European Network of
Transmission System Operators
for Electricity

An Overview of System Adequacy:

Summer Outlook Report 2012 and Winter Review 2011/2012

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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 7th December 2011 (week 49) to 4th April 2012 (week 14). It outlines the main events during the previous winter in comparison with the forecasts presented in the ENTSO-E Winter Outlook report 2011-2012, published on 24th November 2012. In light of the significant cold spells and severe weather conditions that occurred during the 2012 winter in Europe, an early winter review report was prepared by ENTSO-E and published on 2 April 2012. The purpose of this report was to provide an overview of the impact faced by TSOs as well as the measures which were put in place to manage the situation.

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 6 June (week 23) to 25 September (week 39). More information regarding reference points is provided in point 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 neighboring countries, whilst also assessing the possibility for neighboring 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.

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2 EXECUTIVE SUMMARY

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 6th June (week 23) to 25th 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, cross border capacity is sufficient enough to accommodate them.

The ENTSO-E Summer Outlook 2012 shows that, on the whole, the balance between generation and supply 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 hot waves and high temperatures, demand increases from normal levels. In such situation, from the data submitted by the TSOs, the analysis shows that reliability margins are reduced. Indeed, countries such as Germany, Hungary, Finland and Poland would require imports to maintain the demand and supply balance for all reference points during the entire summer period (Poland – except for the holiday on Wednesday, 15th August). In such severe conditions then, the margins would be reduced in certain moments of the summer period, for Belgium and Luxemburg (only one week), as well as for Slovakia, Albania, Serbia, Latvia, and the Republic of Macedonia.

For this Summer Outlook report, the analysis has been extended to consider "overnight downward adequacy" in addition to the usual power balance analysis between electricity generation and peak demand. The "Overnight downward adequacy" issue occurs when due to low overnight demands, there can be excess of the minimum generation on the system when renewable generation (e.g. wind, at the reference overnight time used for the performed assessment in this report, but in general photovoltaic too) and inflexible classical generation can be at high output levels on weekends in particular. There could well be an excess of generation which would need to be exported or curtailed.

When generation exceeds demand in a country due to both of the above reasons, cross border flows will occur in regions which can import the excess generation. When cross border capacities are full, then curtailment of renewable (or other inflexible generation) will occur due to the lack of appropriate infrastructures, also including storage facilities, which balance the inflexible generation or flexible generation needed to substitute inflexible generation.

The Summer Outlook report 2012 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 infeed and inflexible generation in Belgium, Denmark, Germany and the Netherlands leads to high exports to all surrounding countries. Based on the minimum NTCs provided, not all excess energy can be evacuated from this cluster of countries, and thus measures could be required to limit this generation surplus.

Furthermore, Ireland would be required to curtail excess wind generation due to limited interconnector capacity. In addition, during low load periods, such as weekend nights, high levels of wind generation penetration, up to 50% of system demand, could lead to balancing problems and wind curtailment.

The main issues identified for the coming summer are related to reduced hydro level availability, including 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 lack of adequate regulating capacity.

The Winter Review 2011/12 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 2011 in the Winter Outlook 2011/12.

The Winter Review as it pertains to the period December 2011 to March 2012 shows that the most stressed situations, due to severe weather conditions, took place in February 2012 when the European system experienced a tense situation because of extreme weather conditions.

While the majority of the 2012 winter was mild, the weather conditions changed abruptly at the beginning of February, causing stressed situations in most of the countries where exceptional snow falls and extremely low temperatures were observed. It confirms that, as identified in the Winter Outlook report, the main risks factor for most of the countries are related to the sensitivity of load to low temperatures which may cause stressed situations to be phased with planned measures.

During the February cold spells, the safety measures highlighted by the TSOs in the Winter Outlook report 2011/12 were activated, including voltage controls, curtailments and interruptible load. Moreover, additional coordinated actions between TSOs were necessary in order to maximize import possibilities.

3 METHODOLOGY

3.1 SOURCE OF INFORMATION AND METHODOLOGY

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 time as well as the causes and the remedial actions taken.

The summer outlook report is based on the information provided by ENTSO-E members on a qualitative and quantitative basis, when relevant. The information provided in the summer outlook referred to the answers sent by TSOs till beginning of May in response to a questionnaire which has been significantly improved in order to increase the level of details in the analysis performed. It presents TSOs' views as regards any national or regional matters of concern regarding security of supply 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.

Based on the successful experience of the winter outlook 2011-2012, 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 their neighbouring countries.

Similar to the previous winter outlook 2011-2012, and for the first time within this summer outlook report, the methodology for the quantitative analysis has been significantly enhanced to provide a European overview of adequacy. Additional data was requested from all member TSOs. Some basic principles were also adapted to allow the regional analysis to yield representative results.

In order to conduct a regional marginal analysis, a synchronous point in time was used for all countries. The data was requested for synchronous time each Wednesday (11:00 CET) in order to allow for meaningful analysis when determining cross border flows. With regards to the regional analysis, the only 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.
- The best estimate of the minimum NTC values towards individual neighboring countries.

In addition, across the period of assessment for the next summer, it is also highlighted any European “downward regulation” issues where excess inflexible generators output exceeds overnight minimum demands. Similar to the peak demand analysis, it is provided a level of confidence that countries that require exports to manage inflexible generation. Indeed, this involved an analysis of their ability to export these to neighboring regions who are not in a similar situation. The reason for this analysis pertained to the fact that a number of TSOs had expressed concern that this issue is a growing problem for system operation due to the increase of intermittent generation on the system (wind and solar). This is a significant change from the previous summer outlook reports in terms of analysis of the submitted returns and being the first year of attempting to do this analysis. Based on the analysis, it is envisaged that these improvements will be embedded into all summer and winter outlook reports.

To carry out a regional downward analysis, a synchronous point in time was used for all countries. The data was requested for a synchronous time each Sunday (03:00 CET) in order to allow for meaningful analysis when determining cross border flows. Although it is recognized that this may not be the minimum demand in every region in the summer, 03:00 was selected in order to allow for consistent analysis.

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

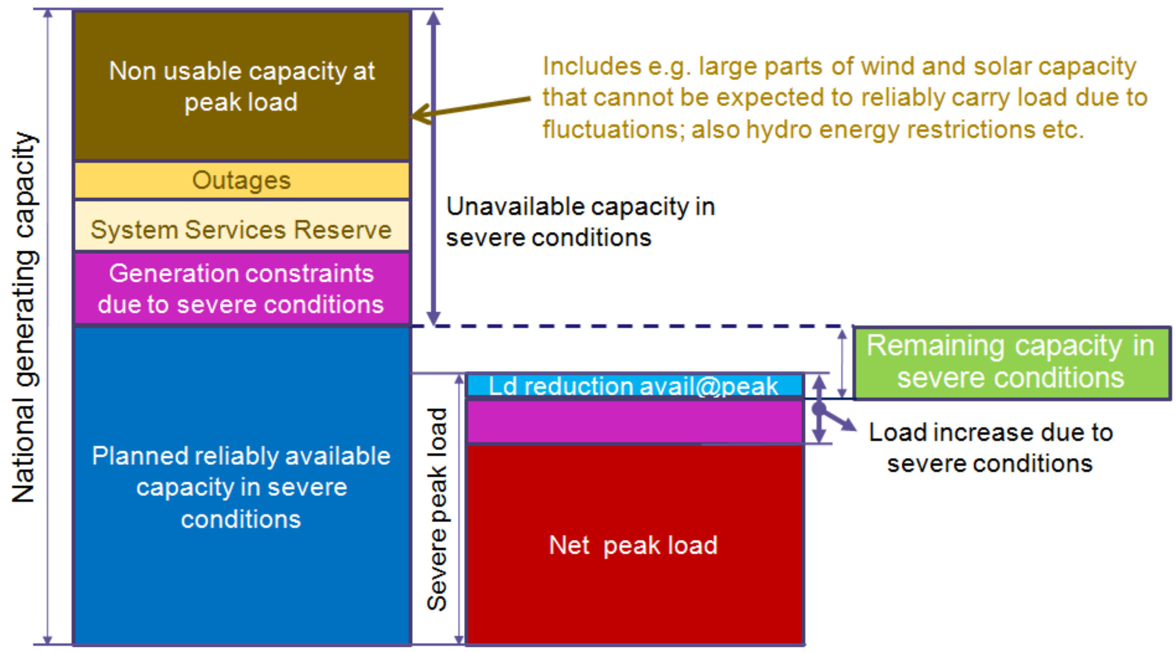
- The minimum demand at 03:00.
- Sum of the inflexible and must run generation.
- Simultaneous importing and exporting capacity.
- The best estimate of the minimum NTC values towards individual neighboring countries.

The analysis then assumed wind output of 65% for the country to calculate total generation which it then compared to the total of demand, pumped storage and downward regulating reserve requirement. The 65% amount was assumed as an average estimation of the maximum output power which could be delivered during the night based on the installed capacity.

3.2 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 shown 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 normal outages). 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).

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

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

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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 level, it will not say which countries will have a generation deficit as this depends on the actual market price in all connected countries. The goal is to provide a level of confidence that countries requiring imports are able to source these across neighboring regions under normal and severe conditions.

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 added, and when the result is greater than zero, theoretically enough capacity is available in Europe to cover everyone's needs. No problems were detected 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 was taken. The problem was modeled as a linear optimization with the following constraints:

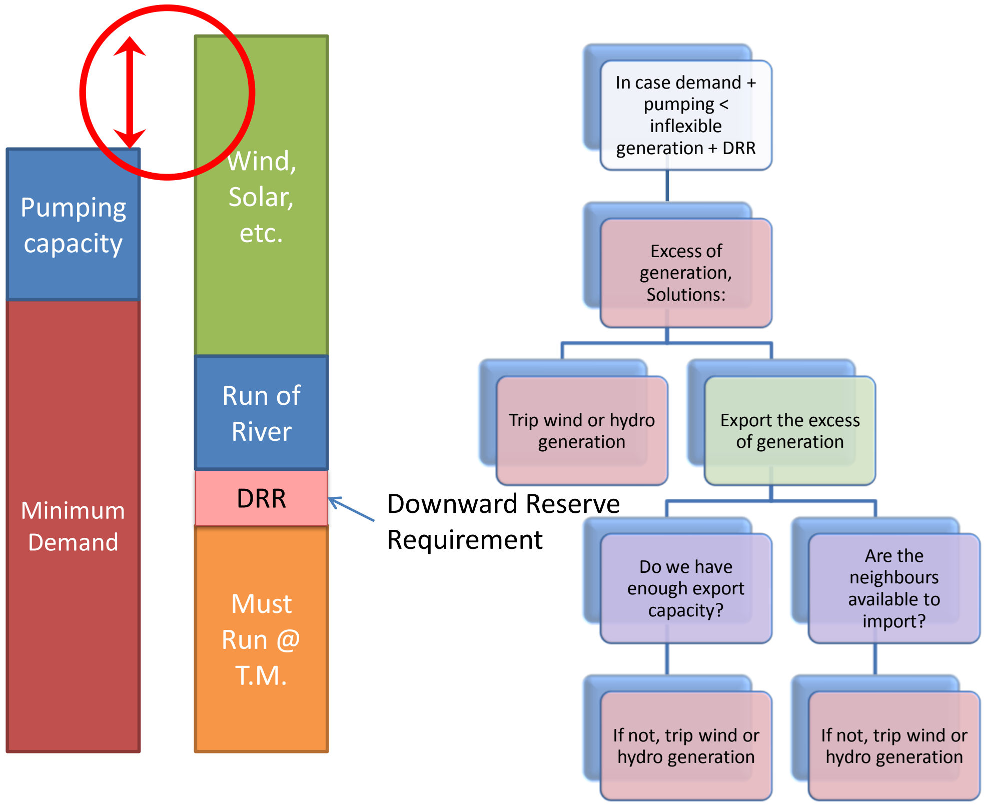
- Bilateral exchanges between countries should be lower or equal to the given NTC values.
- Total simultaneous imports and exports should be lower or equal to the given limits

Based on this methodology, it was calculated which 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 Ukrainian system operates synchronously with Continental Europe) and MA, TR the following values ware taken for these systems for analysis:

- The balance (remaining capacity) of these systems was set for 0 MW.
- Best estimate of minimum NTC comes from neighboring systems belonging to ENTSO-E.

With regards to the new downward regulation analysis it is recognised that this is the first occasion that ENTSO-E have analysed the downward regulation situation in Europe. It is appreciated that downward regulation may not be a focus for many TSO's at present and hence a short explanation of what the potential issue is, is provided in the diagram below.



Under minimum demand conditions, there is a potential for countries to have an excess of 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, 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 assumes that wind is at 65% output. For countries that have an excess of generation, the optimisation looks to exports to neighbouring regions based on the best estimate of the minimum NTC values submitted via linear optimisation.

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

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4 WINTER REVIEW

While the majority of the winter was mild, the weather situation changed abruptly in February 2012 causing a stressed situation on the European electricity system. In many countries, such severe weather conditions, characterized by exceptionally heavy snowfalls and extremely low temperatures, have not been observed in decades. TSOs in close cooperation with each other managed a difficult situation well by maximizing the available network, coordinating generation, and ensuring that customers had the greatest opportunity for uninterrupted power supply during what were, in certain cases, extreme conditions.

Due to the extremely low temperatures many countries experienced extreme demand; some countries including France, Poland, Austria, Croatia and FYROM reported the highest ever peak on their system, with Bulgaria reporting its highest peak in twenty years.

The security of supply in many South Eastern European countries was severely impacted due to the highest ever electricity demand and restricted generation due to the limited water supply, including hydro power generation, or difficulties in transporting fuel to power stations, as well as forced outages of generating units. In such force majeure circumstances, certain TSOs in Southern Europe adopted safety measures limiting electricity export while all the electricity transits were maintained. In this context, during February the allocated capacities on Romanian - Bulgarian and Romanian-Hungarian borders were reduced 100 % for certain hours during each days, due to the generation limitation described above.

In Germany, due to limitations of gas supply to fuel power stations (particularly in the South), TSOs experienced problems balancing generation and demand and were required to seek coordinated solutions with gas operators to ensure fuel was available for generation. Due to the unfavorable weather conditions, generation from renewable electricity like wind or solar was not able to contribute significantly to the generation–demand balance. The effect of the nuclear phase-out in Germany on power system adequacy was also significant during this period, not only on national, but also on the regional ENTSO-E level.

In the CWE region, Elia encountered a forced outage of the Phase Shifter in Zandvliet on February 10th (near the end of the cold spell), leading to severe limitations to control North-to-South flows in the CWE region. While the coordinated use of Phase Shifters has already proven its usefulness, the loss of these instruments in combination with allocated market capacities led to very stressful, nearly critical grid situations in Belgium, The Netherlands, and by extension the entire CWE region. This indicates the importance of both the Phase Shifters and a correct capacity allocation in keeping the stress level in the CWE region under control and limiting the risk for Security of Supply.

In the Continental Central East region the security of supply has also been threatened many times by the unexpectedly high electricity flows in the North-South direction caused by the over-generation in the RES located in the North of Europe. TSOs of Poland, Czech Republic or Slovakia had to cope with extreme electricity transits threatening their system and as such were forced to call upon countermeasures in order to prevent the cascade tripping of the transmission lines.

TSOs coordinated all necessary actions and cooperated very closely with each other; this was in order to more efficiently manage the stressed system facing highly loaded cross-border capacities and internal system constraints. TSOs used all available control reserves to maintain supply to customers, while maximizing all import possibilities. Some TSOs also used additional measures, such as calling for moderation in demand through the media, localized voltage reduction, or activation of interruptible load arrangements. In general, the electricity markets responded positively with generators responding to higher market prices.

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 is based on data submitted by each TSO. A synchronious point in time has been requested for all data in order to allowing a comparision across regions in order to determine that there is enough generation to meet demand under normal and severe scenarios.

Based on the data submitted by each TSO, under a "copperplate" analysis, Europe as a whole has over 65GW of spare capacity to meet demand and reserve under severe conditions. To put that into perspective, for the Winter Outlook report, ENTSO-E analysis was forecasting a copperplate surplus of 22GW under severe conditions.

The analysis indicates that there is sufficient cross border capacity various between countries to take full advantage of this excess capacity and the analysis highlights which weeks and which borders are likely to experience higher flows under severe conditions.

For this Summer Outlook report, new data has been requested to allow an analysis for downward regulation across overnight minimum demand periods. It is recognised that this is the first year of a request for additional data and it anticipated that greater consistency will develop over time.

For the downward analysis, it indicates that there may be periods when export capacity in certain countries is not sufficient to transport all of the excess generation to neighbouring regions.

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5.2 INDIVIDUAL COUNTRY PERSPECTIVE ANALYSIS

Based on Normal conditions for demand, the majority of countries do not require imports as shown pictorially in Figure 1. Where a country is colored green, it always has excess capacity to meet demand and reserve. Countries which are orange have at least one period where imports are required to meet their demand and reserve requirements.

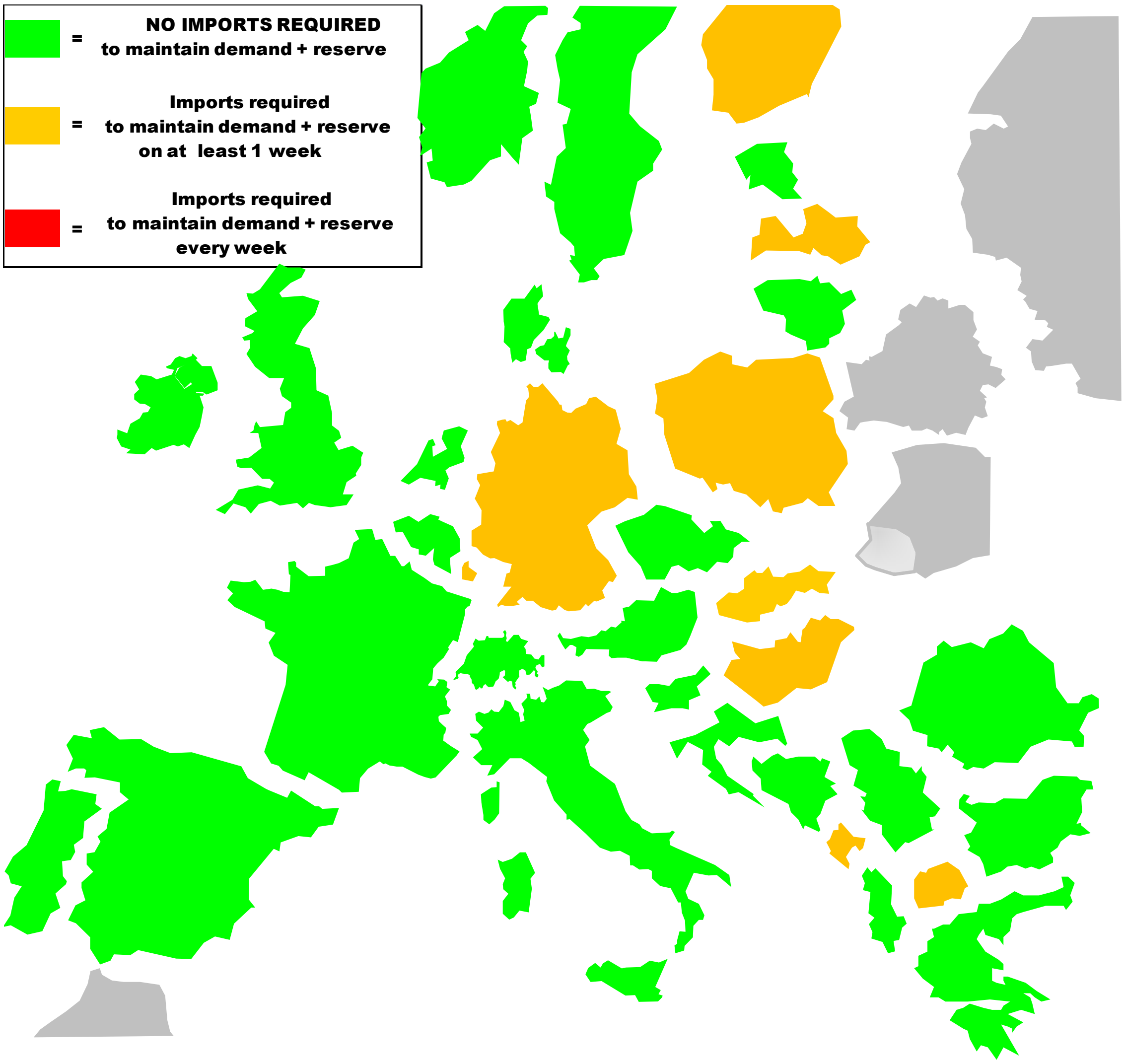

FIGURE 1: COUNTRY ANALYSIS UNDER NORMAL CONDITIONS

While the majority of regions do not require imports for security, markets will determine the economic flows based on respective price differentials between regions and hence various borders will be flowing power at their maximum capacity. As indicated in the description of the methodology, this analysis is not a market simulation and hence flows are not indicated.

Although some regions do require imports, there is ample interconnector capacity from neighbouring regions and a subjective weekly assessment by the coordination team has determined a green status for all weeks as shown below in Figure 2

FIGURE 1: COUNTRY ANALYSIS UNDER NORMAL CONDITIONS

Date	06-Jun-12	13-Jun-12	20-Jun-12	27-Jun-12	04-Jul-12	11-Jul-12	18-Jul-12	25-Jul-12	01-Aug-12	08-Aug-12	15-Aug-12	22-Aug-12	29-Aug-12	05-Sep-12	12-Sep-12	19-Sep-12	26-Sep-12
Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Time	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**
Weekly Status																	

FIGURE 2: WEEKLY STRESS ASSESSMENT UNDER NORMAL CONDITIONS

Under severe conditions, demand increases in each country from normal levels. This is driven by high temperatures and hence high air conditioning loads. Where a country is coloured green, it always has excess capacity to meet demand and reserve. Countries which are orange have at least one period where imports are required to meet their demand and reserve requirements and countries that are red will always require imports to meet demand and reserve. The analysis for severe conditions is as shown below in Figure 3

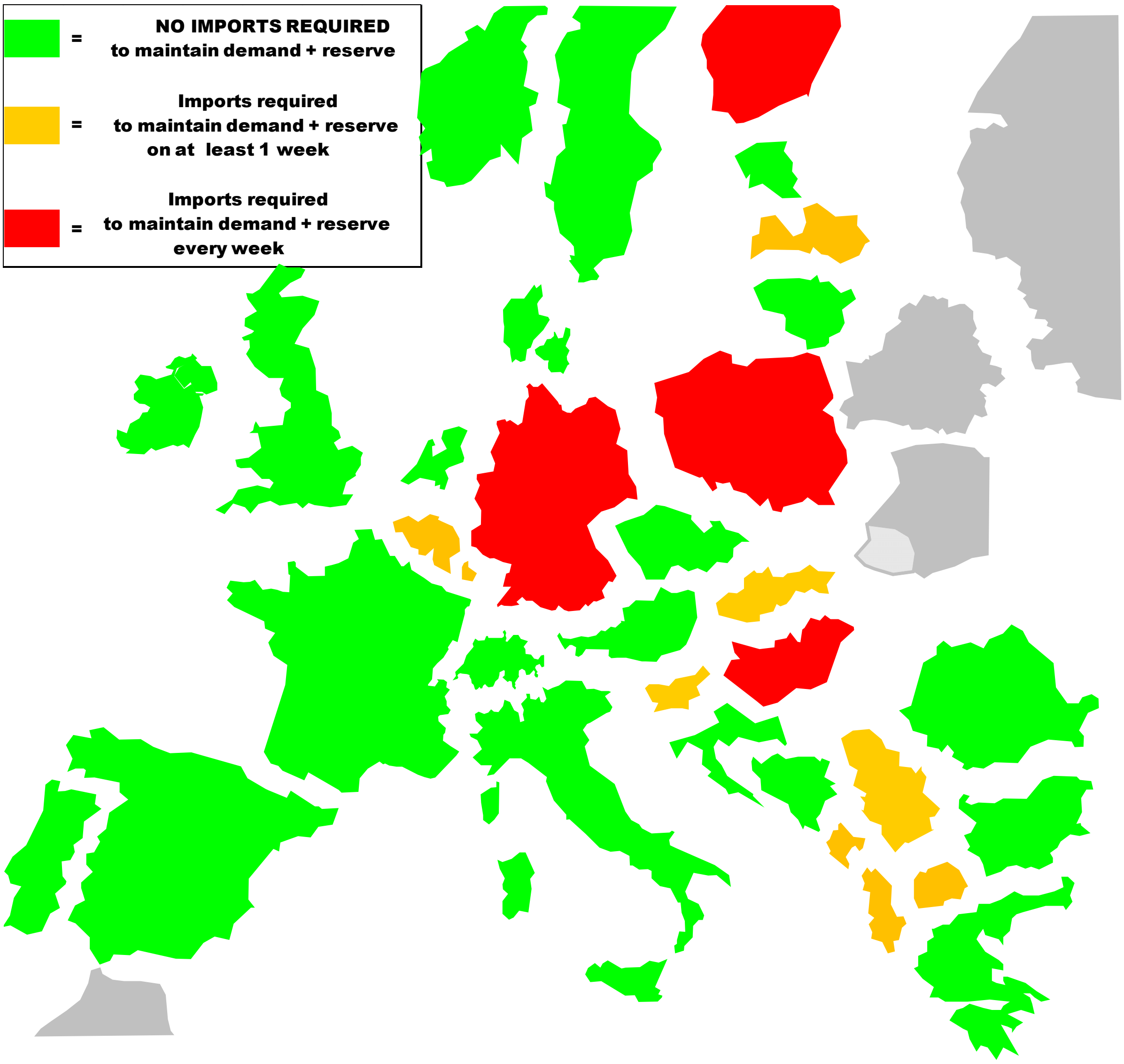

FIGURE 3: COUNTRY ANALYSIS UNDER SEVERE CONDITIONS

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From the data submitted by TSOs, under severe demand conditions, Germany, Hungary, Finland and Poland will always require imports to maintain demand and reserve (Poland – except for the holiday on Wednesday 15th August).

Although some regions do require imports, there is ample interconnector capacity from neighbouring regions and a subjective weekly assessment by the coordination team has determined the following status for all weeks as shown below in Figure 4

Date	06-Jun-12	13-Jun-12	20-Jun-12	27-Jun-12	04-Jul-12	11-Jul-12	18-Jul-12	25-Jul-12	01-Aug-12	08-Aug-12	15-Aug-12	22-Aug-12	29-Aug-12	05-Sep-12	12-Sep-12	19-Sep-12	26-Sep-12
Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Time	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**
Weekly Status																	

FIGURE 4: WEEKLY STRESS ASSESSMENT UNDER SEVERE CONDITIONS

Thus, if interconnector capacity is maintained across these periods, then countries that require imports will always be able to access power from neighboring regions.

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5.3 IMPORT/EXPORT CONTRIBUTION AND REGIONAL OVERVIEW

The analysis in the previous section highlights that under normal conditions there is ample interconnector capacity for flows to regions which may require imports.

Under severe demand conditions the assessment of the coordination team is that cross border flows will increase to various countries, but based on the best estimate of the minimum NTC data provided by TSOs it is not anticipated that there will be significant issues.

An example to highlight is week 34 which is shown below in Figure 5

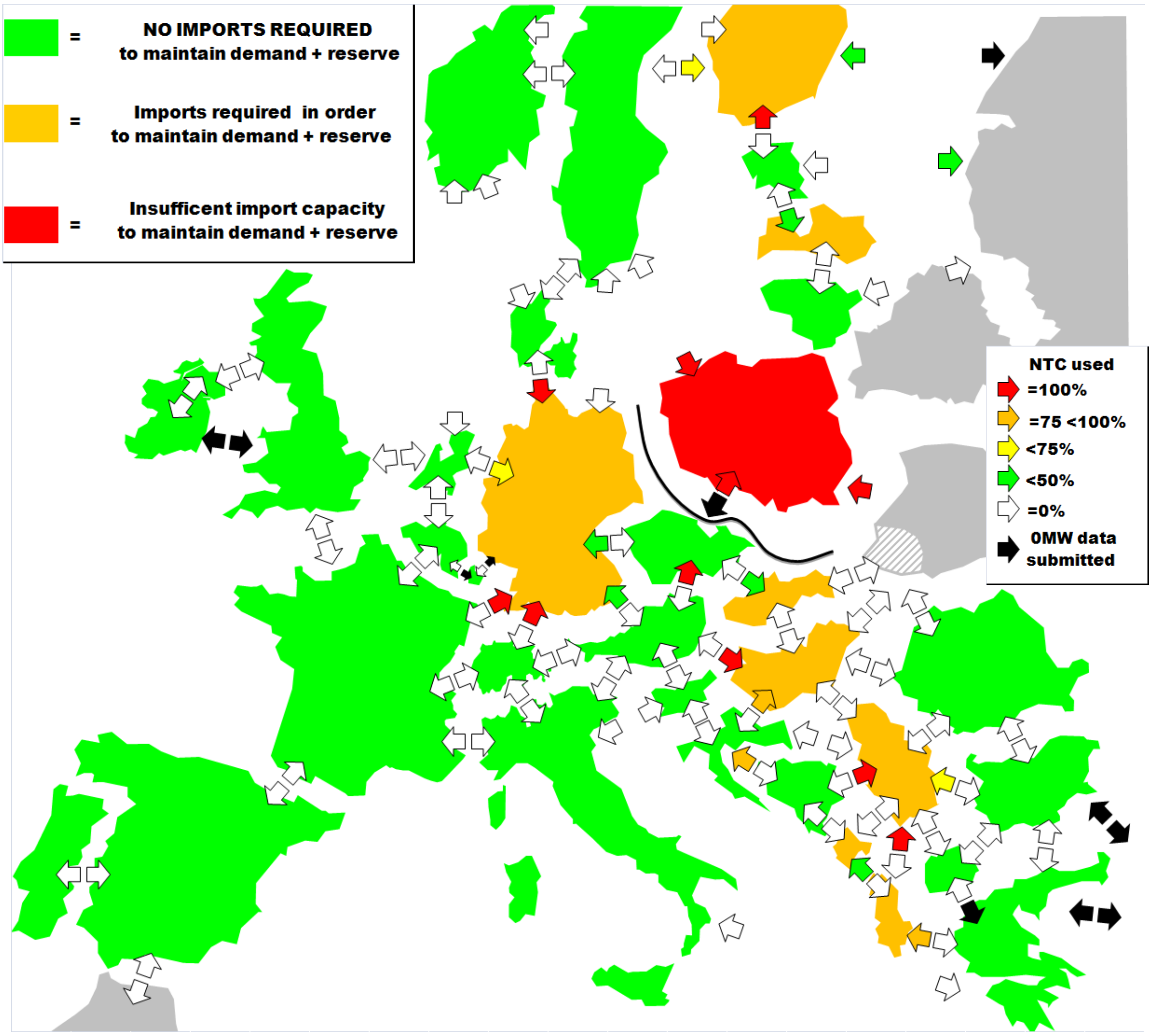

FIGURE 5: WEEK 34 FLOWS FOR UPWARD ADEQUACY UNDER SEVERE CONDITIONS

For this week under severe conditions, the negative balance in Poland has not been covered using the simultaneously importable capacity provided to the report, which is planned in yearly horizon for normal conditions. Extremely severe balancing conditions in the summer period may take place in case of heat spells, when 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 energy up to 1000 MW will be possible on the synchronous profile (in normal conditions there is no import capacity available). 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. For more information please read the Polish national responses.

The analysis for this week shows that under severe conditions (high demand and low renewable generation), increasing levels of imports will be required for certain countries. As indicated previously, this is not a market simulation and hence flows to satisfy a countries import requirements are likely to be different. This analysis highlights the level of flows on the interconnector boundaries to give the reader and appreciation of how stressed the situation could become.

5.4 INDIVIDUAL COUNTRY PERSPECTIVE ANALYSIS – DOWNWARD ADEQUACY

This is the first occasion on which ENTSO-E analyzed the downward adequacy situation in Europe. It is recognized that downward adequacy may not be a focus for many TSOs at present and hence a short explanation of the potential issue is provided in Figure 6 below.

