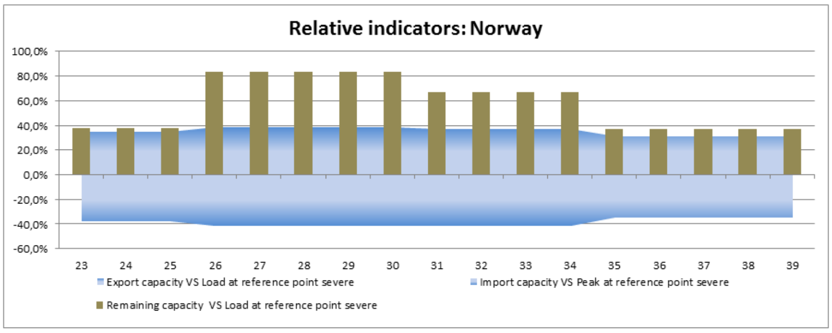
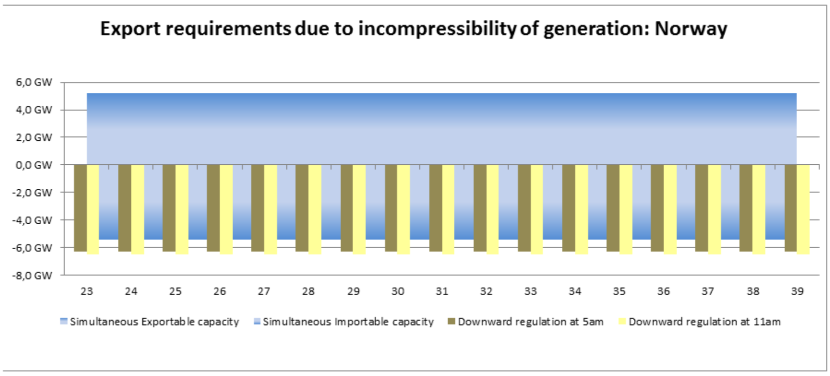
NORWAY









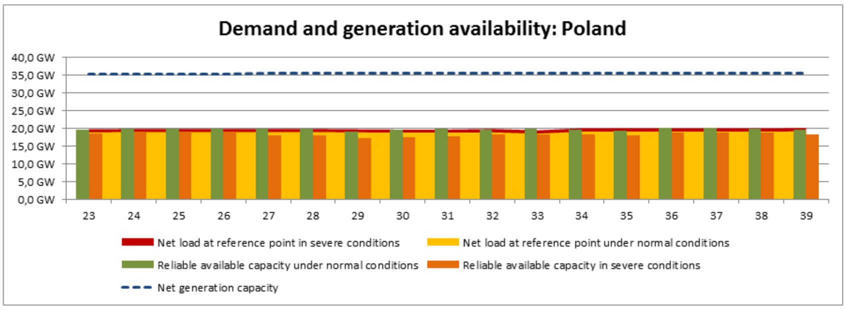
Synopsis

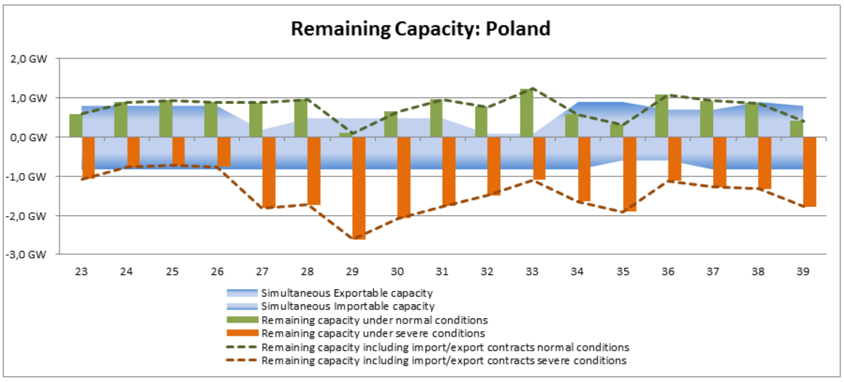
Statnett does not expect any critical situation during the summer 2013. The available generation capacity exceeds the expected peak load.

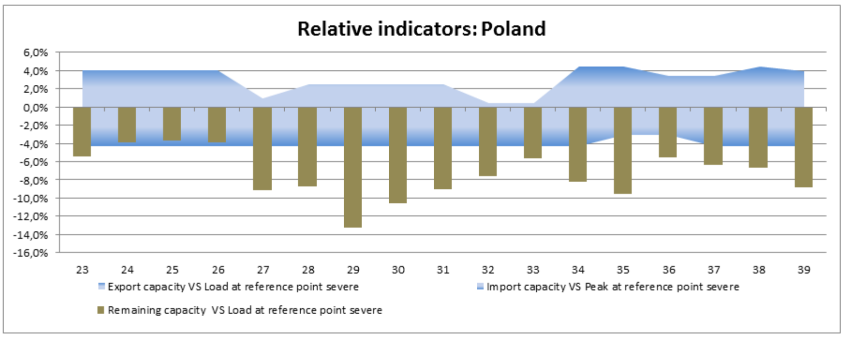
General situation

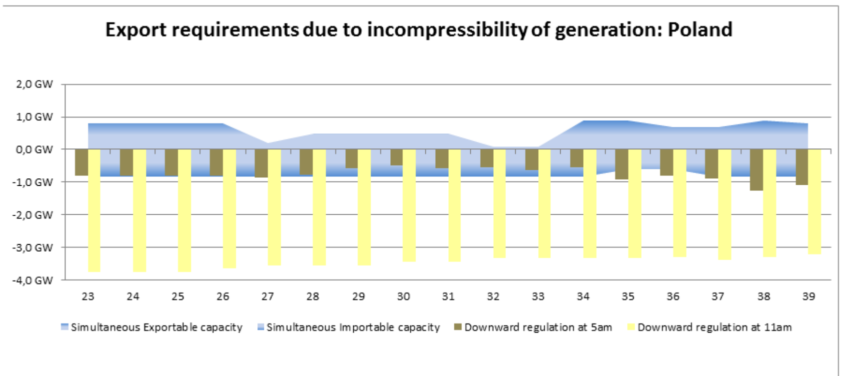
Towards the summer period 2013 we expect that the hydrological balance will be lower than normal. Due to lower energy balance, we expect import during the summer.

<u>POLAND</u>









Assessment for Summer season 2013

In normal conditions PSE does not expect any problems in operation and for balancing the system this summer. For the whole analysed period, the balance of the Polish power system is positive at 12:00 (CET). During peak hours an unbalance is expected in September as the result of a quick increase of peak load (quickly coming dusk, lower temperatures, peak load occurring in the evening), continuing overhauls, and Combined Heat & Power plants not having started yet. However, in September the evening peak is very short and PSE can use intervention reserves in pumped-storage hydropower stations to cover the peak demand.

Severe conditions, mainly in June and July, with extremely high temperatures and dry weather, may cause not only the increase of the forecasted load but also a higher level of unavailable units due to:

- restrictions in operation because of too high cooling water temperature in certain thermal power plants as well as a low level of natural sources of cooling water;
- generation limitations resulting from transmission network constraints.

To keep the balance at a safe level, the Polish TSO can use operational procedures to cope with power shortages.

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

Downward national analysis shows that in all reference points at 5:00 (CET) and 11:00 (CET) there will be no problem with the balance of the system – exports will be not required.

Referring to network conditions, for years PSE has been affected by unscheduled transit flows through the system from west to south. These flows not only limit cross-border exchange capacities which could be offered to the market, but mainly cause network problems in operations, as for example overloading of tie-lines and internal elements, and not fulfilling N-1 criteria on the borders. To keep the 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.

Expected role of interconnectors

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 (including unscheduled flows through the Polish system from 50Hertz to the Southern Polish border).

Additional Polish connections in use are: a DC cable to Sweden and a 220kV line to Ukraine, on which only imports are possible (Ukrainian units are synchronously connected to the Polish system).

As the best estimate of the NTC for the Summer Outlook, PSE provides the yearly forecast of the NTC. This forecast takes into account network constrains caused by planned unavailability of the cross-border and/or internal lines (or other elements) as well as unscheduled flows through the PSE control area. Both factors limit the transmission capacity for the Polish system in the yearly planning horizon.

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

Framework and methodology of the assessments

In Poland forecast plans (yearly coordination plans[4]) are created for the whole year on a monthly basis (average values for working days at peak time), until 30th November of every year.

On the 26th of every month PSE publishes monthly coordination plans, which include precise information on peak times for all days of the next month.

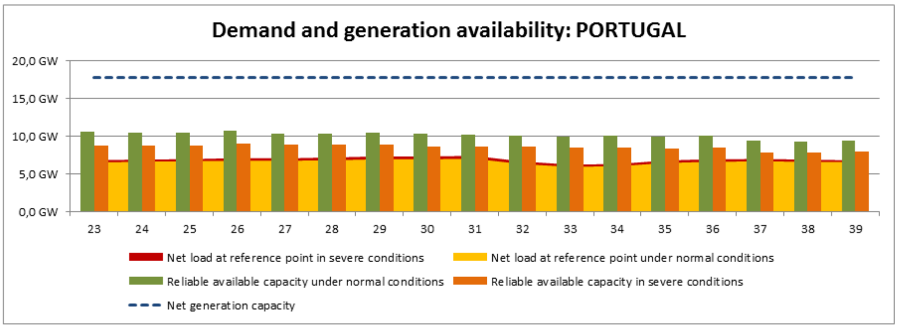
Further specification is done within the operational planning (weekly and daily). At the moment the Polish system has no problems balancing the system during the night (except for 3-4 days per year, especially during Christmas, Easter and holidays in May). This is the reason why PSE does not prepare the balance for minimum load in monthly and yearly forecasts. Such analyses are done during the daily planning.

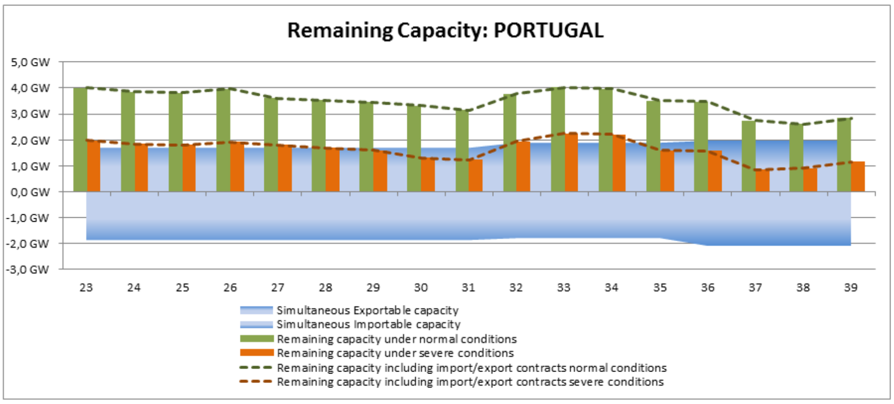
In normal conditions PSE classifies 88% of the wind national generating capacity as non-usable; for severe conditions this is 100%. The wind generation load factor used for the national downward analysis amounts to 85% of the national generating capacity.

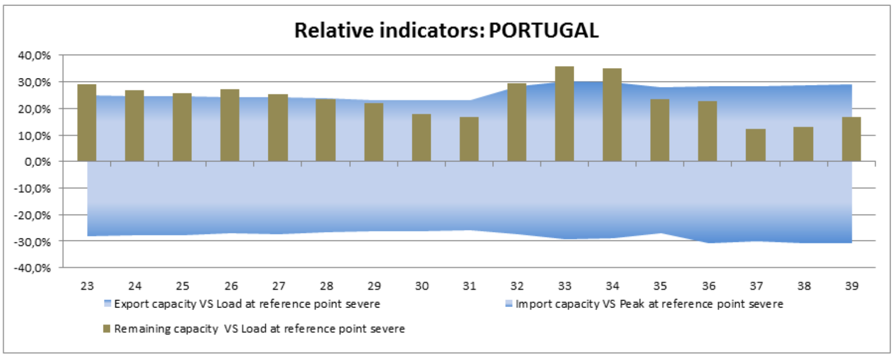
Because the Outlook reports require weekly data, PSE has prepared a special assessment for the Summer Outlook, where weekly data of the national generating capacity, overhauls, load and a best estimate of the NTC is required. It is important to underline that there also is a yearly planning horizon. This assessment as well as coordination plans are coherent and based on information from producers (national generating capacity, overhauls, non-usable capacity) and analyses of the Polish TSO (load, outages, reserves, non-usable capacity, NTC). Additionally, PSE has prepared the required data for downward regulation capabilities for all reference points, but this only based on best estimations.

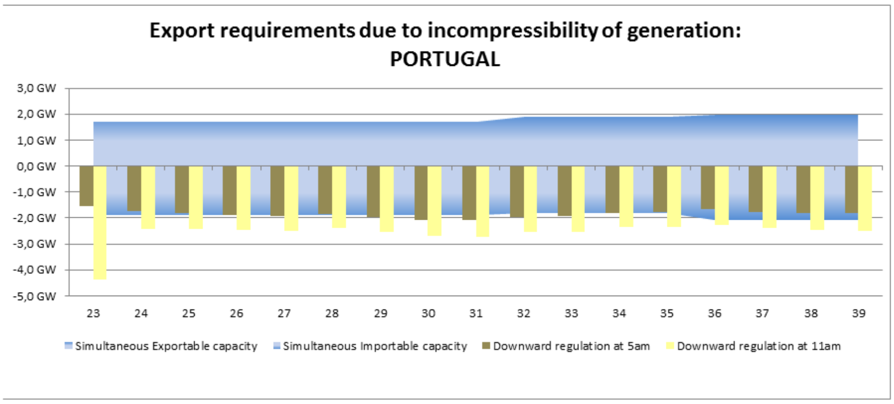
[4] System balance plans (published on PSE S.A. web site)

PORTUGAL


Demand and generation availability: PORTUGAL
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
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
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
40,0%
30,0%
20,0%
10,0%
0,0%
-10,0%
-20,0%
-30,0%
-40,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
-4,0 GW
-5,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Synopsis

The outlook for the generation-demand balance during the next summer season is positive.

As economy continues to slowdown, demand level is expected to be lower than in previous summers, and so the impact of the occurrence of heat waves.

From the generation side, conditions are also favourable to system adequacy as hydro levels are high (84% in the end of March) and thermal generating capacity is fully available from mid-June to mid-September.

The Portuguese system has virtually no primary source constraints other than water and wind availability, so we expect the available capacity will be more than sufficient to deal with all kind of unpredictable situations without resorting to imports.

ROMANIA

Synopsis

The forecast for the becoming summer 2013 does not indicate any problem which could affect the Romanian Power System adequacy.

General situation

The generation units' maintenance plan takes into account the requirements to cover the internal demand and to fulfil the system reserves amount in any time interval.

Most critical periods

During the summer of 2013, we do not expect critical time intervals even for heat wave circumstances.

Expected role of interconnections

As usual, the interconnection capacities will be used in the range of the NTC values offered to the market. There are regional coordinated plans of the interconnectors' maintenance in order to avoid the interconnection safety jeopardising and to optimise the NTC values.

On one hand, speaking about a high generation level of renewable it was observed during the last months an increased level of export schedules within the agreed NTC ranges. On the other hand, there are market rules and procedures in order to avoid unplanned exports when it could be an excess of inflexible generation at minimum demand hours.

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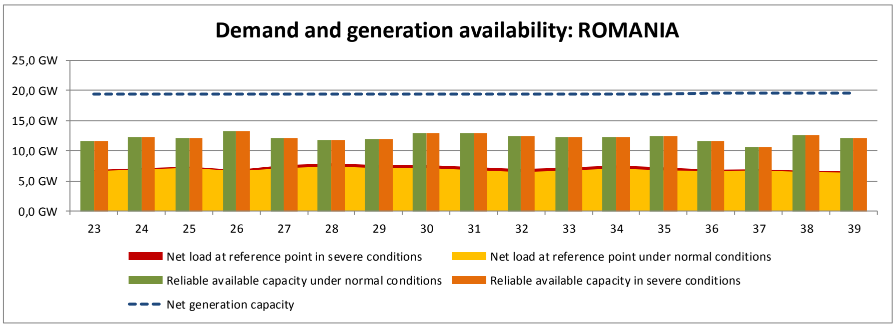
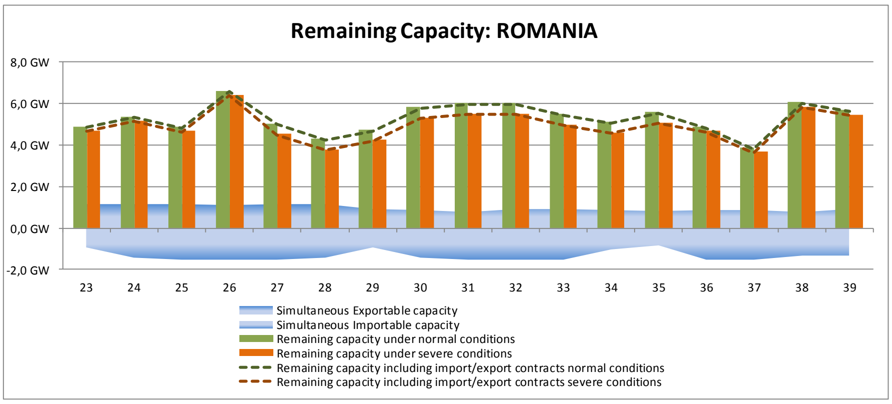
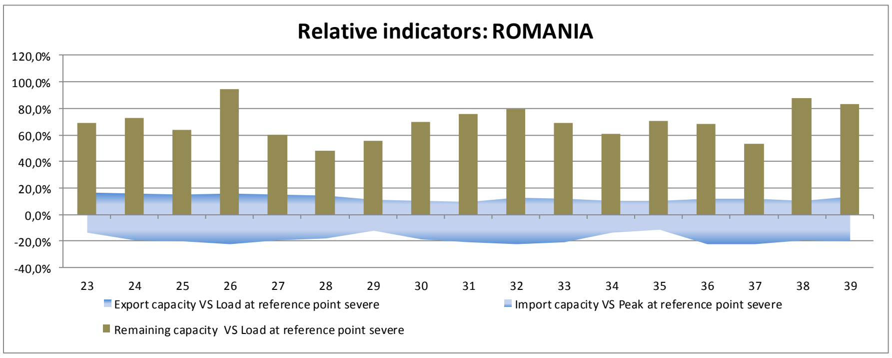
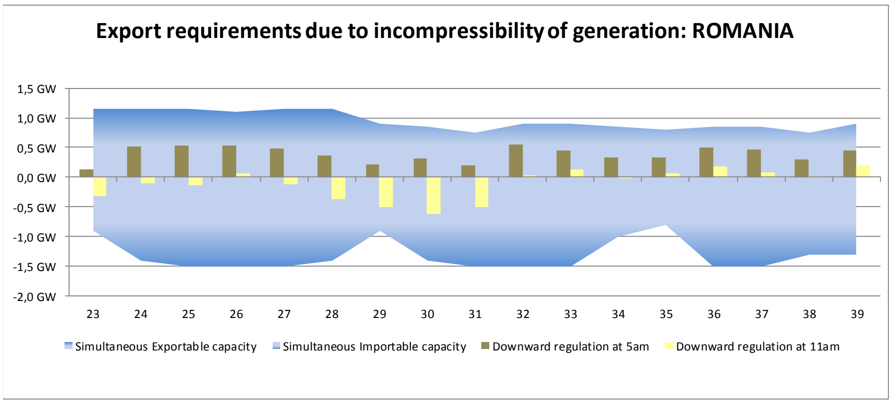

Demand and generation availability: ROMANIA
25,0 GW
20,0 GW
15,0 GW
10,0 GW
5,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity


Remaining Capacity: ROMANIA
8,0 GW
6,0 GW
4,0 GW
2,0 GW
0,0 GW
-2,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
120,0%
100,0%
80,0%
60,0%
40,0%
20,0%
0,0%
-20,0%
-40,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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
1,5 GW
1,0 GW
0,5 GW
0,0 GW
-0,5 GW
-1,0 GW
-1,5 GW
-2,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Framework and methodology of the assessments

Based on a Methodology issued by the National Energy Regulatory Authority, the consumption projection for the coming summer is approved by the Regulator before the beginning of the year, based on the hourly load forecasts delivered by the suppliers and distribution companies. According to the same Methodology, Transelectrica receives on behalf of producers also the planned maintenance / overhauls schedules and units technical and economic data for the next year, in order to perform the market analysis that will provide the input to the Regulator for establishing the regulated contracts. Also these data are used to assess the load and national generating capacity data for next summer adequacy outlook.