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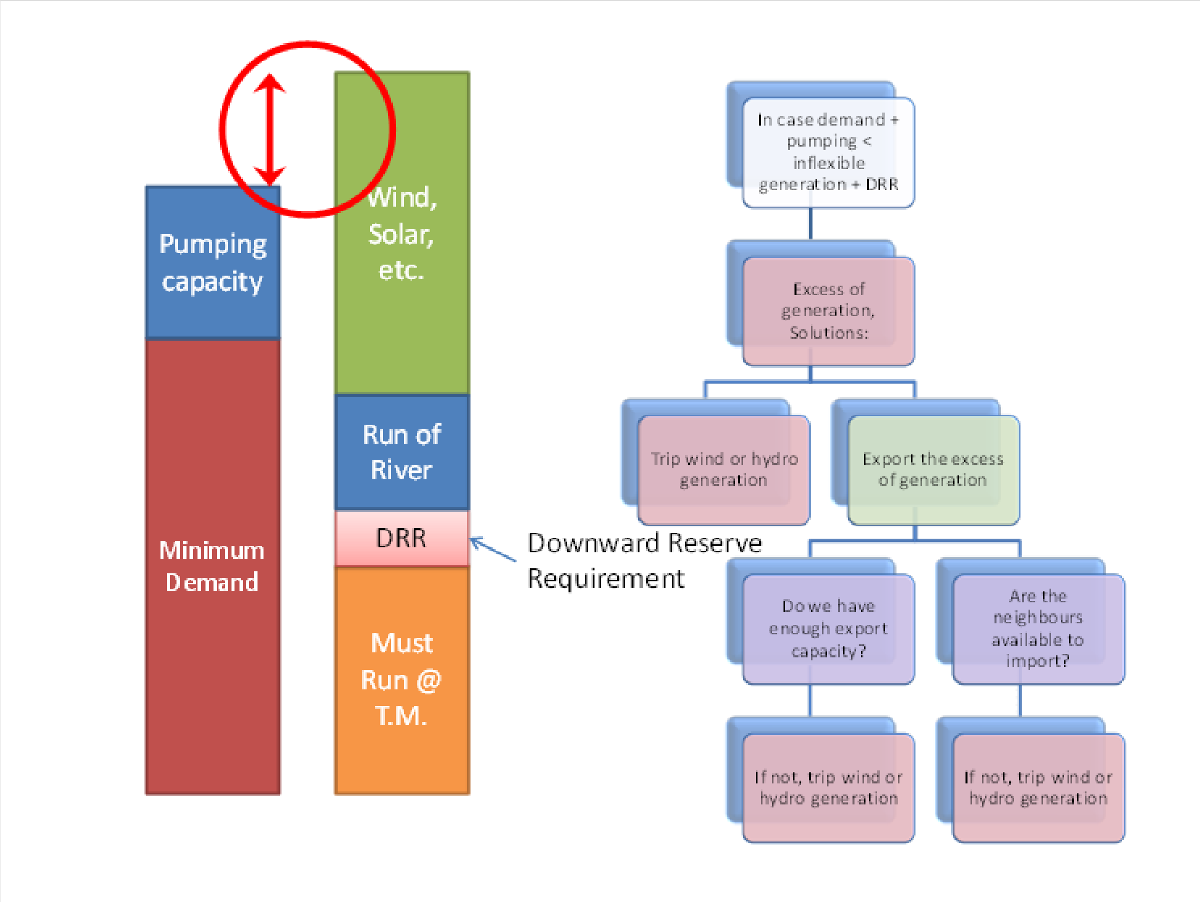

FIGURE 6: DOWNWARD REGULATION REQUIREMENT

Under minimum demand conditions, there is a potential for countries to have an excess of 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 and wind whose output is inflexible and variable. At times of high renewable output, 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 new analysis on downward adequacy looks at this situation to determine if neighbouring regions can indeed import the excess generation via the submitted the best estimate of the minimum NTC. The analysis is based on submitted TSO data on overnight demands (03:00am synchronous time) and must run generation. It then sets wind at 65% output across the whole of the ENTSO-E region and calculates if there is enough interconnector capacity to take the excess generation to neighbouring regions. This analysis has been carried out as various TSOs have indicated that as renewable generation (and in particular wind) grow in capacity, there may be occasions when it is necessary to curtail excess generation due to insufficient export capability to neighbouring regions.

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This overnight scenario does not catch the situation where the excess generation is also due to high solar in-feed during windy low load holidays and weekends.

With increasing renewable generation in Europe, the output of the analysis is shown below in Figure 7. Countries which are green have no requirement to export excess generation under high renewable output. Countries in yellow have at least 1 week where they will be required to export and countries in red will be required to export all weeks under high renewable/inflexible generation at low overnight demand periods.

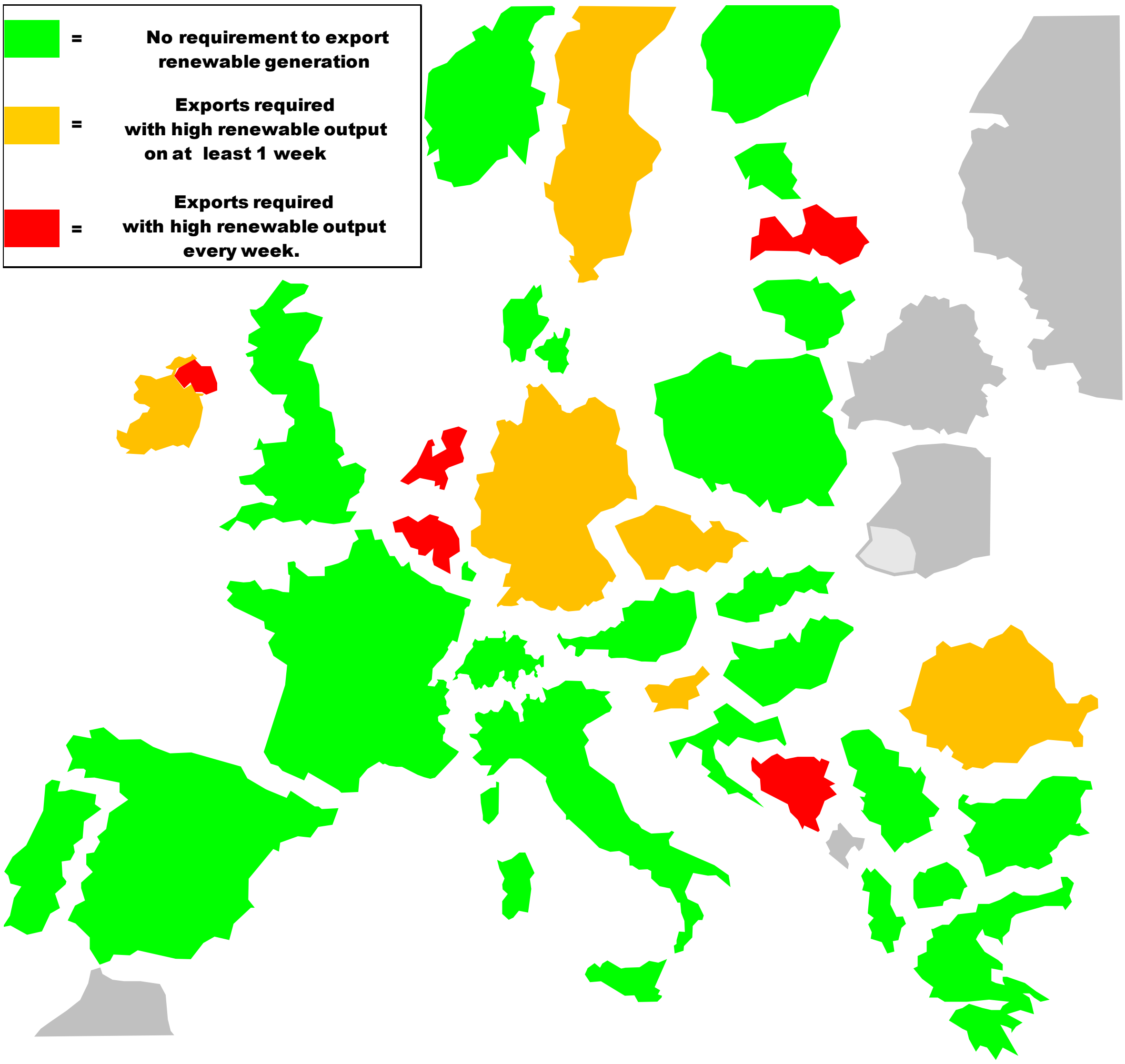

FIGURE 7: COUNTRY ANALYSIS FOR DOWNWARD ADEQUACY

It can be observed that with a wind output at 65% of the installed capacity across the ENTSO-E region, there are various countries would be required to export excess generation under minimum overnight demands to neighboring regions, with some regions in red consistently requiring exports under high wind periods and minimum overnight demand levels.

A weekly assessment by the coordination team determined the following status for excess generation to be curtailed as shown below in Figure 8.

Date	06-Jun-12	13-Jun-12	20-Jun-12	27-Jun-12	04-Jul-12	11-Jul-12	18-Jul-12	25-Jul-12	01-Aug-12	08-Aug-12	15-Aug-12	22-Aug-12	29-Aug-12	05-Sep-12	12-Sep-12	19-Sep-12	26-Sep-12
Week	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Time	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**	**11:00**
Weekly Status																	

FIGURE 8: WEEKLY STRESS ASSESSMENT FOR DOWNWARD ADEQUACY

The analysis suggests that there will would be periods across the summer where high renewable and/or inflexible generation across minimum overnight demands would stress cross border flows, with weeks 29, 30, 38 and 39 highlighted.

5.5 IMPORT/EXPORT CONTRIBUTION AND REGIONAL OVERVIEW – DOWNWARD ADEQUACY

The analysis has been run for every week and indicates that there are periods when there will be an excess of generation that cannot be exported to neighboring regions.

As an example, the flows based on week 30 are shown below in Figure 9.

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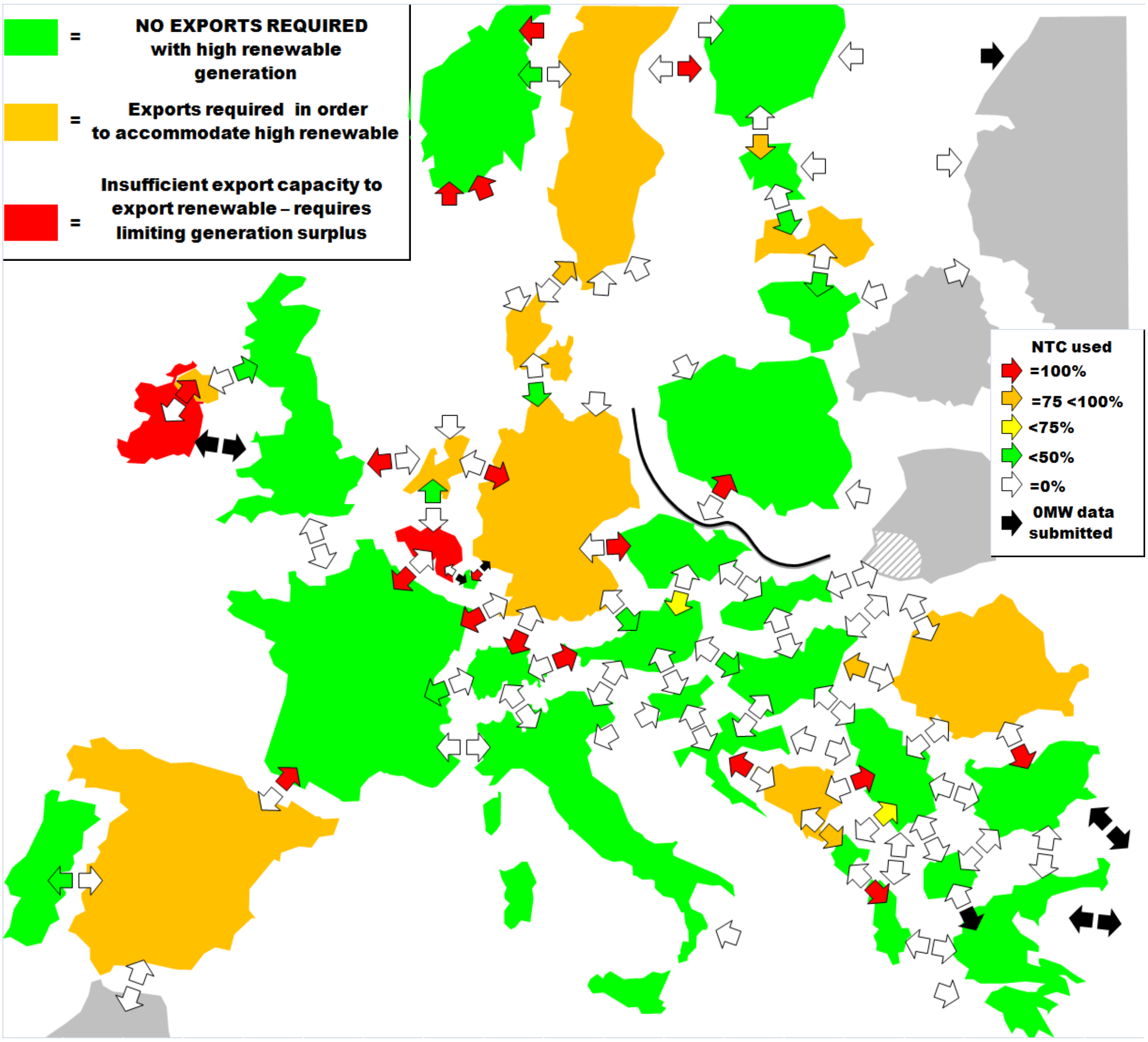

FIGURE 9: WEEK 30 DOWNWARD ADEQUACY

It can be observed that the combination of high renewables infeed and inflexible generation in Belgium, Denmark, Germany and The Netherlands leads to high exports to all surrounding countries. Based on the best estimate of the minimum NTC's that were provided, not all excess energy can be evacuated out of this cluster of countries, and measures could be required to limit this generation surplus.

In addition, Ireland will be required to curtail renewable generation due to limited interconnector capacity.

As previously indicated, this is not a market simulation. Rather it is an indication of the levels of cross border flows to determine a solution to excess generation in countries at overnight minimum demands.

The flows based on week 39 are shown below in Figure 10:

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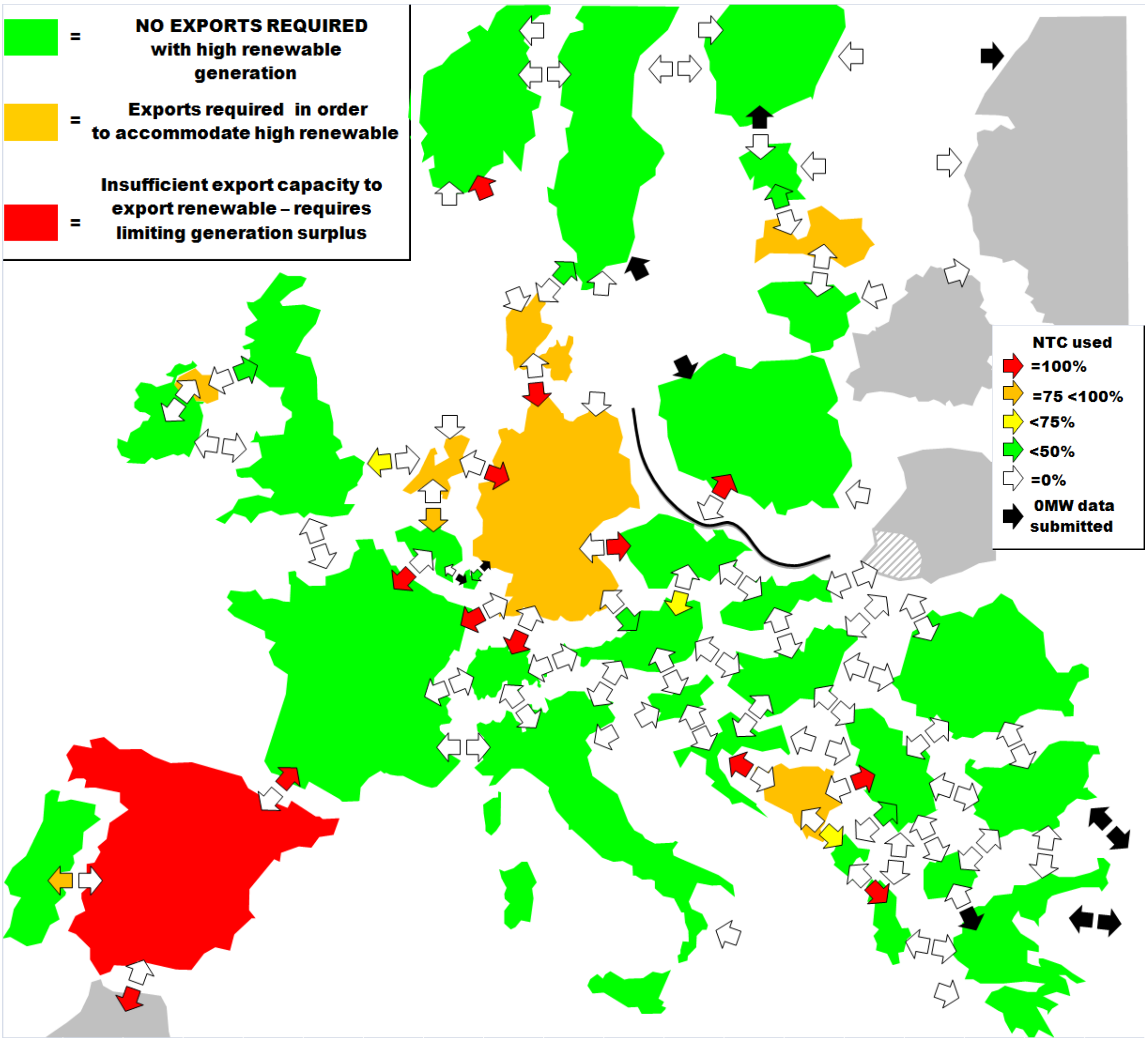

FIGURE 10: WEEK 39 DOWNWARD ADEQUACY

In this week, exports from Germany are still high on all cross border circuits. Ireland now has a new interconnector commissioned to GB which relieves its congestion. However, Spain is not able to export all its excess inflexible generation to neighboring countries.

6 COUNTRY LEVEL

6.1 INDIVIDUAL COUNTRY RESPONSES TO SUMMER OUTLOOK

- **Albania**
- **Austria**
- **Belgium**
- **Bosnia & Herzegovina**
- **Bulgaria**
- **Croatia**
- **Cyprus**
- **Czech Republic**
- **Denmark**
- **Estonia**
- **Finland**
- **Former Yugoslav Republic of Macedonia (FYROM)**
- **France**
- **Germany**
- **Great Britain**
- **Greece**
- **Hungary**
- **Iceland**
- **Ireland**
- **Italy**
- **Latvia**
- **Lithuania**
- **Luxembourg**
- **Montenegro**

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- **Netherlands**
- **Northern Ireland**
- **Norway**
- **Poland**
- **Portugal**
- **Republic of Serbia**
- **Romania**
- **Slovak Republic**
- **Slovenia**
- **Spain**
- **Sweden**
- **Switzerland**
- **Ukraine-West**

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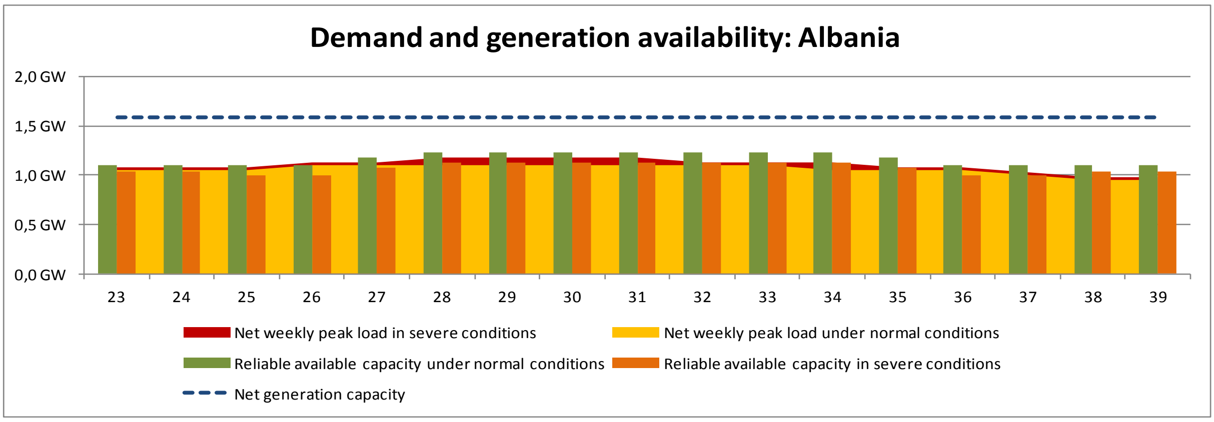
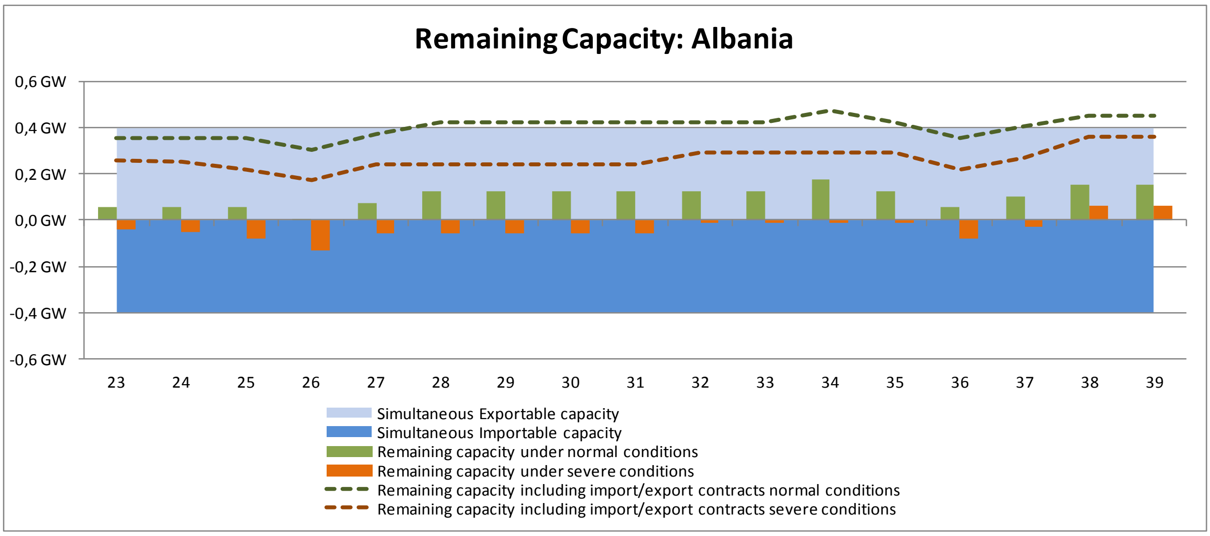
ALBANIA





The Albanian Power System, due to the significant share of hydro power plants, mainly depends on the hydrological conditions of the region. The differences between the production of hydro power plants (HPP) in extremely dry or extremely wet periods fluctuate by approximately 50% of the average HPP production. During the month of May, a new HPP (Ashta) with installed power of 50 MW is expected to commence operation. This additional power plant downstream of Drin River Cascade will compensate, to some extent, for the low hydro-levels. Thus, for the forthcoming summer period, it is considered that the adequacy and security of the Albanian power system is not threatened under normal weather conditions.

The most critical period remains during the months of July and August, depending on temperatures, and therefore, the maintenance schedule of units and transmission elements is set to minimum during this period.

Albania will also continue to be dependant from electricity imports for the approaching summer, whilst the role of interconnectors in relation to maintaining adequacy and the ability to import are also high.

In general the interconnections were deemed sufficient to fulfill the need of electricity imports, and in case of exports if so. They were also commonly used for transits, mainly towards Greece.

In the case of any problems with generation-load adequacy during the period, it is planned to manage the risk as much as possible by using market mechanisms.

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

Taking into account the commissioning of the new HPP (Ashta) with installed power of 50 MW, and the firm import contracts for this year, we do not anticipate significant balance problems in the Albanian Power System during the approaching summer period.

The most critical period encompass the months of July and August, due to expected high temperatures associated with increasing demand, and potentially low inflows at Drin River Cascade. In such a case, a request would be made to increase the import volume using the availability of interconnections.

Our system is usually dependent upon imports of electricity, and it will also be dependent upon imports for the coming summer period. Physical imports are expected on the Greece and Montenegrin border whilst exports are expected 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. Generally speaking, the interconnections are sufficient for import/export of electricity.

The average simultaneous import/export capacity for the coming summer is approximately 450 MW. The simultaneous import and export capacity was obtained by adding the average NTC-values of all borders and multiplying this sum by a simultaneous coefficient of 0.7.

In the worksheet are indicated only the minimum capacity values which are afforded in the yearly auction for both directions, which represent less than half of the real transportable capacity calculated monthly for each border in collaboration with neighboring TSOs, and afforded by monthly auctions.

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

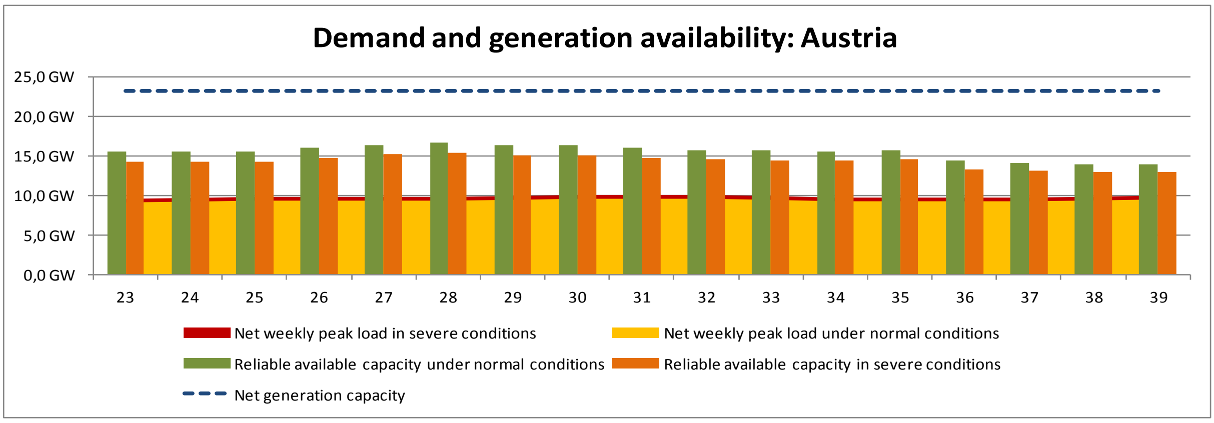
Most of the maintenance works in generation and transmission system are concentrated in the period of April – May and September – October, when the demand is relatively lower.

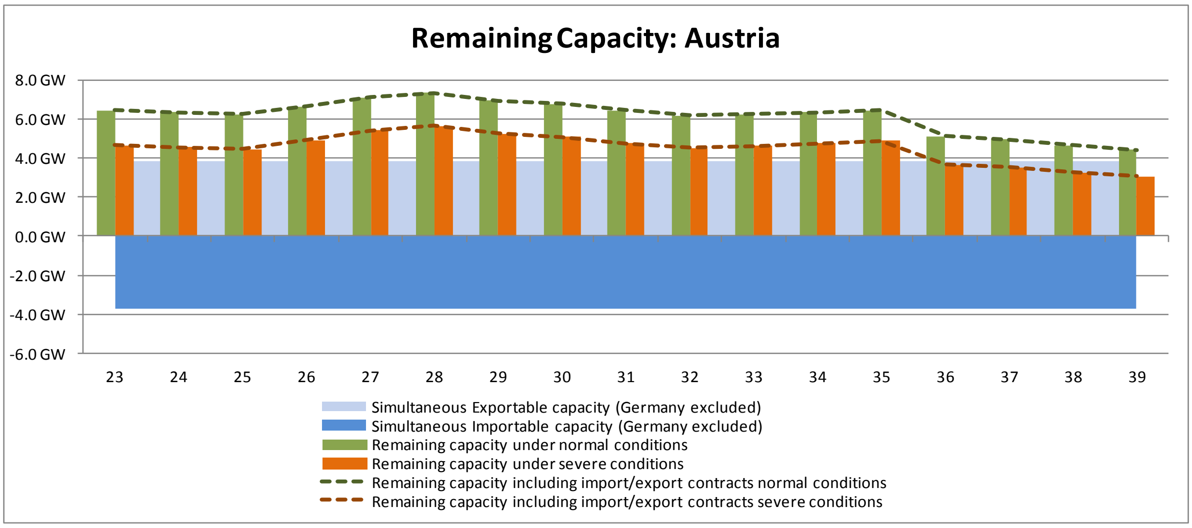
The level of remaining capacity considered as necessary in order to ensure a secure operation for the next summer is around 100 MW. Albania is yet to exploit intermittent energy sources such as wind or solar, therefore they were not taken into account in our assessment.

The Distribution System Operator (DSO), which also holds the license for Retail Public Supply (RPS) has already concluded yearly import contracts with traders, based on 300 MW. This is the reason why the worksheet did not pertain to the exporting countries, although the firm import contracts were in place.

Under these conditions, all criteria for the system adequacy will be met.

AUSTRIA

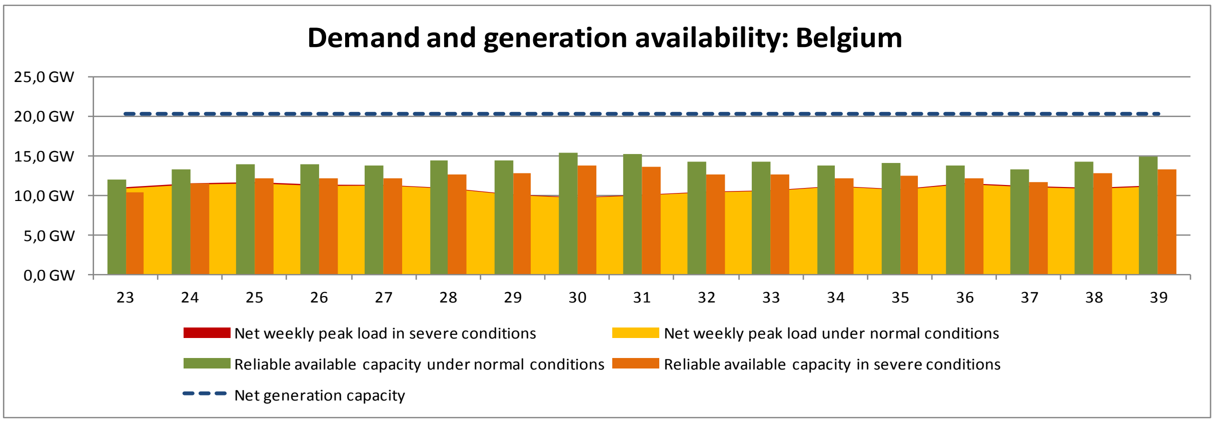


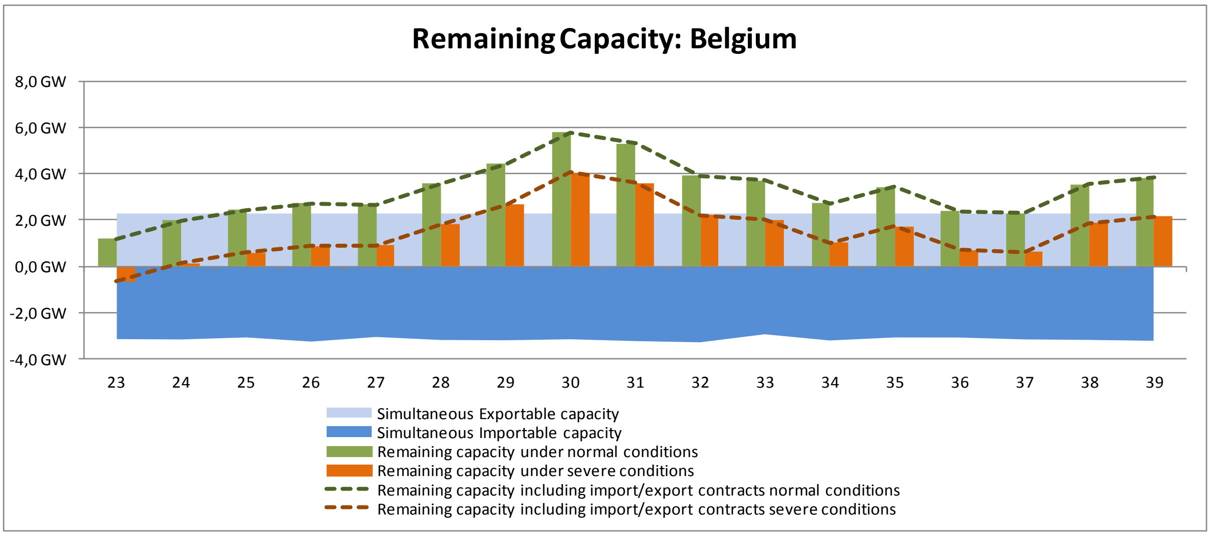


Due to the uncertain economic situation, no reliable forecast for the demand in Austria in the coming summer is available. For security reasons, a 2% increase on the load was assumed. As a consequence of the shutdown of nuclear power plants in Germany, an increase in the Austrian thermal power plants' production could be expected for this summer.