The best estimated NTC values was obtained based on the NTC profile for 2012, calculated monthly for time periods defined by maintenance schedules for both transmission network in the National Power System and in the neighbouring region

The following algorithm was applied:

- the network elements limits for 2013 was checked in comparison with the 2012 ones;
- average NTC values from June till September 2011 without significantly limiting disconnections were determined and set for the summer 2013 dates without significant disconnections;
- the disconnections of the lines in the National Power System and region, which determined significant modification of Romanian export/import NTC values in the summer 2012, were identified;
- the disconnection periods of these lines were identified in the 2013 national maintenance plan and in the regional maintenance schedules and correspondingly modified NTC values were declared for 2013 summer days with such significant disconnections.

SERBIA

General situation

During this summer it is not planned high level of maintenance and hydro levels are above average, therefore we don't expect any issues.

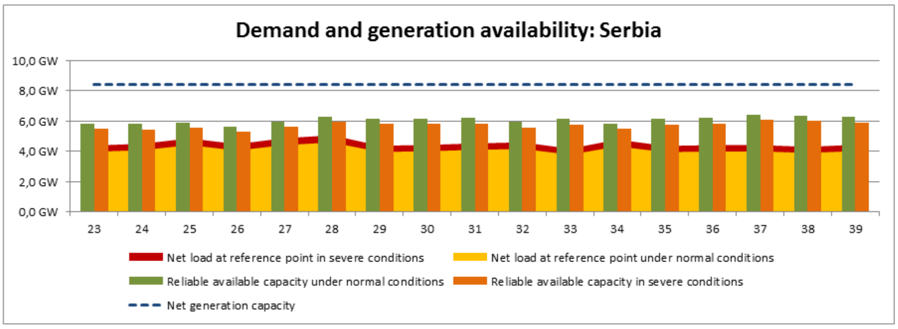
Most critical periods

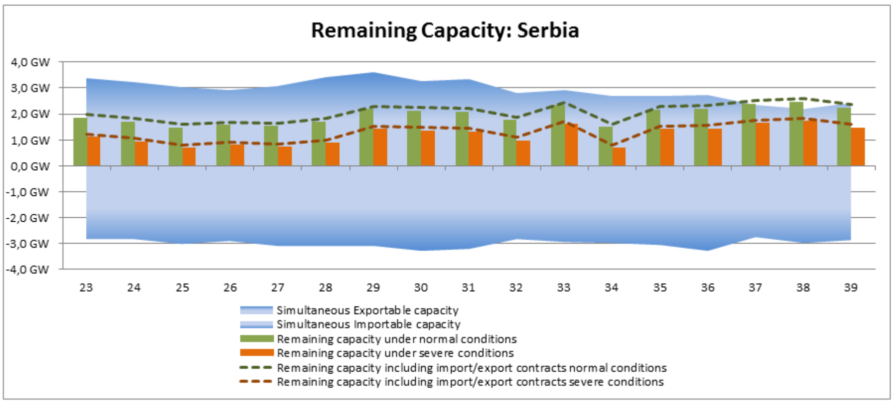
We don't expect any critical periods.

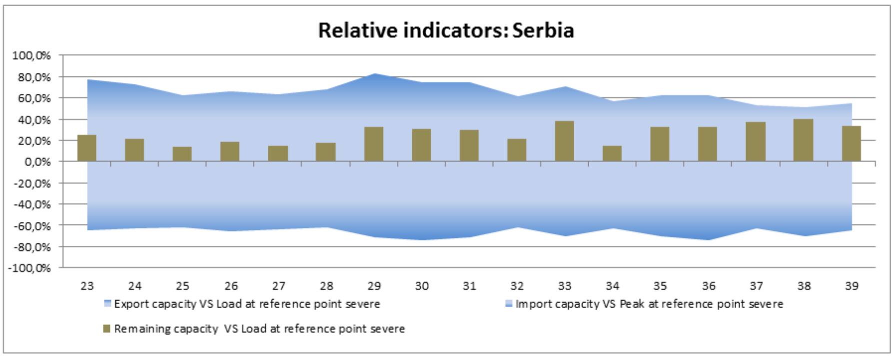
Expected role of interconnections

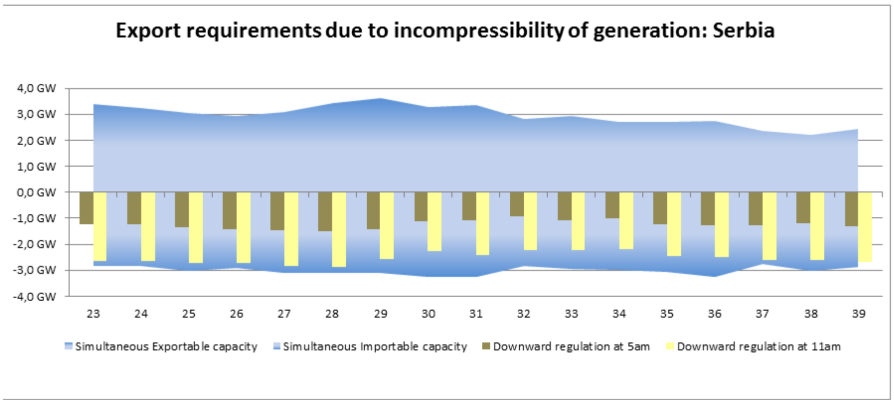
We don't expect necessity for interconnectors' usage to maintain adequacy. We expect only small amount of commercial exporting.

We don't expect necessity for interconnectors' usage to manage minimum demands periods.









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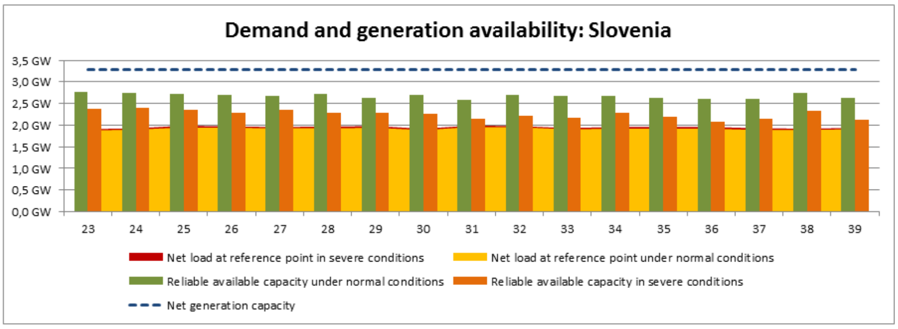
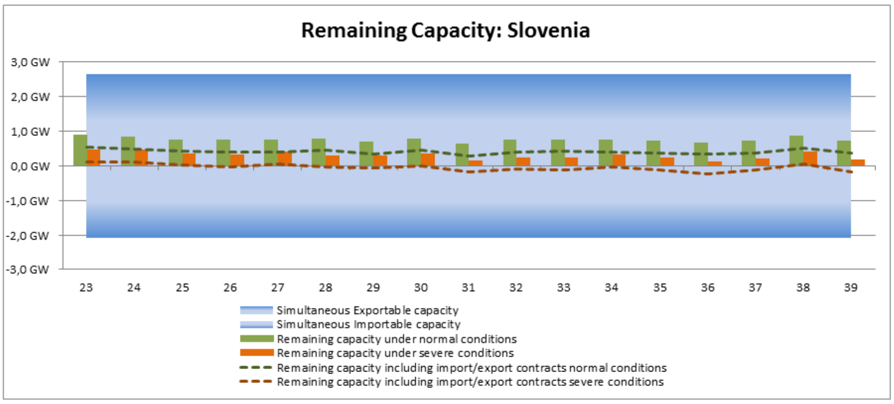
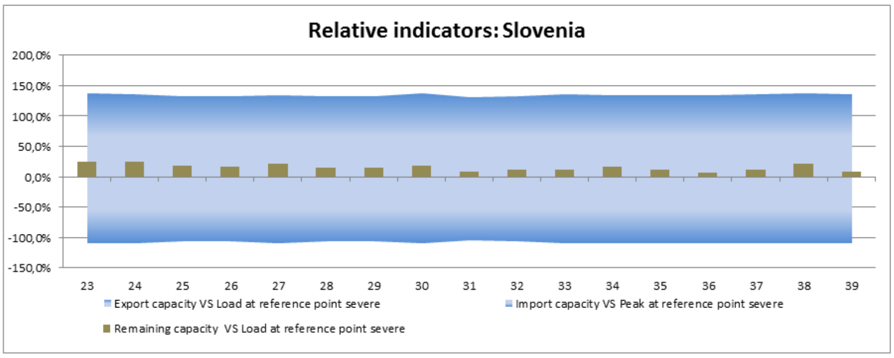
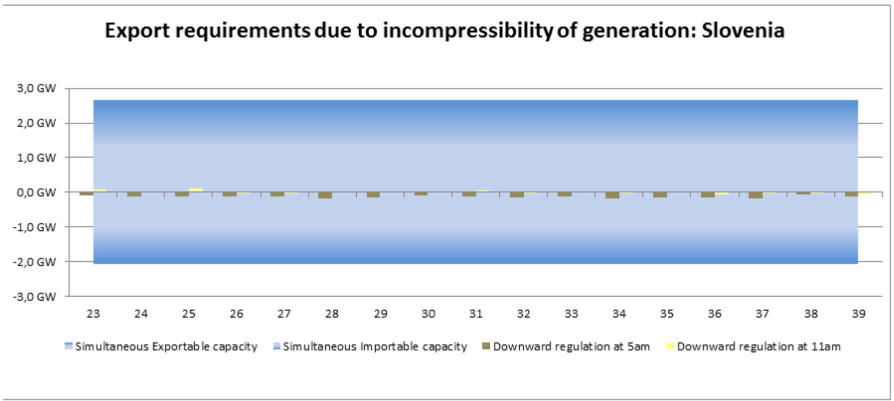
SLOVENIA


Demand and generation availability: Slovenia
3,5 GW
3,0 GW
2,5 GW
2,0 GW
1,5 GW
1,0 GW
0,5 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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: Slovenia
3,0 GW
2,0 GW
1,0 GW
0,0 GW
-1,0 GW
-2,0 GW
-3,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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: Slovenia
200,0%
150,0%
100,0%
50,0%
0,0%
-50,0%
-100,0%
-150,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
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: Slovenia
3,0 GW
2,0 GW
1,0 GW
0,0 GW
-1,0 GW
-2,0 GW
-3,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

General situation

In July and August lower hydro levels are expected. No problems with gas supply are expected as a low electricity production from gas is usual for Slovenia. No planned commission or decommission of units in the coming summer.

Most critical periods

No critical situations are expected. With firm exports taken into account some imports to cover peak loads will probably occur.

Expected role of interconnections

Slovenian power system is well connected to neighbouring systems. Interconnectors enable cross border trading as well as help from neighbouring systems in case of emergency. All maintenance works on interconnection lines are coordinated and planned with neighbouring TSOs.

Slovenian power system is connecting three different price areas (central-east Europe, Italy, south–east Europe), therefore electricity prices in these three areas dictate export/import situation in Slovenia. High import and high export at the same time are characteristic for typical transit country, such as Slovenia is, however due to well interconnected network ELES does not expect transmission constraint and/or reductions of import/export in coming summer period.

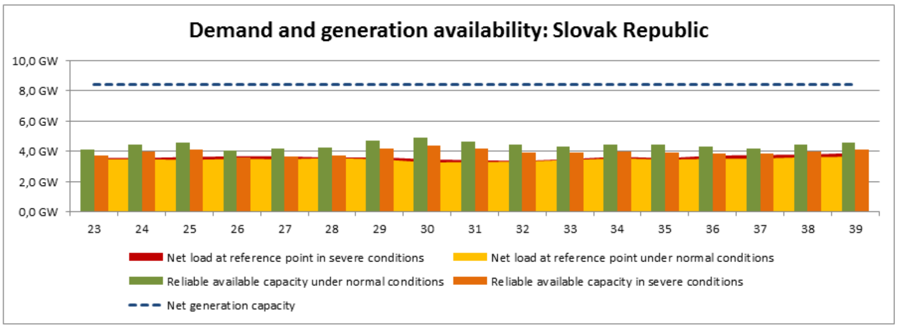
SLOVAK REPUBLIC

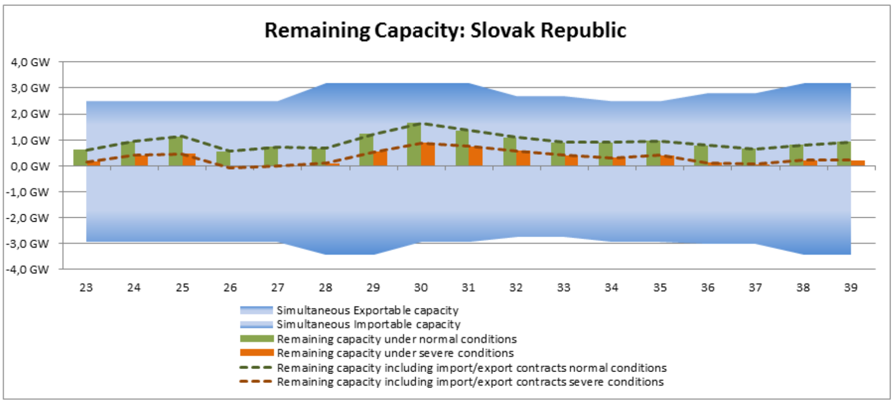
General situation

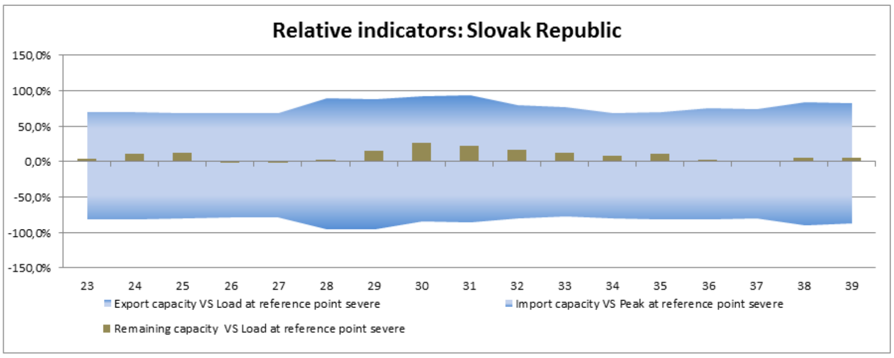
Summer is a period of maintenance and outages of some power plants. A unit of 430 MW capacity will be probably out of operation during all summer and maintenance of a nuclear unit (500 MW) is planned in weeks 26 to 28.

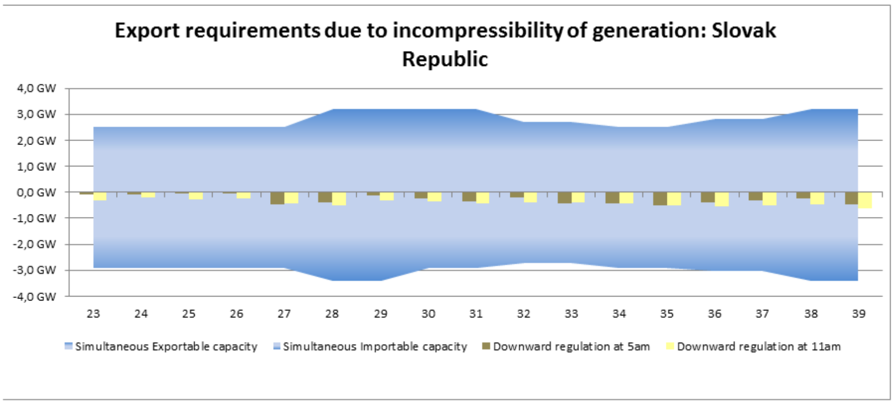
Most critical periods

Remaining capacities under severe conditions in several weeks are slightly negative. Under normal conditions the remaining capacities are sufficient. The highest weekly peak load in severe conditions for this outlook report is foreseen in the 39th week, 3890 MW (the same level as in summer 2012). The last summer peak load was 3 672 MW, recorded on September 24, at 20:00. In August 2013 two tie-lines between SEPS and PSE are out of operation for two weeks. No new tie-lines and decommissioning of current interconnectors are planned in this summer. In case of electricity import, the cross-border capacities are sufficient in summer period.


Demand and generation availability: Slovak Republic
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: Slovak Republic
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: Slovak Republic
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: Slovak Republic
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Expected role of interconnections

In summer 2012 the electricity import was in June, July and September, while it was expected in all summer months. Import of electricity (292 GWh) was 2.5 % of consumption in summer 2012. These imports were not caused due to the lack of generation capacities but trading activities. In summer 2013 we expect similar situation.

Framework and methodology of the assessments

The analysis of unavailable generation capacities is based on the data from the previous year. Generation capacities reflect the situation as of the end of 2012. The maximum weekly load was estimated at the same level as the last year (we assume the same weather and behaviour of consumers). Operation of nuclear, thermal, hydroelectric and renewable sources was identified according to experience from previous years. Cross-border capacities were calculated taking into account planned outages.

SWEDEN

Synopsis

No particular problems are foreseen the upcoming summer when it comes to adequacy of demand vs. generation balance or inflexibility of generation. But a lot of grid maintenances are scheduled which require post fault remedial actions to be prepared to be able to cope with local problems (e.g. overload of remaining elements after fault) which shouldn't have any significant effect on any of the neighbouring countries.

General situation

During summer, with a small exception during July, there is a lot of maintenance on both grid elements and production units. Net export from Sweden is nonetheless expected during the whole period. When it comes to grid elements taken out of service it is both due to maintenance of existing facilities and due to new investments. Other than that no particular problems are foreseen, although some maintenance is more critical than others.

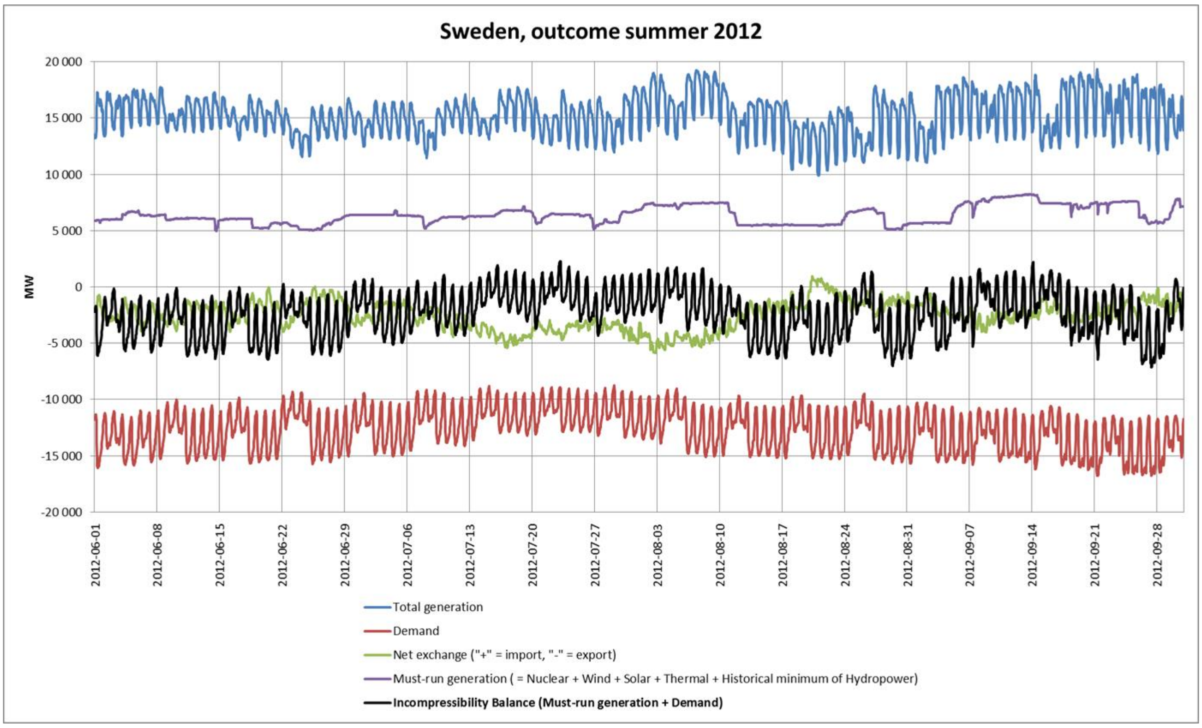
Most critical periods

No certain period during the summer is expected to be much more critical than the others, because the maintenance works is relatively evenly distributed over the period. Generally, situations with high voltages are to be expected (especially during nights) which is a consequence of long and lightly loaded transmission lines. This could however be handled by disconnecting parallel lines, which is a standard procedure for controlling voltage in Sweden, and should not cause any significant problem in neighbouring countries. Furthermore, during spring flood some overloads in the northern 220 kV grid may occur which requires reallocation of production and/or disconnection of lines. Beside this, summer is also a period with increased probability of lightning strikes. As this is the most common cause of the faults in the Swedish national grid a Lightning Localization System is used during summers. In summary, no particular problems are foreseen although a lot of maintenance requires special attention due to local problems and with regard to the N-1 criterion.

Expected role of interconnections

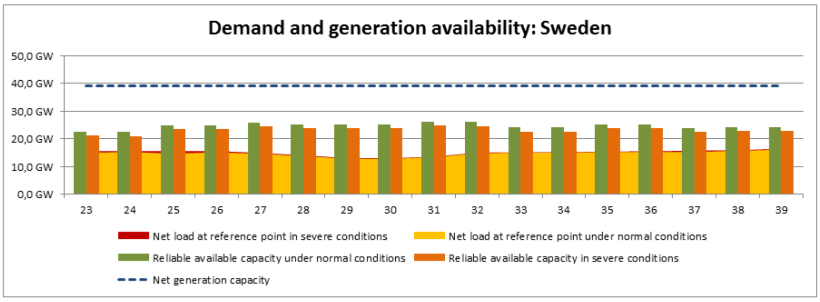
As Sweden is expected to export power during the whole summer period no adequacy issues related to the interconnectors are expected.

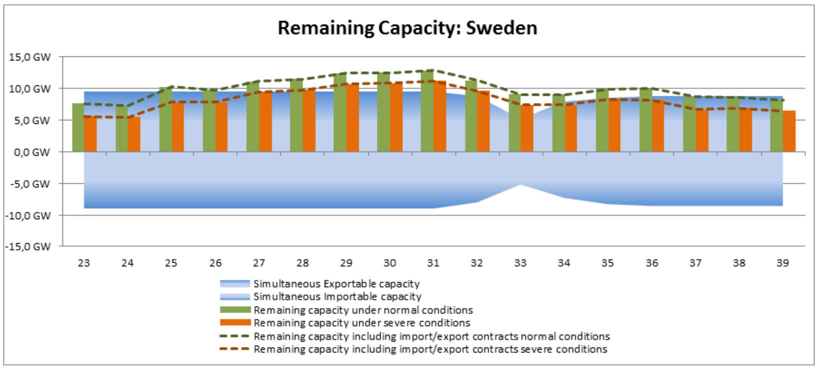
Export is expected during the whole summer period. When looking back at the previous summer (2012) one can see that the export was only needed during July and the first half of August (as the demand is low during the vacations) when it comes to inflexibility of generation, please see the figure below.

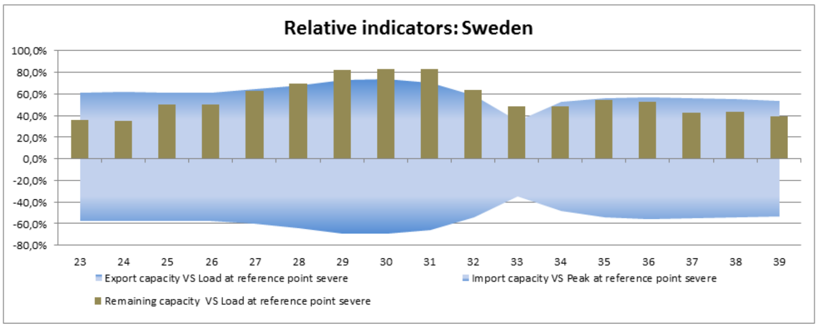


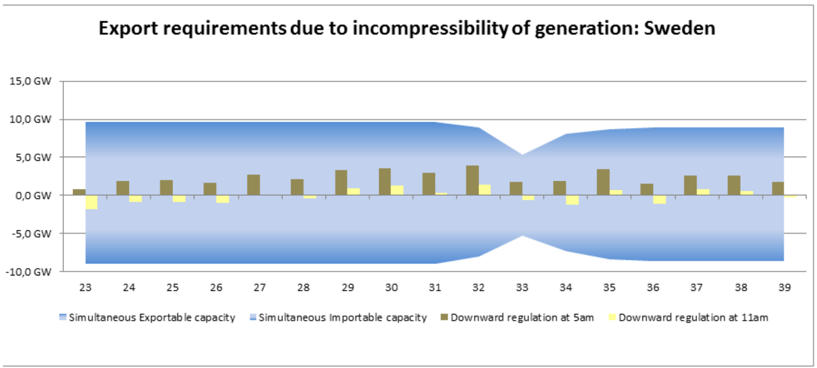
Framework and methodology of the assessments

The outage rates have been estimated with help of historical data. Best estimate of NTC on interconnectors and maintenance/overhauls (and mothballed) production units, have been assessed with help of market messages at Nord Pool Spot (via Urgent Market Messages - UMMs) and historical data. Must-run generation have been assessed based on historical data and the need of a certain level of production to meet system requirements (e.g. Frequency Containment Reserve - FCR, voltage regulation, etc.). Finally, demand figures are based on previous years demand data.

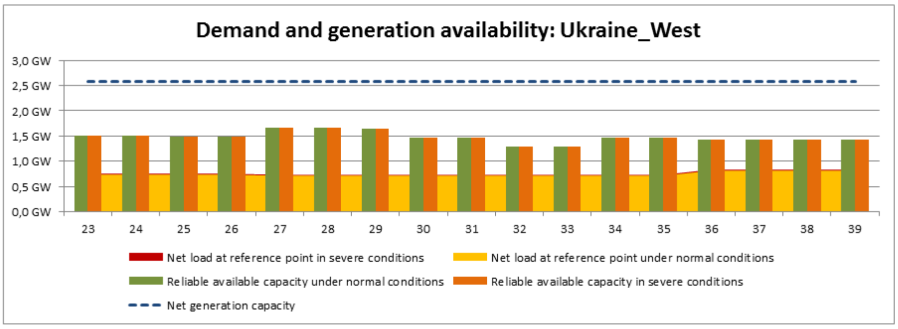

Demand and generation availability: Sweden
50,0 GW
40,0 GW
30,0 GW
20,0 GW
10,0 GW
0,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Net load at reference point in severe conditions
Net load at reference point under normal conditions
Reliable available capacity under normal conditions
Reliable available capacity in severe conditions
Net generation capacity

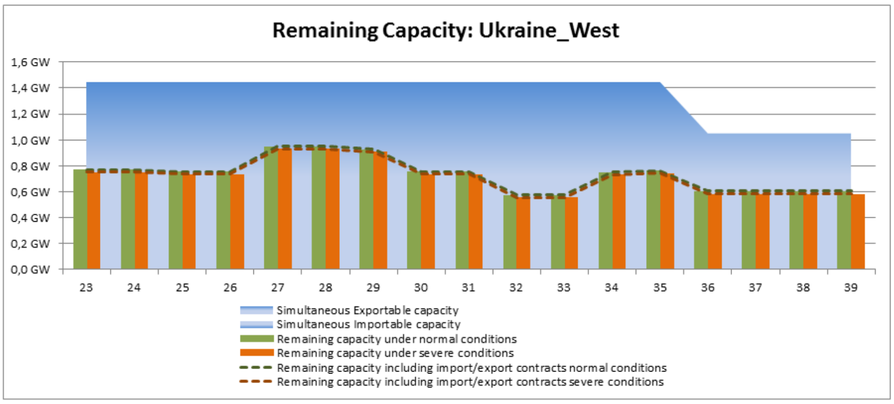

Remaining Capacity: Sweden
15,0 GW
10,0 GW
5,0 GW
0,0 GW
-5,0 GW
-10,0 GW
-15,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Remaining capacity under normal conditions
Remaining capacity under severe conditions
Remaining capacity including import/export contracts normal conditions
Remaining capacity including import/export contracts severe conditions

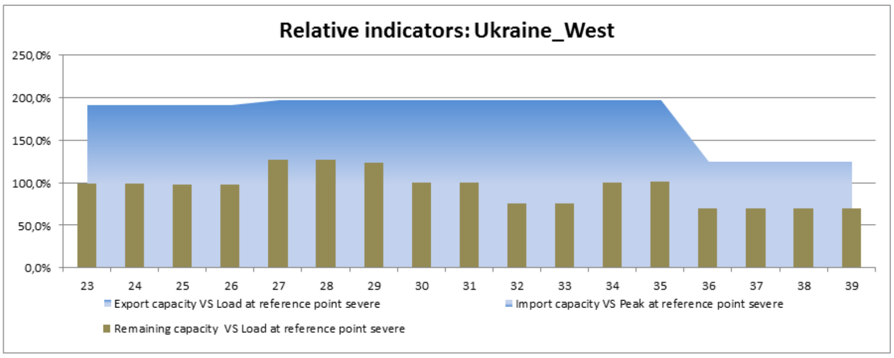

Relative indicators: Sweden
100,0%
80,0%
60,0%
40,0%
20,0%
0,0%
-20,0%
-40,0%
-60,0%
-80,0%
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Export capacity VS Load at reference point severe
Import capacity VS Peak at reference point severe
Remaining capacity VS Load at reference point severe

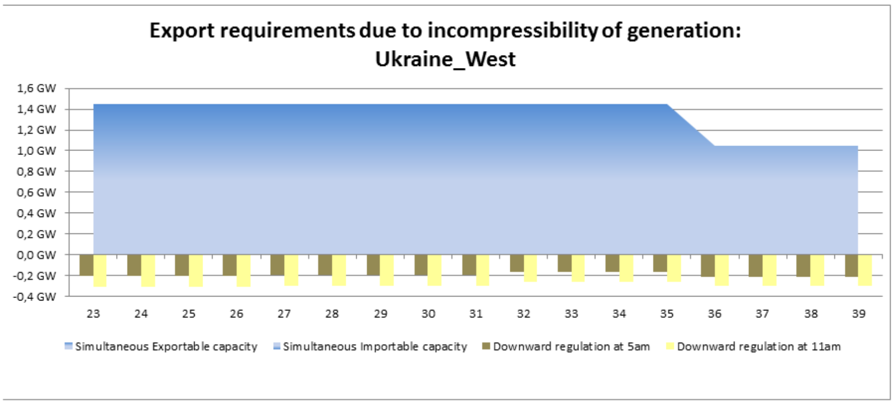

Export requirements due to incompressibility of generation: Sweden
15,0 GW
10,0 GW
5,0 GW
0,0 GW
-5,0 GW
-10,0 GW
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Simultaneous Exportable capacity
Simultaneous Importable capacity
Downward regulation at 5am
Downward regulation at 11am

Ukraine West









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6.2 INDIVIDUAL COUNTRY RESPONSES TO WINTER REVIEW

ALBANIA

General comments on the main trends and climatic conditions

Winter period that just passed was relatively mild compared with the respective period of a year ago, and can say that we have not faced with severe conditions as provided in the report for this winter. Temperatures in the lower and coastal areas, where the most of electricity consumption is concentrated, did not exceed the foreseen values. The average temperature in these areas was about 8 degrees centigrade, and the low one was around 0 degrees centigrade. During the months of December and March there were a lot of rainfall and as a result there were abundant flows in reservoirs of Drin cascade power stations in the north of the country.

Occurrence of the identified risks

During this winter we did not face with the risk identified in the previous report of winter outlook.

Unexpected situations

Given that foregoing winter was relatively mild, we did not faced with problems or difficulties relating to the transmission system, so we had no reduction in transmission capacity either in internal network or in interconnection network. Availability (transmission capacity) of import/ export was in the full capacity. At the same time, as a result of abundant rainfall and respective inflows, we have had a greater generation and lower import values compared with the pre-planned values provided for these items starting from December until March of this year.

Effects of external factors on demand

It is not identified any influence of external factors on the electricity consumption in Albania, so we are not faced with reduced demand due to economic conditions, climate changes or energy efficiency initiatives. Instead the electricity consumption in Albania has been increased during the period from December to March compared with the values foreseen for this time of the year. Also during this period the peak load resulted in higher values than provided, as shown in the attached graphs.

Most stressed periods for system adequacy

Most stressful period was it from the second part of December until the end of February as a result of high demand for electricity; however, we were not faced with adequacy problems thanks to the imports that have continued during all times although in smaller quantities than previously planned.

Specific events occurred during the winter

Excluding the growth of domestic consumption and peak load mainly during the months of January and February, our power system was not facing with specific events such as the reduction of gas imports because APS do not have TPP with gas and Albania is not importing gas for energy production, also we did not faced with other events of this nature.

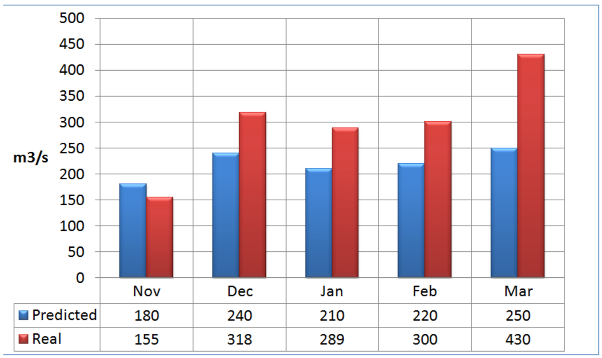
Detailed review of the most stressed periods

Average conditions of the foregoing winter, as mentioned above, were almost similar to those foreseen and hoped by us beforehand, primarily associated with ambient temperatures. Regarding energy parameters, as a result of increased inflows in Drin cascade, and in order to meet the increased demand for electricity, we did operate by increasing the generation at power plants of Drin cascade and by reducing the energy imports for the whole period of December -œ March, even for March realization of energy imports is about 25% of the quantity anticipated to be imported for this month. In the next worksheet there are some graphics showing the implementation of key energy parameters, monthly basis, and comparison with the values previously planned by us. It should be noted that during the winter period we have had no problems of grid congestions because the maintenance works have been completed around the end of October. Meanwhile there have been some short-term supply interruptions for periods of several hours announced in advance, due to rehabilitation works that still continue in our 400 and 220 kV substation,

Lessons Learned for next winter

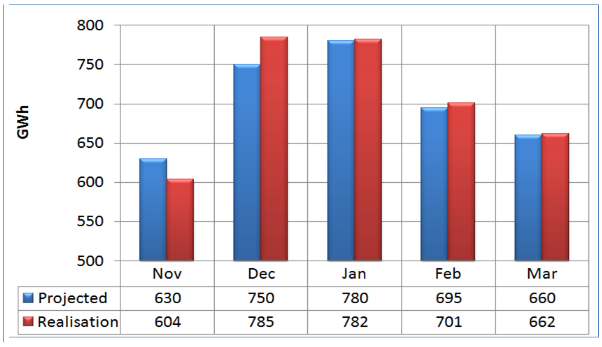
Lesson learnt: it is clear that we have to go ahead and accelerate the projects in Generation and Transmission system, in order to diversify generating sources and reduce the dependence from electricity import.