Due to the shutdown of nuclear power plants, higher exports to Germany are expected this summer, increasing the transmission flows on the lines from St. Peter (AT) to Germany.

BELGIUM

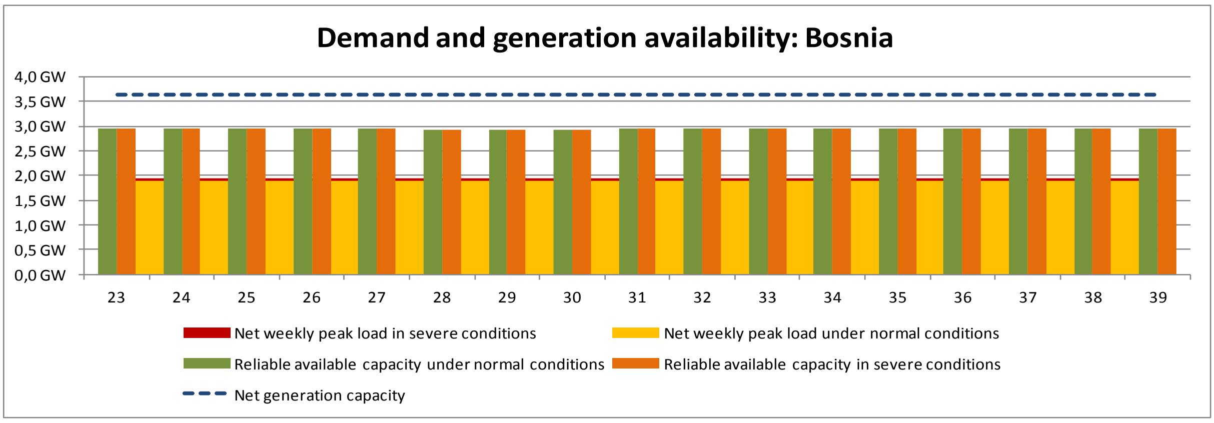


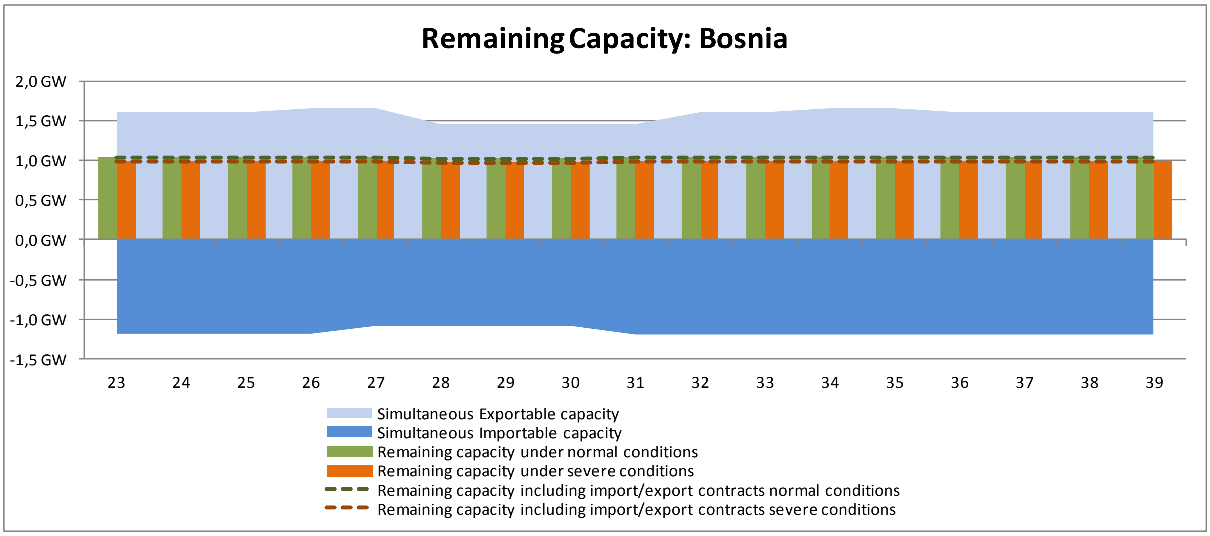


For the coming summer, no significant issues are expected concerning the generation-load balance for upward regulation for Belgium under normal or severe conditions. However, at certain moments in time Belgium might have to rely on structural imports from neighboring countries. Under normal circumstances, importing the predicted amount of energy should not be an issue. In the 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.

As opposed to the positive results for upward regulation, the analysis of the adequacy regarding downward regulation has shown that an elevated risk for the coming spring and summer exists. For an extended period starting from May onwards, the large volume of inflexible generation combined with a high renewables in-feed might lead to balancing issues during weekend nights. For weeks 29 to 31 this risk may be extended even to weekday peak loads. With this in mind, Elia stressed the need for inclusion of this downward regulation assessment in the pan-European summer outlook, combined with an un-delayed publication of the results of this assessment.

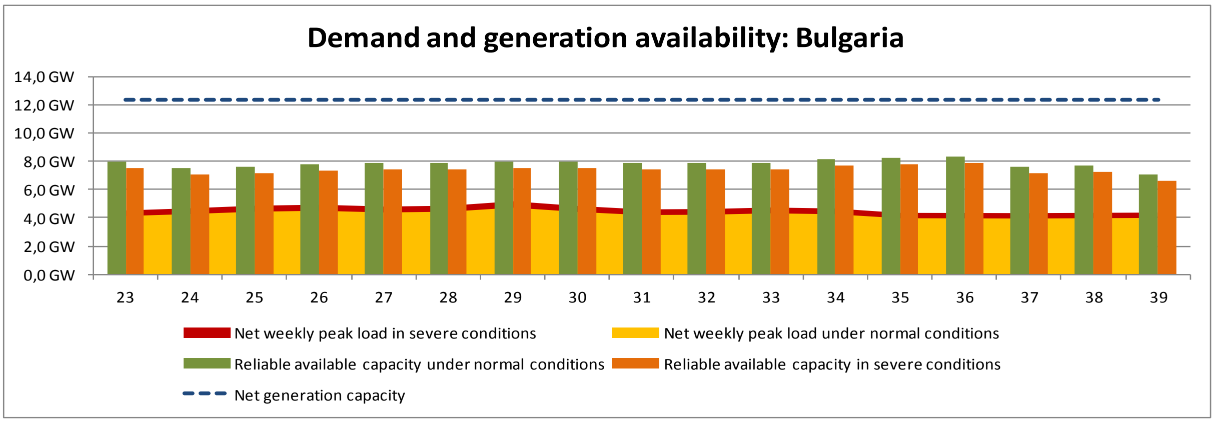
BOSNIA AND HERZEGOVINA

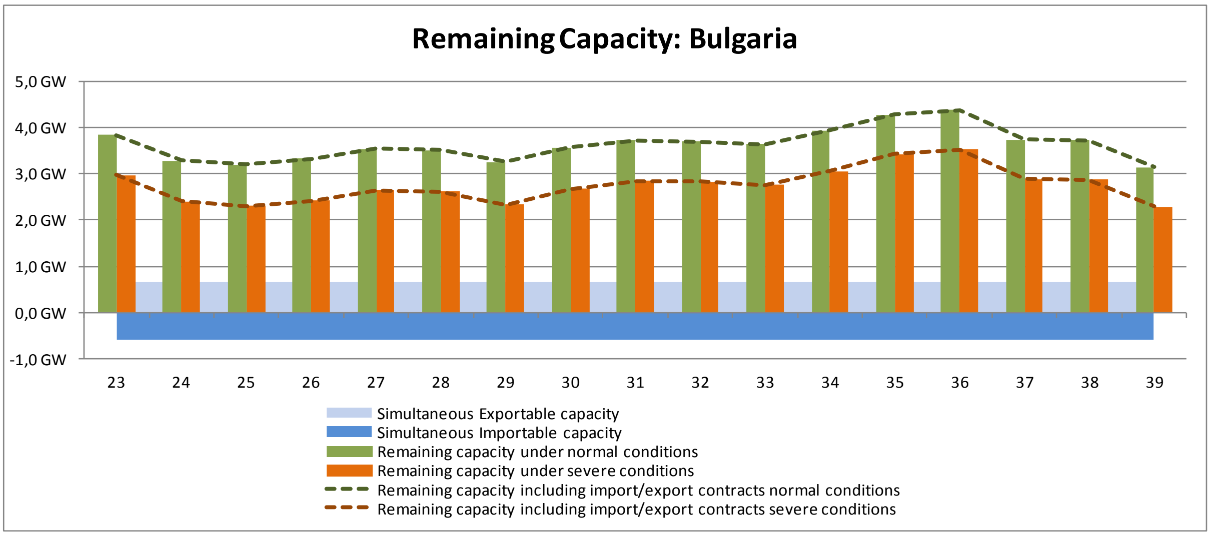




We do not expect any particular problems regarding system adequacy in the power system of Bosnia and Herzegovina in the coming summer.

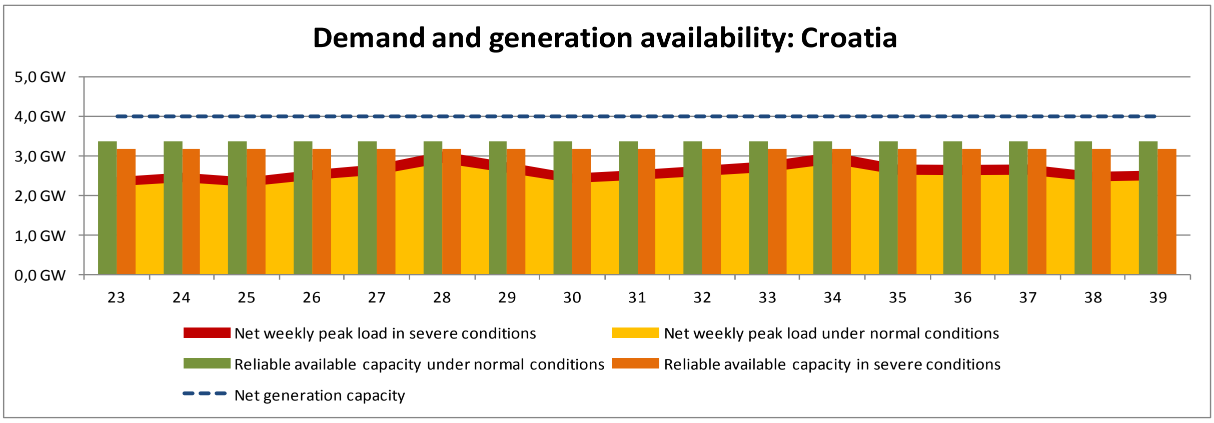
BULGARIA

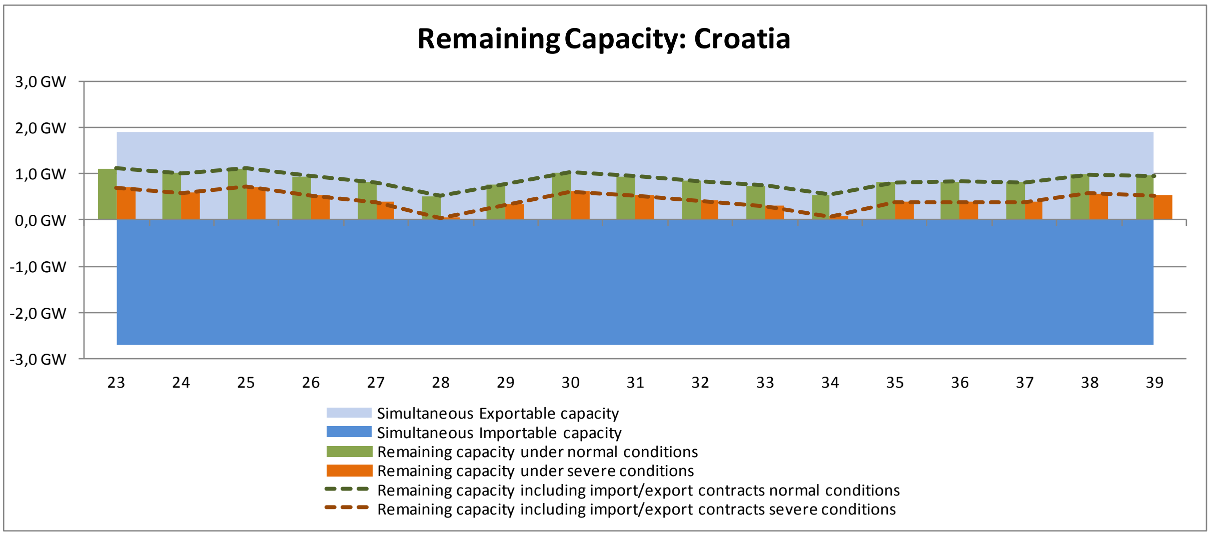




No problems concerning generation adequacy in the summer period are expected. However, it is expected a slight increase of demand in cases where heat waves last more than 5 days. The maintenance schedule for the generating units is expected to be strictly followed.

CROATIA





According to the Croatian transmission system operator (HEP-OPS) for the summer 2012 there is no extreme increase of consumption foreseen in comparison to year 2011. It is expected that the maximum consumption will occur in periods characterized by hot weather.

The hydro accumulations have only small amounts of water available at the moment and thus the Croatian power system remains very reliant on electrical energy imports. Consequently, the interconnection tie-lines will have a very important role to play.

In spite of regularly planned overhauls as well as maintenance of generating units and in transmission network, the Croatian power system will remain stable and be able to meet the demands of customers.

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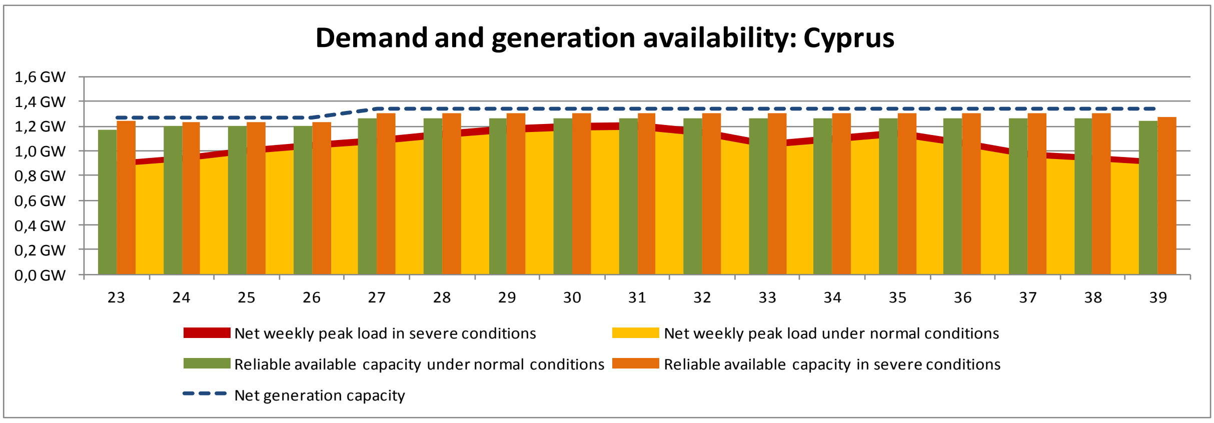
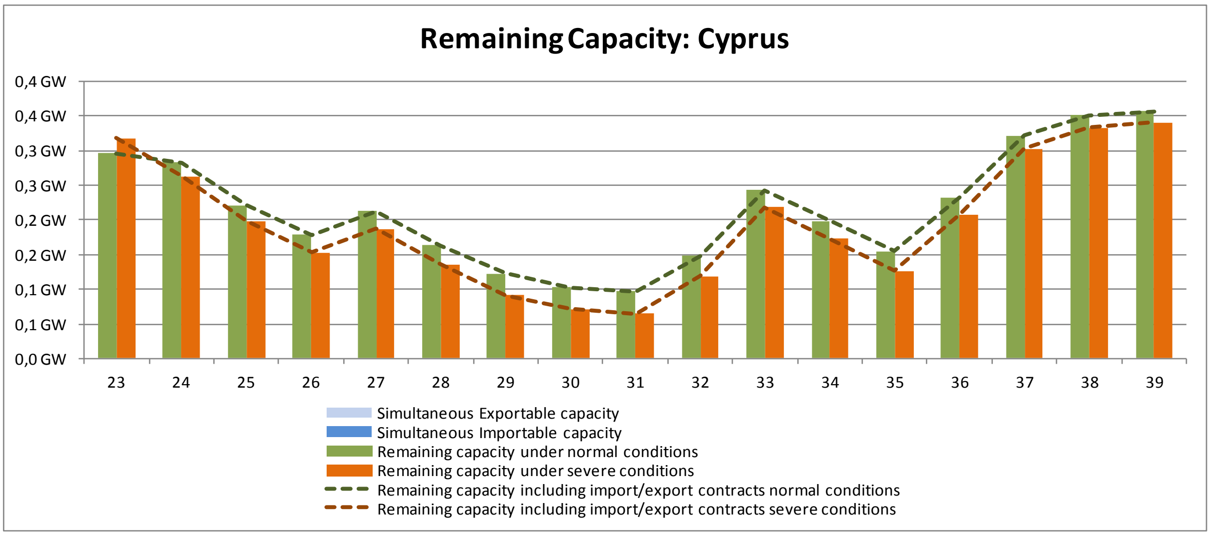
CYPRUS





Extensive actions are in process so as to repair the damage to generating units at “Vasilikos” Power Station, which were caused by an explosion on 11/07/2011 at a nearby Naval Base. One Combined-Cycle Gas Turbine 220 MW will be repaired and operated by the beginning of July 2012 so that the system can be able to meet the summer peak demand of 2012.

High wind penetration create operational problems to the isolated Power system of Cyprus, especially during minimum demand night periods. In order to alleviate this problem, an amount of extra negative spinning reserve is maintained during night hours that consequently increases the overall cost of generation. The Cyprus TSO is in the process of conducting studies on the operational issues relevant to the wind penetration.

Internal combustion engine generators of a total of 120MW generation will also be installed temporarily so as to contribute to the generation availability of the system in view of the peak demand of summer 2012.

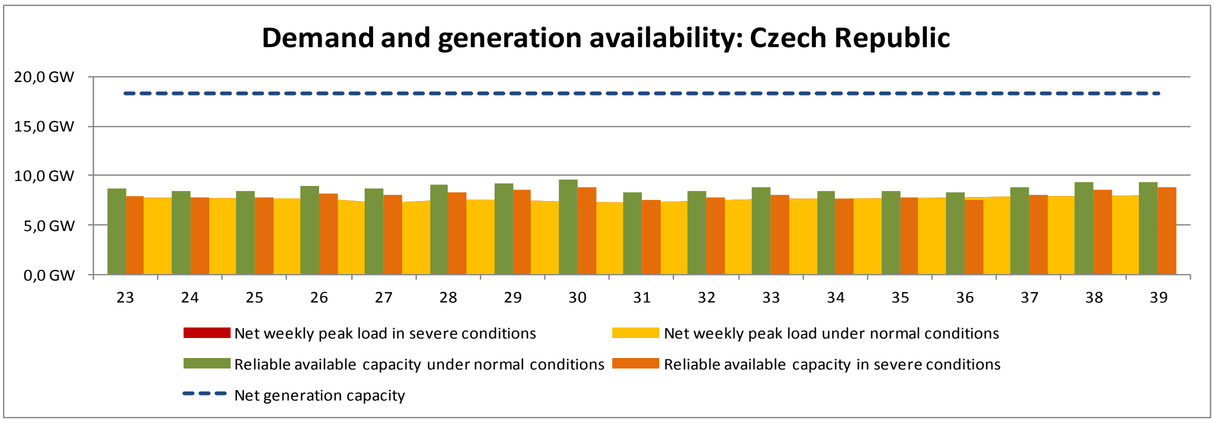
A cyclic load rejection programme disconnecting 11kV feeders supplying domestic and commercial load is under revision so as to maintain frequency in case of generation inadequacy.

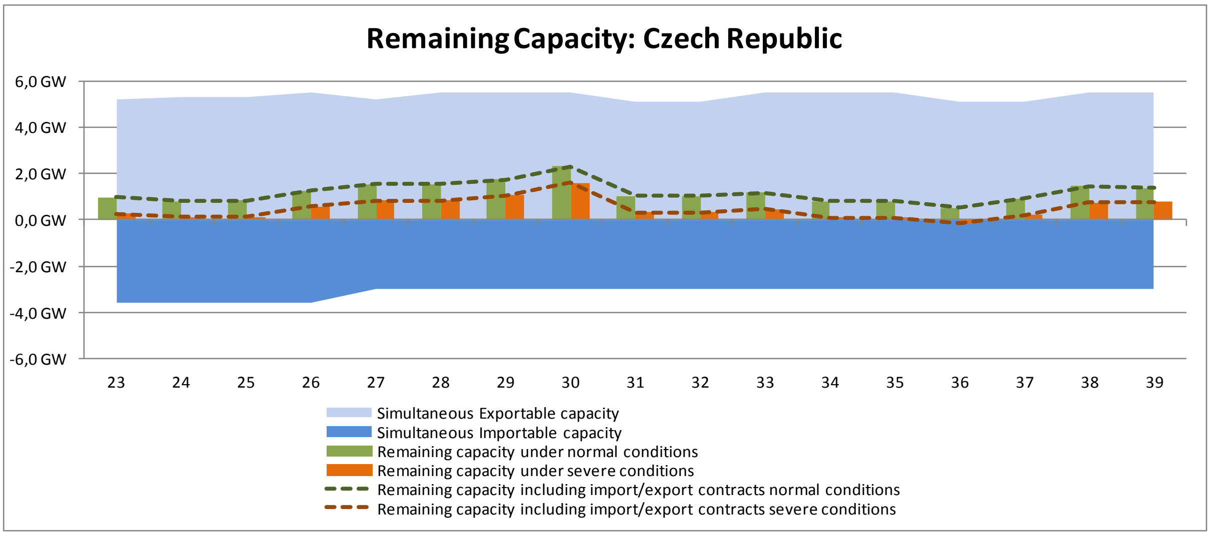
Outage rate is the generating capacity of one generating unit at “Moni” Power Station, which is considered a medium generating unit in the system.

In the case that the Combined-Cycle Gas Turbine 220 MW units is not repaired until the beginning of July 2012, so that to meet the summer peak demand of 2012, then a cyclic load rejection program will take in place in order to ensure system stability.

High wind penetration creates several operational problems especially during minimum demand periods. In order to alleviate this problem an amount of negative spinning reserve is kept during night hours. Must run base units of 60MW exist. In case minimum stable generation is violated, internal combustion units are switched off.

CZECH REPUBLIC

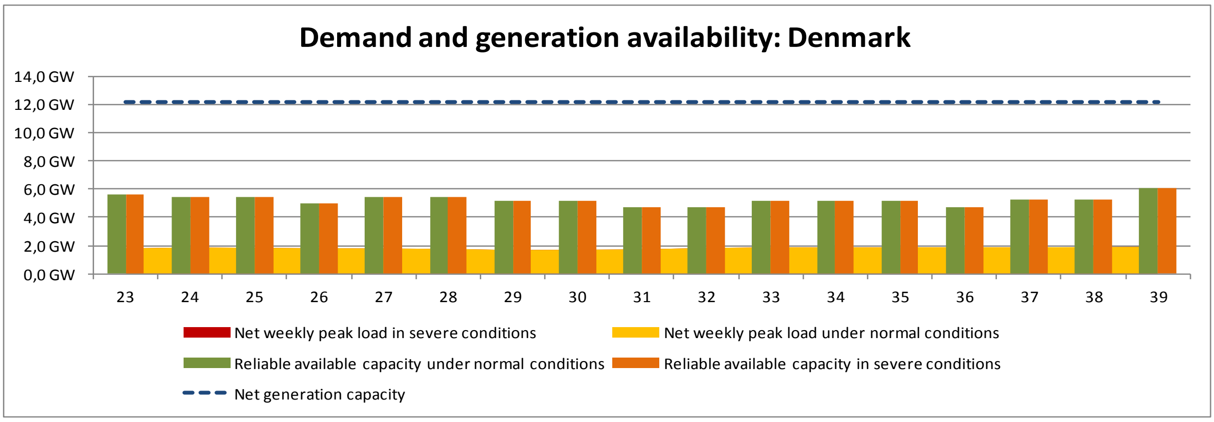


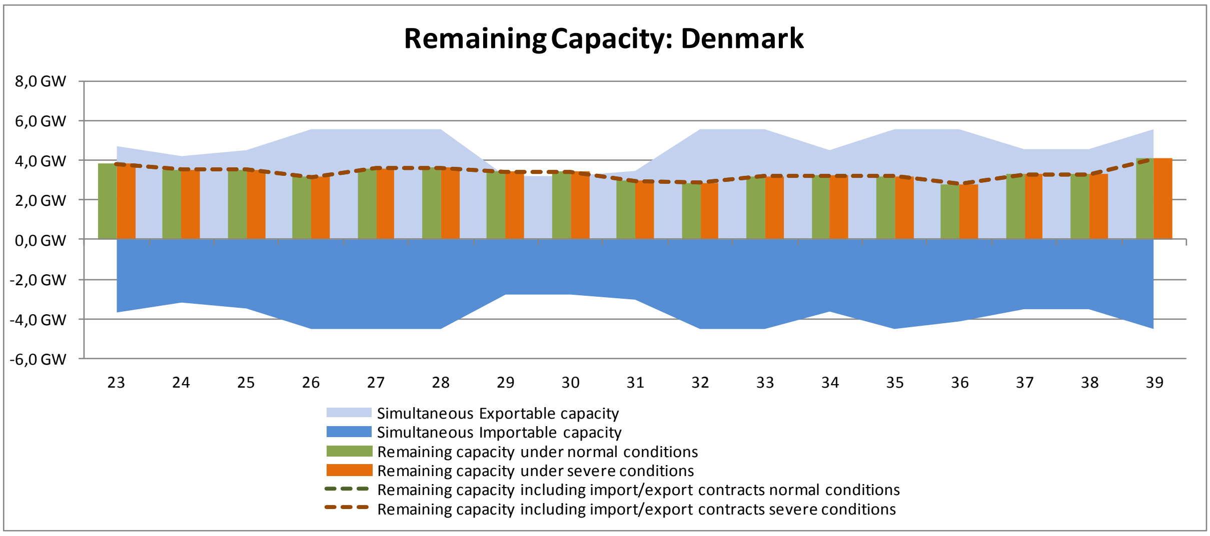


CEPS does not foresee any event which may cause considerable system difficulties in power balance during the summer period.

Some n-1 violations could occur in cases of extreme production in renewable sources in Germany and high transits of energy between Germany and Austria or the South-East region of Europe due to unmanaged flows on the profile DE-AT (market coupling). Indeed, the latter may occur in some operational states induced by outages caused by ambitious investment plans in our own grid thus ensuring renovation and enforcement of the system (mainly lines). These cases are coordinated with neighboring TSOs in operational planning.

DENMARK





The summer is expected to be steady. There will be a few network outages, especially in Jutland, which will result in limitations on the interconnections to our neighboring countries. However, this is no more critical than normal.

The construction of a new 400 kV line from Kassø to Tjele will also cause some outages. This has, however, been taken into account in the yearly outage plan.

Because of several prolonged outages of power plants in Zealand, the power situation in this area may be a little strained. The power situation requires attention to be paid to outages on the interconnections to our neighboring countries, and it will be necessary to co-operate closely with Svenska Kraftnät in order to avoid getting into a strained power balance.

Dependent on the power plant equipment and the flow on the international interconnectors to our neighboring countries, high voltages are expected again this summer. Measures which should reduce the problem have been taken by Svenska Kraftnät and TenneT Germany. Energinet.dk has also installed reactive components. With regards to New Zealand in particular, it is expected that the difficulties have been reduced. Even though these initiatives have been carried out, problems with high voltages can still be expected, especially in low-load situations.

We forecast a minimum of 2.78 GW remaining capacity throughout the summer despite the fact that all of our wind- and solar capacity is ignored in this context due to the unreliability of these sources. Taking this into consideration, we do not expect any problems this summer.

The net weakly peak load is expected to be in the range of 1.72 and 1.96 GW throughout the summer with the highest load in the last week of September when temperatures begin to drop.

- We will experience some prolonged overhauls in the Eastern part of Denmark as well as certain plant disengagements in the West due to the construction of a new 400 kV line from Kassø to Tjele.
- During weeks 29-31 the AC line from DK west to Germany will be limited to 150 MW for both import and export, although for the rest of the summer it will be at its usual level. The DC line from DK East to Germany will be completely disconnected during weeks 23-24 and there will be a reduction of capacity in week 25 on both import and export.
- During weeks 37-39 the interconnector to Norway will be disconnected completely for both import and export. In addition to this there will be limitations during the weeks 23-25 and 29-31 where it will be running at between 25 and 75 % of its normal level of 1 GW.
- The DC line to Sweden will have a limited capacity in the weeks 29-31 for both import and export as well as a reduction in weeks 34 and 36 on import. The AC will only be limited in week 34.

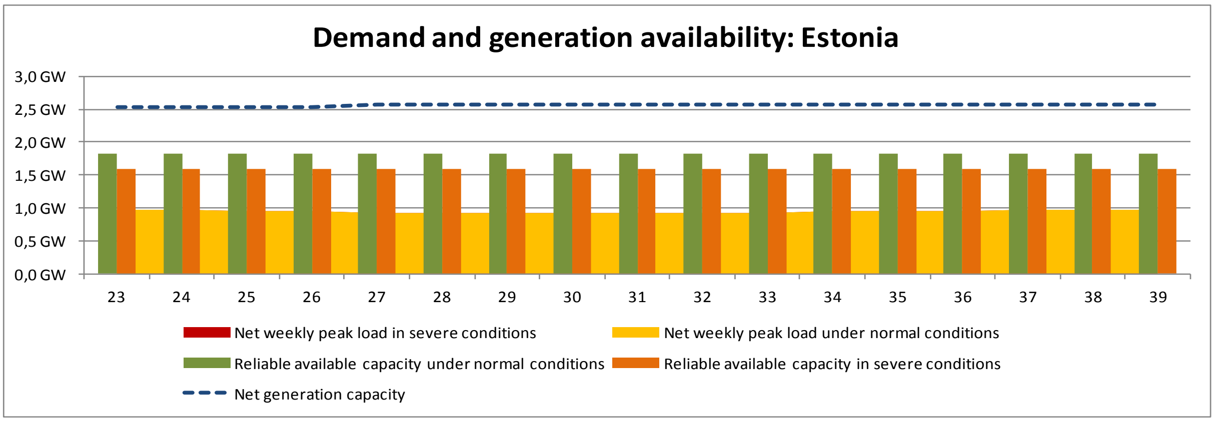
All of the limitations on the cross-frontier lines, however, are not expected to cause any problems but will require close cooperation with the TSOs of our neighboring countries.

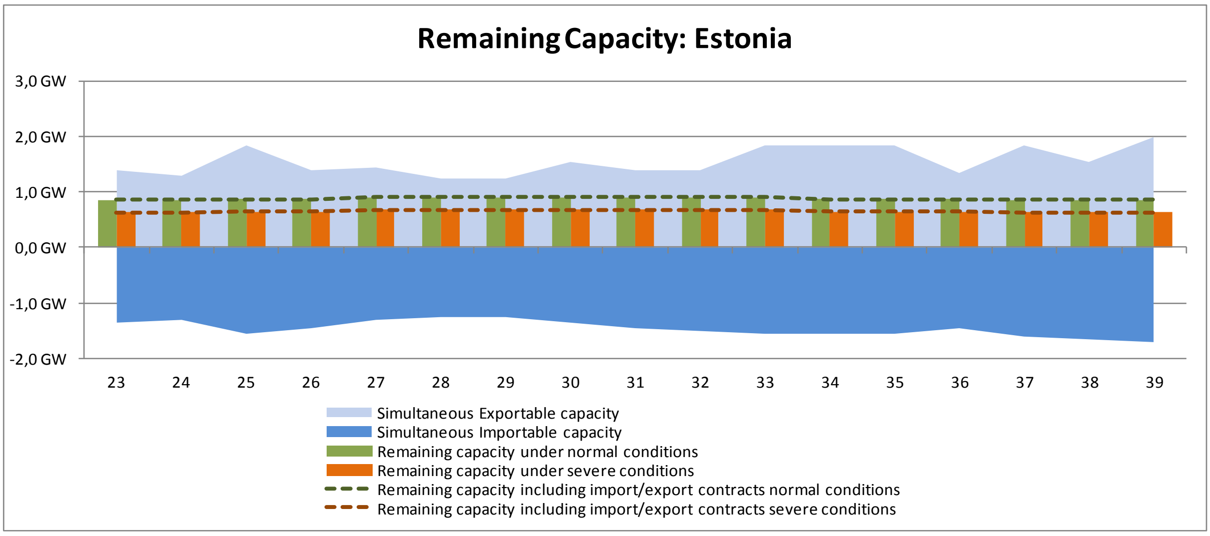
The summer is expected to be a normal summer. However, despite this there are many scheduled inspections and maintenance, and those in the 400 kV lines in particular will cause constraints on the interconnection lines. One overhaul will be given special attention: in May both 400 kV connections on the Danish-German border will be disconnected. This will cause, with regards to the system reliability, constraints on all of the Danish interconnection lines, whilst the production for certain central power plants will be reduced.