Monthly inflows at Fierza HPP



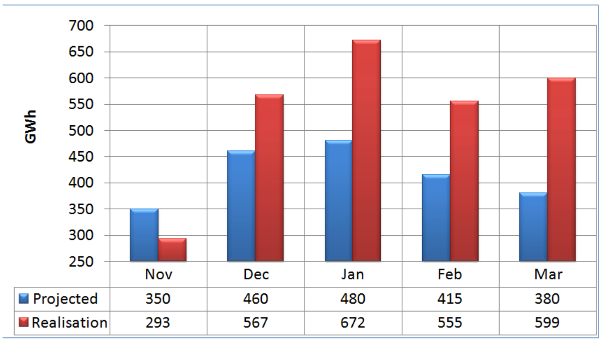
	Nov	Dec	Jan	Feb	Mar
Predicted	180	240	210	220	250
Real	155	318	289	300	430

Monthly Consumption



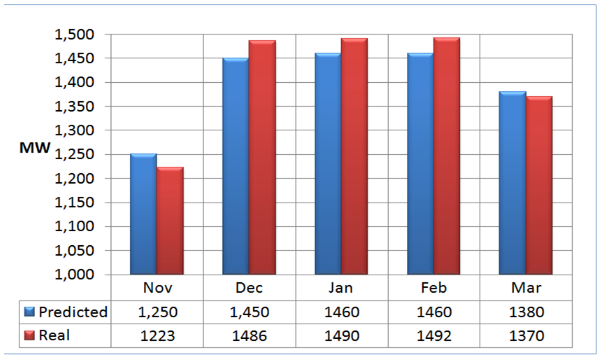
	Nov	Dec	Jan	Feb	Mar
Projected	630	750	780	695	660
Realisation	604	785	782	701	662

Monthly total production



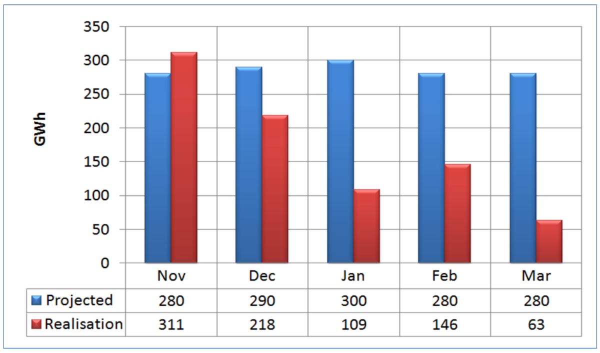
	Nov	Dec	Jan	Feb	Mar
Projected	350	460	480	415	380
Realisation	293	567	672	555	599

Monthly Peak Load



	Nov	Dec	Jan	Feb	Mar
Predicted	1,250	1,450	1460	1460	1380
Real	1223	1486	1490	1492	1370

Monthly import



	Nov	Dec	Jan	Feb	Mar
Projected	280	290	300	280	280
Realisation	311	218	109	146	63

AUSTRIA

General comments on the main trends and climatic conditions

Winter 2012/2013 brought heavy snowfall in all parts of Austria. Temperatures were at the level of an average winter situation. No extreme weather situations occurred during this winter period.

Occurrence of the identified risks

In the Winter Outlook Report a potential risk of higher load flows from Austria (APG) to Germany (TENNET) on the 220kV tie line between St. Peter (APG) and Germany as consequence of the shutdown of nuclear power plants were mentioned.

Due to high production in Germany no problems happened. In contradiction unexpected high imports from Germany to Austria on few days were recognised due to low prices because of high wind and solar generation in Germany.

Effects of external factors on demand

Due to the prolongation of the economic crises no increase of load compared to the previous winter situation were measured.

Most stressed periods for system adequacy

System adequacy was easily met over the full winter period.

BOSNIA & HERZEGOVINA

General comments on the main trends and climatic conditions

During the winter period 2012/2013 there were not significant unusual events in the electric power system of Bosnia and Herzegovina. Maximum load occurred on December 13 at 18:00, and it was 2032 MW. Electric power balance was positive during this period, and Bosnia and Herzegovina exported electricity.

BELGIUM

General comments on the main trends and climatic conditions

In its winter outlook 2012 Elia indicated a potential issue with regards to Generation/load adequacy under extreme winter conditions in all of CWE following the structural outage of 2GW of base load nuclear production. Combined with market trends and outage planning a structural dependency on imports of up to 3500MW was forecasted.

In hindsight, the extreme conditions did not entirely occur; temperatures were cold or very cold, but not extreme.

The following observations can be stated:

- Mid January to early February: very cold temperatures.

- Further on from mid-February: structurally cold temperatures.

- Until mid-March: below average temperatures.

Occurrence of the identified risks

- The forecasted high load was partially attained especially in Belgium; other CWE countries were less susceptible to extreme loads.

- The structural dependency on imports was also confirmed: 1/3 of the time max imports in excess of 3000MW were recorded (about 25% of peak load)

- Import levels of up to 3800MW attained, requiring prior and additional security studies (mostly stability related),

Effects of external factors on demand

The peak load reached this winter is slightly lower compared to 2012 for Belgium. In France, the peak load was 10GW lower than last year. Possible reasons can be:

- Temperatures were cold, but not extreme.

- Low temperatures limited to only a part of CWE, not all CWE.

Specific events occurred during the winter

On February 14 the coastal region of the Elia grid was susceptible to Galloping on series of 150kV overhead lines. In total 5 overhead lines tripped in the same region within a 5 hour time frame, leading to small local blackouts. (About 20MW load impacted),

Detailed review of the most stressed periods

January 11: with a cold spell about to start, Elia faced the additional forced outage of a third nuclear power plant - Tihange3 (1000MW) on a Friday. The immediate loss was compensated for by fast starting reserve units. Soon thereafter, market trades increased import levels for Belgium. On this day, peak imports of about 3800MW were reached and additional safety studies were performed to check the system stability. The unit came back on line on Saturday.

January 17: highest load in both BE & FR due to cold temperatures, high market prices in D-1 lead to start-up of additional available generation. Instead of the usual 2-2.5 GW imports, the imports into Belgium significantly decreased to about 1500MW. Additionally BE was faced with 3 outages totalling more than 1000MW the same evening between 17h00-20h00.

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The loss of these power plants was compensated by depleting free bids, activation of contractual load shedding, incl. extra winter contingent & demand side, start-up of tertiary reserves (300MW). All available reserves were used to cover the incidents: no more margin was left.

Lessons Learned for next winter

The extra efforts invested by Elia in autumn to prepare for the upcoming winter contributed to a manageable situation:

- CWE coordinated calculations & data exchanges

- Preparation together with CORESO

- Create awareness on the stressful winter situation among market parties,

- minimise grid outages

- optimise plant outage planning (with market parties)

- Winter dashboard (with indicators) set-up & close monitoring of the situation both provisional as in real time.

- Prior briefing/exchange with policy makers

BULGARIA

The monthly consumption during the winter period compared with the same period of the previous year is as follows: increase by 1.07 % in December, decrease by 5.06 % in January and decrease by 19.06 % in February. The significant decrease of the consumption in February is due to the fact the average monthly temperature in 2013 was with 6 C' higher and that 2012 was a leap year

The highest load for the past winter period was observed on 9 January 2013 – 6656 MW. Compared with the peak load of the previous winter (7444 MW on 1 February 2012) the decrease is by 10.5 %. The reason for this is that the average temperature on 9 January was with 7.2 C' higher. Water levels in the big reservoirs were quite above target levels and hydro plants experienced more intensive operation. The high level of penetration of RES (mostly photovoltaic) combined with the low demand and the unusually low exports have become a pressing concern lately. The favourable weather conditions and the political and economic state of the country have led to a boost in RES production and an overall drop in demand. Significantly reduced export quantities are another negative factor. For these reasons there were problems covering the minimum loads of the power system especially in days with clear skies and high output from photovoltaics. The load sensitivity to temperature was from 90 MW / C' (against 97 MW/C" for the previous winter period). There were no critical outages in the transmission network.

No predefined risks occurred. We experienced balancing problems during early afternoon hours in clear sky days due to high penetration and hence to high output from the photovoltaic plants.

SWITZERLAND

General comments on the main trends and climatic conditions

December 2012: the first half was wintery with temperatures lower than the norm and frequent snowfall. The second half was mild but also very humid.

January 2013: that month was marked by too low precipitations

February 2013: the temperature was below the norm, and there was little sunshine

March 2013: the temperature was well below the norm, and there was little sunshine,

Occurrence of the identified risks

No risks were identified, and nothing special occurred.

Unexpected situations

No.

Effects of external factors on demand

No.

Most stressed periods for system adequacy

None.

CYPRUS

General comments on the main trends and climatic conditions

Climatic conditions during winter 2012-2013 were held at normal levels.

Occurrence of the identified risks

No risks expected.

Unexpected situations

The reduction of the minimum load due to the economic crisis and the increased wind generation during the morning hours resulted in limited wind generation curtailment. This was applied during the morning hours in order to sustain the safe and secure operation of the system.

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Effects of external factors on demand

The Cyprus electrical system is an isolated system. Increased wind penetration during the morning hours resulted in around 0.5 GWh of wind generation curtailment.

Most stressed periods for system adequacy

Curtailment was applied mainly during the morning hour period (0:30-06:00), when high wind penetration occurs.

Specific events occurred during the winter

Wind power generation curtailment was carried out due to low load demand and high wind generation during these hours.

Detailed review of the most stressed periods

TSO Cyprus has set up a curtailment policy. This was applied mostly during morning hours when wind penetration is high and load demand conditions are low. The amount of energy curtailed is estimated on a daily basis.

Lessons Learned for next winter

The new format in completing the report in the excel file is very convenient and helpful.

CZECH REPUBLIC

General comments on the main trends and climatic conditions

The fact differed slightly with the assumptions from point view balance. During winter period, regulation power reserved sufficient amount for TSO needs. We have had export potential.

Occurrence of the identified risks

The risks situations were not expected in the Winter Outlook from point view balance. Problems were expected with overflow of energy from north to south. This problem occurred in late year 2012. Problem solved redispatching of generating plants.

Unexpected situations

No risk situation was foreseen. There were no unexpected situations from the balance viewpoint.

Effects of external factors on demand

During the winter, the emergency situations were not unexpected in balance. Problem occurred due to overflow of energy from North to South caused by wind plants. It was

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necessary to make the redispatching of generating plants. We reach at limit of network security of the country.

Most stressed periods for system adequacy

The most stressed period was in late year 2012. We carried the redispatching of generating plants in late year 2012.

Specific events occurred during the winter

During the winter, the situations were not unexpected problems in balance. Problem occurred due to overflow of energy from North to South caused by wind plants. It was necessary to make the redispatching of generating plants. We react at limit of network security of the country.

During the winter we had no problem with the import of gas.

Detailed review of the most stressed periods

During the winter, the situations were not unexpected problems in balance. Problem occurred due to overflow of energy from North to South caused by wind plants. It was necessary to make the redispatching of generating plants. We reach at limit of network security of the country. During the winter, risk situations were not from point view planned and unplanned overhaul plants. Weather conditions were within the expected.

GERMANY

General comments on the main trends and climatic conditions

A longer cold-spell as in winter 2011/12 did not occur the last winter.

Occurrence of the identified risks

No gas shortage has occurred in the last winter so far. As expected, (N-1)-situations occurred and could be handled with the prepared countermeasures.

Unexpected situations

On the evening of December 24th, the German control area was massively oversupplied (up to 8 GW), resulting in strong negative prices for electricity. This also contributed to an unusually high upward frequency deviation (frequency reached 50.13 Hz in maximum). During this period of time the German demand for negative control reserve could not be satisfied by the procured reserves and emergency reserve had to be used.

This unusually high demand for negative control reserve continued – to a lesser extent – until 5th January.

Effects of external factors on demand

No.

Most stressed periods for system adequacy

Holidays around Christmas and New Year's Eve.

Specific events occurred during the winter

At December 18, 2012 a new line between Hamburg and Schwerin was commissioned in the control area of 50Hertz. This line contributes to a higher security of supply in the region of Hamburg and to an increased integration of wind energy in the northern parts of Germany.

PSE (Poland) and 50Hertz operated a virtual phase shifter (vPST). The test phase ends in April 2013. At that time a prolongation or determining of the vPST is not decided.

Some power plants were decommissioned but due to their importance kept in a new type of reserve. This reserve is only available for network security purposes and not for system adequacy needs. Similar reserves have been contracted abroad. The common network analysis of the German TSOs for the winter has continued as in the year before providing important guidance for preparation of measures and dimensioning of extra reserves.

Lessons Learned for next winter

The new balancing pricing mechanisms introduced after the winter 2011/12 are still not sufficient to prevent situations like the ones in last winter around Christmas and New Year's Eve.

DENMARK

General comments on the main trends and climatic conditions

It has been a calm winter. There has been no system disturbance due to the weather. There were two cable outages: One on the interconnection to Bornholm and one on the interconnection between Zealand and southern Sweden. The interconnection to Bornholm disconnected as a consequence of an anchor in the cable. The interconnection was disconnected for approximately six weeks.

One in four interconnections between Zealand and Southern Sweden disconnected as a result of a cable fault. A 132kV cable disconnected as a consequence of flashover in the cable - the cable is expected in service by the middle of March after five weeks outage time.

On 25 December the market was struck by very low prices (-200 Euro/MWh). The reason was a combination of very low consumption, much wind and very bound production as a consequence of district heating production. The large production caused curtailment of tenders (not possible to form market price). Subsequently, the large production caused shutdown of wind farms.

ESTONIA

General comments on the main trends and climatic conditions

Winter was normal with no extraordinary circumstances. The average temperatures in December were lower than usually, average temperature was -5.7 °C and the peak load of the winter took place also in December. Peak load was 1517 MW, which is smaller than last year. The temperatures in January were little bit lower than last year; average temperature was -5.2 °C. The overall minimum temperature of winter period took place in 19 of January and was -28.7 °C. February was little bit warmer than usually, average temperature was -2.7 °C, Generation capacity in Estonia was sufficient to cover peak loads during the winter season and the power balance was positive throughout the whole winter period.

Occurrence of the identified risks

No significant risks were identified and no risks occurred.

SPAIN

General comments on the main trends and climatic conditions

In general, the temperatures were similar to the average values during winter. Wind production was much higher than the average, and several wind production records were met. Water inflows increased considerably since January.

Month by month:

December 2012:

Temperatures have been slightly higher than average.

Water inflows in reservoirs were lower than average (78% of average).

Higher wind production than in December 2011 (increase of 19%).

January 2013:

Average temperatures have been slightly higher than average.

Water inflows in reservoirs were in the average level.

The wind production was much higher than in January 2012 (increase of 74%)

February 2013:

Temperatures have been slightly higher than average

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Water inflows in reservoirs were lower than average (85% of average).

The wind production was higher than in February 2012 (increase of 7.4%)

March 2013:

Temperatures have been lower than average

Water inflows in reservoirs were much higher than average (175% of average).

The wind production was much higher than in March 2012 (increase of 54%),

Occurrence of the identified risks

Not significant operational risks had been foreseen. System operation and system adequacy functioned without any larger problems during 12-13 winters.

Unexpected situations

None.

Effects of external factors on demand

The demand values have been lower than last year due mainly to the economic and financial crisis. Besides, the temperature had a positive effect on demand on December and January (1% each), a negative effect on February (-1.8%) and a slightly positive effect on March (0.5%).

Most stressed periods for system adequacy

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

Specific events occurred during the winter

Nothing remarkable.

Detailed review of the most stressed periods

Actual demand was slightly higher than expected for the months of December 2012 and March 2013. It was lower than expected for January and February. Nevertheless, the demand monthly forecasts had a suitable accuracy (the error was lower than 3 %).

The winter peak demand was lower than the estimation for extreme conditions, and it was reached on the second half of February 2013 (40277 MW), due to the low temperatures on that period. However, this winter peak demand was much lower than the historical peak demand (44900 MW, reached during winter 2007).

High wind production together with the very high water inflows during the second half of the winter have cause curtailment of RES, as expected. The balance of the system was kept without major problems.

FINLAND

General comments on the main trends and climatic conditions

December was exceptionally cold in Finland. The monthly average temperature was 3 to 5 degrees below long term average. In January average temperature was about 1 degree below long term average in South-Finland while 2 to 3 degrees above average in the north. February was 2 to 5 degrees warmer than average. March was exceptionally cold, the average temperature being 4 to 6 degrees below long term average. I.e. during the winter temperature varied a lot compared to the long term average.

In Finland the water reservoirs were at a little higher level than long term median in December coming towards the median level in March.

Occurrence of the identified risks

Problems with the HVDC-interconnection Fenno-Skan 1 to Sweden existed through the whole winter period. This restricted import from Sweden to Finland. This did not endanger the system adequacy but caused at times price difference between Finland and Sweden.

Import from Russia remained low during high demand periods as was expected in the Winter Outlook report. This did not cause any risks to the system adequacy, however.

As there were no exceptionally cold weather conditions the peak demand was about 14200 MW which is just a little above the forecasted peak load in normal conditions.

Unexpected situations

See what was written about Finland - Sweden interconnection above.

Effects of external factors on demand

Apparently also the low economic conditions affected the demand.

FRANCE

General comments on the main trends and climatic conditions

The climatic conditions this winter were relatively cold (5.6°C: 0.8°C under the normal conditions) and very cloudy (15% more precipitations during the December-January-February period and up to 40% less sunlight depending of the region). The lowest temperature was -4.5°C (-3.2°C forecasted) and the highest 14.6°C (13°C forecasted) (weighed average depending of the consumption in the area). The average forecast error is 0.55°C.

Occurrence of the identified risks

In the winter outlook, middle of January 2013 was identified as the most strained period. Due to weather conditions, eventually, the most stressed periods in terms of short term generation/demand balance were the second week of December and the end of February. There were although no consequences on the safety of supply. In a matter of fact, the maximum consumption was 92.300MW this winter compared to 102.100MW reached during the winter 2011-2012.

Unexpected situations

The hydraulic generation units were more used during the winter 2012-2013, especially during February because of a lower availability of the nuclear generation units.

Effects of external factors on demand

Due to economic conditions, RTE estimate that this winter, demand adjusted for climatic contingencies remained stable or down.

For instance, in February 2013 demand adjusted for climatic contingencies was down by 0.3%.

Most stressed periods for system adequacy

The most stressed periods in terms of short term generation/demand balance were the second week of December and the end of February due to weather conditions.

Specific events occurred during the winter

Concerning the use of the interconnections, the monthly balance of RTE was in export during all winter (14.6GWh exported from November to February). The minimum value of the balance was 3993MW of import the 25th of February. This value should be compared with the 9435MW imported the 9th of February 2012 during the cold spell.

The average import capacity was higher this winter because of an increase of the import capacity on the Spanish border. Nevertheless, the frequent unavailability of one dipole of the interconnection between French and GB has a negative effect and the average capacity of import stays under the level of the winter 2010-2011.

We noted negative price in the spot market at the end of December.

Detailed review of the most stressed periods

No consequence on adequacy this winter. The minimum value of the balance was 3993MW of import the 25th of February. This value should be compared with the 9435MW imported the 9th of February 2012 during the cold spell.

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Lessons Learned for next winter

NTC values have a significant impact on the adequacy on the winter outlook. For instance at the peak, the NTC in the way Germany->France was generally 2000-3000 MW this winter. To remind, in the Winter Outlook, the selected value was 1300MW. Maybe a use of probabilistic value would be more realistic.

GREAT BRITAIN

Synopsis

For the first four months of winter, weather conditions were close to the normal level. During this period there were two relatively average cold spells (ACS); the first in mid-December, the second in mid-January. The winter peak demand occurred during the first of these on 12 December 2012. It was metered at 56,365 MW including station load and was below the forecast ACS of 57,000 MW. This was partly due to a rise in the level of customer demand management (CDM) at peak demand. In previous years this was typically in the region of 700 MW. However, this winter, peak demands were regularly suppressed by up to 1,300 MW, thought to be a direct result of CDM.

The final month of winter was dominated by a sustained period of un-seasonally cold conditions; more typical for December and January. As a result March 2013 became the coldest since 1963. Although demands for this period did not produce the winter peak, they were significantly higher than the normal level for the time of year.

Embedded solar generation also had an impact on demand this winter with installed capacity of circa 1600MW. Day-time levels were noticeably suppressed with respect to previous years. As a result, the overall weather corrected energy level tracks slightly below that of last year.

There were no substantial losses of generation throughout the winter.

Over the winter there was sufficient generation available although more expensive oil plant was run on five days. Demand was met in full and no system warnings were issued.

Gas prices remained high over the winter and coal prices eased slightly, making coal significantly more economic than gas-fired generation, on average by £20/MWh. As a result, coal took a larger proportion of the total generation than gas.

Both the French and Britned interconnectors mainly imported power during the peak demand periods except for a few days in December. The Moyle interconnector and EWIC mainly exported power. There were only a handful of days when power was being wheeled through Great Britain, coming in through Britned and flowing out through the French interconnector.

Occurrence of the identified risks

Wind levels were not at a low level over the peaks this winter which was highlighted as a risk.

Unexpected situations

The impact of embedded solar generation, as described in the synopsis above,

Effects of external factors on demand

The effect of customer demand management (CDM) at peak demand, as described in the synopsis above,

Most stressed periods for system adequacy

There were no substantial losses of generation throughout the winter and the system was not put under any additional stress. There was sufficient generation available although more expensive oil plant was run on five days. Demand was met in full and no system warnings were issued.

Specific events occurred during the winter

Gas prices remained high over the winter and coal prices eased slightly, making coal significantly more economic than gas-fired generation, on average by £20/MWh. As a result, coal took a larger proportion of the total generation than gas.

GREECE

General comment on winter conditions

At the beginning of the winter Greece experienced very high storage of water in the hydro reservoirs. This is crucial for the summer season, which is the season with the maximum demand of the year.

In general, the winter did not have severe weather conditions. It was in general a mild winter with some periods with cold weather, but not exceptionally cold, which is not typical.

The demand starting from January was lower than expected and it was close to the previous year's demand.

Review of the situation

Wind conditions were on a typical level during this winter. The establishment of new wind parks mainly in the south region reinforced system stability in this area. The maximum wind production was 1100 MW on the 7th of February on 06:00 hrs (CET).

The installed generation capacity of wind parks in the Interconnected System today is 1519 MW. A significant increase of wind production is expected in the following years.

At present, the stored energy in the hydroelectric power plant reservoirs is lower than the levels we had last year.

On the demand side, in the following Table the values of net monthly peak load (forecast and actual) are presented.

	NET MONTHLY PEAK LOAD (Average values per hour in MW)			
	DECEMBER	JANUARY	FEBRUARY	MARCH
Forecast	8500	8630	7980	7700
Actual	8557	8818	7981	7879
Difference	-57	-188	-1	-179

The deviations between forecast and actual values are mainly due to the financial crisis and very mild climatic conditions (especially in temperature).

The peak net electricity demand (excluding pumping loads) for the interconnected system in the winter 2012-2013 amounted to 8765 MW, on 08/01/2013 on 1900 hrs (CET).

Additionally, during the winter there was no need to select any resources from the demand side response.

Transmission infrastructures outages, realised reinforcements.

During the winter no crucial transmission expansion or reinforcement took place.

Use of interconnections

The Greek system continuously used all capacity (NTC) from the neighbouring countries in the incoming direction. The NTC was up to 1200MW due to the operation of the 400KV OHL between Bulgaria and FYROM. Also this winter we had connection with the Turkish power system through the 400kV line between Nea Santa and Babaeski substations.

Summary of market conditions

Explicit auctions for the allocation of Physical Transmission Rights (PTRs) were held by IPTO for 50% of the NTC in the northern Greek interconnections in the importing direction. In the exporting direction, IPTO held explicit auctions for the 100% of the NTC, taking into account the excess production capacity of the Greek production system. The Auction Rules are fully compliant with the Regulation 1228. The same is valid for the Auction Rules for the interconnection with Italy.

In the following table the maximum and minimum SMP values are presented.

	MAX and MIN SMP (prices in € / MWh)			
	DECEMBER	JANUARY	FEBRUARY	MARCH
Max	90,02	97,00	90,63	95,00
Min				

Description of remarkable events

There were no remarkable events during winter 2012-2013

Lessons learned for winter 2012-2013

The basic key points for the forthcoming winter will be the consumption of electric energy especially if the rate of reduction should continue. If this happens, it may be useful to review the estimations about the needs for energy in the future.

For the Greek energy system, the most critical period about the energy is the summer. Therefore, the summer outlook report is more useful.

CROATIA

General comments on the main trends and climatic conditions

Winter 2012/2013 was characterised by enough rainfalls and continuously low temperatures. Although the periods of extreme cold weather and unfavourable conditions did not occur, even in March 2013 the weather did not become warmer. The rainfalls affected favourably the hydro accumulation levels.

Occurrence of the identified risks

In Croatian Winter Outlook 2012/2013 was identified risk regarding low hydro accumulation levels and possible extreme high loads. The situation in accumulations changed for the better and on the other side there was not any extreme increasing of load.

Unexpected situations

One situation that can be mentioned is a trip of nuclear power plant Krško situated in neighbouring Slovenia on 25th February 2013. Although this power plant has an important role in supplying of Croatian system the consequences were not harmful.

Effects of external factors on demand

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Such factors cannot be identified in Croatia.

Most stressed periods for system adequacy

During the winter 2012/2013 Croatian power system did not have such extreme consumption as for example at beginning of February 2012 (see Figures 1 and 2 on Optional explanatory graphs sheet). The situation was more favourable for the electricity supply, but some constraints in network prevented even greater production in hydro power plants.

Figure 1 - Consumption of Croatian power system from 5th December 2011 till 25th March 2012

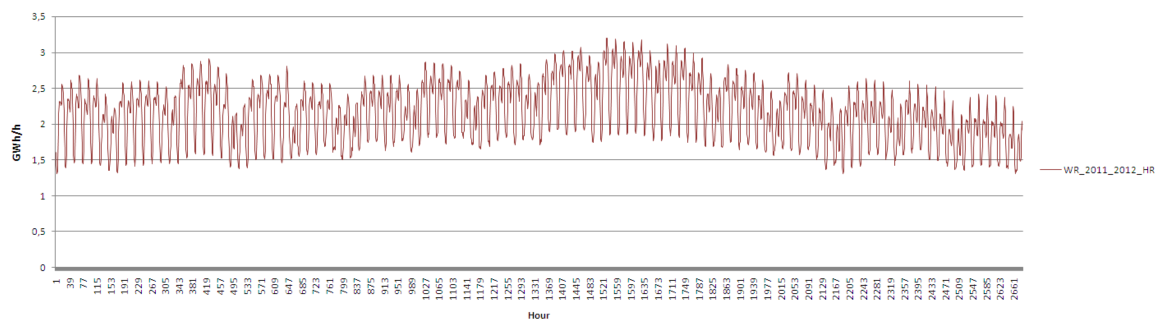
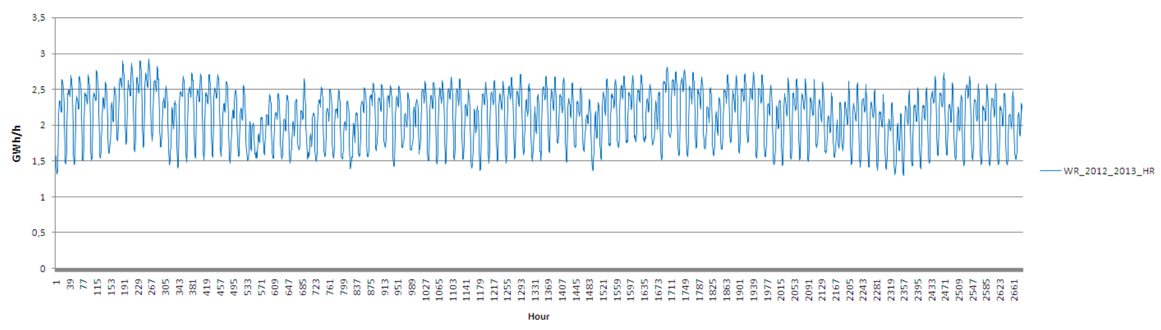


Figure 2 - Consumption of Croatian power system from 3rd December 2012 till 24th March 2013



HUNGARY

General comments on the main trends and climatic conditions

Winter of 2012-2013 was calm for the Hungarian power system. There was no extremely high demand; the total demand was slightly lower than in the last year. Outages of generators were rather low. The grid was reliable and controllable. MAVIR, the Hungarian TSO procured the necessary amount of reserve power by concluding market maker contracts, which put an obligation on the market participants to offer their capacities on the daily market of ancillary services. This solution proved to be effective.

Occurrence of the identified risks

We did not experience any significant event. Generator outages were under 500 MW in the whole winter period, excluding only a few days, but there was no need to make extra precautions on these days either.

Unexpected situations

There weren'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 winter

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

Detailed review of the most stressed periods

There was only one week, when the actual demand is more than 500 MW higher than the expected demand. (2012.12.28)

The level of maintenance was between 100 and 200 MW.

ICELAND

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

The curtailment of primary energy delivery, due to disturbances, was approximately 5.7 GWh in the year 2012. The total yearly energy fed into the transmission system was 16.61 TWh in 2012. The peak load observed this winter was 2222 MW on the 6th March 2013. This is the highest peak ever observed in Iceland.

The curtailment of primary load was exceptionally high this winter due to a number of incidences of strong wind combined with heavy ice load on overhead lines.

IRELAND

General comments on the main trends and climatic conditions

The winter in Ireland was relatively mild with temperatures warmer than had been experienced in 2009 and 2010 but on par with 2011. It was a dry winter with no snow or ice and little precipitation or flooding.

Occurrence of the identified risks

The capacity margin in Ireland for the winter period remained well above critical levels. This was aided by the mild winter which occurred. The commissioning East-West Interconnector, which was predicted to be fully operational for the Winter Outlook, was delayed until mid-December but this did not impact significantly on the overall security of supply.

Unexpected situations

The interconnection capacity for Ireland, with the exception of the tie-lines connecting Ireland to Northern Ireland, was 0MW until mid-December 2012 although this did not affect the security of supply during that period as the weather was mild. When the interconnector became available, it was capable of 250MW import/export capability. The generation and transmission capacity for the period was adequate for the predicted demand levels.

Effects of external factors on demand

The peak on the system in 2012 occurred on Monday 10th December at 17:30 with the peak coming in at 4589MW. This is a reduction on the 2011 peak of 54MW. This can be attributed to a mild winter and lower than expected economic growth.

Most stressed periods for system adequacy

The most stressed time on the system occurred on 10th December during the highest demand period of the system. However on this day demand remained almost 200MW below that predicted for the Winter Outlook in 2012 and Ireland had a dispatchable generation margin of approximately 1,500MW. Therefore the system was well equipped to deal with the highest demand period of the year.

ITALY

General comment on winter conditions

The adequacy evaluations for 2012-2013 winter period has not evidenced particular risks for capacity adequacy and peak load cover as well as with the national supply system's. A winter season with average temperatures essentially steady compared to the previous period with an only exception during December. In addition, high hydro conditions marked the entire winter period: values above the multi-year average capability factor were recorded, confirming a rainy winter.

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Review of the situation by monthly period

Any to remark for generation availability respect to the planned maintenance. The installed generating capacity remained steady with exception of a little increase of wind farms and photovoltaic solar park.

During winter period load requirements were lower respect same period of 2012. Record power peak normally got in winter was not exceeded in this period. The only exception of December when, caused by a bad weather, national power peak reached the highest value equal to 52,790 MW (+2.0%). A monthly consumption also marked a small decrease over these months.

Transmission infrastructures outages, reinforcement realised

The number of new realizations in the transmission network was practically unchanged.

Rearrangements in the electricity grid have been made in order to improve the reliability of the existing connections.

Use of interconnections

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 terms of physical flows, the interconnection recorded a variable performance of import/export balance of energy. The HVDC cable interconnecting Italy with Greece has been basically characterized by prevalent import conditions towards the Italian system.

In the last decade of March 2012 a new PST was installed in the substation of Camporosso, in order to control the power flows on the 220kV Italian-French tie-line Camporosso-TrinitèVictor. This PST allows a more secure control of the Italian North-East (Liguria) French South-West (Cote Azure) common interconnection.

At the beginning of 2013 two new elements entered in operation on the Italian-Austrian border:

- The PST on the 220 kV tie-line Soverzene-Lienz.

  This allows the secure operation and a more flexible control of the tie-line

- The 132 kV Merchant Line Tarvisio-Greuth with a maximum exemption value (winter peak hours) of 85 MW.

Description of remarkable events

The total net production registered a decreased of 6.2% while the balance of energy exchanged with foreign countries increase of 3.5%. Monthly hydroelectric capability factor has showed a constant increase with percentage values above below the corresponding values recorded in the previous period of winter. Essentially same result for the fullness factor of hydro reservoirs.

LITHUANIA

General comments on the main trends and climatic conditions

The weather in winter 2012/2013 was colder than in last winter. The average temperature in winter 2012/2013 was -3.8°C while in winter 2011/2012 was -1.7°C. Due to colder weather in winter 2012/2013 the total consumption increased 1.9%. The maximum load was reached in the second half of January as was expected in 2012/2013 Winter Outlook. The maximum load was 1684 MW and it was lower than was expected under normal conditions (1700 MW forecast). The maximum load was reached in week 4 when average daily temperature was -13.2°C. The average winter balance portfolio consisted of 38% of local generation and 62% of imports from neighbouring countries. The largest share of imported electricity was from Russia.

Occurrence of the identified risks

The instability of wind generation and possibility of icing were taken into account as it was identified in Winter Outlook. These reasons were assessed by procuring required level of ancillary services.

Unexpected situations

Considering wind parks on Lithuania system there was three periods when unexpected situation occurred. In week 50, week 3 and week 5 approximately 67% of wind power capacity was stopped due to icing. Despite the fact that level of necessary ancillary services had increased and the adequacy of ancillary services had been maintained, though no emergency situation had happened during icing periods.

Effects of external factors on demand

The main reason influencing the variable load demand is the climate change. There are no any identified effects for demand changing.

Lessons learned for next winter

The relevant points for the next winter forecasts have to be set when forecasting generation of wind power plants during moist and windy weather around -5°C degrees. Such conditions are associated with the high risk of wind turbines icing.

LATVIA

General comments on the main trends and climatic conditions

The average air temperature in December in Latvia was -4.8 0C and it was lower than previous winter + 2.1 0C. The annual air temperature in December in Latvia is -2.7 0C. According to deviations in weather conditions consumption can fluctuate +/- 10 %. The winter period was without any stress periods for system adequacy as TSO has been expected and all deliverables have been going by schedule. Due to the current economic situation in Latvia and total growth rate increase after economics crises, the total load and consumption have been tendency slightly increasing. The installed capacity in Latvia was as planned without any additions. 26 % of time Latvia power system was exporter but 74 % of time Latvia power system was importer. This winter mainly has consisted of four main weather periods:
1. The weather in November and in the beginning of December was rainy and wet (average air temperature +4 0C) therefore in this time was higher water inflow in Daugavas HPP and production increased. For System Adequacy planning we always are using worst case and we did not expect such a big amount of water inflow in Daugava River (in winter only approx. 200 MW of installed capacity of HPPs can cover the peak load). In this period Latvian power system most of time could cover the balance.

2. In the mid of December has started cold weather period for Latvia when air temperature was close to -10 0C and heat and electricity consumption in whole area have increased steadily. The water inflow in Daugava River has been decreased and CHPPs worked according to heat demand. In this period consumption exceeded generation and Latvia power system most of time was importer.

3. After Christmas the air temperature exceeded 0 0C and again started wet and rainy weather conditions which allowed Daugava HPPs cover the consumption in Latvia.
4. From February until March the weather conditions were close to annual statistics.

The cross-border capacity flows on Latvian borders were on the feasible limits, because, as mentioned above, in compare with the previous years, in the current winter period Latvian power system was closely to the balance guarantying, due to raining weather conditions, increased inflow of Daugava River and increased generation in Latvia. In December-January, the energy transit through the Latvian transmission network was higher, in compare with the previous year, but despite this the LV-EE border was not fully utilized and almost all the time transmission capacity between LV-EE was enough to keep the balance in Latvia and Baltic States. Past winter was without any dramatic and serious emergency cases and events for Latvia power system. No one big power plant has been stopped for a long time regarding disturbances in the operational mode. According to the network statistics in this winter we had approx. 7 unexpected events regarding trees in the 110 kV network, approx. 10 unexpected events regarding unknown disconnections in the 110 kV network, 5 unexpected transformer disconnection in 110 kV network and only two disconnections in 330 kV network

– the first when has been disconnected CHPP – RigaCHP1 and the second when has been disconnected Plavinu HPP.

Most stressed periods for system adequacy

The most stressed periods are when the air temperature is decreasing from -10 till -25 0C because than the HPPs are producing almost nothing.

Specific events occurred during the winter

No specific events and no gas reduction.

MONTENEGRO

General comments on the main trends and climatic conditions

The electric power balance for this period was positive due to good hydrological conditions.

Occurrence of the identified risks

We did not face with risk identified in previous reports.

Unexpected situations

The most stressed period of the winter 2012/2013 was on January because of extreme weather conditions, low temperatures, strong wind with snow in whole country. Due to severe weather conditions, on 15th and 16th of January, some disturbances happened on internal lines without influence to the synchronous operation of the system. Part of 110 kV network in the north of country were out of work several days.

Effects of external factors on demand

None.

Most stressed periods for system adequacy

None.

FORMER YUGOSLAV REPUBLIC OF MACEDONIA

General comments on the main trends and climatic conditions

Generally, the 2012/2013 winter conditions were very close to the forecast ones from the point of view of temperatures, and the levels of our reservoirs are very high. There wasn't any unexpected situation during the winter period.

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The operation of power system was secure and reliable over all winter period. Macedonian electricity system mainly depends upon imports of energy to reach adequate balance between consumption and production/import. From the point of view of system adequacy, load – generation balance was not at risk during the whole period of Winter 2012/2013 in the Macedonian System

Macedonian transmission network has well developed interconnections with neighbours. So, the operation of power system is secure

The water reservoirs were on very high level, because of the good hydrological conditions this year, so the HPP also contribute to the security of the system.

According to all these above, the generation-load balance on the Macedonian system was not at risk, during the winter 2012-2013.

NORTHERN IRELAND

No comments.

THE NETHERLANDS

Occurrence of the identified risks

No Risks where identified, nothing actually occurred.

Unexpected situations

None.

Effects of external factors on demand

Over the past two years, a demand reduction is identifiable, most probably due to economic conditions.

Most stressed periods for system adequacy

During the winter the Dutch Transmission Grid did not experience any significant or unusual events with regard to system adequacy.