We do not expect any problems with the power balance during the summer, despite the fact that there are a number of overhauls for some of the power plants.

The most critical week, both under normal conditions and under severe conditions, will be week 35, with a remaining capacity of 830MW. However, these numbers are calculated whilst ignoring all possible wind power and all import possibilities. Taking this into consideration, no special actions are planned or required for these weeks.

ESTONIA

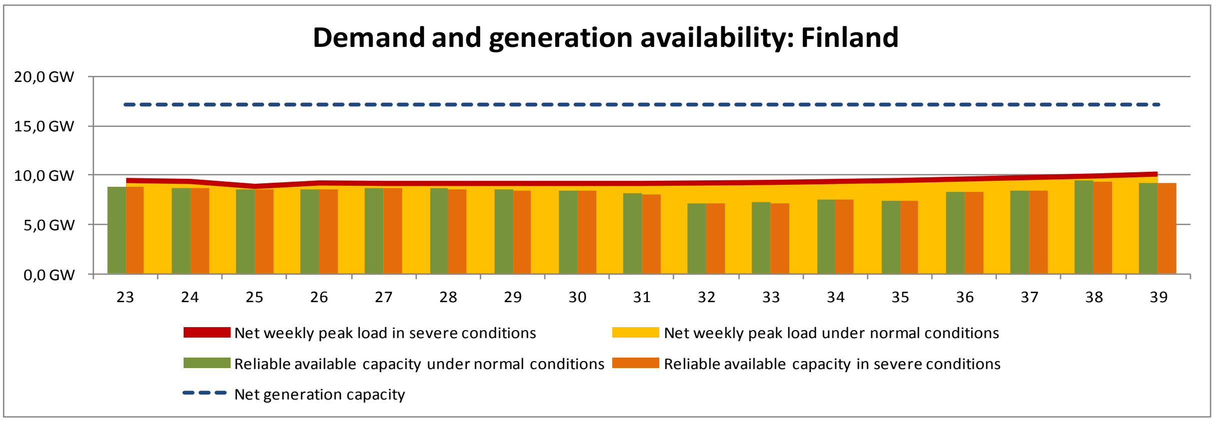


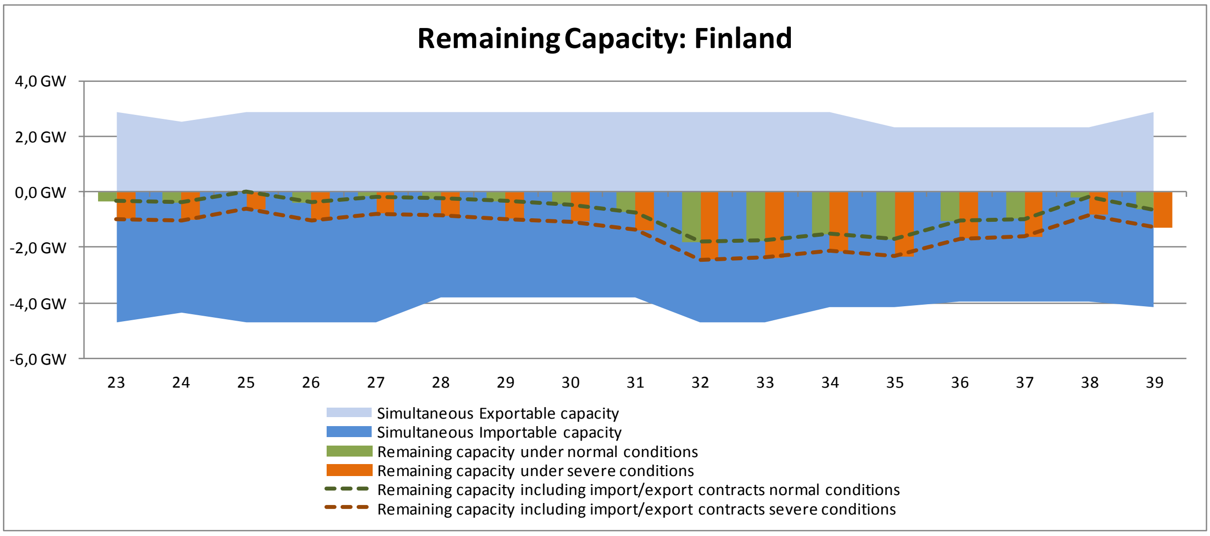


In the case of hot weather conditions and large electricity deficit in Latvia and Lithuania's power system certain stressed periods may occur for Latvia and Estonia's cross-border section. In order to reduce the risk of congestion, there are plans to allow only a limited amount of grid maintenance works as these negatively affect the transmission capacity between Estonia and Latvia. The operational situation as far as Estonia's internal grid and generation are concerned, is expected to be normal.

Some limitations are expected with regards to transmission capacity between Finland-Estonia and Estonia-Latvia caused by renovations and maintenance of 330kV lines. However, the overall situation should be similar to the one witnessed in the previous year. It is though that July will be the month when the interconnectors to neighboring countries are utilized above average level.

FINLAND





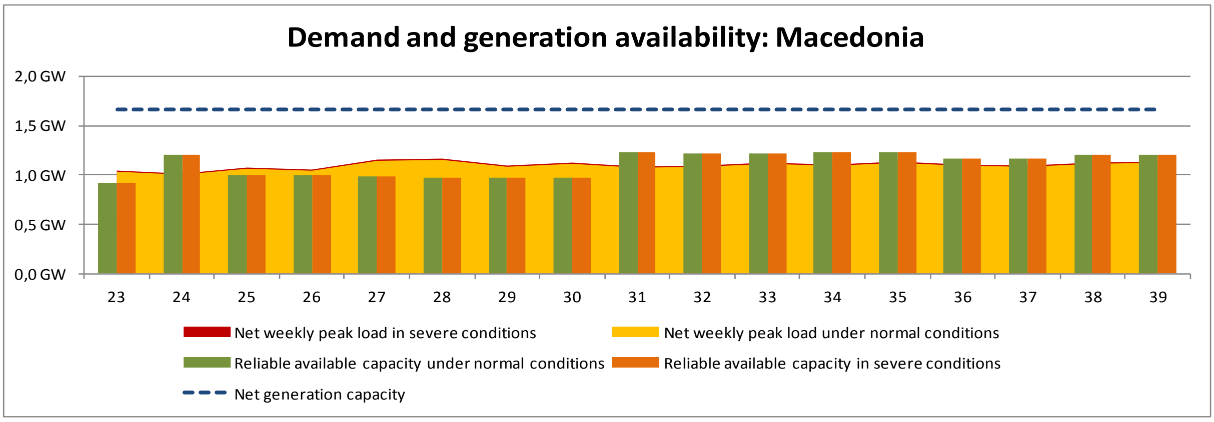
Summer is not forecast as a critical period on the Finnish power system. The typical peak load in summer is 60 to 70% of corresponding winter peak. With this said however, combined power and heat power plants (CHP), especially for district heating, produce remarkably lower levels of electricity than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

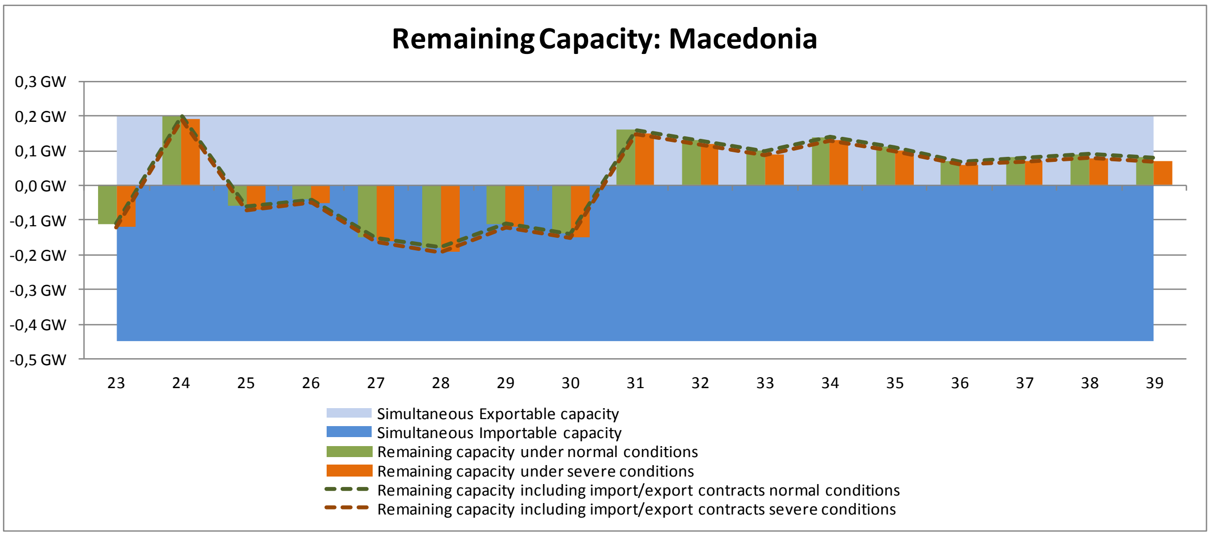
There are no changes to be expected during the coming summer compared to the previous one. Both load and generation have remained at the same level as last year.

The remaining capacity is negative for the entire summer during high demand hours. More overhauls of power plants are scheduled for August than last year resulting in higher negative remaining capacity. The deficit is met with import from neighboring systems.

Interconnections with Sweden and Estonia will export or import electricity depending on markets. Following last summer, a new interconnection to Sweden was commissioned. Import from Russia is expected to continue during the summer season, with the amount being defined by the prices. Total import capacity is sufficient to meet the needs. Maintenance periods result in capacity limitations regarding interconnections with Estonia, Sweden and Russia. The limitations will not risk the system’s adequacy.

FORMER YUGOSLAV REPUBLIC OF MACEDONIA (FYROM)





The operation of the power system is expected to be secure and reliable over the entire summer period.

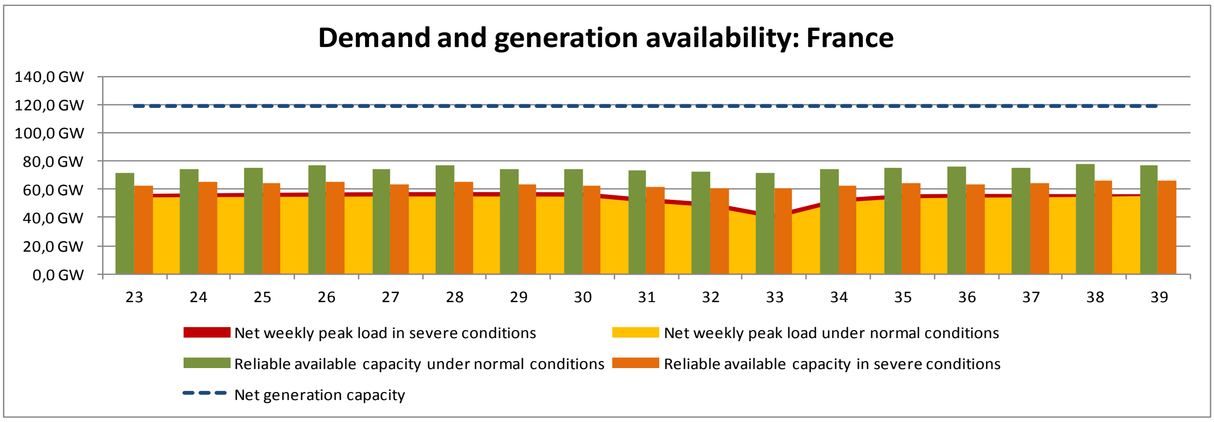
We did not list data regarding firm import contracts in the analysis. We knew that traders and eligible customers in Macedonia signed contracts for import of energy, although we did not know the countries from which the firm contracts exist. As a result of this, there was unbalanced load-generation data in some weeks. This was not a realistic situation, because eligible customers have their own contracts with traders for importing energy, and have informed us about this. However, we did not possess information regarding the exporting countries.

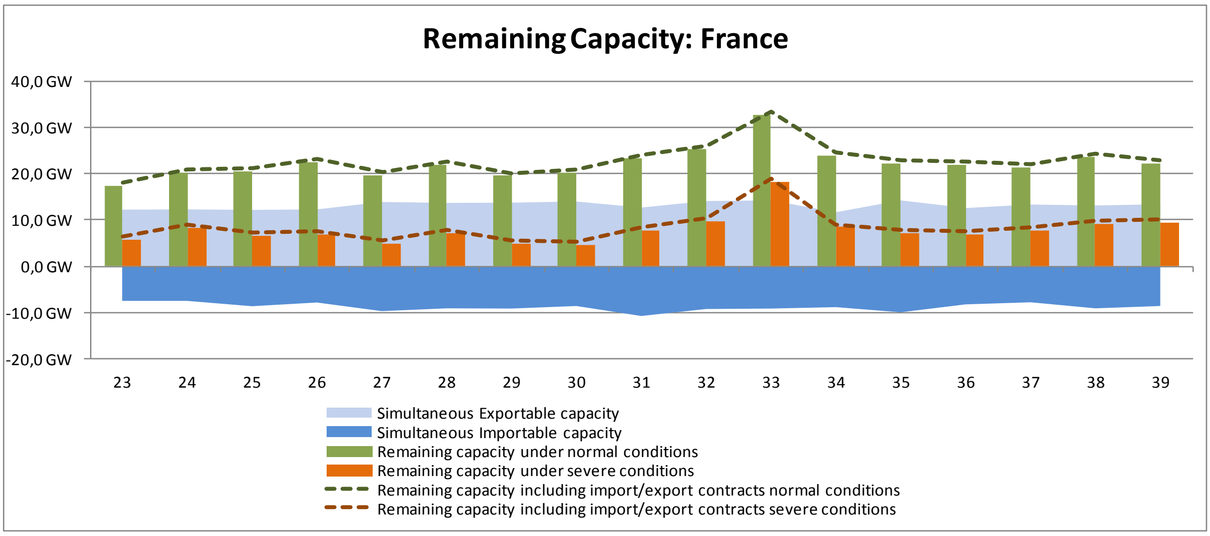
The data with regard to NTC, were harmonized with our neighbors (BG, RS and GR). These are best estimates of minimal value. On the day, the value may be higher or lower, according to harmonized calculations between neighbors and due to system conditions. The overhauls of the interconnections and power plants would be in accordance with the plans coordinated with the other countries in the SEE region within the WG Maintenance.

The water reservoirs are at a very low level; a result of poor hydrological conditions this winter, although we hope as usual, that during spring the levels of the reservoirs will increase.

The generation-load balance in the Macedonian system will not be considered at risk during the summer 2012, (bearing in mind that firm import contracts between eligible customers and traders are signed, although they are not listed in the tables).

FRANCE

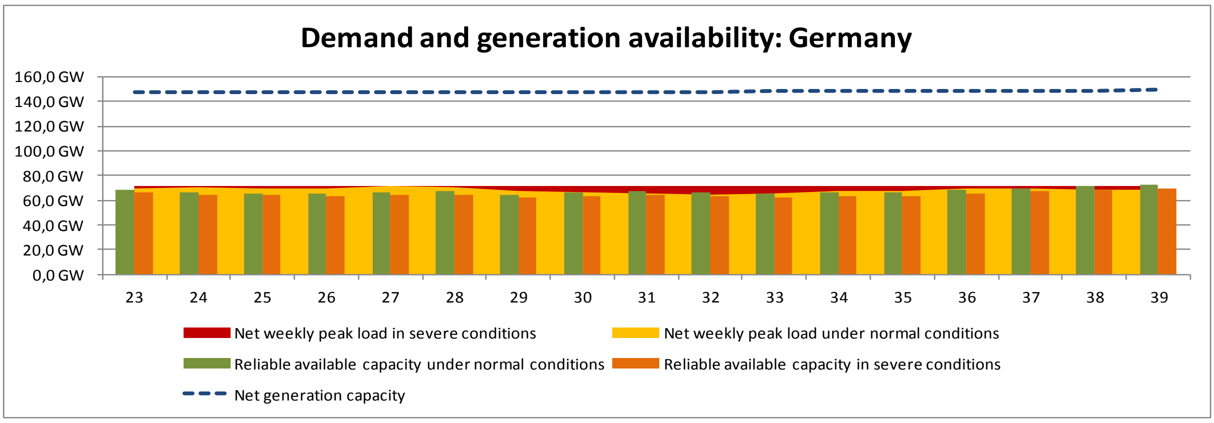


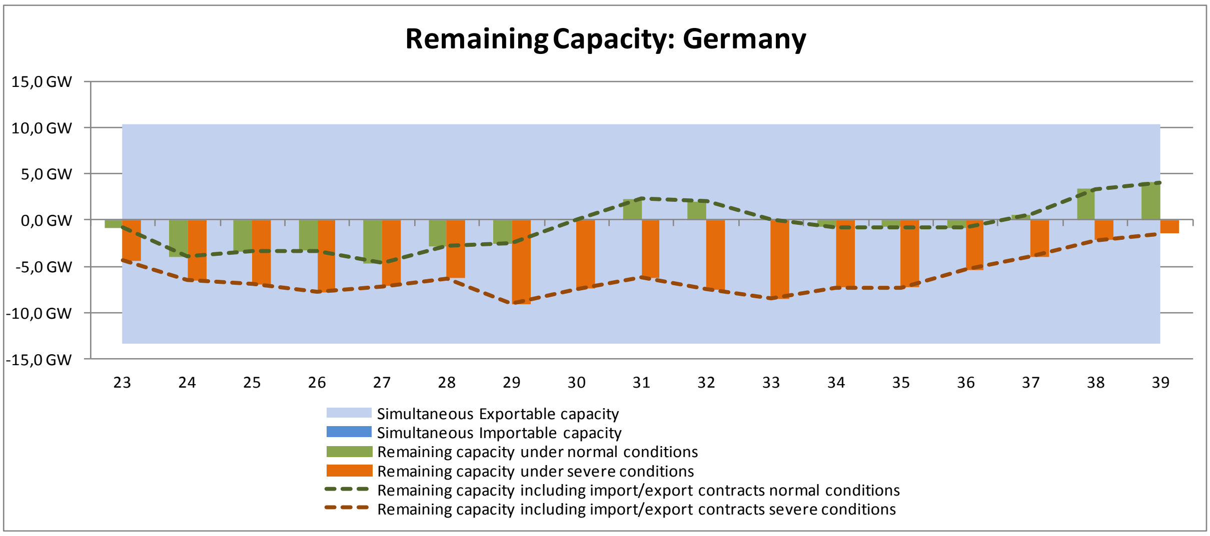


For our study, we use a probabilistic approach to simulate random situations of load and generation, covering the whole of mainland France. The results of this study are published on the RTE website.

In the case of events that may affect the adequacy, French market suppliers could also invoke demand response agreements, asking their customers to reduce their electricity consumption further, in addition to making purchases on the European markets. In addition, generators based in France could also alter maintenance schedules for their generating units in order to increase their availability if possible. Finally, before taking exceptional measures, RTE could also draw on the following provisions: accepting demand response offers made by French consumers or by international consumers via the balancing mechanism to reduce their consumption, and activating backup contracts signed with other European TSOs. If these preventive measures nonetheless proved insufficient, RTE would alert the government of the risk that supply will be interrupted, and would take exceptional operational actions in real time to limit the impact on the power system.

GERMANY





The common evaluation of the German TSOs gives an overview of the security of electricity supply for the coming summer 2012.

After the first step of the accelerated nuclear phase-out in Germany German TSOs are still facing a basically different grid situation compared to the period before the Fukushima catastrophe. It is determined by the enduring lack of 5 GW of conventional generation in Southern Germany. At the same time the commissioning of important conventional power plants in southern Germany is further delayed. Even in the TransnetBW Control Area generation capacity of about 900 MW is expected to become available not before the end of 2013. Another unit of the same size is expected to be delayed until end of 2014.

RES are continued to be installed at breakneck speed. For southern Germany this attributes largely to distributed PV generation. The installed capacity of PV generation in Germany is expected to reach about 26 GW. The German government plans a massive cut-down of financial subsidies for photovoltaic power plants for the near future. As many details of this plan are still unclear the effect on the current increase of installed solar power capacity is difficult to predict.

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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 as well as the exceeding of transmission capacities of network elements in the important transmission axes from North to South. Compared to the summer conditions before the Fukushima catastrophe security margins are expected to be lower. At the same time German TSOs expect the amount of interventions required to maintain system security to be on a similar level compared to the summer of 2011.

Temporary congestions may occur not only inside of control areas but also on tie-lines, e.g. tie-lines between 50Hertz Transmission (50HzT) and TenneT Germany (TTG).

The shutdown of the nuclear power plants also causes a shortage of available reactive power. In the frame of their extensive grid analyses in 2011 German TSOs identified the risk of voltage problems in Baden-Württemberg, Hessen and Rheinland-Pfalz. The risk of low voltages is anticipated for scenarios of strong North-South load flows especially during high load and high wind feed-in. The risk of high voltages is expected to be relevant for scenarios of very low load combined with a high PV feed-in in Southern Germany.

In the Hamburg area voltage problems may occur during low load conditions.

For counteraction German TSOs expect to make use of the full range of topological and market related remedial actions. In general German TSOs consider the different boundary conditions by adapting the amount of network capacities given to the markets. Thus at the southern and western German borders network capacities have been moved from the long/medium term horizons into the short term horizon to contribute to the flexibility to react to adverse environmental framework conditions.

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 redispatch measures in addition to the regularly implemented SIV measures of 50HzT, even on a preventive basis.

As a result of the evaluations of German TSOs and related discussions with the German NRA the generator of the NPP Biblis A had been reconstructed into a synchronous compensator. It has been in operation since February 2012 and is expected to contribute significantly to maintain voltage levels within accepted limits in the area of Baden-Württemberg, Hessen and Rheinland-Pfalz.

For maintaining permissible voltage levels in the Hamburg area German TSOs provide mutual help. A conductor was temporarily transferred from TransnetBW to 50HzT to be installed in a substation of the Hamburg area.

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.

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In case of dry spells in Poland and thus reduced generation capacity, 50HzT expects high loads especially on the tie-lines between Vierraden and Krajnik as well as on directly connected lines.

TransnetBW has prepared a process to operate under the conditions of an enduring hot and dry spell. In cooperation with the authorities of the federal state of Baden-Württemberg criteria for a minimum set of required generation in Baden-Württemberg has been agreed taking into account the effects of the nuclear phase out. If TransnetBW is not able to cover demand in such extreme situations emergency actions have been prepared in coordination with the related DSOs.

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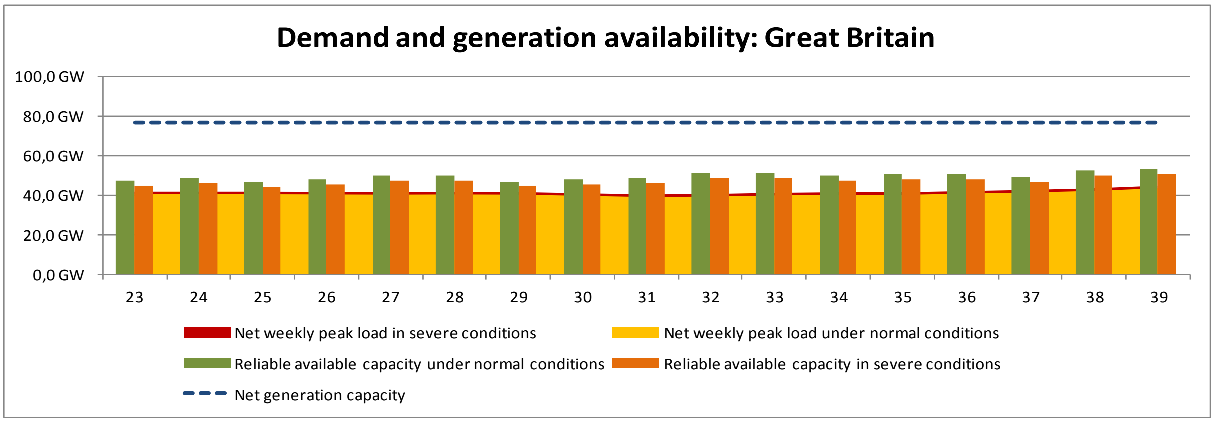
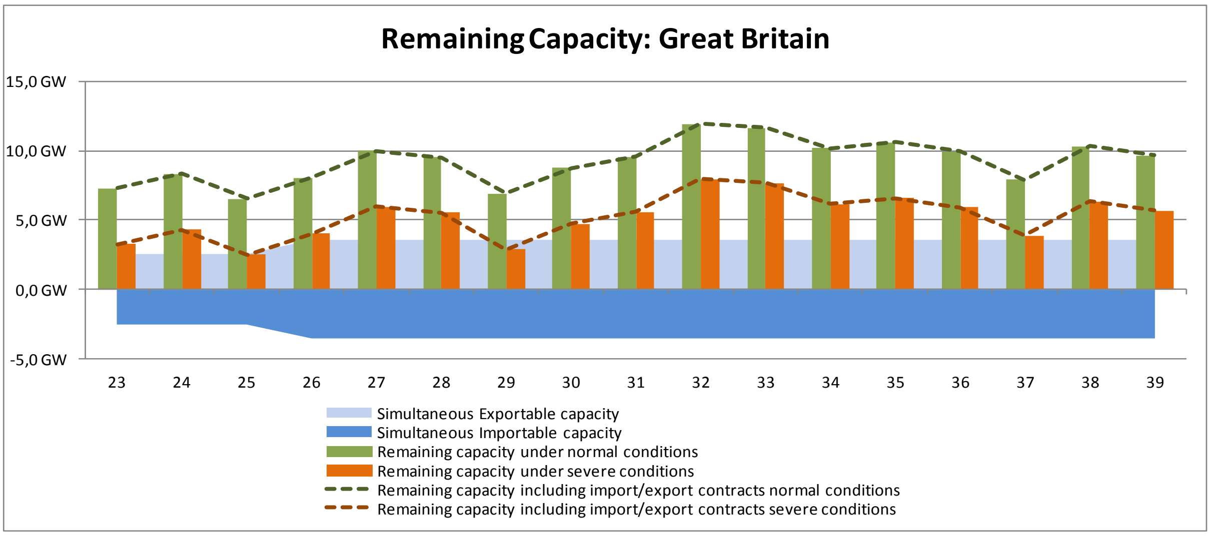
GREAT BRITAIN





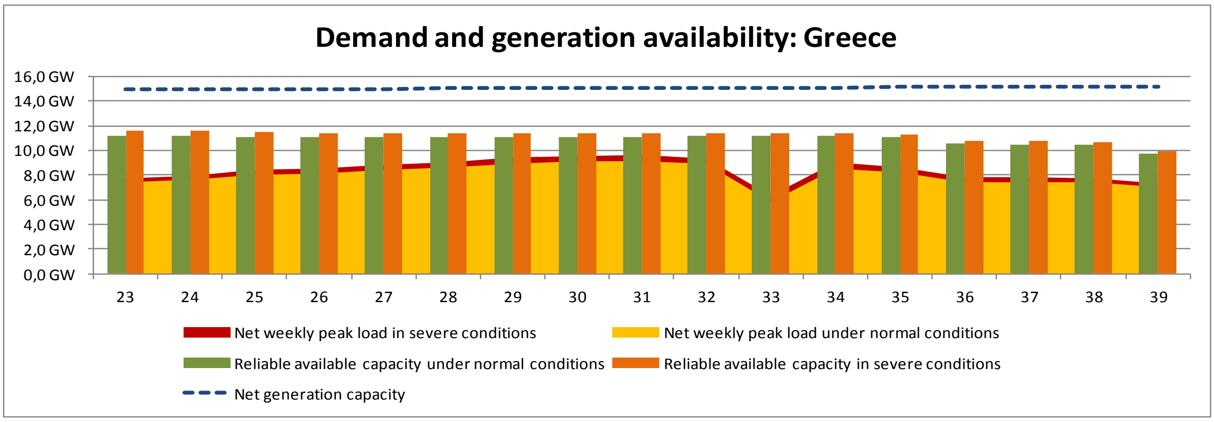
The margin between generation and peak demand is expected to be comfortable under all conditions including extreme high ambient temperatures with no wind generation and maximum interconnector exports.

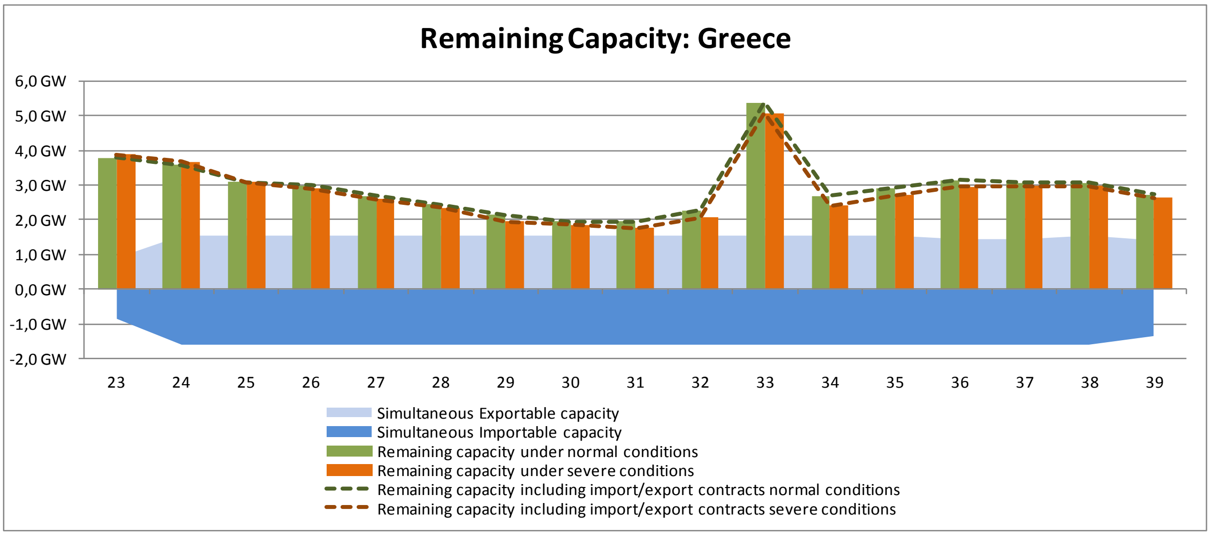
Great Britain is hosting the Olympic Games this summer and National Grid has been working to ensure energy supplies will be particularly secure and reliable during the period from mid-July to mid-August. Although no problems are envisaged, the system will be managed and run in a more resilient manner than normal.

There is a risk that the below average rainfall over the last two years could lead to drought conditions this summer. The impacts of a drought include the risk of reduced generation at inland power stations due to restricted river water abstraction rates and reduced hydro output. There is also the possibility of overhead lines being switched out due to grass or forest fires. Also, long periods without rain can lead to the buildup of pollution and salt on insulators particularly in coastal areas. Precipitation after such a period can lead to flashovers and trips.

There would be an excess of inflexible generation at overnight minimum demand periods under high wind generation conditions and interconnector imports. This would have to be alleviated by reducing imports or constraining wind output. However, interconnector exports would not be necessary.

GREECE





The Greek system is expected to be in balance in the upcoming 2012 summer. The expected commissioning of a new unit in the system, the sufficient hydraulic storage of hydropower stations and the strengthening of the northern interconnections ensure the adequacy and security of the Greek interconnected System. In addition, the demand load will be reduced more than the previous summer due to photovoltaic penetration in the Low Voltage Grid.

In accordance with the power balance for the upcoming summer 2012, it is thought that the adequacy and security of the Greek interconnected system is not threatened under normal weather conditions, taking into account the available importable capacity of interconnections. The hydro conditions have been lower than last year although the water reserves remain at sufficient level.

The Northern interconnections have been strengthened with the new 400KV connection between the neighboring systems of Greece and Turkey (Phase C of Trial Parallel Operation CESA and TEIAS systems) and have increased the capacity from the Northern neighboring systems. This had a positive effect on the facilitation of energy exchanges in the region.