NORWAY

General comments on the main trends and climatic conditions

December, January and February were about 1 °C colder than normal and with lower precipitation than normal. Low temperature, especially in the consumption areas in the south of Norway, resulted in high demand. Low inflow and high production resulted in low reservoir content in some areas. As a consequence, the deficit in hydrological balance was 12 TWh at the beginning of mars 2013. It was mostly net export during the winter period.

Occurrence of the identified risks

There was not any identified risk in the winter outlook.

Detailed review of the most stressed periods

The energy balance can change very fast, from a high surplus before the winter period, to a deficit at the end. This can be worse if the spring period arrives some weeks later than normal.

POLAND

General comments on the main trends and climatic conditions

This winter (analysed period from December 2012 to March 2013), operational conditions were good, mainly due to the fact that unscheduled power flows through the Polish system (from 50Hertz to the Southern Polish border) were lower than average. The winter season was not so severe (without periods of extremely low temperature); however pure winter lasted longer (till the beginning of April). The result was that the average temperatures during this winter were about 3°C lower compared to the previous winter. Such conditions combined with the fact that economic growth slowed down, caused that PSE registered a load decrease by 2,7% and energy consumption by 1,7% (it is worth saying, that February 2012 was one day longer).

PORTUGAL

General comments on the main trends and climatic conditions

Last winter season was particularly favourable to system adequacy as temperatures remained most of the time on average levels, with some periods significantly above the average.

The winter peak demand of 8185 MW occurred on 23th January at 20:15 CET and remained about 13% below the winter record observed in 2010.

From the supply perspective, climatic conditions were two folded.

In December, the hydro inflows were about 94% of the season's average and wind availability was 10% below the normal values, which induced a high level of imports (the highest since 2008). Since the beginning of 2013 a very favourable climatic scenario has contributed to invert the situation and, for the first time since May 2011, the Portuguese system is having a positive exchange balance. In February the exports totalled 1.7% of the national demand.

Considering the first two months, renewable generation corresponded to 63% of the electricity consumption.

During the whole season the thermal generation capacity has presented a low level of utilization.

Occurrence of the identified risks

In general, the comfortable margins identified in the Winter Outlook Report were further eased by a lower than forecasted demand and, from the supply side, by a high availability from hydro and wind capacity.

Unexpected situations

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

ROMANIA

General comments on the main trends and climatic conditions

During the winter 2012-2013 the precipitation amounts were higher than normal ones in December 2012, January and February 2013. For December 2012 the temperature was smaller than the climatological average. For January 2013 and February 2013 the temperatures were higher than the climatological averages.

Occurrence of the identified risks

None of the risks identified in the Winter Outlook Report, such as gas crisis or coal freezing occurred. In any case, there were solutions as: switching from gas fired to only oil fired and activation of the slow tertiary reserve and a part of remaining capacity.

Unexpected situations

In early December 2012 due to bad weather conditions several internal 400 kV overhead lines were tripped in the South-East part of Romania leading to a generation loss of 1400 MW. The system reserves covered the generation lost.

SERBIA

General comments on the main trends and climatic conditions

Serbian power system passed through winter period without huge problems. Import from neighbouring systems was realized in January, February and March as it was planned,

Occurrence of the identified risks

There was need to buy some amount of energy to cover demand at periods with lower temperature. This energy was bought on market as it was planned.

Unexpected situations

No.

Effects of external factors on demand

No.

Slovenia

General comments on the main trends and climatic conditions

The winter 2012/13 was the winter with most snow in the last 50 years in Slovenia. December and January were warmer than average, February and March were much colder than average. Precipitation was lower than average in December and higher than average in January, February and March. More snow than average and lower temperatures did not cause any problems in the Slovenian power system.

Unexpected situations

On February 25th the NPP Krško was unexpectedly shut down due to a steam valve failure in the secondary loop. The NPP was back in operation on the 3rd March. This event caused no loss of supply.

Slovak Republic

General comments on the main trends and climatic conditions

The winter 2012/2013 was colder than in the previous year. Average temperature during winter months was -0.2 °C (the winter before it was 1.7 °C). December, January 2012 and March 2013 were very cold months. The average temperature in December 2012 was only -1.9 °C (in December 2011 it was 4.1 °C). The same situation occurred in March and the average temperature was only 2.1 °C (4.3 °C lower than in March 2012). Conversely warmer weather was recorded in February when the average temperature climbed to 4.4 °C (5.3 °C higher than in 2012). The winter weather 2012/2013 is unusually long. Taking into account comparable economic situation between last and winter before, the weather has got main influence on the consumption in particular months. There was slight decrease of consumption (1.34 %) and increase of production (3.96 %) of electricity from December 2012 to March 2013, comparing to the same period of winter 2011/2012. The production increase was as following: fossil fuels (8.1 %), non-identifiable (4.2 %) and hydraulic (16.1 %) power plants. Contrariwise the decrease was observed mainly from solar (-28.7 %) power plants and slightly nuclear (-0.1 %) power plants. This winter we had very little sunny days, therefore decrease of photovoltaic production. The winter peak load (4 338 MW) was on

Thursday, December 13, 2012 at 17:00 (the 50th week), the predicted value of the winter peak was 4 390 MW in the 6th week. The import of electricity was foreseen in all period in the winter outlook report 2012/2013. In reality the import of electricity was recorded only in December (28 GWh, 1.1 % of monthly consumption). In months January, February and March there were exports of electricity (total amount 171.1 GWh). In the winter period 2011/2012 there was higher import (341.1 GWh, 3.3 % of consumption). The export of electricity was about 1.4 % of winter production 2012/2013.

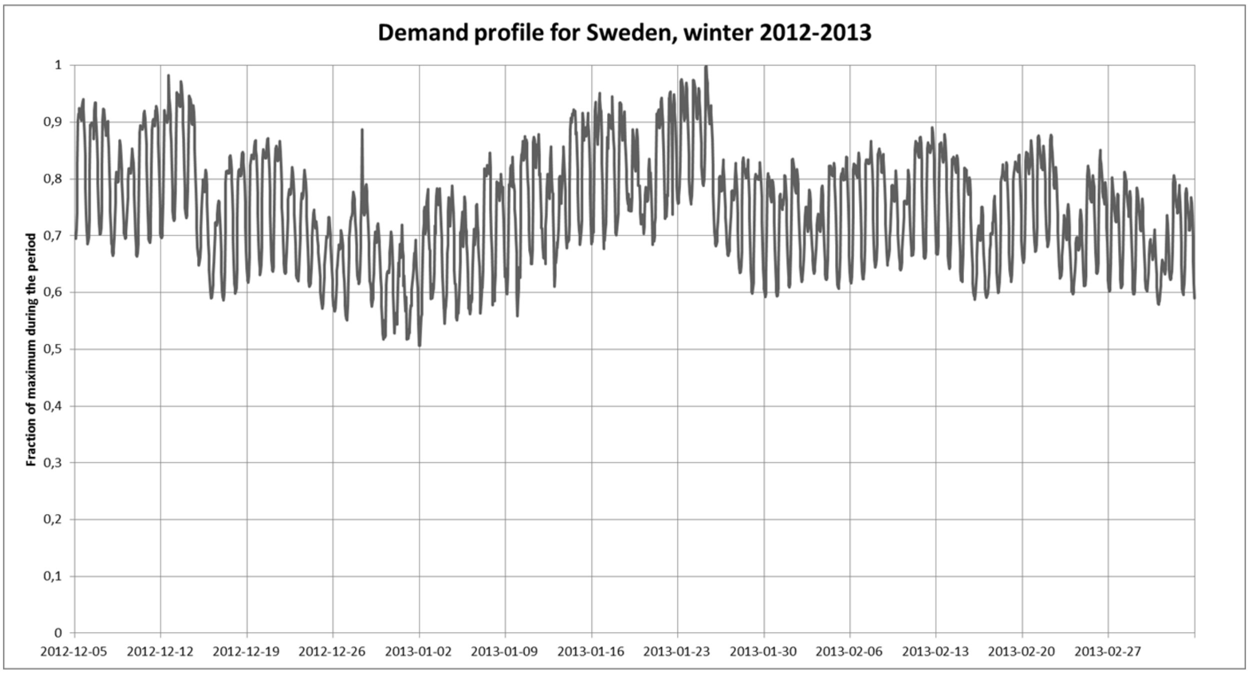
Unexpected situations

No, the unexpected situation with effect on the power system did not occur.

SWEDEN

General comments on the main trends and climatic conditions

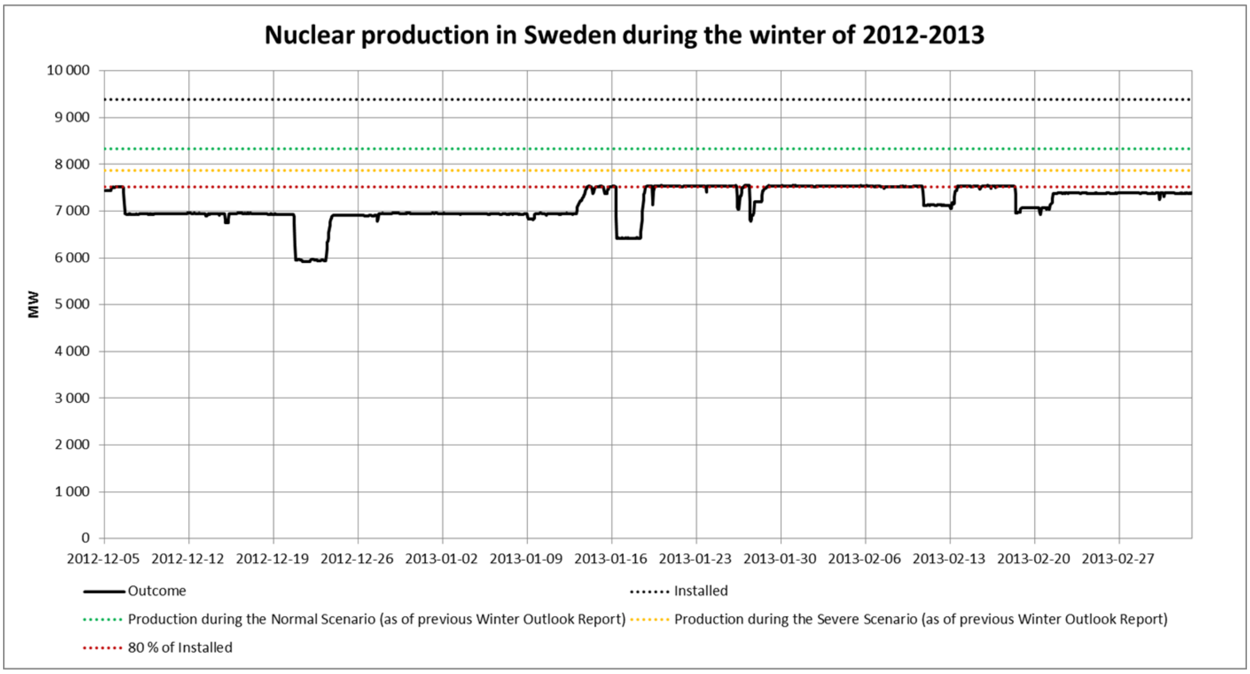
The previous winter (2012-2013) was a mild winter compared to normal temperatures for the season, with an exception for the first half of December and the second half of January which was significantly colder than normal (on average approx. 5 to 10 degrees colder, in the whole country, compared to normal). This is also reflected in the demand profile which can be seen below.



The forecast load for both the normal and severe scenario in previous Winter Outlook Report is deemed as reasonable.

Occurrence of the identified risks

The biggest risk outlined in the Winter Outlook Report, when it comes to the power balance in Sweden, was the availability of the nuclear units. Svenska Kraftnät estimated that approx. 80 % of installed capacity was needed for Sweden to be self-supporting. The figure below shows the outcome (until the 5th of March), compared to installed capacity and what was expected during a normal and a severe scenario.



The power balance in Sweden could be maintained in a satisfactory way, although the availability of the nuclear units was quite low.

Unexpected situations

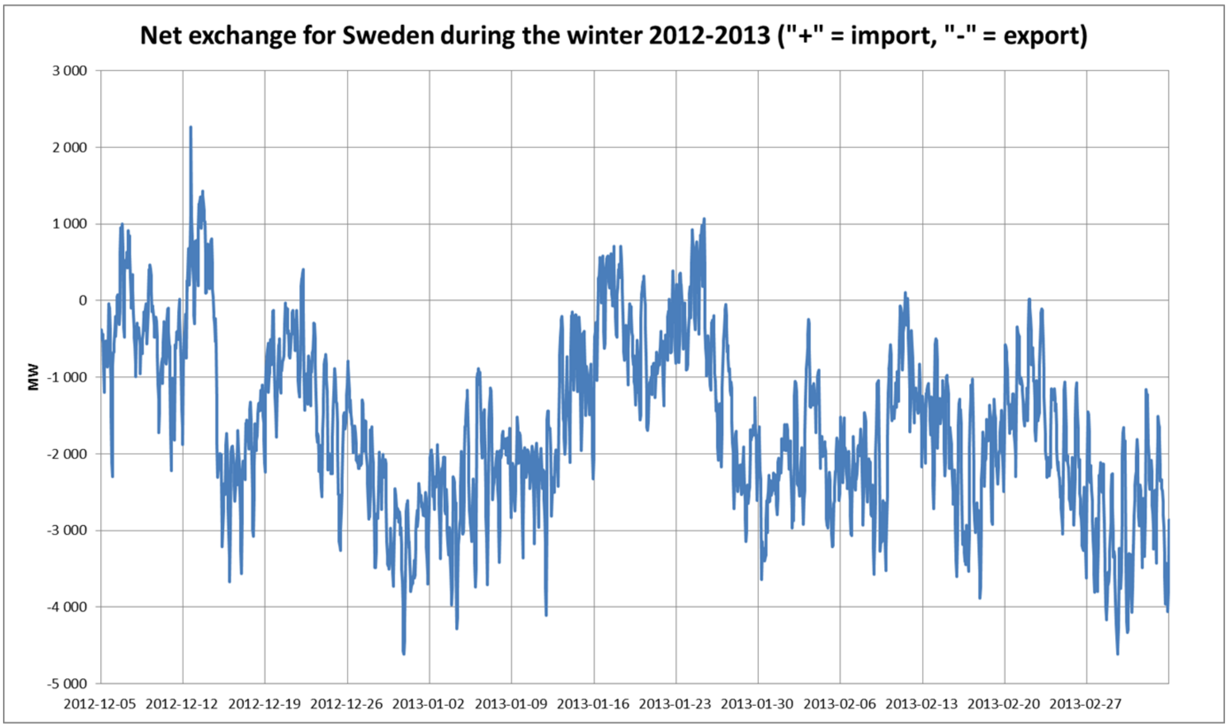
Nothing unexpected occurred during the winter which jeopardized the security of supply. But there have however been several faults, e.g. a cable fault on the HVDC link Fenno-Skan 1 (between Sweden and Finland) and a cable fault on one of the interconnectors between Sweden and East Denmark. Both these faults have now been repaired.

Effects of external factors on demand

When looking at temperature-corrected demand, the rolling average for a two year period has been more or less constant during recent year. In other words, no significant change in the temperature dependency of demand is evident.

Most stressed periods for system adequacy

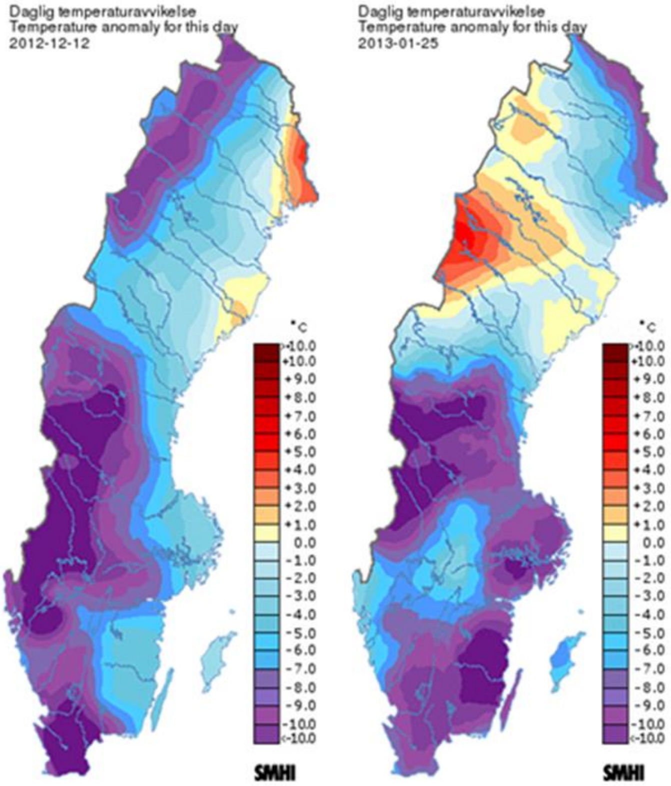
The most stressed periods were in the first half of December and the second half of January which was colder than normal. During this period some parts of the Peak Load Reserve were activated to maintain a sufficient margin between demand and production. The measured demand was in line with what was forecasted. During these periods Sweden had net import, as can be seen below.



Detailed review of the most stressed periods

The most stressed periods were Wednesday 12th of December to Friday 14th of December (especially Wednesday), and Wednesday 23th of January to Friday 25th of January (especially Friday). The temperature deviation from normal for the most stressed day during these two periods is presented on the figure on the following page (data from SMHI, Sveriges Meteorologiska och Hydrologiska Institut).

On the 12th of December Sweden were importing just above 2.2 GW during the peak hour (15-16 CET), and on the 25th of January the import were approx. 0.8 GW during the peak hour (06-07 CET). The import difference on these two occasions is mostly explained by a higher nuclear power production and hydro power output on the 25th of January. The Peak Load Reserve, which consists of both load reduction and production, was partially used during both these periods and the grid was almost intact.



Source: SMHI (the meteorological and hydrological institute of Sweden)

UKRAINE_WEST

No comments.

7 APPENDIX: QUESTIONNAIRE FOR SOR 2012 AND WR 2011-2012

7.1 FOREWORD

The "Summer Outlook 2013 and Winter Review 2012-2013 Report" will be published on ENTSO-E web-site and communicated to the Electricity Cross-Border Committee of the European Commission[5].

If any information (figures or comments) are to be kept confidential for use within ENTSO-E only, please identify them clearly and they won't be made available to other parties.

The proposed plan for the report is significantly different from previous reports. The spreadsheet for data collection has been changed to increase transparency and bring it more into line with the terminology as used in the long term adequacy reporting. Average generator outages rates for normal and severe conditions are requested to check consistency across regions and to provide a more robust analysis.

It is also intended to carry out a flow based analysis using submitted NTC values to give a level of confidence that countries that require imports to meet summer peak demands are able to source these across neighbouring regions under both normal and severe conditions. Hence the requirement for TSOs to give an indication of their **best estimate of NTC values** between countries is essential for this analysis. It is recognised that these NTC values may be different than previous submitted values by a TSO.

Across the analysis period it is also proposed to also highlight any European "downward regulation" issues where excess inflexible generators output exceeds overnight minimum demands. Similar to the peak demand analysis, the submitted NTC values will be used to give a level of confidence that countries that require exports to manage inflexible generation are able to export these to neighbouring regions who are not in a similar situation. The reason for this analysis is that a number of TSO's have expressed concern that this is a growing problem for system operation.

The format of the final report "Summer Outlook 2013 and Winter Review Report 2012-2013" will be:

[5] "The EC Cross Border Committee acts in accordance with Regulation (EC) No 1228/2008 of the European Parliament and of the Council of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity (Article 13), replaced by Regulation EC n. 714/09 . It consists of Member States' representatives.

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- **Main Report** (about 15 pages)
- Executive Summary
- Introduction and methodology
- Winter Review 2012-13
- Summer Outlook 2013 (including comments per Regions)
- Flow based NTC analysis across EU (including comments on areas of concern) for summer peak demands
- Lessons learnt
- **Appendix** (about 3 pages per country and when available per Region) on a country by country basis with graphs illustrating the generation-load balance and comments provided by each country.

The information provided should reflect the actual state of the analysis made by the TSO and should be based on the available materials.

For your reference the ENTSO Summer Outlook 2011-2012 is available on:

https://www.entsoe.eu/resources/publications/system-development/outlook-reports/

Guidelines for data collection are indicated in this document. There is also a "Guidelines for System Adequacy forecast data collection" that is available on the ENTSO-E extranet site which gives definitions and explanations of terminology[6].

[6] https://www.entsoe.eu/extranet/kt/view.php?fDocumentId=34997

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7.2 INPUT FROM EACH COUNTRY

The input expected from each country comprises 3 main parts included in the same excel workbook:

- **One or two paragraphs** emphasizing the TSO's appreciation of the generation – load balance for the coming summer. It should also highlight any issues of excess inflexible generation at times of minimum demand; this synopsis will be included in the main report. No common form is suggested in order to fit with each country's specific case.

- **A table with quantitative elements** with a common format; this table will not be published but sent only to those TSOs taking part in the exercise; the data will be used for building graphs attached in appendix to the report and illustrating the summer outlook for the country. In addition, the NTC data in this table will be analysed against all other regions to determine adequacy across the EU with a focus on those regions that require imports under normal or severe conditions. Finally, it is envisaged that graphs of downward regulation will be presented as a high level European Overview.

- **A synopsis and comments** on the generation-load adequacy for the coming summer that will be included in the Appendix of the report. In order to facilitate the production and use of these comments, common guidelines are provided hereafter.

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7.3 QUANTITATIVE ELEMENTS

Please fill in the Excel spreadsheet available on extranet.

The data is requested for synchronous time each Wednesday (12:00 CET) in order to allow meaningful analysis when determining cross border flows. It is recognised that this may not be the peak demand in every region in the summer but 12:00 is chosen to allow a consistent analysis.

If weekly data is not available for any TSO then the data for the third Wednesday of July should be the minimum that is available to countries of the Regional Groups "Continental Europe" (as provided in the framework of the system adequacy forecast). It is therefore requested that a TSO that is unable to provide weekly data provide the data for the third Wednesday of July with updates in order to take into account the increased knowledge of the situation since the last SO&AF (outages, status of hydro reserves, etc.).

An additional requirement is in PART E of the Excel spread sheet to provide minimum demand data, downward reserve requirement, level of inflexible plant, pumped storage demand in order to allow an European overview of the need for countries to export across borders at times of high levels of inflexible generation such as wind or solar. Starting from this year Summer Outlook, two separate assessments will be performed, each one targeting downward adequacy reference points. First point is synchronous time of each Sunday 05:00 CET, the expected minimum demand for the considered period. At overnight minimum demand periods, there is a possibility of high wind in-feed, so the problems with downward regulation can occur in certain number of European TSOs. The second reference point for which the assessment will be performed is synchronous time of each Sunday 11:00 CET. At this time point high amounts of solar generation is expected. The difference in load between this two time points may be less than the solar in-feed, thus downward adequacy is relevant in both cases.

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7.4 GUIDELINES FOR COMMENTS

Starting from this year Summer Outlook all comments will be included in the excel spreadsheet. Each TSO is requested to provide the following information:

7.4.1 CONTRIBUTION TO THE MAIN REPORT

A few lines on the main results of the assessment including:

- General situation highlighting specifics such as high levels of maintenance in certain weeks, low hydro levels, low gas storage, sensitivity to commissioning generation etc.
- Most critical periods for the TSO and in particular which weeks are considered as most critical.
- Expected role of interconnectors in relation to maintaining adequacy and the ability to import or export.
- Expected role of interconnectors to managing an excess of inflexible generation at minimum demand periods

7.4.2 SYNOPSIS

This qualitative assessment should stress the main critical periods and the main factors of risk. It would be useful to indicate, if any, which level of remaining capacity they consider as necessary when making this forecast in order to ensure a secure operation for the summer (i.e. what is the reference adequacy margin) and the role of renewables. In addition, the qualitative assessment should consider the role of interconnectors in allowing excess inflexible generation (such as wind) to be accommodated on the power system.

7.4.3 SHORT EXPLANATION OF THE FRAMEWORK AND THE METHOD USED FOR MAKING THE SUMMER ADEQUACY ASSESSMENT

The framework used is to determine adequacy under normal and severe conditions for each TSO. This is based on data that is submitted by each TSO. The analysis then checks if the countries that rely on imports, have enough transmission capacity to import energy from neighbouring countries. To do this analysis, each TSO is requested to give its best estimate of the NTC that it anticipates will be available.

The analysis is based on a spreadsheet that takes remaining capacity (under normal and severe conditions) from all the TSO submitted spreadsheets with all the submitted NTC values. If there are 2 countries that submit different NTC values on the same border, then the analysis will be completed taking the minimum submitted value. Based on the outcome of the analysis, additional questions may be asked from the relevant TSOs if particular country boundaries are considered critical.

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In addition for the specific Summer Outlook Report, the analysis will consider the minimum demand periods with potential maximum inflexible generation to determine that countries that are required to export excess generation can do so.

7.5 GUIDELINES FOR COMPLETING THE SPREADSHEET

The analysis is country based and not control area nor bid area based. It is recognised that this does cause issues for completing the spreadsheet and the guidelines below have attempted to resolve these issues.

If this Generation – Demand balance is considered at risk for the system i.e. too low, then please provide an explanation of the main risk factors (e.g. availability of generation, load sensitivity to temperature, low hydro levels, low wind etc.) and how this risk is to be managed by the TSO. This part will only be included in the appendix if the TSO wants it to be included.

According to the degree of available data please fill in the spreadsheets:

- for each week of the considered period, namely Wednesday of each week at 12:00 CET;
- for each week of the considered period, namely Sunday of each week at 05:00 and 11:00 CET;
- for each month of the considered period namely the third Wednesday of each month at 12:00 CET;
- for each month of the considered period namely the Sunday before the third Wednesday of each month at 05:00 and 12:00 CET;
- for typical weeks or days (at least the third Wednesday of July) at 12:00 CET;
- for typical weeks or days (at least the Sunday before the third Wednesday of July) at 05:00 and 12:00 CET.

PART A: INDIGINEOUS NATIONAL GENERATION (Lines 1 to 7):

The total generation capacity notified to the TSO as being installed for each week for the same period. The requested data on fuel types has been modified to better reflect the long term adequacy reports and in order to increase transparency in reporting.

The available generation capacity should be calculated according to a methodology directly derived from the one used for the former ETSO system adequacy forecast report and within the former UCTE for generation adequacy assessment.

It is noted that certain countries may have generators that are located in neighbouring countries and consider them as part of their capacity due to firm contracts or grid topology. Where this exists, please highlight so as for regional analysis it is important not to double account generation.

The following specific data is requested:

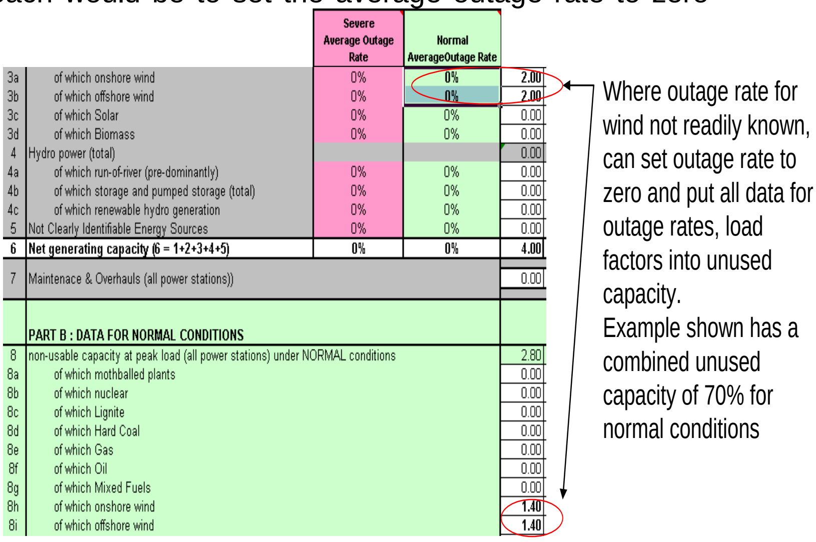
- **Net generating capacity** (lines 1 to 5): installed capacity by fuel type. The fuel types are similar as found in the long term adequacy reporting in order to increase consistency between long term and short term adequacy reporting.

- **Net generating capacity** (line 6): corresponds to the generating capacity as calculated from data input in lines 1 to 5.

- Please note that a change from previous year's submissions is that a "Normal Average Outage Rate" and a "Severe Average Outage Rate" is requested in order to increase transparency and allow comparisons across regions. This percentage outage rate can be used to automatically calculate the Outages in **lines 10 and 19** (formulae are included in the spreadsheet: for example if the outage rate is set at 10% and the capacity is 2GW, then the spreadsheet will automatically calculate an outage value of 200MW).

- Alternatively, the user can overwrite the formula in lines 10 and 19 with more detailed weekly forecasted outage rates. For example, the user may wish to do this if they calculate outages rates at a weekly level. However, we do ask that you indicate a figure for the average outage rate percentage to allow comparison with other neighbouring regions.

- It is recognised that some regions may not calculate percentage average outage rates for some plant types and may wish to bundle all the data into unused capacity. An example may be Wind where the outage rate is unknown across the fleet. An acceptable approach would be to set the average outage rate to zero but to combine outages and maintenances in unused capacity for Wind in PART B and C. In this way the remaining capacity is still calculated correctly which is inherently what the spreadsheet is forecasting. This is shown in the picture opposite.



		Severe Average Outage Rate	Normal AverageOutage Rate	
3a	of which onshore wind	0%	0%	2.00
3b	of which offshore wind	0%	0%	2.00
3c	of which Solar	0%	0%	0.00
3d	of which Biomass	0%	0%	0.00
4	Hydro power (total)			0.00
4a	of which run-of-river (pre-dominantly)	0%	0%	0.00
4b	of which storage and pumped storage (total)	0%	0%	0.00
4c	of which renewable hydro generation	0%	0%	0.00
5	Not Clearly Identifiable Energy Sources	0%	0%	0.00
6	**Net generating capacity (6 = 1+2+3+4+5)**	**0%**	**0%**	**4.00**
7	Maintenace & Overhauls (all power stations))			0.00
	PART B : DATA FOR NORMAL CONDITIONS			
8	non-usable capacity at peak load (all power stations) under NORMAL conditions			2.80
8a	of which mothballed plants			0.00
8b	of which nuclear			0.00
8c	of which Lignite			0.00
8d	of which Hard Coal			0.00
8e	of which Gas			0.00
8f	of which Oil			0.00
8g	of which Mixed Fuels			0.00
8h	of which onshore wind			1.40
8i	of which offshore wind			1.40

- **Maintenance & Overhauls (all power stations)** (**line 7**): as notified by generators to TSOs at the time of completing the spreadsheet and hence the most up to date information is requested. In case of lack of information from generators, TSOs should include an estimate value based on historical data.

PART B: DATA FOR NORMAL CONDITIONS (Lines 8 to 16):

The following data is required for normal conditions which are defined as those conditions that correspond to normal demands on the system e.g. normal weather conditions resulting in normal wind, hydro output and normal outages:

- **Non-usable capacity at peak load under NORMAL conditions** (**line 8a to 8o**): resulting from lack of primary sources (hydro, wind), insufficient fuel availability due to actual contracts, mothballed plants not in operation during the summer. This part has significantly changed from previous submissions in terms of being broken down by fuel type. The reasons for this change is to increase transparency and to bring reporting more into line with long term reporting and to allow TSOs to give a fuller picture of where the non-usable capacity is on their respective system.

- **Available capacity under NORMAL conditions (line 9):** automatically calculated from data submitted above.

- **Outages (line 10):** as discussed above (section 5.1), this will automatically be calculated based on the percentage outage rate in PART A but can also be overwritten if required. There are standard normal outage rates published for nuclear and fossil fuels which are based on the Data Collection Guidelines[7] published by WG SAMM but it is anticipated that most TSOs will have actual outage rates for their system based on historical analysis.

- **System services reserves under NORMAL conditions (line 11)**: the amount of capacity required by the TSO to provide operating response/reserves. It corresponds to the level required one hour before real time (additional short notice breakdowns are already considered in the amount of outages). In some market structures, market participants may provide reserve however for the avoidance of doubt, the figure requested is the total amount of reserves that the country requires at 1 hour ahead.

- **Planned reliably available capacity under NORMAL conditions (line 12):** is automatically calculated from the data given above.

- **Weekly peak load for NORMAL conditions (line 13):** peak load excluding any demands on interconnectors and net of any demand management/demand price response in normal weather conditions for the period from June 5 to September 25. Possible load reductions in normal conditions should be mentioned (line 14). It results in the Net weekly peak load for NORMAL conditions (line 15).

[7] https://www.entsoe.eu/extranet/kt/view.php?fDocumentId=37765

- **Remaining capacity for NORMAL conditions (line 16)** corresponds to the generating capacity available above net demand and is the basis of the TSO's appreciation of the generation adequacy for the current week. It is used for the flow based NTC analysis with data from PART D.

PART C: DATA FOR SEVERE CONDITIONS (Lines 17 to 25):

The data format for Severe conditions is the same format as PART B DATA FOR NORMAL CONDITIONS.

Severe conditions are related to what each TSO would expect under a 1 in 10 year scenario. For example the demand will be higher than normal conditions and in certain regions the output from certain generating units such as wind may be very low or there may be restrictions in gas plants that operate at a reduced output under hot ambient temperatures.

In terms of average outage rate, regions may experience a higher outage rate than under normal conditions due to the higher temperatures and it is intended that this is captured by a severe outage rate that is input in PART A and/or the non-usable capacity in PART C.

It is difficult to be very specific and hence a description of the scenario being considered should be described by each TSO and if a TSO is not using a 1 in 10 year scenario e.g. only calculates at a 1 in 20 year demand level then this should be highlighted.

Where users do not submit data for severe conditions, a percentage reduction may be applied to the normal conditions (**figure as yet to be determined*****).***

FIRM IMPORT AND EXPORT CONTRACTS (Lines 26 and 27)

For countries where firm import/export contracts are notified to the TSO, their influence on the remaining capacity should be mentioned. Information on the possibility of export reduction or import increases will give a more complete view of the situation. It is important that a country that has a firm import contract from a neighbouring country ensure that the neighbouring country has also included the contract as an export contract.

It is also important that if a firm import contract is assumed from a country then the NTC value is reduced to reflect that some of the capacity is being used.

PART D: ADDITIONAL INFORMATION FOR INTERCONNECTORS (Lines 31 and 32).

A significant change in the spreadsheet that is carried over from the Winter Outlook report for 2011/12 is the additional data on interconnector capacity between countries. The reason for requesting this data is to allow analysis to be completed across the EU in order to check that countries that are relying on imports (under severe conditions in particular) have neighbouring countries that are able to provide exports.

It is recognised that this data is available via NTC tables but TSOs are requested to submit the NTC data in this spreadsheet. The NTC data requested is the TSOs best estimate NTC and may be different from what is publicly published. It is recognised that on the day the value may be higher or lower due to system conditions but this analysis is to get a confidence around the capability of interconnectors to contribute to maintaining generation-demand balance.

It should be stressed that there is no Grid model being developed for the analysis and it is not a market simulation either. Rather, it is a confidence test on highlighting where the most important country boundaries exist based on the data submitted by TSOs.

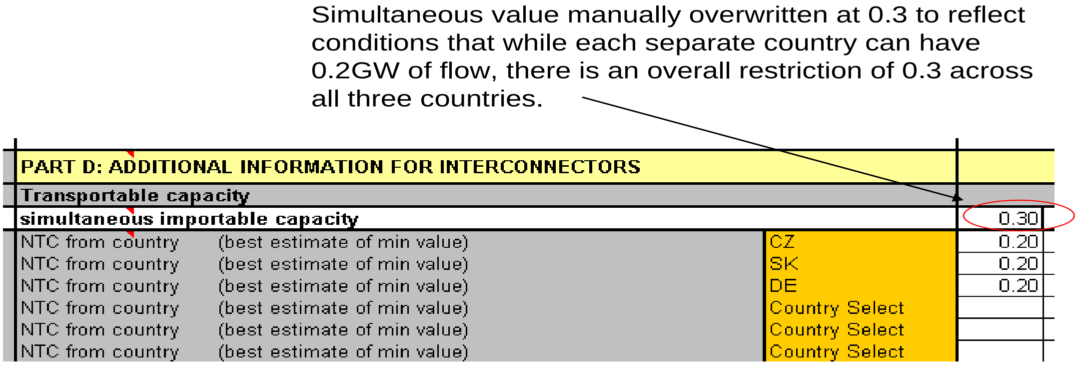
For that purpose the following items should be covered:

- **Simultaneous importable capacity (line 31) and Simultaneous exportable capacity (line 32):** Importable and Exportable capacity with other national systems expected to be available each week and a range of possible outcomes for Interconnection power flow. It is recognised that for many TSOs, it is not possible to calculate weekly values and hence a best estimate on the value taking into account known variables (such as planned maintenances) is requested.

- ***It is recognised that due to loop flows or transit flows, it may be difficult for TSOs to be specific as a high flow across one boundary results in a lower capacity across another etc. It would be helpful if TSOs could provide a comment if this is the case in order to assist the analysis and to reflect the limitation via the simultaneous importable/exportable capacity (see below).***

Transportable capacity is asked for as a per country value as well as a simultaneous value. The per country values are mandatory for the analysis. It is noticed that some countries may be divided into more than one Bid Area (Norway, Denmark …) then only the sum of the NTCs to/from these Bid Areas should be provided. The simultaneous value should always be smaller or equal to the sum of all per country values. When not completed, it is assumed to be equal to the sum of all per country values and the spreadsheet will automatically calculate the sum of all values unless it is manually

overwritten in lines 31 and 32. The picture below gives an example where the simultaneous value is overwritten.