As usual, the Greek TSO expects high load (demand) during the summer and particularly between 20 June and 25 August, because of the high temperatures. In addition, during the summer months, forest fires could affect the availability of transmission lines.

In the case of any risks, the mechanisms in place are: incentives to interruptible customers to reduce their consumption during peak hours, and maximization of our import capacity in collaboration with our neighboring TSOs. In terms of interconnections, the most critical pertain to the interconnection with Bulgaria and the HVDC cable with Italy.

High risk periods are forecast for the second half of June, July, and the first half of August. The reliability of assets could affect the availability of imports.

In addition, a substantial number of photovoltaic panels have been installed (600 MW, expected 200MW plus until summer) which will help to reduce the peak noon load during the summer. This production will be critical, particularly in case of severe conditions.

In the 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 the 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 aim to verify the actual energy situation as well as 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 regularly conducts studies for the assessment of mid term generation adequacy, usually focusing on a five year period, and 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 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 calling 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 also 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 to meet the forecast 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 neighboring counties.

IPTO used the power balance studies to assess the system adequacy in the very short term, and thus 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 focused 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 personnel responsible for System Operation.

Our best estimates regarding the minimum NTC for IPTO are given in the excel spreadsheet.

With regards to 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 combination with 700-800 MW distributed photovoltaic panels as well as the fairly sufficient hydraulic storage of hydropower stations and the strengthening of the Northern interconnection lines, ensures the balance of the 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 made by IPTO. The overhauls of the thermal power plants are avoided during periods of high demand, such as June and July.

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, the common 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 at a sufficient level. The aim of water management is to save the water reserves so as they can be used at 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 was calculated both for normal and severe conditions. Monthly peaks, as well as yearly peaks, are highly dependent on weather conditions, and particularly temperature. A statistical approach was followed based on recorded hourly load and temperature data covering the period since 1997.

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The load is the sum of two components. The first one reflects the load sensitivity to the weather (temperature, humidity), while the other 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 the forecast maximum, while in severe conditions the respective probability is 97.7%. The losses of the transmission system were included in the monthly peak load.

The financial crisis has lowered the expectations of electricity consumption, which has in turn 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 in the form of estimations made 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

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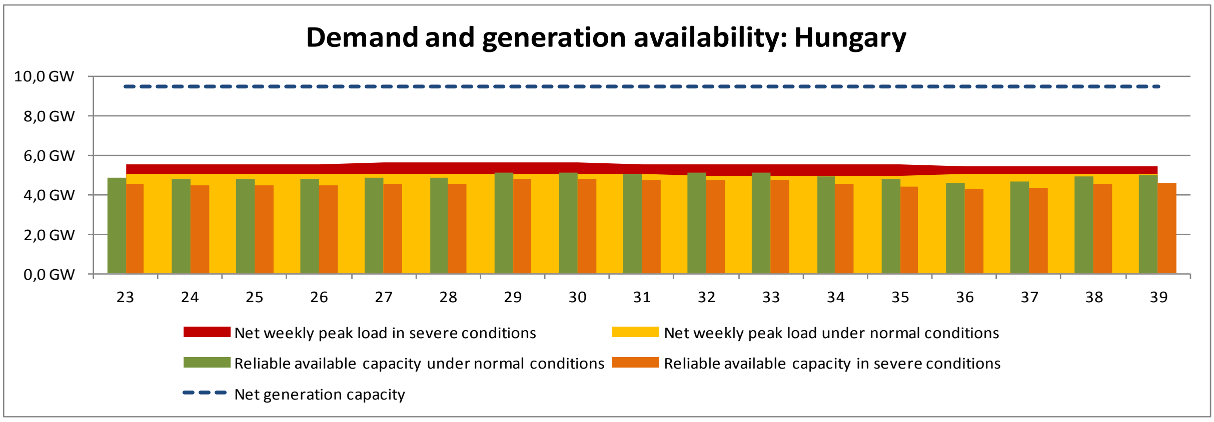
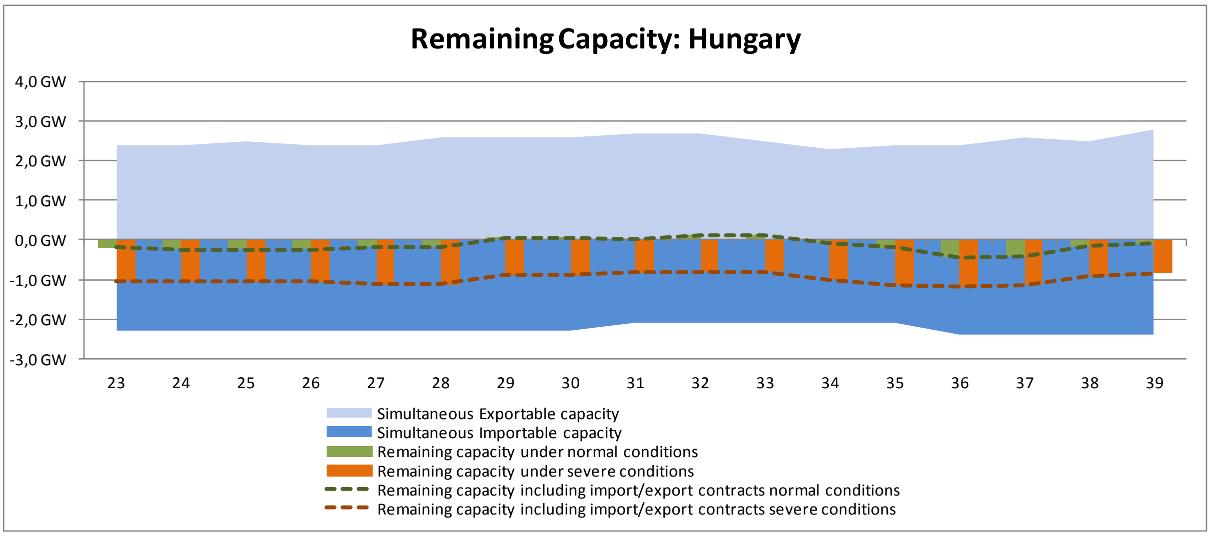
HUNGARY





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

The level of maintenance is relatively high during the summer, namely between 500 and 1000 MW, which comprises 5-10% of the Hungarian installed capacity. The most critical periods are the weeks of July because of the high demand and high average temperature during the summer.

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 900 MW (i.e. final shutdown of a gas-fired power plant), which thus strengthens dependence on imports.

After liberalization, import is the main issue for traders, and 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 regarding the operation strategy of intermittent generators (renewables, co-generation gas engines).

In spite of the growing uncertainty on both the generation and demand side, as a result of liberalization 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 number of risks which 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, for example, 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, which is the capacity of the largest generation unit in the power system. The Hungarian TSO (MAVIR Hungarian Independent Transmission Operator Company Ltd.) maintains a deterministic yearly rolling capacity plan.

For this purpose, load forecast, generation outage schedules, required international exchange of electricity, and forecast production of intermitted generators are determined on a daily basis. The necessary data and information comes from the statistical database of the TSO itself, or from the generating companies and other market participants.

There are three scenarios for average, severe minimum and severe maximum loads.

The necessary reserve level is determined in accordance with the procedure described in ENTSO-E RG CE Operation Handbook, taking into consideration the specialties of the Hungarian power system.

The plan is updated and published monthly on the web-site of MAVIR, combined with actual data.

Generation capacity

Hydro generation is unfortunately not considerable. Mothballed capacities are practically not available under any circumstances. Renewable energy (mainly biomass and wind) as well as co-generation make up a growing portion of the generation mix (over 19%) and their operation is very much legislation-sensitive, that is, difficult to predict – take-off is obligatory, on regulated prices. Due to the low availability of wind generation (it is 0.33 GW at the moment), it was not taken into account in the balance (i.e. calculated as non-usable capacity at peak load).

Although in 2011 new CCGT units have come into operation, there availability depends entirely on the market sales, leading to unavailability during the periods of lower demand and weekends.

Demand

Overall demand level depends on the state of the economy. Weather sensitive extremes can be handled by using different scenarios. Demand-side management is an efficient tool, but it is in the hands of the supply companies – therefore this is a considerable uncertainty for the TSO, resulting in higher reserve requirement. Daily peak demand is a few hundred MW higher in the early afternoon hours, than at the reference time of the weekly table.

System services reserves

Our requirement for primary, secondary and tertiary reserve was calculated with respect to the ENTSO-E RG CE OH Policy 1, taking into consideration the Hungarian specialties (such as weather dependent wind power production or the previously mentioned Demand).

Remaining capacity

Secure operation requires at least 0.5 GW of remaining capacity during the weekly peak demand periods, even under severe conditions (i.e. the capacity of the largest generation unit in the power system).

Interconnection capacity

Since the Hungarian Power System is part of the highly meshed Central-European network, volatile transit flows are comparable to the NTC values. Therefore, cross-border trade is considerably limited by transit flows. However, cross-border capacity is, for the most part, available for the necessary amount of import.

International exchanges

The Hungarian electricity market is traditionally import-oriented, the import part is relatively high. After the completion of liberalization, international exchange has become much more sensitive to market conditions, even in the short term. The Hungarian TSO does its best to stimulate, or even oblige market players through market rules (pricing of balancing energy) and contracts (on provision of reserve power). This is done in order to ensure the required level of import, to guarantee reliability of the power system. For the time being, a vast amount of import energy is available on the market, which increases system security.

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ICELAND

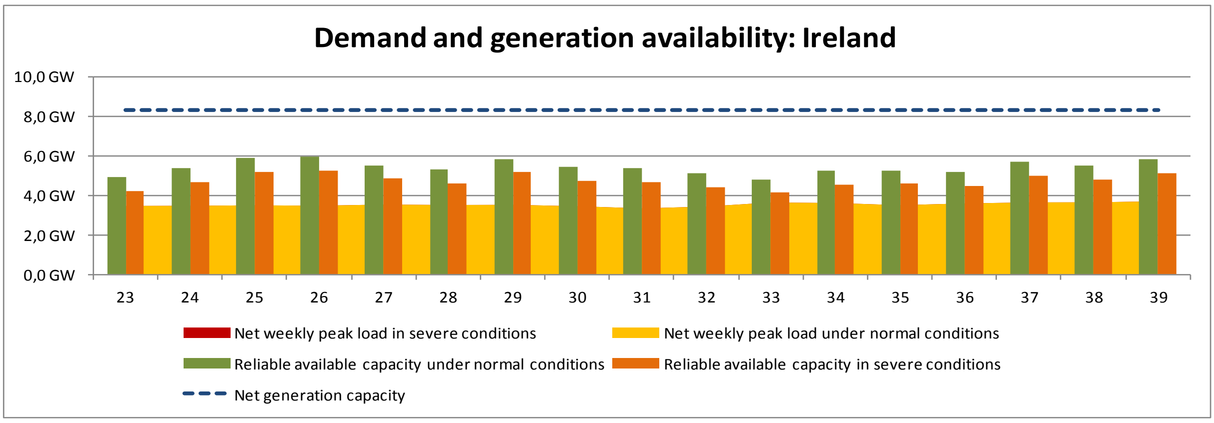
The generation capacity in Iceland is expected to be sufficient to meet peak demand this summer under normal as well as severe conditions. Landsnet does not anticipate any particular problems in the isolated Icelandic power system.

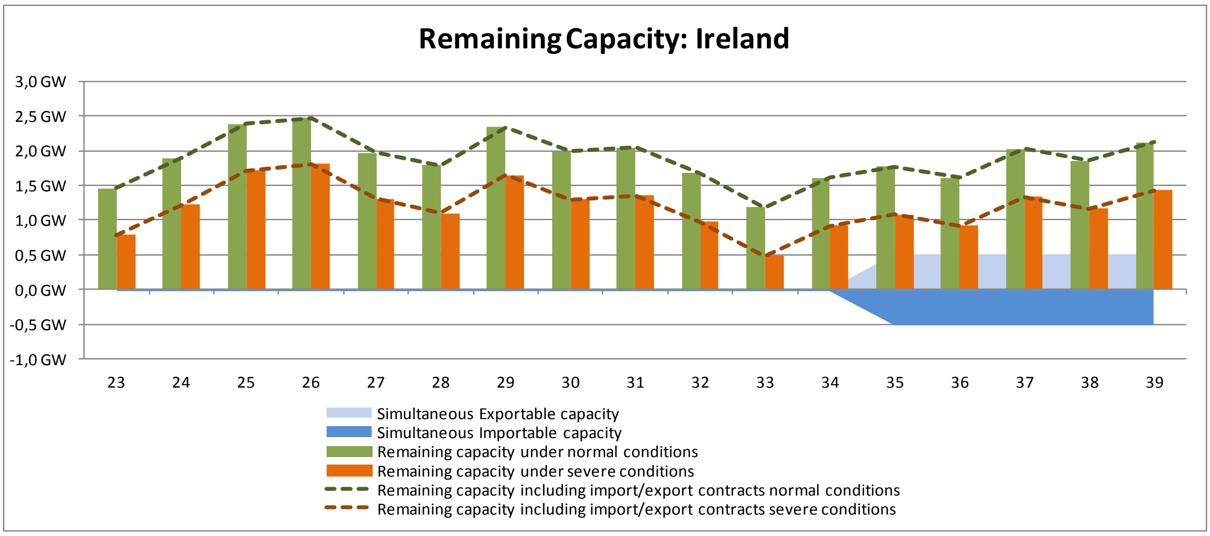
Scheduled maintenance on both generating units as well as transmission equipment is pursued during the summer period.

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.

A Long term Generation Capacity Assessment and Load Forecast for the Icelandic power system are compiled 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





EirGrid does not expect any capacity or demand issues on the Irish system this summer. According to the latest analysis, there will be sufficient capacity to meet the demand over the entire summer period. While there are some significant scheduled outages on the system this year, there is sufficient spare capacity to deal with unexpected forced outages. The East-West Interconnector, connecting Ireland to the GB system, via a 500MW HVDC link, is expected to be commissioning over the summer period.

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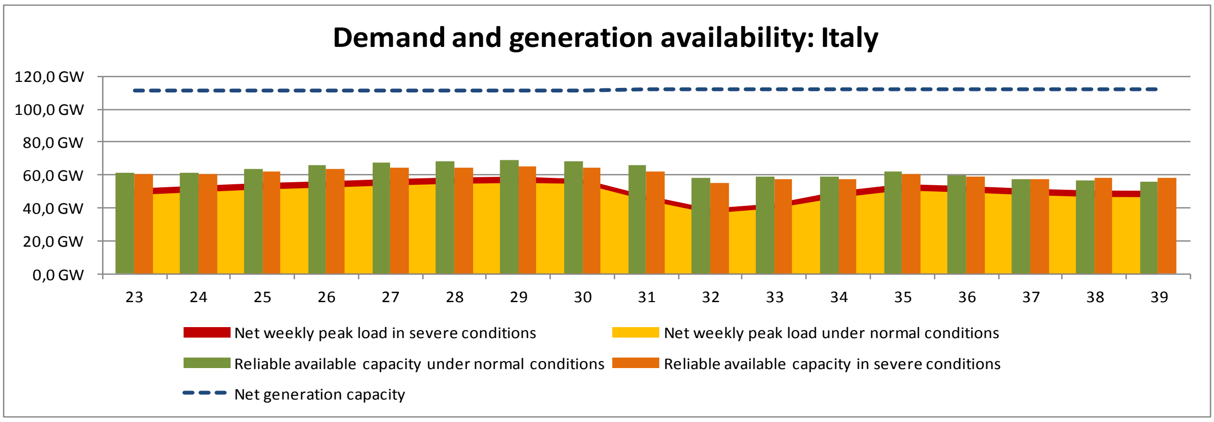
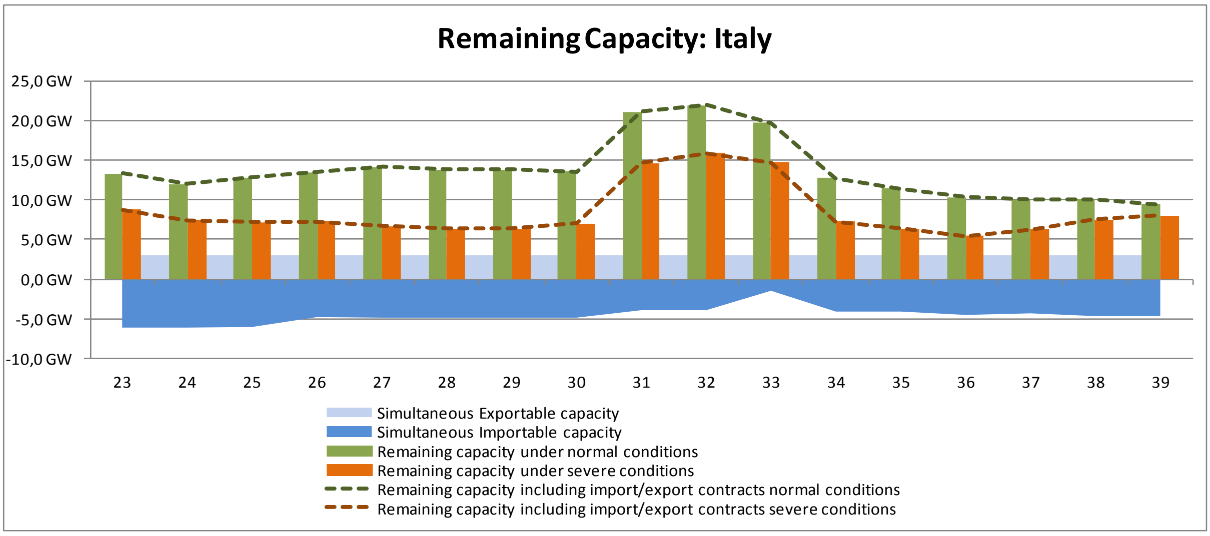
ITALY





From a system adequacy point of view, the huge increase of PV capacity can help to enlarge the margins over the morning peak load during the entire summer period. Nevertheless, the conventional generation capacity will be sufficient to also cope with the evening peak load.

Under severe conditions the general situation expected during the summer is not critical, with some problems possibly arising in the Sicily Island only (in Sardinia the adequacy is improved by the new undersea cable Sapei).

Possible adequacy alerts may arise in case of extreme and unexpected events such as:

- **Very low hydro resources levels** which influences the thermal and hydro generation availability. For the coming summer months, there is the concrete risk of a shortening of hydro resources which could reduce the thermal and hydro generation availability. In this case, margins will be tighter, although no particular need for import is foreseen.
- **Shortage of gas supply** in case of concurrent unplanned outages of several gas import sources, which can influence the availability of CCGT power plants which cover up to 50% of the demand.

In order to cope with these risks Terna:

- Prepares **preliminary action and emergency plans** and, when necessary, adopts the appropriate countermeasures.
- Performs **monitoring of gas and hydro resource** availability.

Furthermore, it should be noted that, after the huge increase of PV installations experienced during 2011 (+9GW) during the summer period (but also in spring and autumn), the Italian TSO may face problems with regards to meeting (n-1) security criteria, especially voltage limits and congestion management. Among the various risk factors, the following can be envisaged:

- **Frequency transient and massive photovoltaic plants disconnection** from the grid whenever the system frequency reaches 0.2 or 0.3 Hz deviations from the normal value (50.0Hz). This would increase the risk of a widespread loss of supply and decrease the effectiveness of emergency defense systems. The majority of PV plants are presently connected to the distribution grids.

- **Lack of adequate downward regulating capacity:** high renewable production (wind and solar) during low load periods, taking into account the level of the other inflexible generation, could lead to a lack of adequate downward regulating capacity.

Voltage regulation problem and congestions: high voltage problems can arise especially in the South due to low load levels, reduced flows along EHV and high renewable production. Market and physical congestion, especially from the South to the Central South market zone, will be very common during the summer. Since the last March the Italian power system has experienced high power flows, more relevant than in 2011, in the transmission axes from South to North. As a result, re-dispatching actions of conventional power plants have been needed in order to restore current values to within the secure limits.

Load demand balancing: a huge and fast re-dispatch of conventional power plants is needed in the evening hours with higher load demand in order to meet the load resulting from the shutdown of PV plants after the sunset. The steep climb forces the thermal units to even faster rates and could present a challenging issue. In the main islands (Sicily and Sardinia) such issues are intensified due to the weakness of their power system, compared to the mainland, and to the lower regulating capacity. In order to handle such issues Terna has taken the following actions:

- New strategies adopted on operational planning of maintenance of critical network elements (i.e. in periods or hours with a lower PV feed-in).

- Re-dispatch measures and topological remedies in order to solve voltage problems, congestions or downward regulating capacity.

- Curtailment of Wind power generation when needed. It should be noted that only wind farms can be curtailed as the greater share of PV is connected to the distribution grid and their disconnection is not easy. In cooperation with DSOs, Terna is working on studying the possibility of the remote disconnection of a portion of them.

- Activation of authorities and DSOs to the adaptation of the frequency rules of PV plants.

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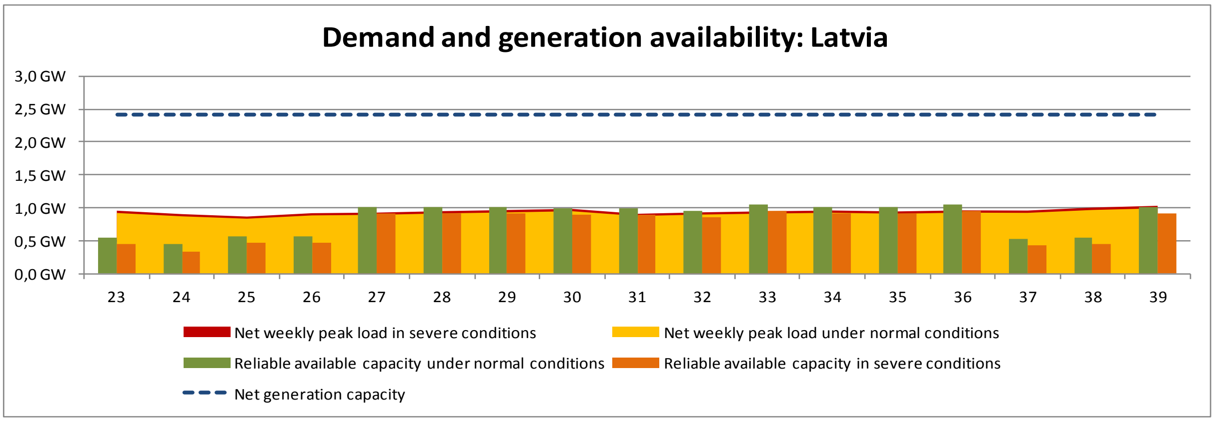
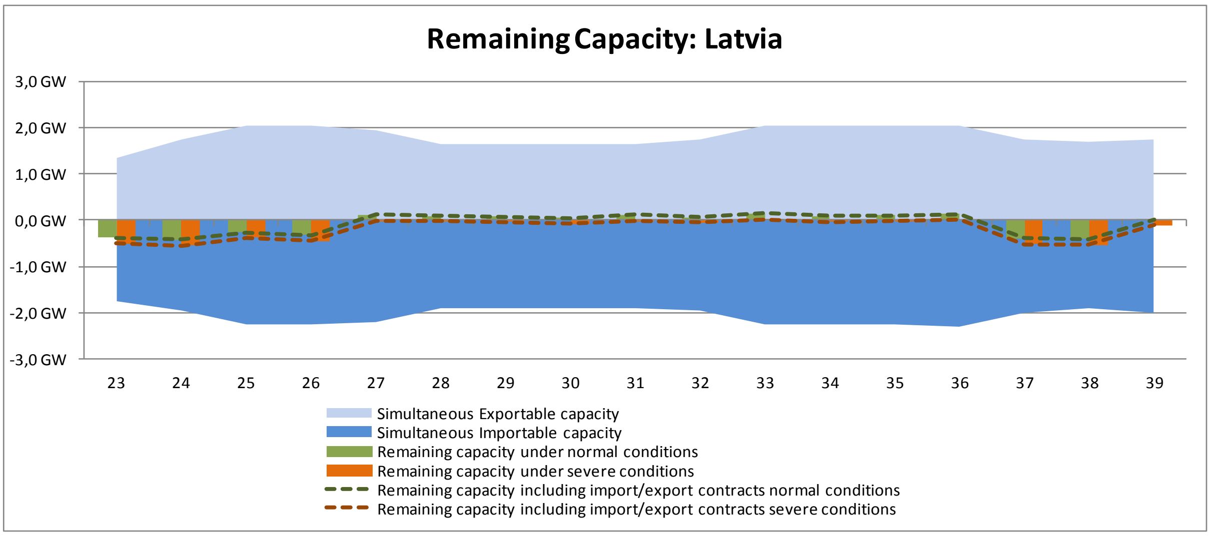
- Enhancing cooperation with neighboring TSOs to take special remedial actions, such as NTC reductions or mutual help.
- Planning the installation of battery storage to reduce congestions resulting from RES feed-in in the most critical area of South Italy.

LATVIA





For the base case, TSO is expecting average weather conditions fairly similar to the previous year, whilst the load could increase by up to 2%. For severe load conditions TSO is expecting 5% load increase and lower generation in the HPP.

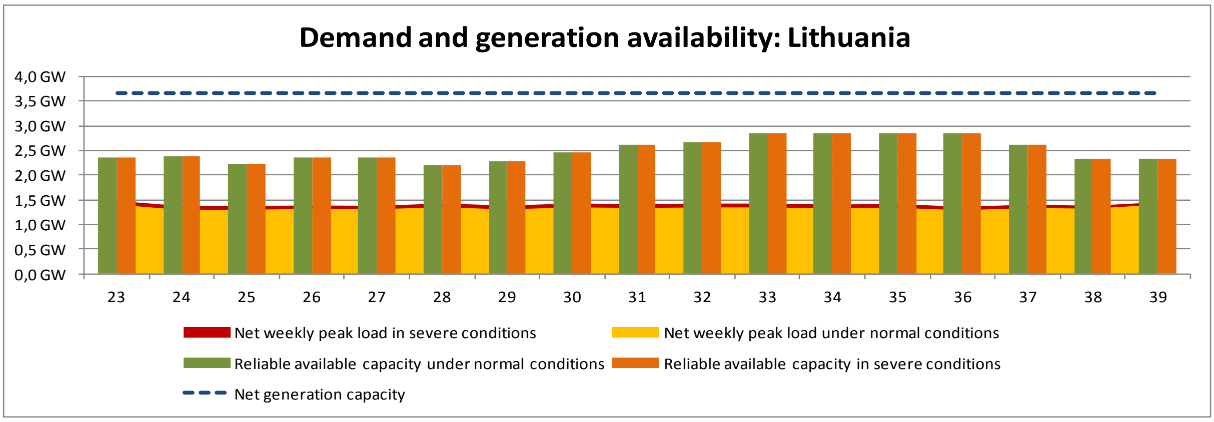
For the coming summer TSO is expecting a decrease in the installed capacity of the Latvian Power system and as such is also expecting high electricity import during the summer. For the coming summer TSO is expecting to commission additional capacity of wind power plants with 30 MW whilst one old CHPP block with a capacity of 100 MW will be decommissioned.

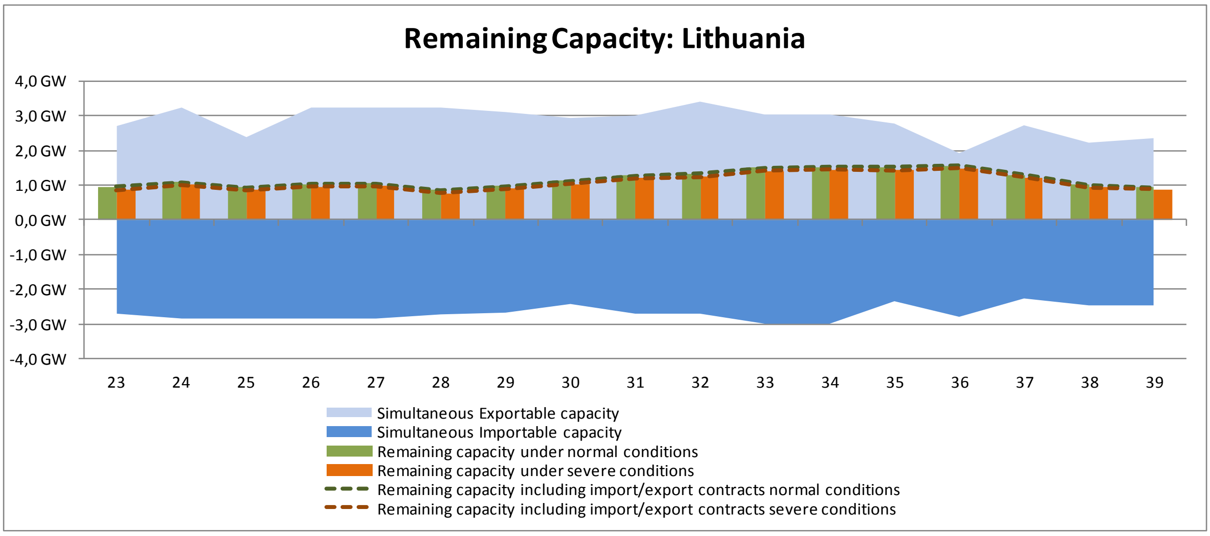
The base CHPPs are going through the maintenance work during the summer and from June to September is thought to be the most critical period for the Latvian power system.

For normal conditions, Latvian TSO is expecting 400 MW of hydro power plants to cover peak load and for severe load conditions TSO is expecting 300 MW of hydro power plants to cover peak load. The only reason to cover peak load of hydro power plants is water inflow in the Daugava river.

Risks with transmission capacities on the Latvian-Lithuanian cross-border are not usually experienced, and all international electricity offers and trades will go according to plan. Considering 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. During this summer period, electricity supply on the cross-border Estonia-Latvia will be limited and counter-trade between the Latvian and Estonian TSOs could be in place. This interconnection is one of weak points in Baltic States. To maintain the security of supply in Latvia’s power system and to solve the congestion possibilities on the Estonia-Latvia border, Latvian TSO has rights on the fast hydro reserves.

LITHUANIA

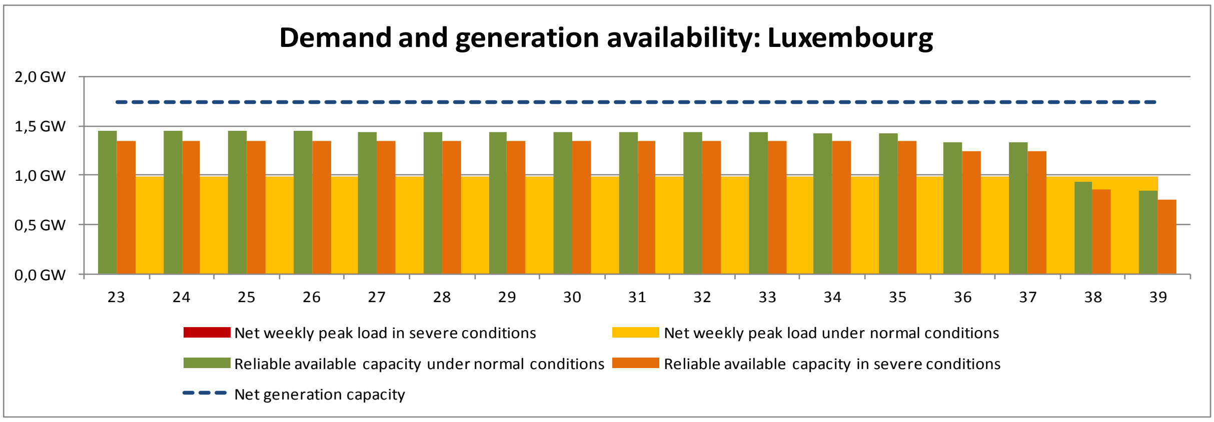


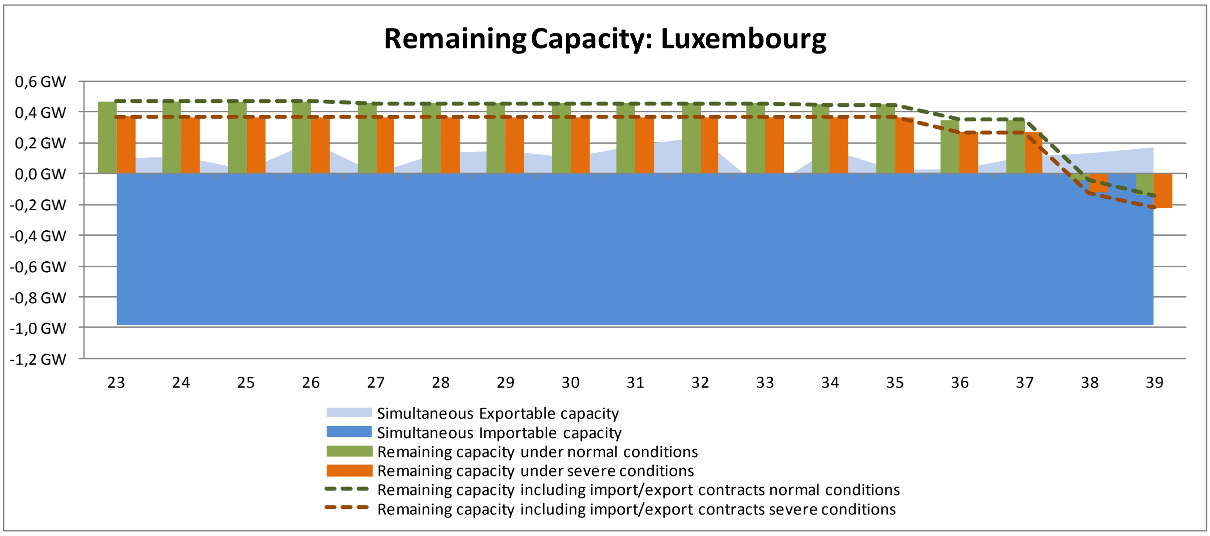


No problems are expected in the summer of 2012 under normal conditions. The generation capacities and available transmission capacities for imports will be sufficient to cover increasing electricity consumption in Lithuania and the Baltic region.

The system balance is expected to be in deficit due to electricity price difference in the neighboring countries. The import of electricity from neighboring countries will be relied upon cross-borders with Belorussia, Latvia and the Kaliningrad area. The availability of imports depends primarily on the generation/demand balances in neighboring countries and also available cross-border transmission capacities. None of these factors are considered as high risk during this summer.

LUXEMBURG





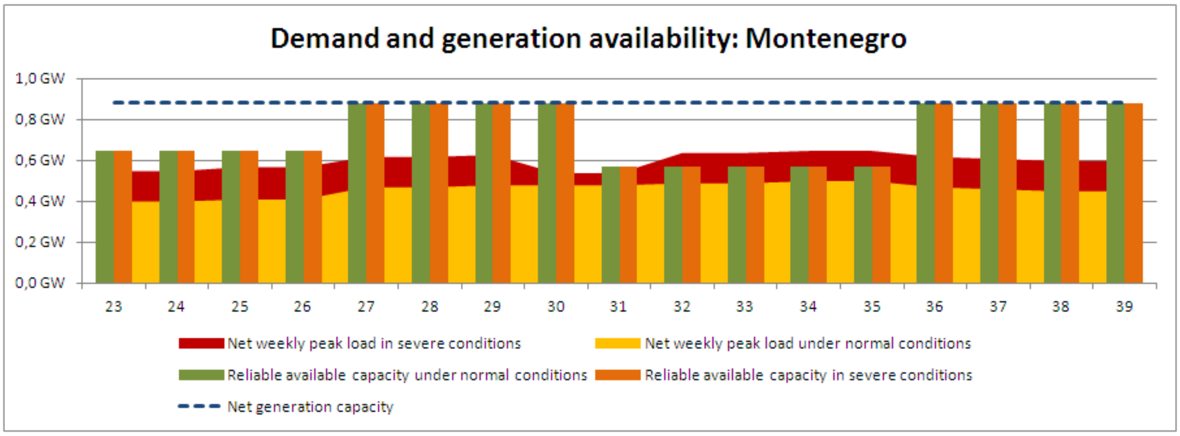
Luxembourg has two high voltage grids, the public grid of Creos connected to Germany, and the industrial grid, connected to Belgium. For both grids, the interconnection capacity will be sufficient to cover n-1 security. In normal operation the grids are not interconnected meaning there is no possibility for transit flows. In emergency cases, mutual reserves can be made available to the other grid. In temperature stressed situations, the load increase can be supported by the lines. No generation depending on very low temperatures exists in our country.

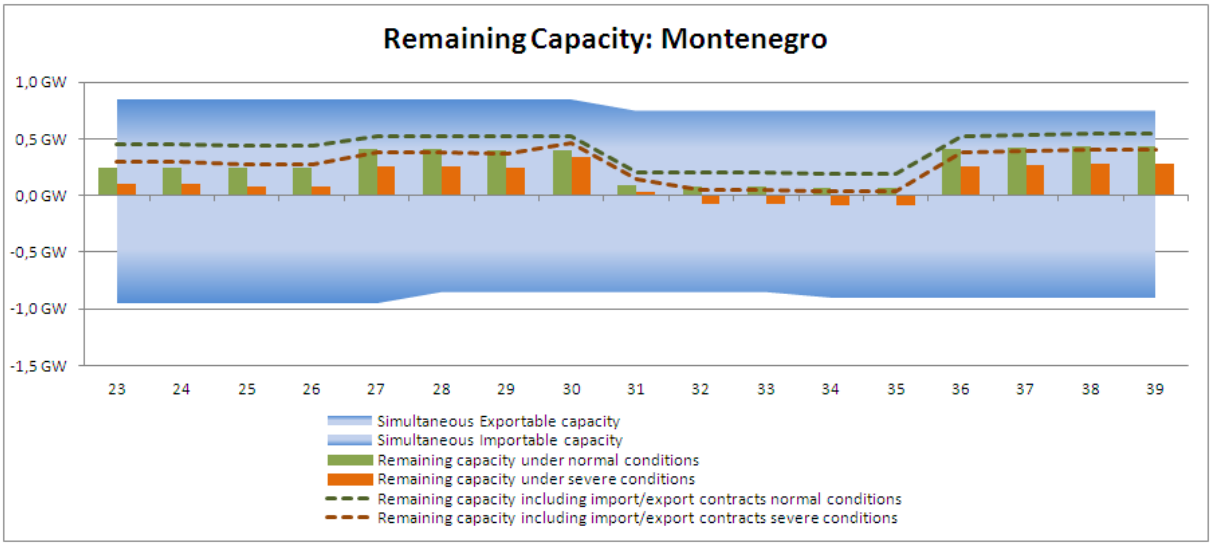
The generation – demand balance remains positive even in the period where some generation capacity is not available due to overhauls.

The non-usable capacity is mainly determined by wind conditions but remains very low.
For energy supply, Luxembourg depends on the neighboring grids. Power plant outage in Luxembourg will not affect the energy supply to the grids.

System services reserves for the Creos grid is assured by the Amprion grid whereas SSR for the industrial grid are assured by ELIA.

MONTENEGRO





The operation of Montenegro's power system is expected to be secure and reliable over the entire summer period of 2012.

The Montenegrin power system depends on imports of energy to cover differences between consumption and production. Due to significant influence of the aluminum and steel industry on Montenegrin power demand, some mistakes in demand prediction can be expected. Montenegrin TSOs' (CGES AD) best expectations are that generation – load balance problems, under normal conditions, are not expected in Montenegro for the summer of 2012. The main period of stress is from July until the end of August 2012, when the load is at its maximum, and the temperatures are high. The main factor can be high demand and bad hydrological conditions.

No major variations of the interconnection capacities are expected during the summer of 2012.

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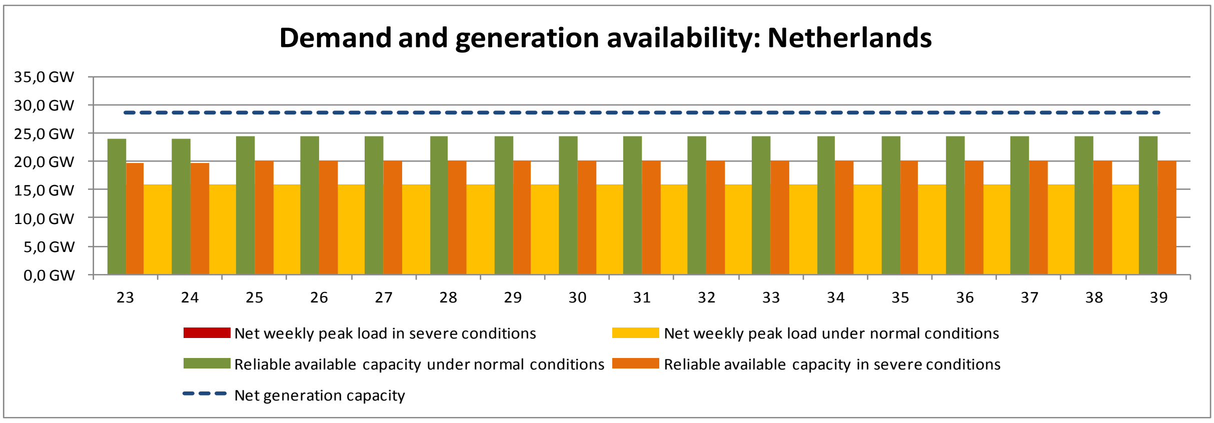
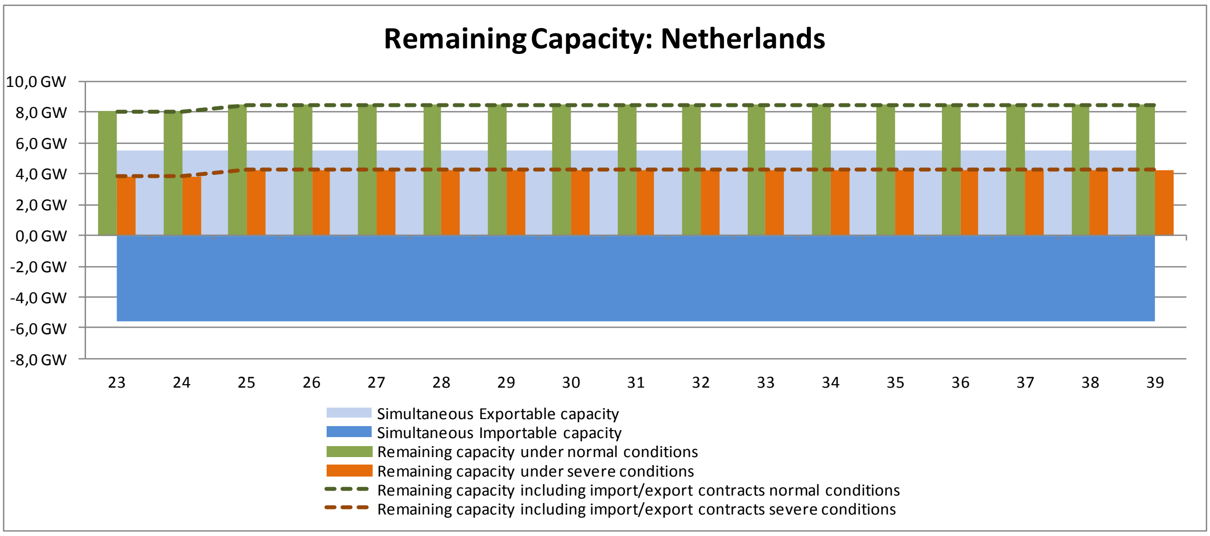
NETHERLANDS





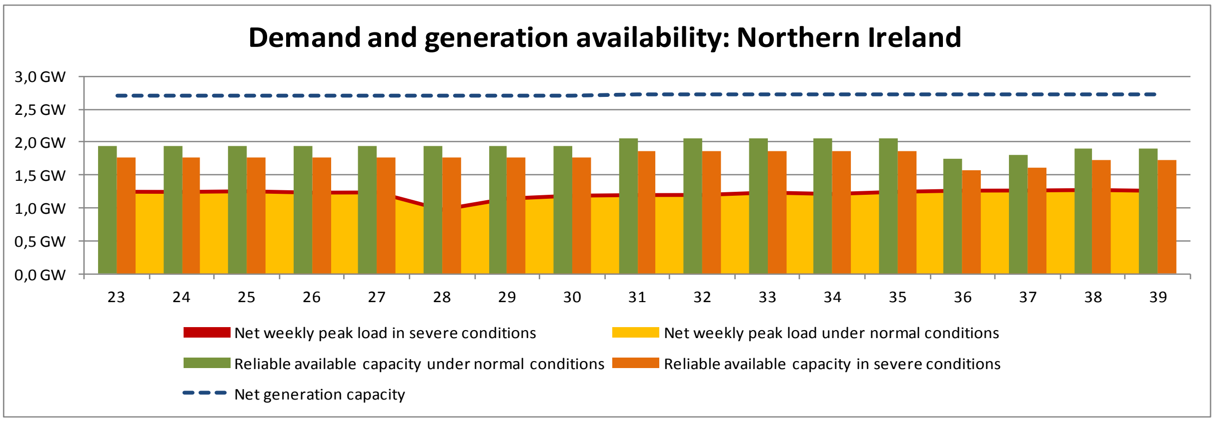
TenneT does not foresee any significant generation shortages during the summer of 2012. Sufficient generation capacity will be available and no large amount of outages during this period are reported. Apart from this, sufficient export and/or import capacity is available.

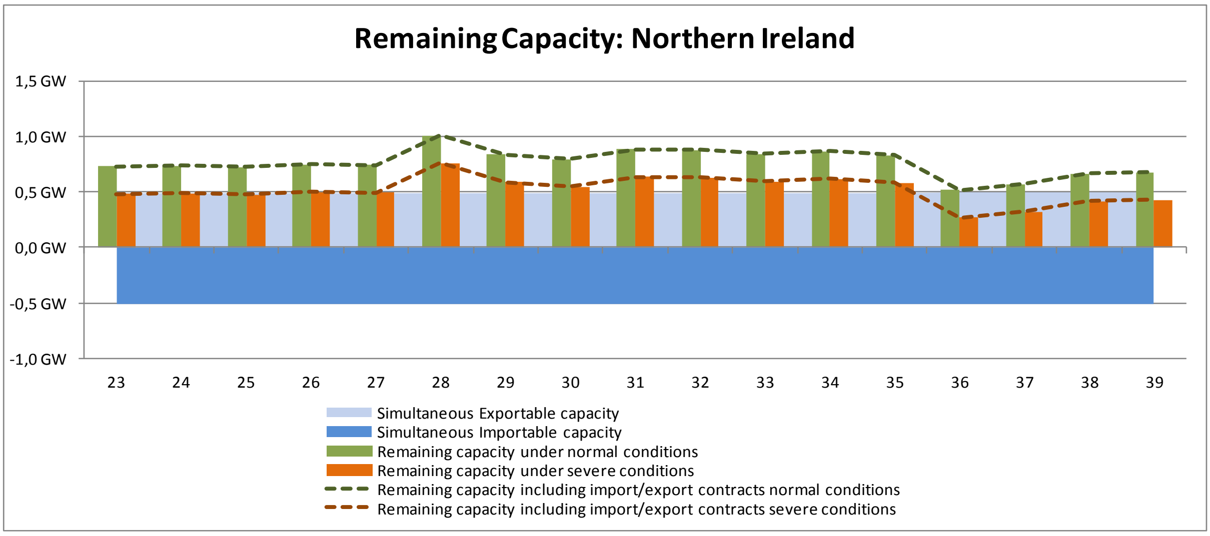
An official summer adequacy forecast has not been conducted as yet. In our opinion the supply-demand balance will be realized on the basis of the price-driven demand principle and it is not the task of the TSO to intervene in an effectively functioning market.

The TSOs' specific task is to balance 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. on behalf of the Ministry of Economic Affairs, provided the report on Monitoring of Security of Supply 15 years ahead (Monitoring Leveringszekerheid / Security of Supply).

NORTHERN IRELAND





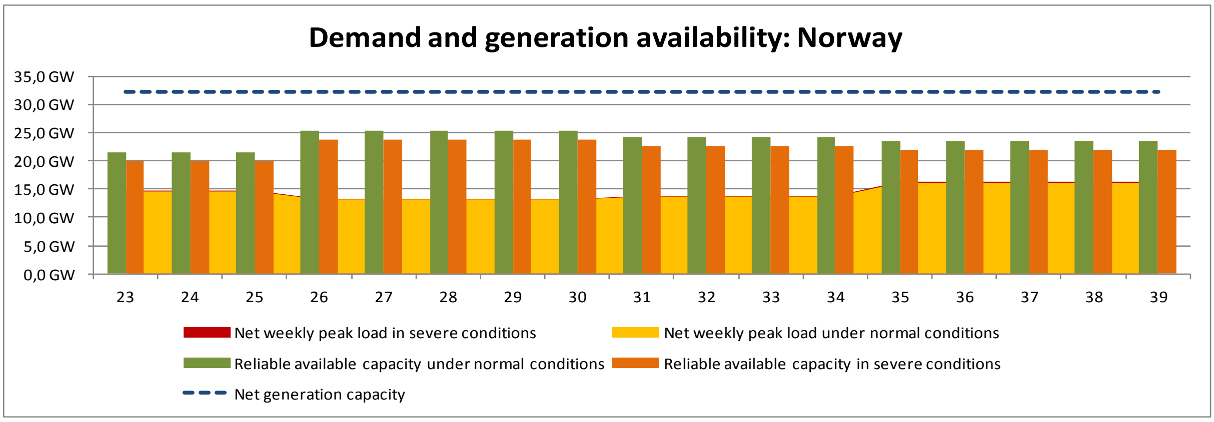
SONI do not anticipate any significant generation adequacy shortfalls on the Northern Ireland system this summer, with sufficient capacity being available to meet demand even with a number of planned generation outages. It is expected that the Northern Ireland Security of Supply Standard of 4.9 hours/year 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.

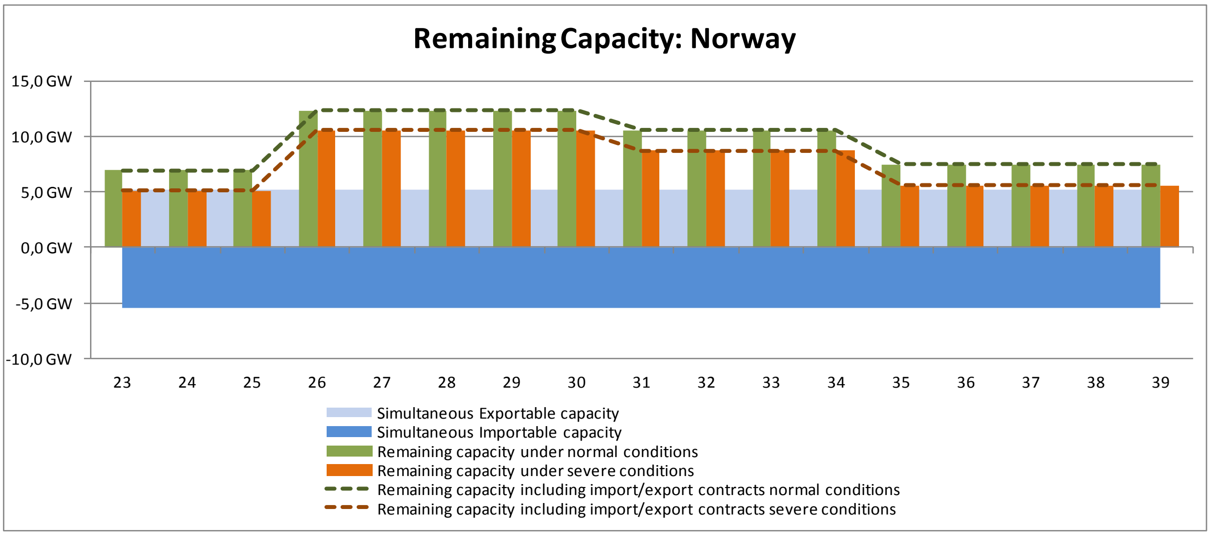
At times, to ensure that peak demand is met in Northern Ireland, SONI may be dependent upon imports on the Moyle interconnector with Great Britain (GB) and/or the North-South tie line with the Republic of Ireland.

At periods of high wind and low load, it has been necessary at times to curtail wind generation. This may be an increasingly common occurrence as more wind capacity is connected to the system.

SONI and EirGrid have established a joint program of work entitled “Delivering a Secure Sustainable Electricity System (DS3)”. This work program 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.

NORWAY





Norway is normally self-supplied during the summer with a high capacity surplus, and this is also the case in severe conditions. Towards the summer period 2012 we expect that the hydrological balance will be higher than normal. Due to a high energy balance, we expect export during the summer. Norway is capable of using interconnectors to support neighboring countries with power.

Due to a very low reservoir situation, last summer seemed as though it would be a challenging period, with high import on the interconnectors and low production in the bigger hydro power plants. The summer became quite rainy and the energy balance improved quickly. The reservoir level is much higher this summer. Statnett does not expect any critical situation during the summer of 2012. The available generation capacity exceeds the expected peak load.

Statnett does not expect any critical situation during the summer of 2012. The available generation capacity exceeds the expected peak load.

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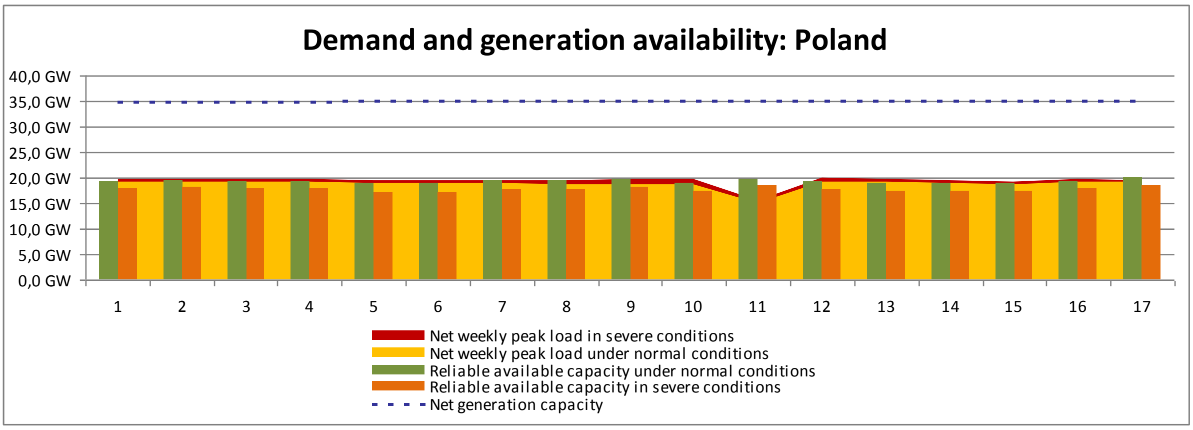
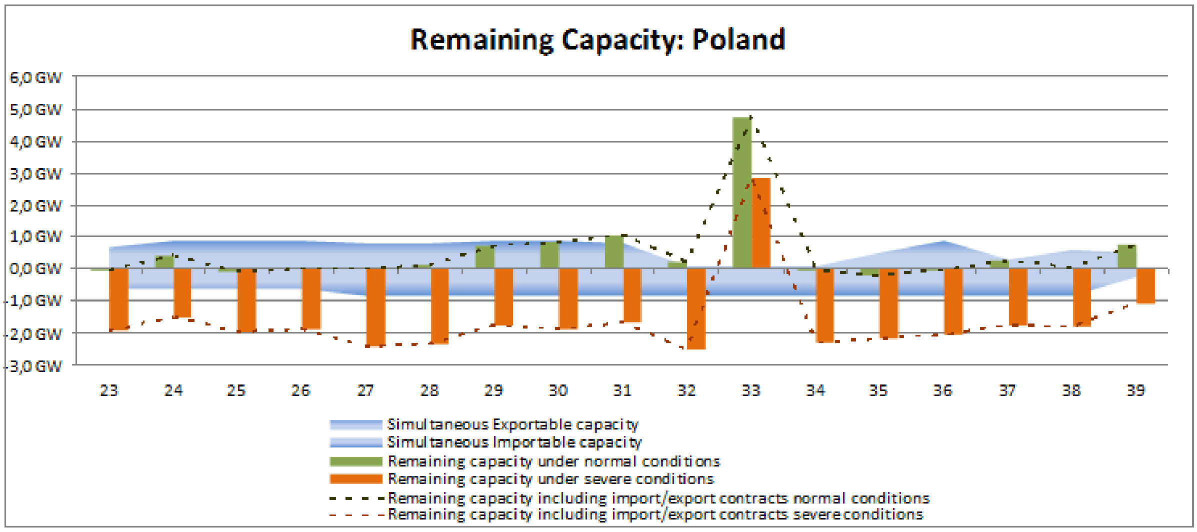
POLAND





In Poland forecast plans (yearly coordination plans[1]) are done for the whole year on a monthly basis (average values from working days at peak time), till 30th November every year.

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

Further specification is done within the operational planning (weekly and daily). At the moment Polish system has no problem with balance the system during the night (expect for 3-4 days per year, especially during Christmas, Easter and holidays in May). This is the way, that PSE Operator does not prepare the balance for minimum load in monthly and yearly forecasts. Such analysis are done during the daily planning.

[1] System balance plans (published on PSE Operator S.A. Website)

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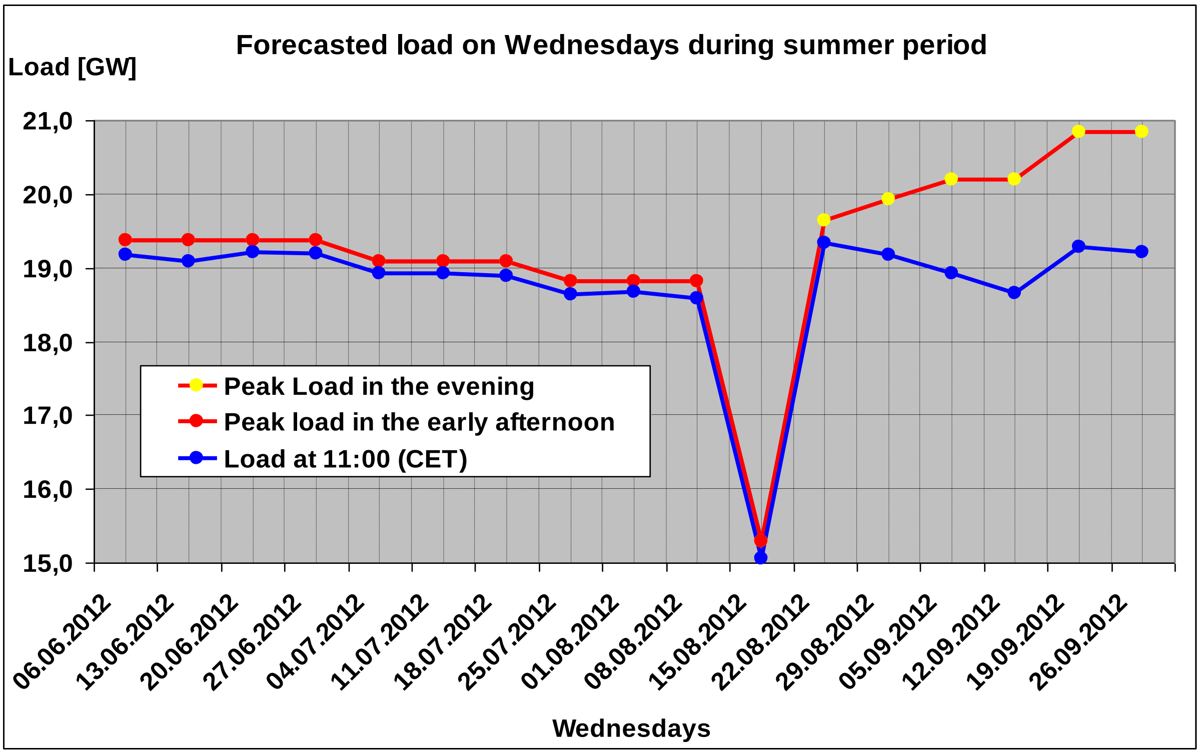
In normal conditions PSE Operator classifies 89% of wind NGC as non-usable capacity, for severe conditions it is 100%.

Because of Outlook reports require weekly data, PSE Operator has prepared special assessment for Summer Outlook, where weekly data of NGC, maintenances, load and the best estimate of minimum NTC is available. It is important to underline that, there is still yearly planning horizon. This assessment as well as coordination plans are coherent and based on information from producers (NGC, overhauls, non-usable capacity), and Polish TSO own analysis (load, outages, reserves, non-usable capacity, NTC). Additional, PSE Operator has prepared the required data for downward regulation capabilities for second weekend in August (Sunday, 12th August, 3:00 CET), but this is a kind of estimation only. The level of the downward regulation on 12th August could be confirmed for the summer period before this date, after this date mentioned level of downward regulation decreases a bit.

In normal conditions PSE Operator does not expect any problems in operation and balance the system this summer. For the whole analyzed period, the balance of Polish power system is positive at 11:00 (CET). During peak hours an unbalance is expected in late August and September as the result of quick increase of peak load (lower temperature, peak load occurred in the evening) and the fact, that overhauls still go on and Combined Heat & Power plants have not started yet. However, in late August and September period of evening peak is very short and PSE Operator can use intervention reserve in pumped-storage hydropower stations to cover the peak demand.

Picture below shows forecasted peak load and load at 11:00 (CET).



Severe conditions, mainly in June and July, that are extremely high temperature and dry weather, may cause not only the increase of the forecasted load, but also higher level of unavailability of units caused by:

- restrictions in operation due to too high cooling water temperature in certain thermal power plants (i.e. increase of the non-usable capacity) as well as low level of natural sources of cooling water,
- limitations due to transmission network constraints (i.e. increase of the non-usable capacity).

In case of forecasted problem with balance the system PSE Operator, as the owner of the grid, can postpone (at the planning stage) or discontinue (operational) the grid overhauls which decreased transmission capacity (result: decreasing of non-usable capacity).

In case of emergency situation, there are agreements concluded between PSE Operator S.A. and neighboring TSOs for emergency energy delivery.

PSE Operator provides aggregated NTC data for the whole 220/400 kV synchronous PL - DE/CZ/SK profile on the base of the Polish Grid Code that accounts for physical power flows in the interconnected systems of Continental Europe, i.e. unplanned flows through Polish system from 50HzT to Southern Polish border.

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

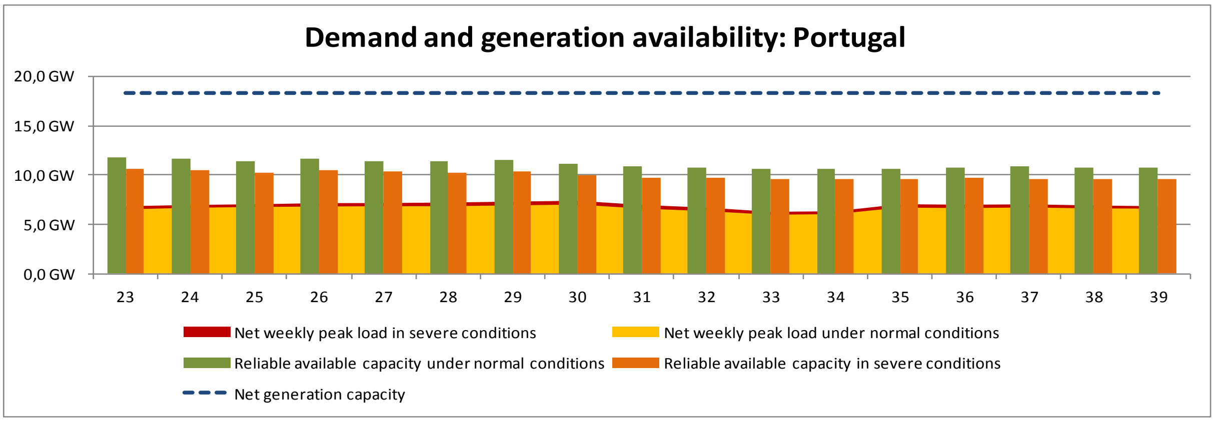
As the best estimate of minimum NTC for Summer Outlook PSE Operator provides yearly forecast of NTC. This forecast takes into account network constrains caused by planned switching off of the cross-border and / or internal lines (or other elements) as well as cross-border loop flows through PSE Operator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

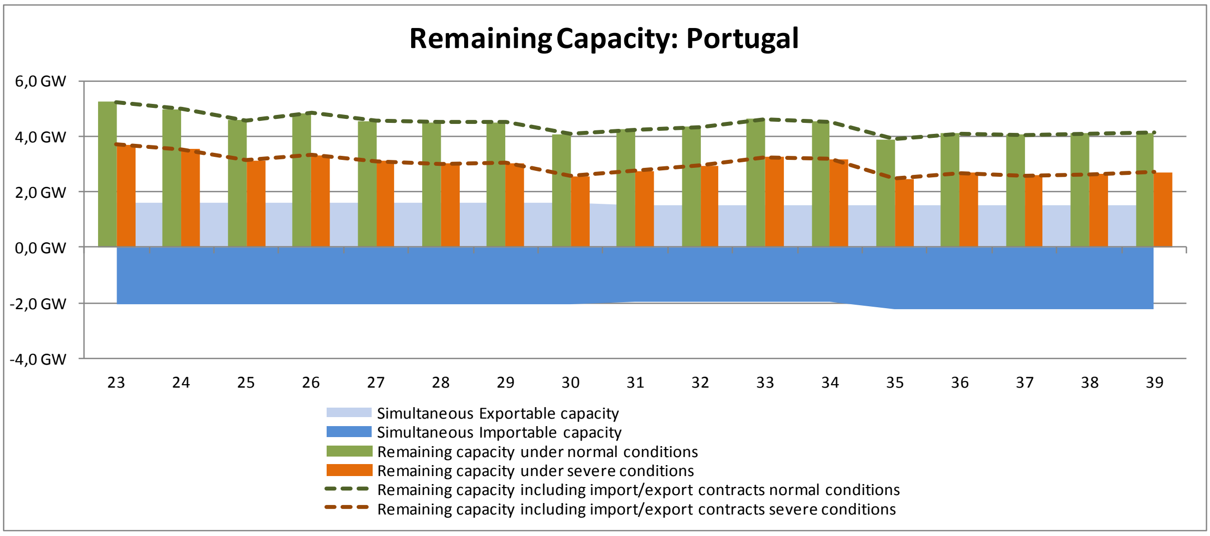
For the whole analysed summer period (in fact during the whole year) yearly forecast of NTC in import direction on PL – DE/CZ/CK profile amounts to zero. This is caused by low level of TTC, which is calculated on the basis of N-1 criterion, simultaneously with high level of TRM, resulting from loop flows through Poland. In other words all capacity possibly to be offered to the market players is already consumed by this loop flows. Therefore the arrows to Poland (import direction) for synchronous profile on the maps at the beginning of the report are red, not black. Black arrows on maps for Poland mean that in the yearly forecast there is planned switching off of power elements that limits NTC to 0 MW, e.g. :

- week 39 – definitive switching off the DC cable to Sweden due to required yearly maintenance,
- week 34 – switching off 400kV double circuit line to Slovakia simultaneously with switching off an internal line. Though the interconnection line is one of many within the synchronous profile, the planned switch off during the 34 week significantly limits

TTC. In connection with high TRM, resulting from unplanned large flows, it causes lack of export capacity.