PART D: ADDITIONAL INFORMATION FOR INTERCONNECTORS			
Transportable capacity			
simultaneous importable capacity			0.30
NTC from country	(best estimate of min value)	CZ	0.20
NTC from country	(best estimate of min value)	SK	0.20
NTC from country	(best estimate of min value)	DE	0.20
NTC from country	(best estimate of min value)	Country Select	
NTC from country	(best estimate of min value)	Country Select	
NTC from country	(best estimate of min value)	Country Select	

If the simultaneous capacity is manually overwritten, the analysis of flows will take this restriction into account.

Country codes are as found on the ENTSO-E website[8]. In cases where NTC codes do not exist, there is the ability to overwrite. A map of the ENTSO-E countries is included in the spreadsheet.

PART E: INFORMATION FOR DOWNWARD REGULATION CAPABILITIES (Lines 33 and 37).

The above described in 5.1 to 5.5 will be familiar to users who completed the previous Winter Outlook data request. For the Summer Outlook report, an additional PART E, divided into two sections, has been added with 4 additional data items requested. The intention is to analyse the level of inflexible generation against minimum demand levels. For countries that have an excess of generation, the analysis will increase exports to regions that have more flexibility in order to solve. Hence, it is anticipated that the analysis will determine which countries are required to export under high renewables. The data items requested are shown below:

8 https://www.entsoe.eu/fileadmin/template/other/images/map_entsoe.png

	Time (CET)	5:00
	PART E: ADDITIONAL INFORMATION FOR MIN DEMAND CONDITIONS	
33	Weekly Minimum Demand (overnight valley minimum)	
34	Must Run Generation (excluding wind/solar/run of river, renewables)	
35	Run of river generation (Must Run)	
36	Downward Regulating Reserve	-1.00 GW
37	Pumping Storage Capacity available	
38a	Highest expected proportion of installed onshore wind generation running (for national analysis only)	65%
38b	Highest expected proportion of installed offshore wind generation running (for national analysis only)	65%
39	**DOWNWARD REGULATION CAPABILITIES: 39 = (33+37)-(34+35+36+38a*3a+38b*3b))**	1

Overnight 05:00 CET is selected as minimum demand reference point for the first downward regulation assessment

	Time (CET)	11:00	11:00
	PART E: ADDITIONAL INFORMATION FOR MIN DEMAND CONDITIONS		
40	Weekly Minimum Demand (Sunday low peak + solar) Hour 12 (noon)*	40.00 GW	
41	Must Run Generation (excluding wind/solar/run of river, renewables)	30.00 GW	
42	Run of river generation (Must Run)	3.00 GW	
43	Downward Regulating Reserve	1.50 GW	
44	Pumping Storage Capacity available (Power)	3.00 GW	-1.00 GW
45	Highest expected proportion of installed solar operating capacity (PV and thermal, national analysis only)	95%	95%
46a	Highest expected proportion of installed onshore wind generation running (for national analysis only)	45%	65%
46b	Highest expected proportion of installed offshore wind generation running (for national analysis only)	65%	65%
47	DOWNWARD REGULATION CAPABILITIES: 47 = (40+44)-(41+42+43+45*3c+46a*3a+46b*3b))	-5.5745	-1

A description of what information is requested is:

- **Weekly Minimum Demand (overnight valley minimum)** (line 33): this is requested for 05:00 CET on each Sunday. If weekly data is not available, then please provide information on minimum demand that will be experience in the second weekend in August (11th)

- **Weekly Minimum Demand (Sunday low peak+solar) Hour 11** (line 40) is requested for 11:00 CET on each Sunday. If weekly data is not available, then please provide information on minimum demand that will be experience in the second weekend in August (11th)

- **Must Run Generation** (lines 34 and 41): the data should include the level of inflexible (i.e. not sensitive to price) generation that is anticipated to be running across the minimum demand periods. Thus it is anticipated that for most TSOs this will include a level of nuclear generation, CHP, Biomass and Coal and Gas generation that is always on the system to maintain overall system security and voltage regulation. The user is specifically asked not to include wind/solar as the analysis that is carried out will use generation data in PART A/B/C to calculate potential output from these generation sources.

- **Run of River** (lines 35 and 42): the data should include the level of inflexible run of river generation that is anticipated to be running across the minimum demand periods.

- **Downward Regulation** (lines 36 and 43): this is the minimum level of generation flexibility that is required by the TSO to be able to reduce output on the system.

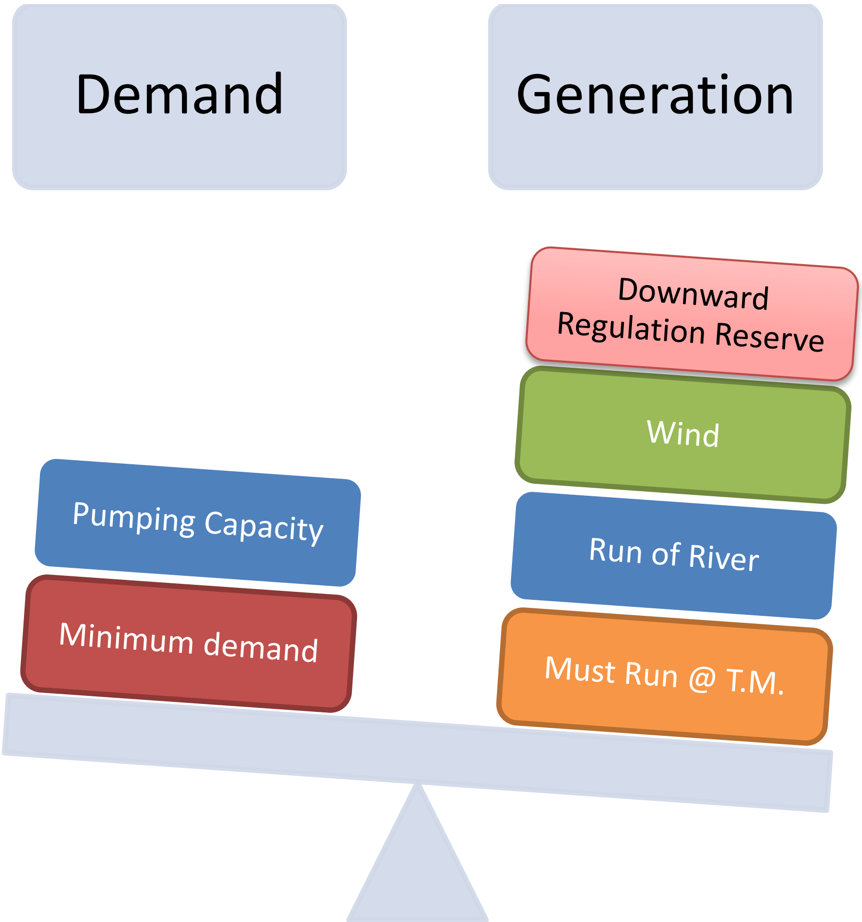
  Pumping Storage Capacity (lines 37 and 44): this is the level of pumped storage capacity.

- Highest expected proportion of installed onshore wind generation running (for national analysis only) (lines 38a and 46a): this data is set to 65% and can be modified according to the national specificities. It will be used for national assessment only.

- Highest expected proportion of installed offshore wind generation running (for national analysis only) (lines 38b and 46b): this data is set to 65% and can be modified according to the national specificities. It will be used for national assessment only.

- Highest expected proportion of installed solar operating capacity (PV and thermal, national analysis only) (line 45): this data is set to 95% and can be modified according to the national specificities. It will be used for national assessment only.

The intention of the analysis is to look at high wind, run of river, solar renewable scenario (details of which to be determined). The levels of exports that a country may require when added to the "must run generation" will be compared against the demand, pumped storage capability and downward regulation for each country. If a country requires exports to maintain balance, the analysis will use submitted NTC values to determine if there is a solution. This is described graphically below:



It is anticipated that the coloured maps that were developed for the previous Winter Outlook report (and what will be used for the peak demand overview) will also be employed to give an overview of countries that may be required to export surplus energy under a high renewables production scenario.

7.6 Questions and Comments

The main areas for comments that TSOs are asked to consider:

1. Please provide feedback on improvements that can be made to the spreadsheet and what difficulties the user had in completing the data. In particular, did you have any problems in providing data for the new PART E?

2. Please indicate how the outage rates for both Normal and Severe conditions have been calculated for the spreadsheet.

3. Please indicate how the submitted NTC values have been derived.

4. Treatment and amount of mothballed plants. Under what circumstances (if any) could they be made available?

5. Issues, if any, associated with utilising interconnection capacity e.g. existence of transmission constraints affecting interconnectors for export or import at time of peak load (such as maintenance or foreseen transit or loop flows)

6. Are there any energy constraint issues particularly for hydro based systems?

7. Any other fuel supply issues which could affect availability e.g. gas supply issues?

8. Do you expect any event that may affect the adequacy during the summer? If yes, what actions do you plan to activate?

9. Do you foresee any issue with inflexible plant across minimum demand periods e.g. high level of wind and must run generation?

10. Any other issues of relevance that are not covered above?

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7.7 WINTER REVIEW 2012-2013 INTRODUCTION AND QUESTIONNAIRE

Following the publication of the summer outlook report, ENTSO-E will be publishing a Winter Review Report.

The objective of the report is to present what happened during this Winter as regards weather conditions and other factors and their consequences on the power system (temperatures, hydro and wind conditions), availability of generating units, market conditions, use/availability of interconnections and imported energy, and to compare what happened in reality with the risks identified in the Winter outlook.

The report will be based on **narrative that will be collected in the excel for the data collection**; however, quantitative data to illustrate how the Winter out-turned against what was forecast would be appreciated (e.g. actual peak load and difference compared with forecast in normal and extreme conditions, major disturbances and their effect on generation or transmission capability etc.). For a synchronized view of the European system any information on the critical periods would be appreciated.

Please indicate if any of your answers should be regarded as confidential and/or commercially sensitive so that this information can be aggregated or withheld from publication.

If you are unable to provide quantitative data, then it would be very helpful if you could still provide some commentary in answer to the questions. It is understood that not all TSOs will have access to all the requested information.

The Winter Outlook Report (published on December 2012) is available to view at:

https://www.entsoe.eu/resources/publications/system-development/outlook-reports/

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Questionnaire on Winter Review 2011-2012 to be answered in the data collection excel

1. General Commentary on Winter Conditions

Recalling main features and risks factors of the Winter Outlook Report, please provide a brief overview of Winter 2012-2013:

- General comments on the main trends and climatic conditions (temperatures (average and lowest compared with forecast), precipitation, floods/snow/ice).
- Did the risks identified in the Winter Outlook Report actually occur?
- Did unexpected situations arise during the Winter which had an effect on the power system (generation/demand balance; transmission capacity; interconnection capacity; availability of imported energy etc.)?
- Is it possible to identify (and quantify) the effects of external factors on demand (e.g. demand reduction as a result of economic conditions; climate change; energy efficiency initiatives etc.)?
- An indication of the most stressed periods for system adequacy.

2. Specific Events Occurred during the Winter 2012/2013

Please report on specific events occurred during the last winter period (i.e. experience on gas imports reductions, others)

3. Detailed Review of the Most Stressed Periods

Describe the actual versus expected and average conditions for the most stressed periods of the Winter (November to March). For each statement please specify the period considered (Month(s), week(s) or even day(s) whichever is easiest – if possible, please use the spreadsheet provided to provide week-by-week quantitative details on generation conditions and demand at weekly peak). Please specify which measures did you apply to manage remarkable events or stressed conditions:

- Description of remarkable event(s)/cause(s) of system stress (e.g. colder than expected weather conditions, low/high wind in-feed etc.) and the duration of the situation.
- Description of any measures applied to overcome the events/system stress (e.g. Interruptible customers, load shedding, curtailments any other).
- generation conditions: generation overhaul (planned, unplanned), gas/oil/availability, hydro output, wind conditions (above or below expectations, extended periods of calm weather), specific events or most remarkable conditions (please specify dates)
- demand: actual versus expectations, peak periods, summary of any demand side response used by TSOs, reduction/disconnections/other special measures e.g. use of emergency assistance, higher than expected imports from neighbouring states
- Transmission infrastructure: outages (planned/unplanned), reinforcement realised, notable network conditions (local congestion, loop flows etc.)

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- Use of interconnections: import/export level, reliance on imports from neighbouring countries to meet demand (you can refer to http://www.entsoe.net/); commentary on interconnector availability and utilisation.

4. Lessons Learned for Winter 2013

- Relevant key points for the forthcoming Winter.
- Feedback on the use of the Winter Outlook Report.
- Feedback on format and content of this report.

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8 APPENDIX 2: LOAD FACTORS USED FOR THE RENEWABLES IN-FEED FOR THE DOWNWARD REGULATION ANALYSES

TABLE 9: LOAD FACTORS USED FOR THE DAYTIME DOWNWARD ADEQUACY ANALYSIS[9]

	Wind Onshore				Wind Offshore				Solar			
Country	*June*	*July*	*August*	*September*	*June*	*July*	*August*	*September*	*June*	*July*	*August*	*September*
AL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AT	35%	31%	25%	25%	0%	0%	0%	0%	54%	51%	51%	46%
BA	19%	13%	15%	25%	0%	0%	0%	0%	54%	51%	53%	50%
BE	21%	28%	27%	27%	64%	76%	85%	96%	50%	49%	47%	35%
BG	17%	15%	11%	26%	0%	0%	0%	0%	54%	52%	55%	54%
BY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CH	24%	16%	21%	22%	0%	0%	0%	0%	53%	52%	51%	46%
CZ	26%	21%	21%	28%	0%	0%	0%	0%	54%	52%	51%	44%
DE	21%	24%	20%	30%	54%	68%	69%	91%	51%	50%	49%	38%
DK	30%	31%	33%	56%	64%	69%	71%	92%	55%	51%	49%	42%
EE	32%	19%	27%	51%	50%	37%	45%	87%	57%	53%	52%	39%
ES	21%	20%	20%	22%	39%	38%	35%	38%	42%	41%	40%	35%
FI	41%	31%	25%	48%	50%	49%	48%	75%	56%	51%	48%	29%
FR	22%	22%	21%	25%	52%	66%	47%	71%	45%	45%	42%	35%
GB	19%	32%	37%	57%	42%	51%	63%	83%	37%	36%	28%	20%
GR	27%	33%	44%	46%	31%	39%	74%	87%	54%	52%	55%	54%
HR	33%	18%	19%	36%	0%	0%	0%	0%	53%	51%	51%	48%
HU	35%	29%	23%	25%	0%	0%	0%	0%	54%	51%	52%	50%

[9] Maximum values that are statistically not expected to be exceeded in more than 10% of the relevant hours.

Data from Technical University of Denmark

	Wind Onshore				Wind Offshore				Solar			
Country	*June*	*July*	*August*	*September*	*June*	*July*	*August*	*September*	*June*	*July*	*August*	*September*
IE	22%	35%	35%	69%	40%	55%	57%	83%	35%	31%	27%	17%
IT	29%	23%	20%	26%	41%	25%	27%	43%	51%	50%	50%	46%
LT	33%	17%	28%	50%	0%	0%	0%	0%	56%	53%	53%	45%
LU	23%	18%	17%	26%	0%	0%	0%	0%	53%	49%	48%	35%
LV	36%	14%	22%	46%	52%	31%	50%	89%	56%	53%	53%	38%
ME	23%	17%	12%	34%	0%	0%	0%	0%	56%	53%	54%	53%
MK	22%	19%	12%	26%	0%	0%	0%	0%	55%	54%	54%	53%
NI	20%	39%	39%	76%	38%	63%	71%	94%	37%	36%	28%	20%
NL	21%	37%	30%	45%	48%	74%	77%	89%	51%	50%	48%	39%
NO	24%	21%	25%	39%	50%	53%	58%	74%	50%	42%	36%	24%
PL	23%	22%	20%	31%	64%	62%	49%	95%	54%	51%	53%	46%
PT	29%	29%	29%	31%	0%	0%	0%	0%	39%	38%	36%	30%
RO	29%	22%	15%	33%	0%	0%	0%	0%	54%	52%	53%	52%
RS	19%	16%	10%	20%	0%	0%	0%	0%	54%	52%	53%	51%
SE	29%	26%	25%	46%	43%	48%	57%	69%	53%	46%	38%	30%
SI	44%	31%	26%	42%	0%	0%	0%	0%	54%	52%	52%	48%
SK	44%	23%	25%	30%	0%	0%	0%	0%	55%	52%	53%	50%
UA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

TABLE 10: LOAD FACTORS USED FOR THE NIGHTTIME DOWNWARD ADEQUACY ANALYSIS[10]

	Wind Onshore				Wind Offshore			
Country	*June*	*July*	*August*	*September*	*June*	*July*	*August*	*September*
AL	0%	0%	0%	0%	0%	0%	0%	0%
AT	27%	29%	21%	24%	0%	0%	0%	0%
BA	21%	20%	16%	21%	0%	0%	0%	0%
BE	20%	25%	25%	31%	56%	69%	66%	74%
BG	22%	22%	16%	24%	0%	0%	0%	0%
BY	0%	0%	0%	0%	0%	0%	0%	0%
CH	23%	19%	22%	20%	0%	0%	0%	0%
CZ	22%	24%	19%	25%	0%	0%	0%	0%
DE	19%	21%	18%	23%	43%	55%	53%	70%
DK	26%	25%	28%	39%	51%	62%	59%	68%
EE	22%	17%	20%	35%	37%	31%	36%	66%
ES	21%	23%	21%	20%	27%	31%	24%	27%
FI	28%	23%	21%	34%	45%	42%	38%	58%
FR	25%	24%	21%	22%	43%	61%	37%	60%
GB	17%	25%	29%	43%	32%	43%	51%	65%
GR	28%	35%	36%	38%	26%	35%	61%	69%
HR	22%	22%	20%	29%	0%	0%	0%	0%
HU	38%	37%	29%	32%	0%	0%	0%	0%
IE	23%	36%	29%	51%	31%	48%	53%	68%
IT	34%	37%	26%	27%	29%	26%	23%	33%
LT	25%	22%	24%	36%	0%	0%	0%	0%
LU	27%	24%	22%	24%	0%	0%	0%	0%
LV	21%	16%	20%	35%	38%	28%	32%	66%
ME	19%	20%	19%	28%	0%	0%	0%	0%
MK	22%	24%	18%	23%	0%	0%	0%	0%
NI	21%	35%	31%	53%	34%	56%	55%	69%
NL	19%	28%	24%	37%	39%	58%	59%	69%
NO	18%	22%	22%	30%	34%	44%	40%	53%
PL	20%	21%	21%	25%	57%	55%	44%	71%
PT	31%	35%	30%	28%	0%	0%	0%	0%
RO	29%	30%	25%	35%	0%	0%	0%	0%
RS	21%	20%	19%	24%	0%	0%	0%	0%
SE	23%	23%	22%	35%	33%	42%	45%	54%
SI	35%	35%	28%	35%	0%	0%	0%	0%
SK	34%	30%	24%	31%	0%	0%	0%	0%
UA	0%	0%	0%	0%	0%	0%	0%	0%
CY	0%	0%	0%	0%	0%	0%	0%	0%

[10] Maximum values that are statistically not expected to be exceeded in more than 10% of the relevant hours. Data from Technical University of Denmark.