PORTUGAL

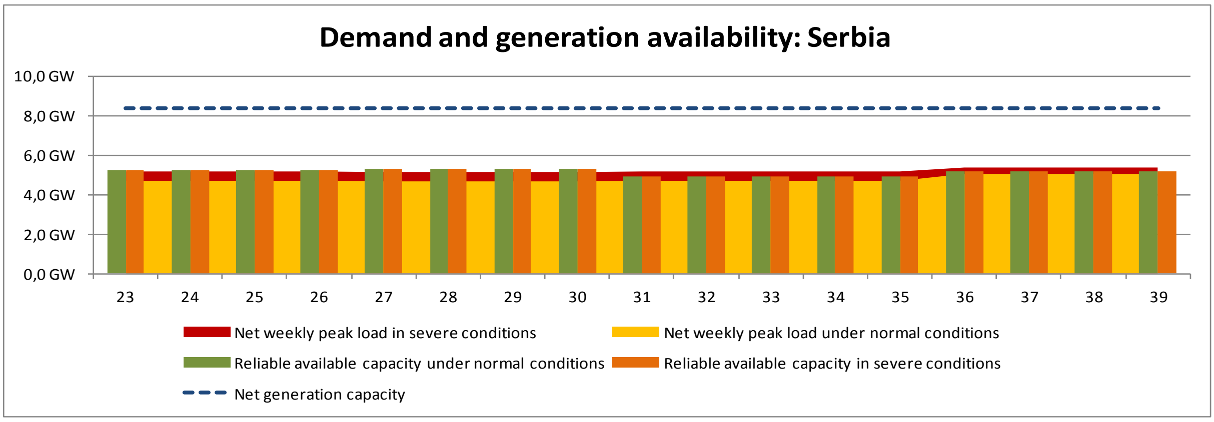


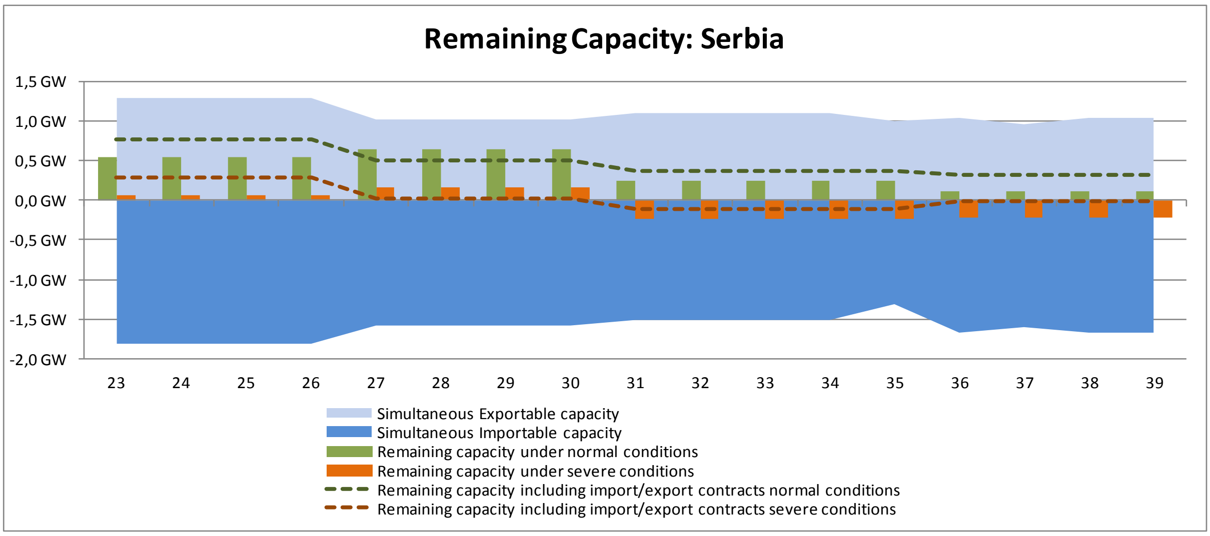


The generation/demand balance is not an issue with regards the operation of the Portuguese system during the coming summer. The financial and economic crisis is having a strong impact on electricity demand and as such, even with a difficult scenario for hydro generation on the horizon, the remaining capacity margin is expected to be at a higher level than observed in previous summers.

For the following summer season, generation/demand balance presents a very comfortable situation. Under normal conditions, remaining capacity margin is expected to stay above the 24% of the installed capacity. In the event of extreme conditions, from both the supply and demand sides, the margin is approximately 6% of installed capacity on average, even without resorting to imports. No problems are envisaged with inflexible generation, as minimum demand and pumped storage capacity have enough room to accommodate excess wind output and remaining must run units.

REPUBLIC OF SERBIA





Parts of the energy in firm contract imports are bought from traders on the Serbian market meaning that at this moment it is not possible to define from which borders it will be.

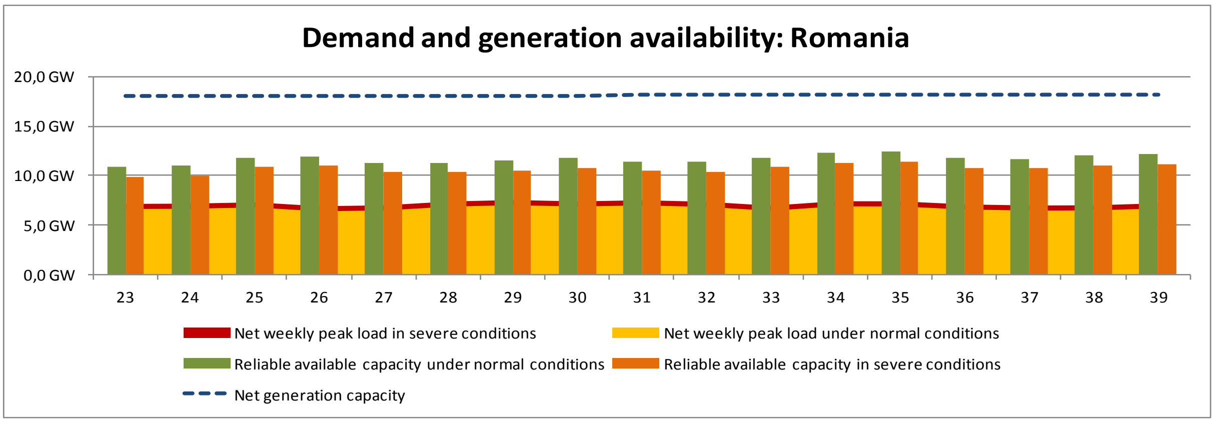
ENTSO-E reserve rules are very expensive for small TSOs with large units, which is our case. In order to depict more realistically our situation, we put in figure 0 for expected outages, as we consider that it is to be covered by the high system reserve (real value of average outages is 0.2 while system reserve is 0.6 GW, net capacity is 8.36 GW). In order to overcome this situation we have concluded five contract for importing of emergency energy.

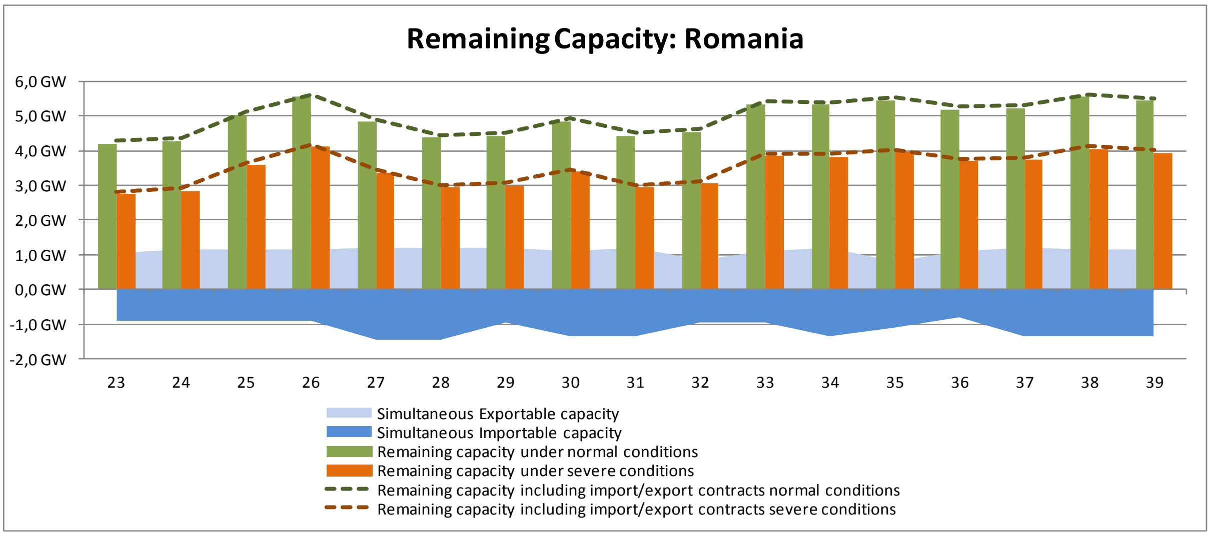
We used minimal NTC values from historical values for the last three years.

There are only two small units of 0.13 GW which we considered as mothballed. Being small and located in the Kosovo region, we did not request any detailed information about their future availability.

We have identified only one 220 kV internal line which is affected for one specific generation pattern, although thus far this could be solved by topology measures and re-dispatching of available units.

ROMANIA





The generation units' maintenance plan takes into account the requirements to cover the internal demand. There are also generation capacities to be used for export contracts. Besides this, before the beginning of the summer season, a new Combined Cycle Power Plant will be commissioned with 870 MW as net generation capacity.

During the summer 2012, we do not expect critical time intervals even for heat wave circumstances.

As usual, the interconnection capacities will be used in the range of the NTC values offered to the market.

The fast tertiary reserve and the balancing market should be used in order to avoid unplanned schedules over the borders, due to the fluctuating wind generation. Under such conditions, the interconnectors will be used for trade schedules.

The forecast for the upcoming summer of 2012 does not indicate any problem which could affect the Romanian Power System's adequacy.

Based on a Methodology issued by the National Energy Regulatory Authority, the consumption projection for the coming summer was 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 also receives, on behalf of producers, the planned maintenance / overhaul schedules and units technical and economical data for the next year. This aids in the conduction of market analysis which will provide input to the Regulator for establishing the regulated contracts. These data are also used to assess the load and national generating capacity data for next summer's adequacy outlook.

The minimum NTC has been estimated based on the NTC profile for 2011. This was calculated on a monthly basis, for time periods defined by maintenance schedules for both transmission networks in the National Power System and in the neighboring region.

The following algorithm was applied:

- The network elements' limits for 2012 were verified in comparison with the 2011 limits.
- The disconnections of the lines in the National Power System and region, which determined significant decrease of Romanian export/import NTC values in the summer 2011, were identified.
- The disconnection periods of these lines were identified in the 2012 national maintenance plan and in the regional maintenance schedules, meaning that correspondingly reduced NTC values were declared for 2012 summer days with such significant disconnections.
- Average NTC values from May until September 2011, free from significantly limiting disconnections, were determined and set for the summer 2012 dates without significant disconnections.

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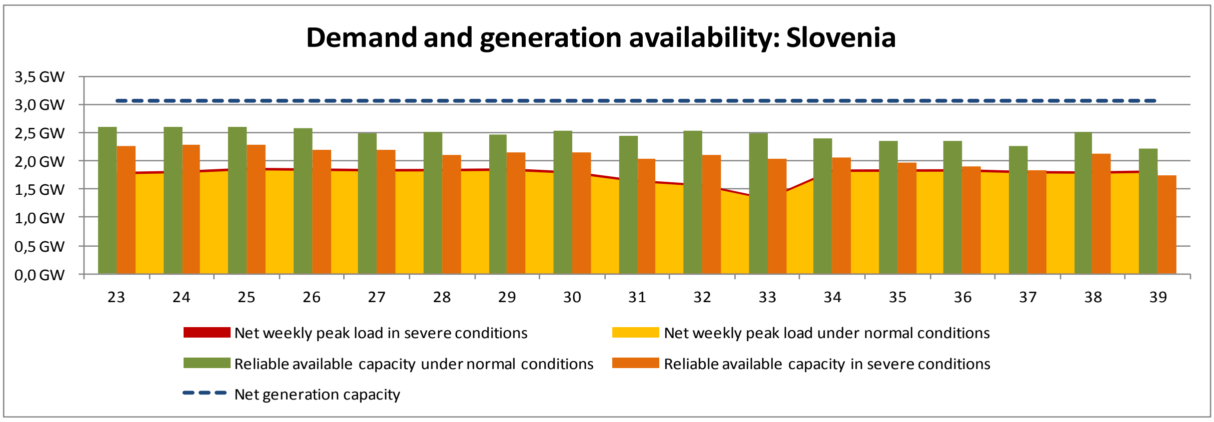
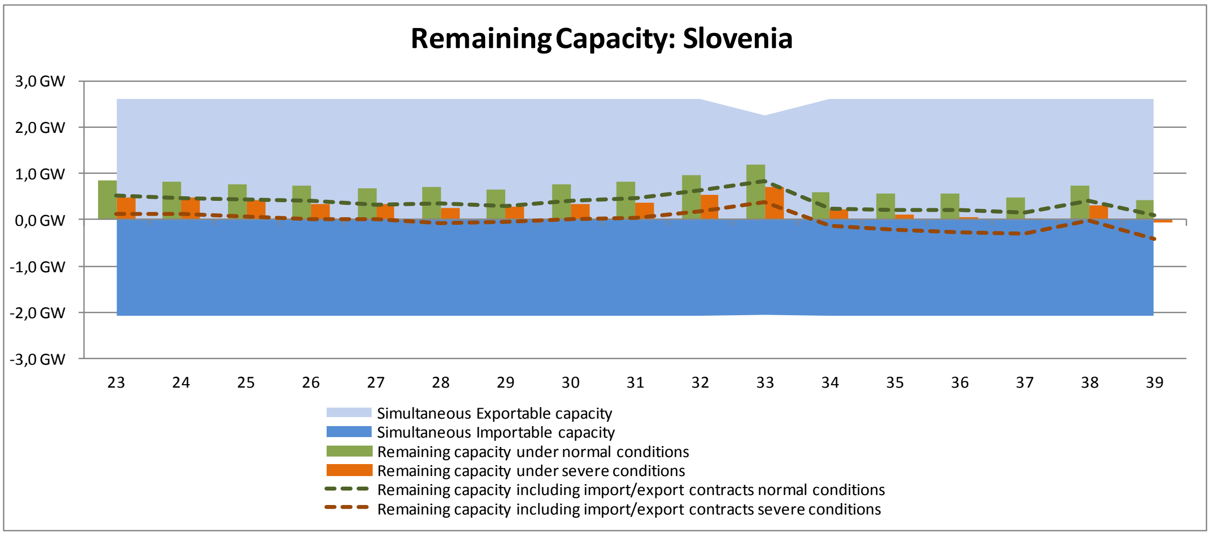
SLOVENIA





No problem is expected during the summer period. With firm export contracts taken into account, Slovenia is mostly net balanced. In the period spanning from week 34 to 39, imports of less than 400 MW are expected in severe conditions. Higher imports are expected in cases of extreme low hydrology when lower hydro production and possible reduction of generation from some thermal units may occur.

Security of supply problems in the Slovenian power system are not expected for the coming summer. However, if such problems occur regardless of this, the following measures are possible:

- Balancing of shortage via purchasing energy on a market.
- Activation of all available reserves in Slovenian power system.
- Activation of agreed emergency reserves from neighboring systems.
- Load reduction in Slovenian power system is foreseen as a last measure.

The Slovenian power system connects three different price areas (Central-East Europe, Italy, South–East Europe). In light of this, electricity prices in these three areas dictate the export/import situation in Slovenia. Simultaneous high import and export are characteristics

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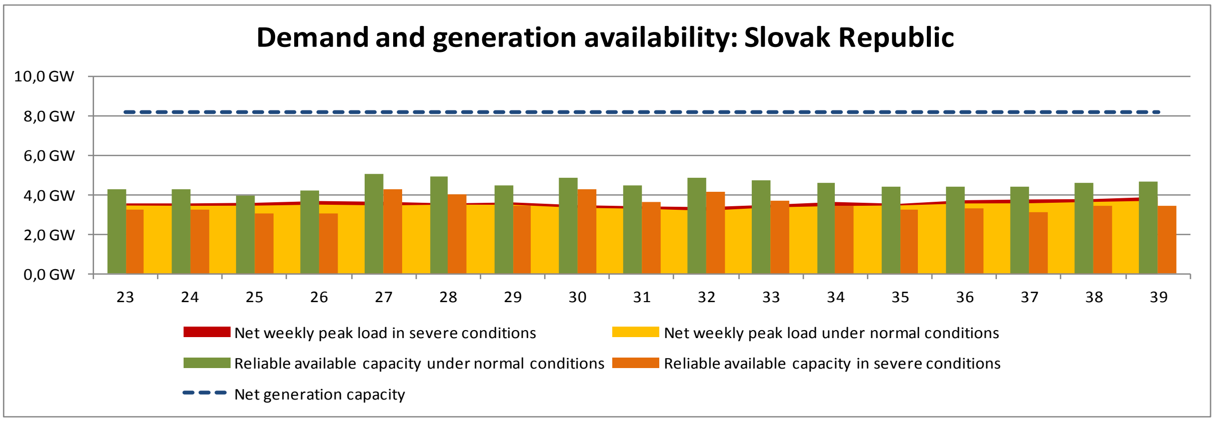
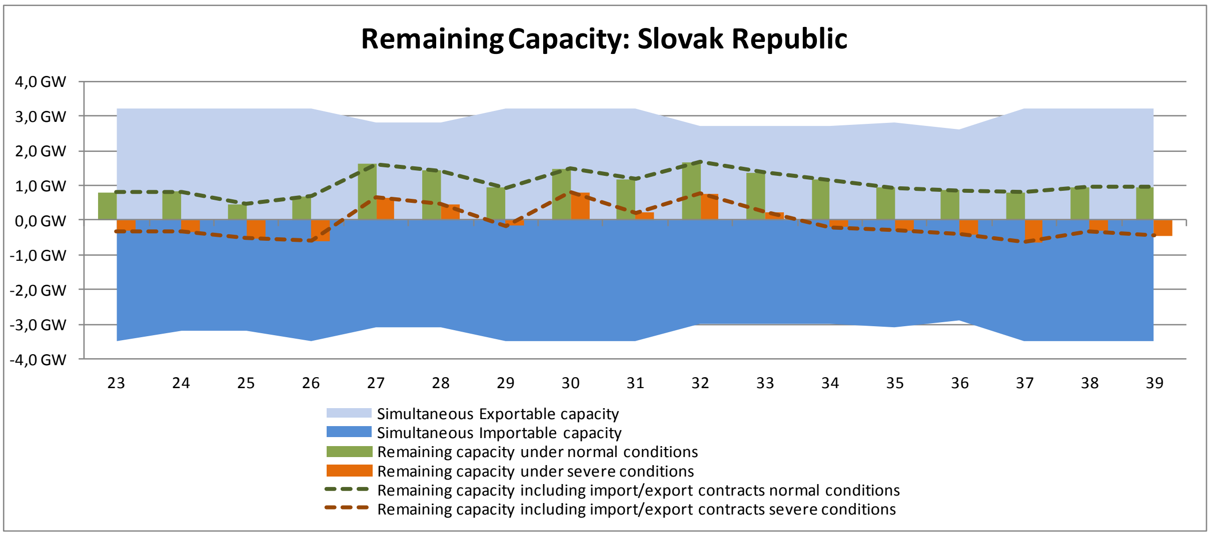
of a typical transit country, such as Slovenia. However due to a well interconnected network, ELES does not expect transmission constraints and/or reductions of import/export in the forthcoming summer period.

In past years, transmission constraints affecting interconnectors at the time of peak load, that is, congestions due to transit flows, have been fairly common. However, after the installation of a phase-shifting transformer in Divača (Slovenia) and with the assistance of PST in Padriciano (Italy) the border flows have been brought under control. Consequently no cross-border capacity reductions are expected. The reductions may occur due to maintenance of particular network elements.

Slovak Republic





The analysis of the Slovak Republic for the coming summer of 2012 is positive assuming standard conditions. In general, daily peak load values are expected to be slightly higher when compared to 2011. Critical periods in the forthcoming summer are also not expected under normal weather conditions.

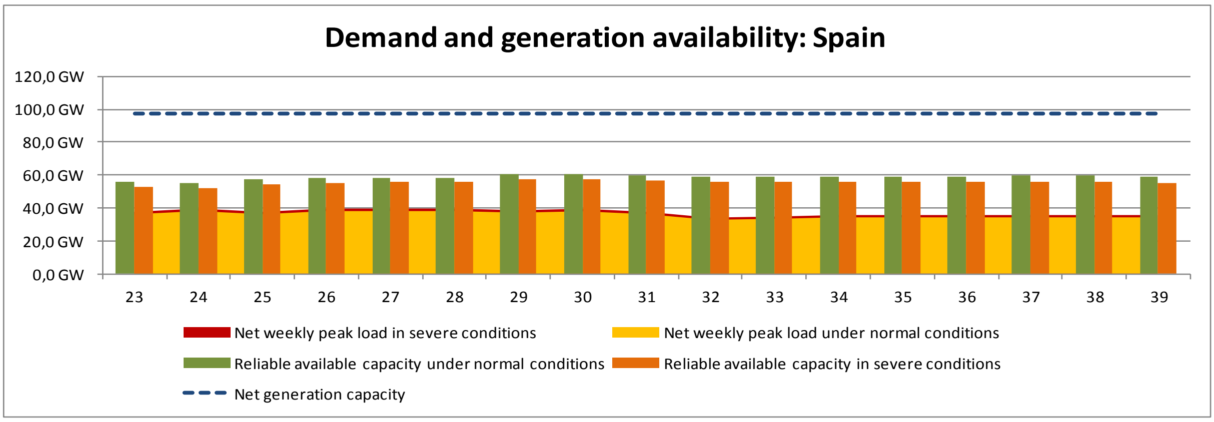
The lowest remaining capacity level in normal conditions is foreseen in the 25th week, namely a remaining capacity of 470 MW (5.7% of net generation capacity). This assessment takes into account the scheduled overhauls, estimation of average outage schedules of generating units, estimation of non-usable capacity for each fuel type, and system service reserves derived from the yearly operational planning. The highest weekly peak load in normal conditions for this outlook report is foreseen in the 39th week at 3710 MW (5.1% higher than in summer 2011).

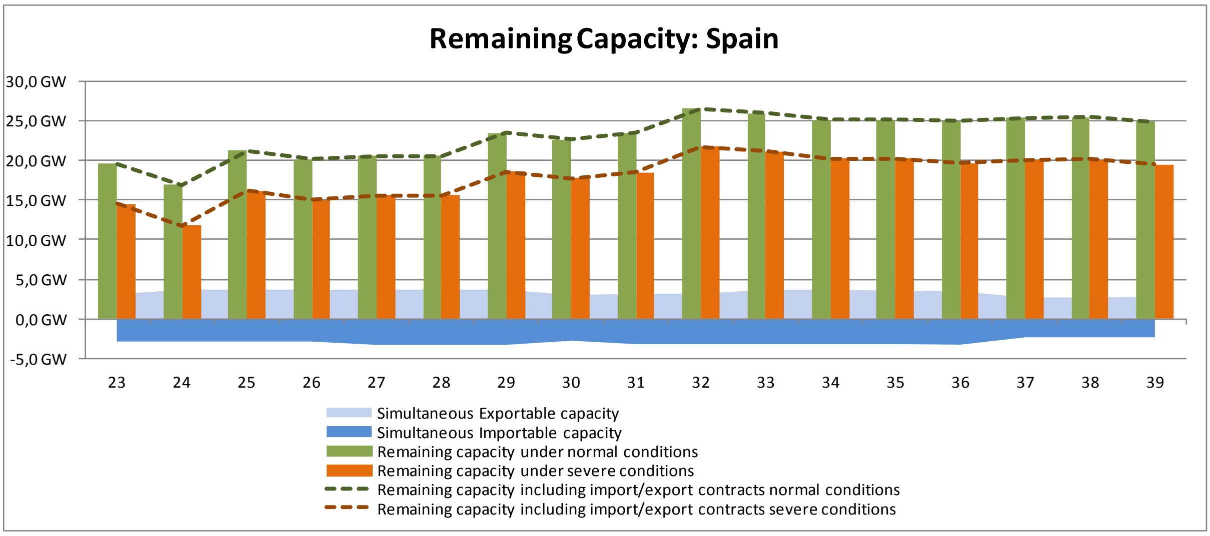
The scenario under severe conditions is also analysed. The maximum load from the past 10 years is taken into account and hot dry weather is assumed. The dry weather conditions result in lower usage rate of hydro power plants and also nuclear power plants (due to cooling problems), that is, the non-usable capacity increases. Therefore, with this scenario, in some weeks (23 – 26, 34 - 39) the remaining capacities are negative.

Last year the Slovak Republic was an importer of electricity, 2.52% of total consumption. In the summer months of 2011 (June, August and September) it was 2.74% of consumption. For the summer of 2012 we expect similar behavior of the Slovak power system. Under normal conditions, even if some electricity imports are expected, this is not caused by the lack of generating capacity in Slovakia, but by the market behavior of the Slovak market participants.

No changes concerning the volume of cross-border capacities are planned (e.g. new tie-line or decommissioning of interconnection lines). In addition, during this summer period the unexpectedly high generation of the renewable power plants mostly located in Germany may result in critical conditions in the operation of Slovak transmission grid in the sense that the extremely high electricity transits and loading of Slovak interconnectors with Hungary and Ukraine above all. This state does not depend on the season and is observed in the summer of 2011 as in winter months. Therefore, certain countermeasures are being considered to avoid and/or mitigate the negative influence of these electricity flows across the Slovak transmission system. Despite these countermeasures, this condition is not considered as safe in terms of the operational rules of transmission system and SEPS, a.s., as Slovak TSO, warns the ENTSO-E´s TSOs by the “Real-time Awareness & Alarming System”.

SPAIN





From the view point of generation adequacy, the situation in the Spanish peninsular system is not critical for the upcoming summer, even when considering very low wind generation (95% probability), very dry conditions, and a high thermal forced outage rate. Even in extreme conditions, problems in load meeting are very unlikely to occur at any week of the period.

The expected demand is similar to the previous summer. Due to the drought conditions during the last months in Spain, the hydro reserves are below their average level. Water inflows from snow melting are not expected to be high.

Good generation adequacy during peak demand hours can be expected regardless of imports from neighboring countries.

At minimum demand periods, with excess of inflexible generation, the export capacity of interconnectors is useful in order to avoid the spillage of renewable energy, mainly wind power. It is worth noting here the importance of energy storage in order to properly manage the excess of inflexible power at minimum demand periods, mainly pump storage plants.

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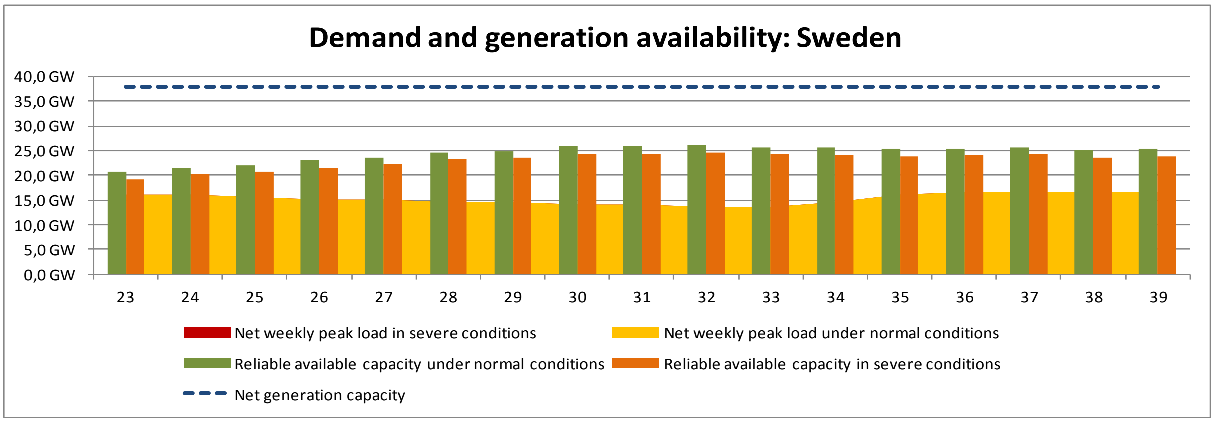
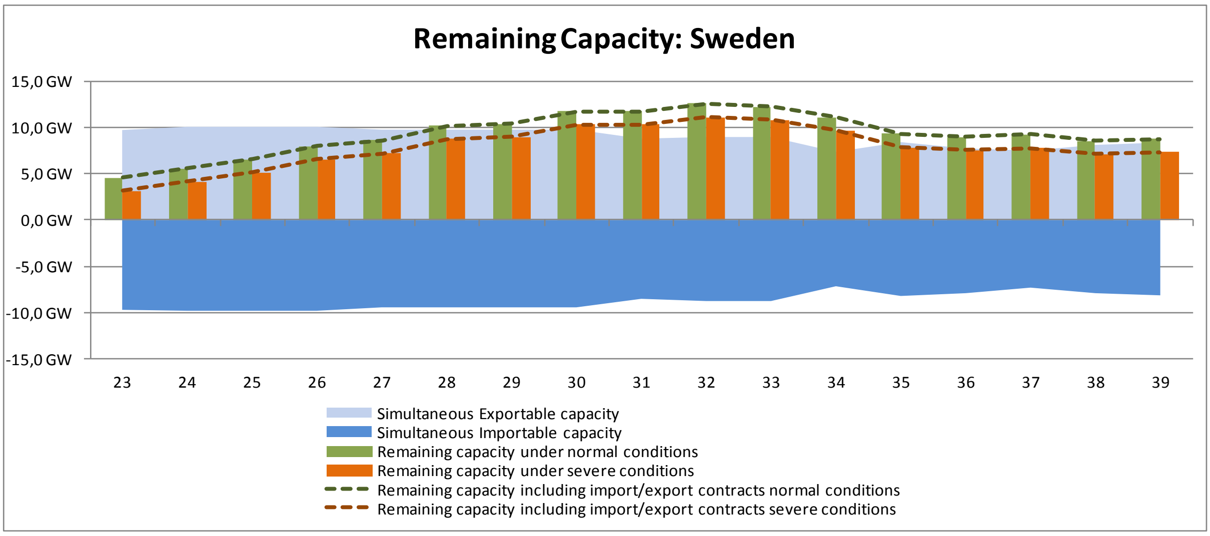
SWEDEN





Svenska Kraftnät expects a healthy generation – load balance during the whole summer period, at most the surplus is expected to be more than 10 GW. In addition, there is no inflexibility issue foreseen, as Sweden and Norway have such a large amount of hydro power installed (although situations have been experienced with high thermal power output and low hydro power production, which reduces the down regulation possibilities considerably). However, in fact there is also a certain amount of hydro power which can be seen as must run for being able to meet the requirements for FNR and FDR (Frequency controlled Normal operation Reserve and Frequency controlled Disturbance Reserve), as well as to maintain control of voltages. Since more and more wind power devices are being installed it is obvious that the flexibility of the system cannot be taken for granted, and this is something that Svenska Kraftnät has been working a lot with lately.

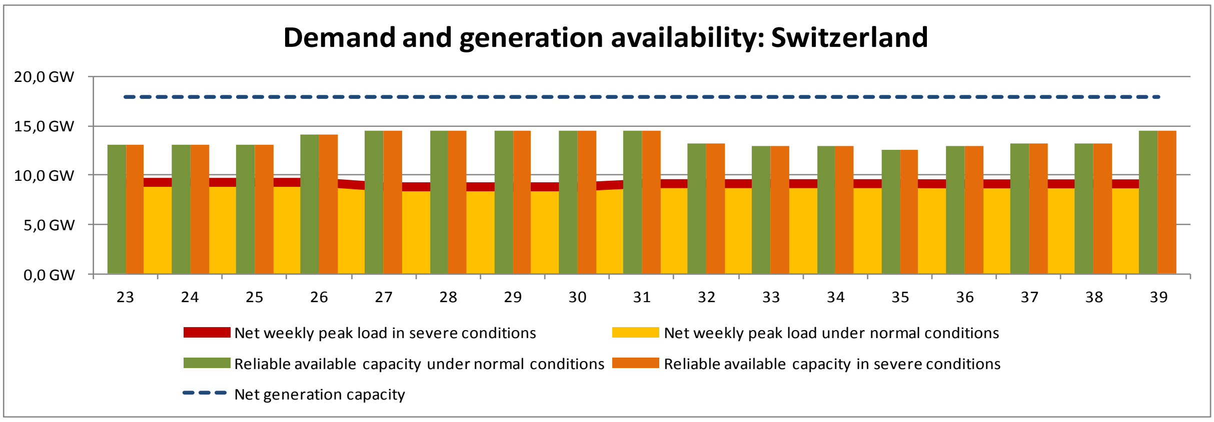
During summer, export is to be expected on the interconnectors, but this is rather a question of price than of inflexible generation. The early and late summer are both periods with a lot of maintenance on both grid and production units. However, there is a calmer period in between the second half of July and the first half of August due to vacations. A number of important activities are planned during this summer, including the commissioning of a new 400 kV AC line in the Southwest of Sweden which will increase the capacity in the West Coast Corridor. This corridor does however not cause any generation – load issue in

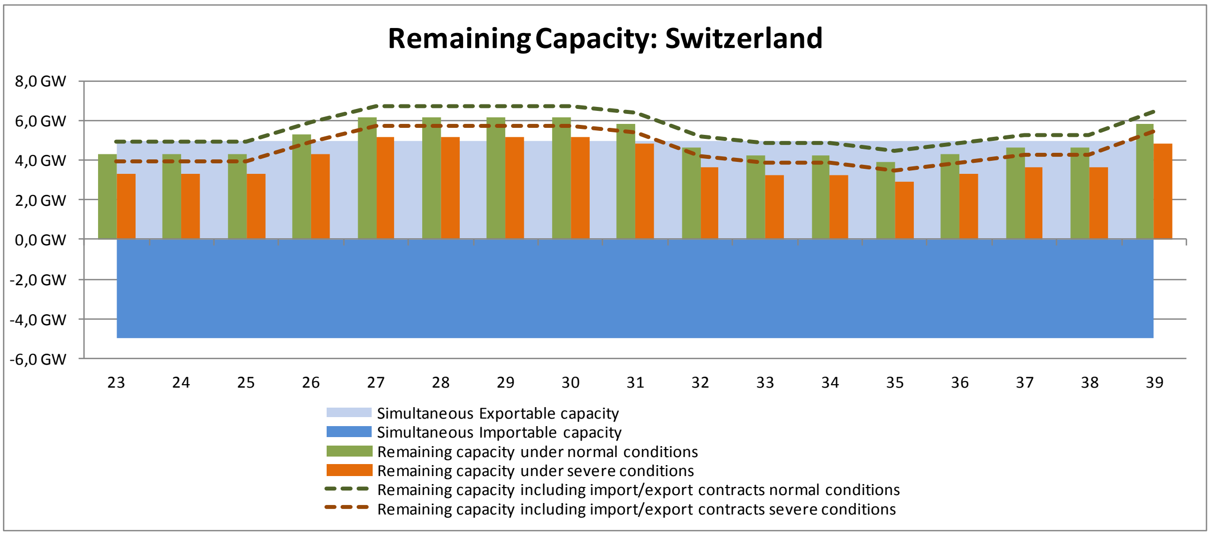
Sweden, or in any other neighboring country, but the increased capacity will probably reduce the price differences between the countries as well as increasing the flexibility of the interconnected system.

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 or bypassing series compensators, which is a standard procedure in Sweden for controlling voltage. Furthermore, during spring floods, some overloads in the Northern 220 kV grid may occur which requires reallocation of production and/or disconnection of lines to overcome the problem. Beside this, summer is also a period with increased likelihood of lightning strikes. Lightning is the most common cause of faults in the Swedish national grid, and for this reason a Lightning Localization System is being used during the summer.

Other than those mentioned above, no particular problems are foreseen, although much of the maintenance requires special attention, for instance the installation of the new line in the West Coast Corridor.

SWITZERLAND





No problem concerning generation adequacy is expected for the coming summer by the Swiss TSO.

Switzerland will not be dependent on imports during the summer period.

UKRAINE WEST

NO INFORMATION

6.2 INDIVIDUAL COUNTRY RESPONSES TO WINTER REVIEW

ALBANIA

AUSTRIA

BELGIUM

BOSNIA & HERZEGOVINA

BULGARIA

CROATIA

CYPRUS

CZECH REPUBLIC

DENMARK

ESTONIA

FINLAND

FORMER YUGOSLAV REPUBLIC OF MACEDONIA (FYROM)

FRANCE

GERMANY

GREAT BRITAIN

GREECE

HUNGARY

ICELAND

IRELAND

Italy

Latvia

Lithuania

Luxembourg

Montenegro

Netherlands

Northern Ireland

Norway

Poland

Portugal

Republic of Serbia

Romania

Slovak Republic

Slovenia

Spain

Sweden

Switzerland

Ukraine-West

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ALBANIA

During the first part of the foregoing winter, the Albanian Power System did not face with any incidents or unusual events/conditions, although we have continued the rehabilitation works of main 220/110 kV substations, along with an increased number of maneuvers faced from our operative personnel due to installation of the primary equipment into substations as well as additional protection and control modifications. Inflows at Drin River Cascade, the main source generation of the country, have been insufficient. In light of this, and despite the import increase, in order to face the demand and safeguard the efficiency of power plants, a reduction in energetic reserves of the Cascade has been required. Consequently, this year has started with a delicate energetic situation in terms of energy reserves in Drin Cascade, due to low inflows for several months. The reservoir level at Fierza HPP has been around 268 m, which is nearly 12 m below the nominal value of the period and too low for the beginning of the year.
As is well known, electricity production in Albania is very dependent upon hydrological conditions throughout the year, and electricity production can fluctuate from approximately 3,000 GWH in a dry year to around 6,500 GWH in a wet year, thus making its reliability rather fragile.

In the period from the second half of January and during February, we have faced severe conditions due to very low temperatures and a high level of snow. In low areas the min temperature has reached around -10° centigrade, and in mountain areas around - 18° centigrade with the level of snow above 2 meters. This situation has been associated with an increase of peak load and the total consumption of the country, although some small mountain areas have been faced with load shading due to the failure of several feeders at distribution level, which has proven impossible to repair in the cold and snowy conditions. Meanwhile, inflows at Drin Cascade have continued to be very low.

In these conditions, our reaction to the additional demand has been to increase the imported electricity, which has been realized to some extent, although the needed and requested quantities have not been met due to a lack of available energy (exports) in the entire region of SEE. This is because of an emergency situation declared by several countries associated with reduction of export quantities. However, the severe conditions have gone already, and during the month of March, we have normal conditions with regards to weather and electricity demand. Thanks to normal inflows at Drin Cascade, and availability of all power plants, the energetic situation of APS is meliorated to some extent, but continues to be very fragile.

Having learnt many lessons from this winter, it is clear that we must go ahead and accelerate the projects (some of which are in the implementation phase whilst others will start soon) in Generation and Transmission system, in order to reduce the dependence on electricity import.

The following diagrams present the comparison between forecast data and realized data.

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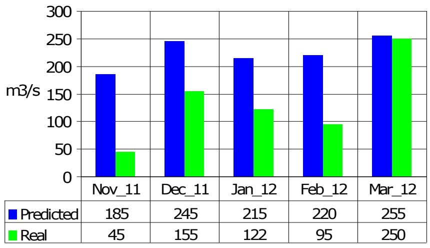
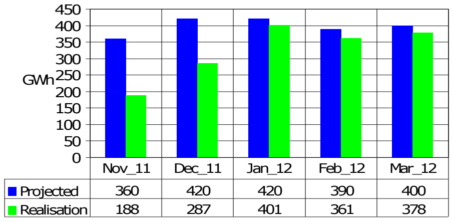
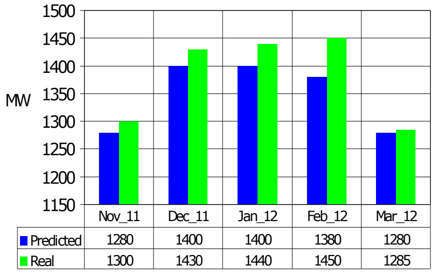
Monthly inflows at Fierza HPP



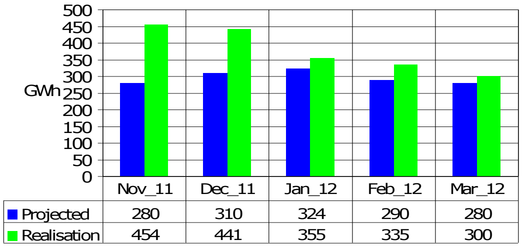
Monthly total Production



Monthly Peak Load



Monthly Import



AUSTRIA

Winter 2011/2012 has been warmer but has brought less rainfall when compared to an average winter situation. Very low temperatures from 1st of February 2012 to 14th of February 2012 have led to historical high loads in Austria. This load has been compensated mainly by domestic power plants. There has been no lack of generating capacity, and no critical situations have occurred in the grid of APG during this “cold-wave“.

The control area of VKW has been successfully integrated into the control area of APG by 1st of January 2012.

An avalanche destroyed an important 220kV line between Tauern (AT) and Salzburg-Elixhausen (AT) on 15th of February. A temporary arrangement was put into operation on 19th of March. The final reconstruction should be completed by mid of May 2012.

As a consequence of the German shutdown of several nuclear power plants, Germany has ordered energy in Austria (either based on Cross Border Redispatch contract or based on direct contracts with Austrian producers) to solve congestion problems within Germany.

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BOSNIA AND HERZEGOVINA

Winter 2011/21012 in Bosnia and Herzegovina has been colder than in the last couple of years, especially in February. February 3 has seen very heavy snow, followed by low temperatures as cold as -30 °C.

The maximum load last year has been on 31.12. 2011. of 2150 MW at 18th hour, and on 10.02.2012. We have maximum load in 2012 of 2143 MW at the 18th hour.

The electric power balance for this period is positive, with the exception of February, when we have had to import electricity, due to increased consumption and bad hydrological conditions combined with some problems in the TPPs.

Bosnia and Herzegovina’s system has faced particular difficulties during the last winter period, which has seen extreme weather conditions with a very cold wave in the first part of February 2012.

The most stressed period of the winter 2011/2012 has been the first part of February 2012 due to its exceptionally extreme weather conditions.

Consumption had increased due to very low temperatures with generation also decreased because of bad hydrological conditions in the previous period, meaning that we have had to import electricity.

The biggest problem, caused by this kind of weather, pertains to the difficulty in transporting coal to our mayor TPP, Tuzla, because of very low temperature. The result of this is a lower than planned production rate.

With regards to the 400 kV and 220 kV power lines, we do not have any mayor problems, with the exception of certain problems on 110 kV network in the Southern area of the country (city Neum and Mostar), where some 110 kV lines have been out of work for a couple of days.

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BELGIUM

The adequacy forecast study “winter 2011-2012” carried out in September 2011 for the Elia control area indicated that:

- Under normal conditions: no large issues were to be expected concerning the generation-load balance for Belgium.
- Under severe conditions: at certain moments in time there is structural dependency on imports from neighboring countries between weeks 47 and 50 of 2011 and weeks 3, 4 and 11 of 2012 due to a combination of: load and generation, temperature, limited availability of load management, and the margin to peak load.

Elia experienced exceptional mild winter conditions until end of January. The risks identified in the ENTSO-E winter outlook 2011-2012 were not materialized in December- January. Elia observed longer periods where the system encountered more production than consumption and Elia had difficulties to have sufficient flexibility in the system to maintain the system balance, therefore, the outage of 2 NPP’s at the end of December did not cause any problems together with import.

The situation changed completely at the end of January when the temperatures dropped drastically. During the first two weeks of February (weeks 5 and 6) Elia and the rest of the CWE area encountered a cold wave resulting in higher load demands and very high N→S transit flows although no new records were achieved in Belgium. On the Elia grid, the situation was stressed but under control. In coordination with our neighbour TSOs, Coreso and SSC, the range of the Elia Phase Shifting Transformers (PSTs) on the northern BE- NL border was almost fully used most of the time in order to cope with the high north to south fluxes in the CWE region. Fortunately, most generation units in the Belgian grid were available and the situation was helped with significant renewables productions (both photovoltaic and wind). Although our system adequacy was not jeopardized, our fast reserves were not always sufficient to cope with the additional outage of a 1000 MW power plant. However, during the period of the cold wave, no critical outages have occurred. In addition, we observed very high voltages (close to material limit) in some substations (close to border with Luxembourg and France) due to voltage problems in northern part of France.

Near the end of the cold spell (on February 10th), Elia encountered a forced outage of the Phase Shifter in Zandvliet, leading to severe limitations to control North-to-South flows in the CWE region. While the coordinated use of Phase Shifters has already proven its usefulness, the loss of these instruments in combination with allocated market capacities led to very stressful, nearly critical grid situations in Belgium, The Netherlands, and by extension the entire CWE region. This indicates the importance of both the Phase Shifters and a correct capacity allocation in keeping the stress level in the CWE region under control and limiting the risk for Security of Supply.

Figure 1 below gives an overview of the forecasted remaining capacity (at evaluation time September 2011) and the observed remaining capacity for the winter 2011-2012

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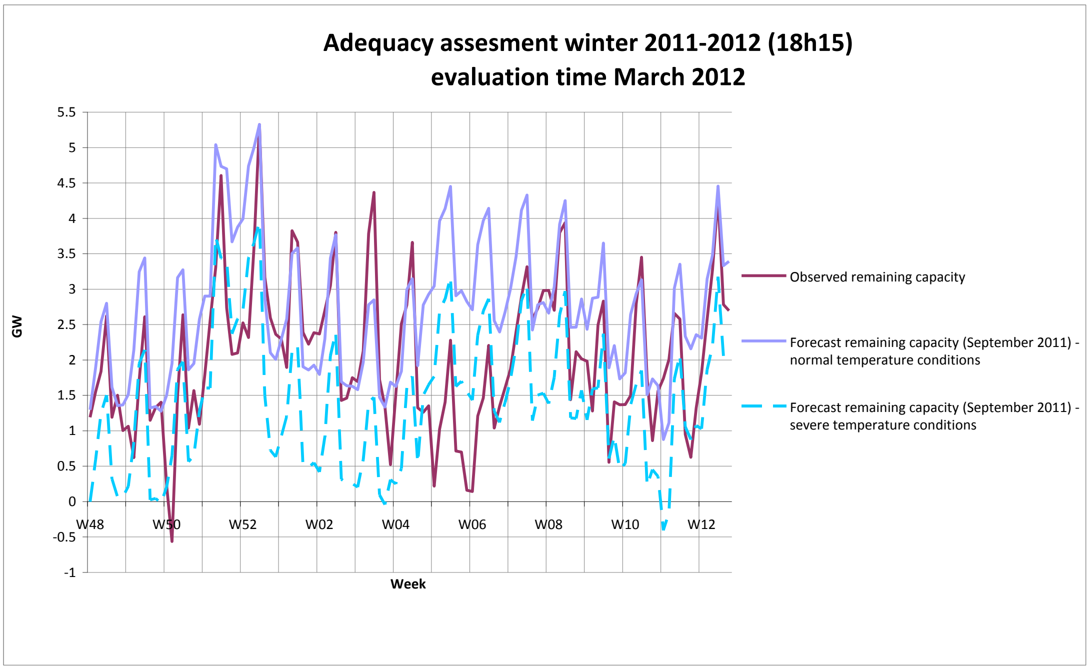


Figure 1: Adequacy assessment winter 2011-2012

Reality has shown us that the desired safety level for the generation-load balance was not attained during only one week (in week 50 of 2011). The lowest remaining capacity was attained on December 16th, namely a remaining capacity of -565MW due to the combined forced outage of two nuclear power units.

The deviation between the observed and forecasted remaining capacity during weeks 5 and 6 of 2012 are mainly due to the forced outage of Tihange 1N since February 2nd (week 5) in combination with unforeseen outages on classical thermal unit. It is important to compare during weeks 5 and 6 the observed remaining capacity with the forecasted remaining capacity under severe temperature condition due to the cold wave at that moment

The desired safety level for the generation-load balance was not attained in weeks 5 and 6 taking into account net export levels. This is illustrated by Figure 2.

The unforeseen outage of the Phase Shifter in Zandvliet was also felt both in the Elia and TenneT grid via the substation of Zandvliet 380kV. Planned outages on the 400kV interconnectors with both TenneT and RTE in March and April 2012 were cancelled to guarantee a safe network situation and to guarantee sufficient net transport capacities with both neighbouring TSO’s (nevertheless limited).

Since mid March balancing issues are detected during periods of low loads due to the large volume of inflexible generation combined with increase of renewable infeed.

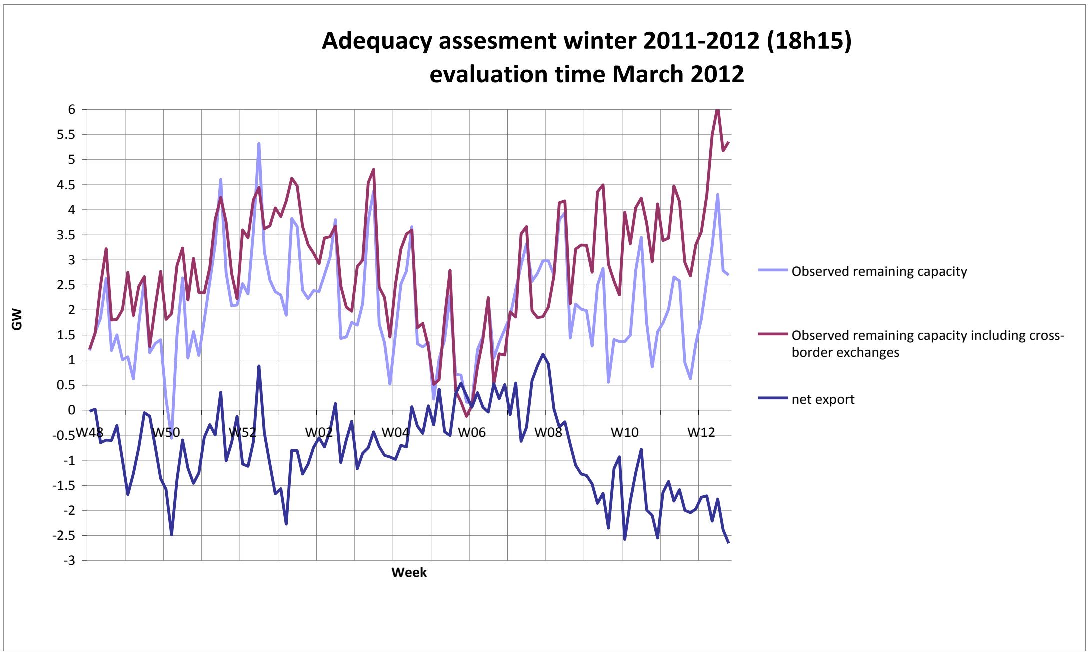


Figure 2: Observed adequacy versus net export in winter 2011-2012

Demand :

According to the guidelines determined by ENTSO-E, the winter outlook assessment was made for the Belgium area based on the total expected peak load. Because the total peak load is not measured and the required data are not yet available, a comparison between the forecasted and observed load is not possible in this winter review.

Unavailabilities :

The forecasted unavailabilities of power units took only into account the known planned overhauls at the moment of the assessment. Taking also into account the statistically forecasted forced outages, which has been done during the adequacy forecast study “winter 2011-2012” carried out in September 2011, the deviation between the sum of the forecasted average forced outages and the scheduled unavailability due to maintenance with the observed unavailability vary between +2.9GW in W50 (due to unforeseen outage of two nuclear power plants) and -0.4GW in W02 (due to postponed revision of a thermal power plant at Drogenbos) with an average of 0.59GW (see Figure 3). In particular Elia encountered the unusual situation of the combined unforeseen outages of multiple nuclear power plants.

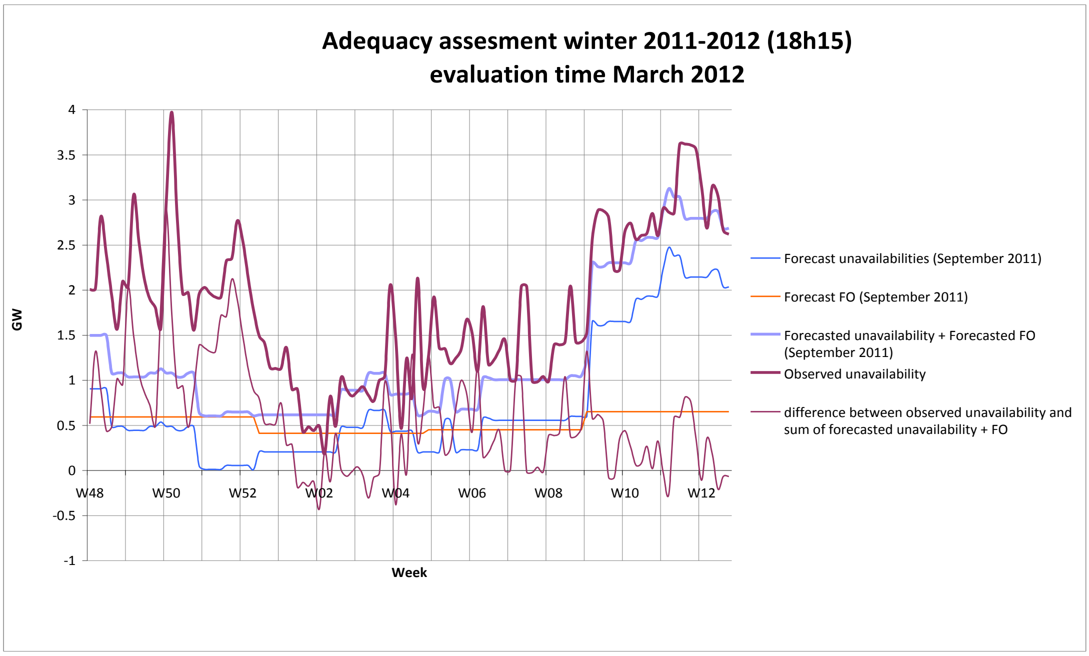


Figure 3: Forecasted and observed unavailabilities of power units

Transmission infrastructures:

The loss of the Phase Shifter in Zandvliet since February 10th led to restrictions on the north-south axis at the substation of Zandvliet 380kV, the cancellation of the planned outages on the 400kV interconnectors with both TenneT and RTE in March and April 2012 in order to guarantee a safe network situation and to guarantee sufficient net transport capacities with both neighbouring TSO's. This event led also to a limited use of PST VanEyck in outermost tap positions until further notice.

In general N→S transit flows through the Elia grid were observed. As illustrated in figure 4 frequent tap position change on the Belgian PSTs were required. Especially during the cold wave in weeks 5 and 6, structural and coordinated use of the PSTs at the outer tape ranges was observed.

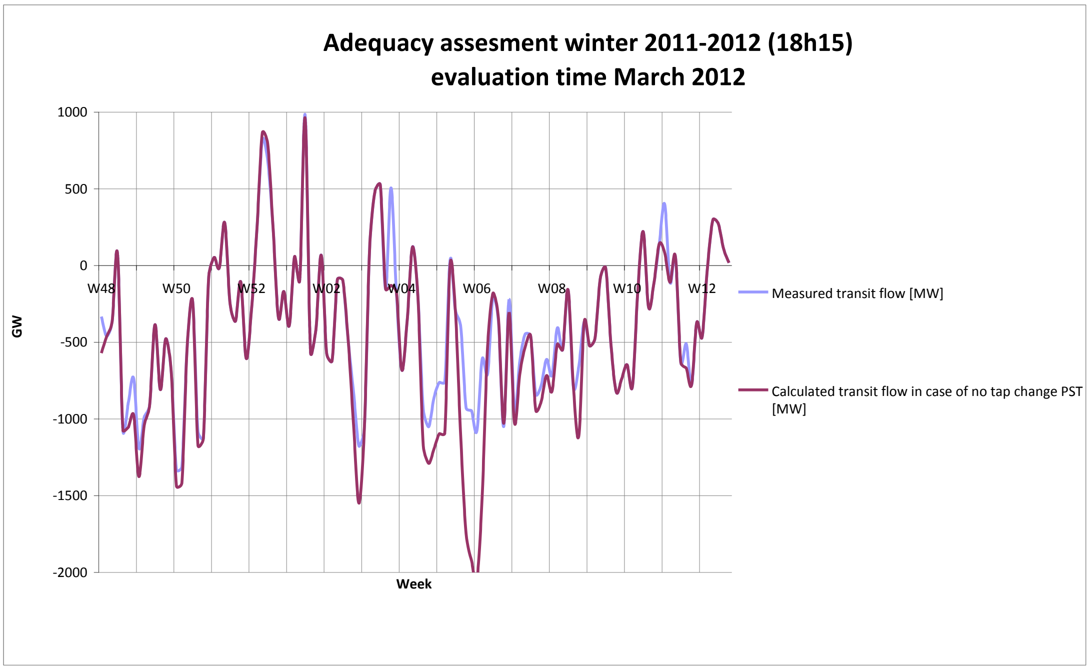
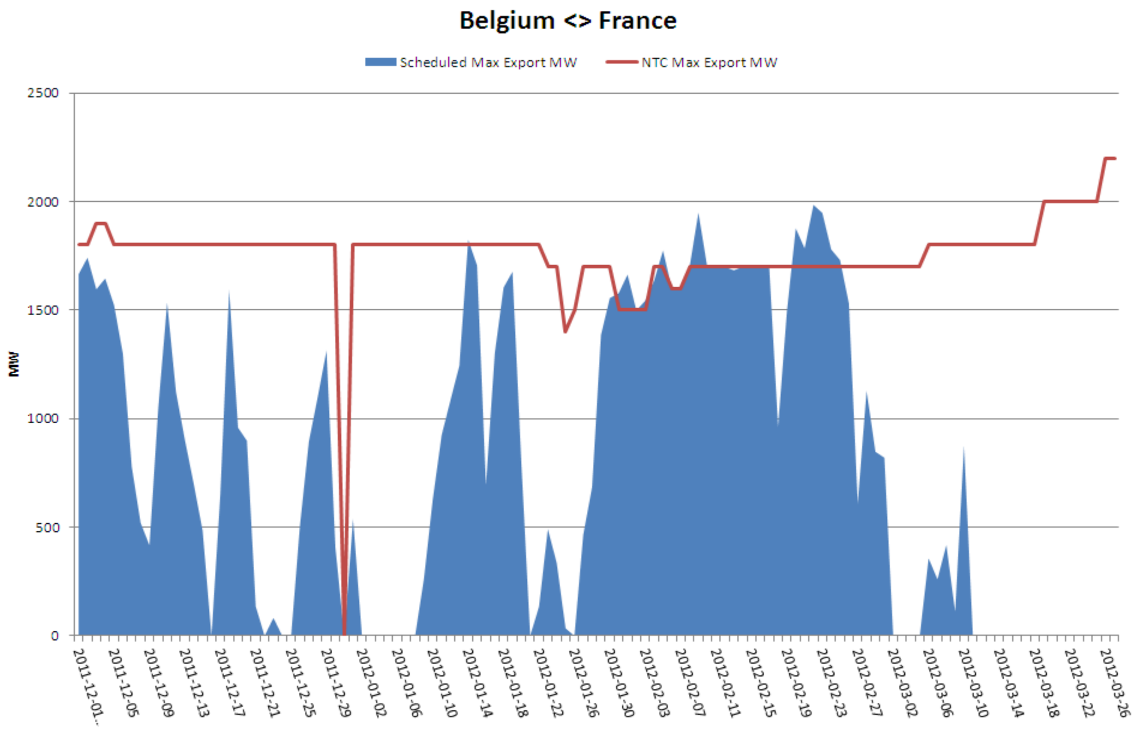


Figure 4: Transit flows through Elia grid (positive value = S→N flow)

Use of interconnections :

Figure 5 and Figure 6 give an indication of the utilisation of the capacity of the interconnection between France and Belgium and between the Netherlands and Belgium during winter 2011-2012. In order to assess the utilisation of an interconnection the available interconnection capacity is compared to the nominated interconnection capacity. Figures 6 and 7 illustrate that during winter 2011-2012, the interconnection between France and Belgium (Figure 6) was used much more in the direction of France (export) during the cold wave in the first two weeks of February and that the interconnection between the Netherlands and Belgium (Figure 7) was used much more in the direction of Belgium (import) during the winter peaks.



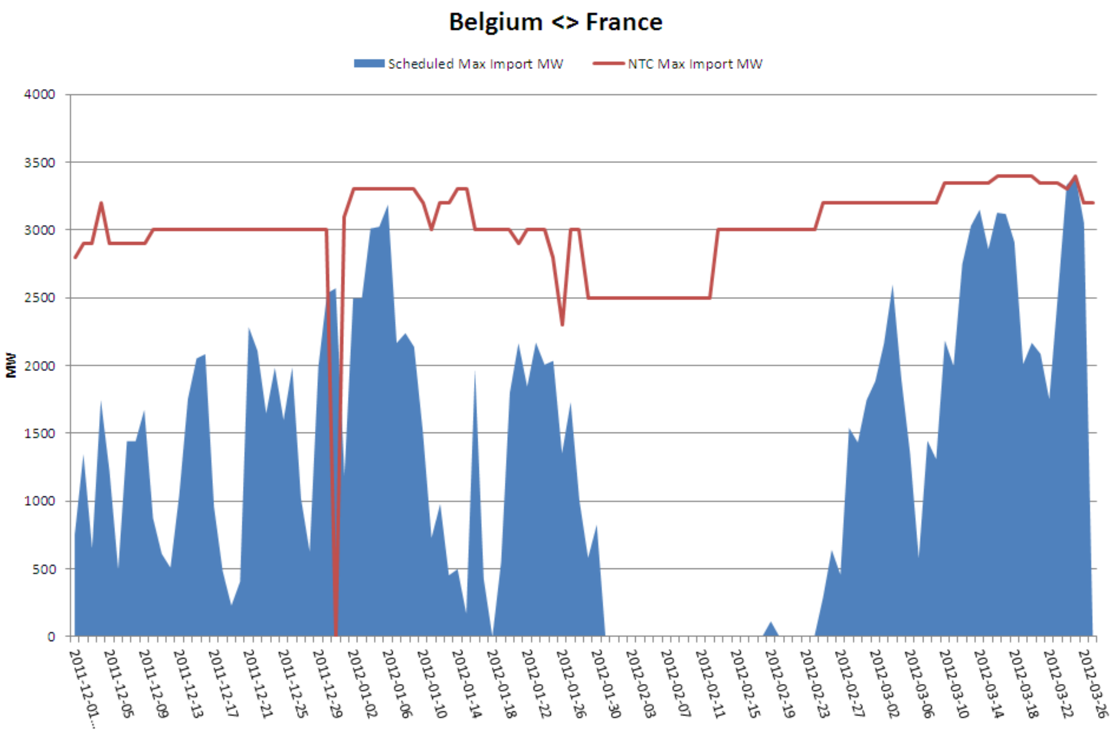
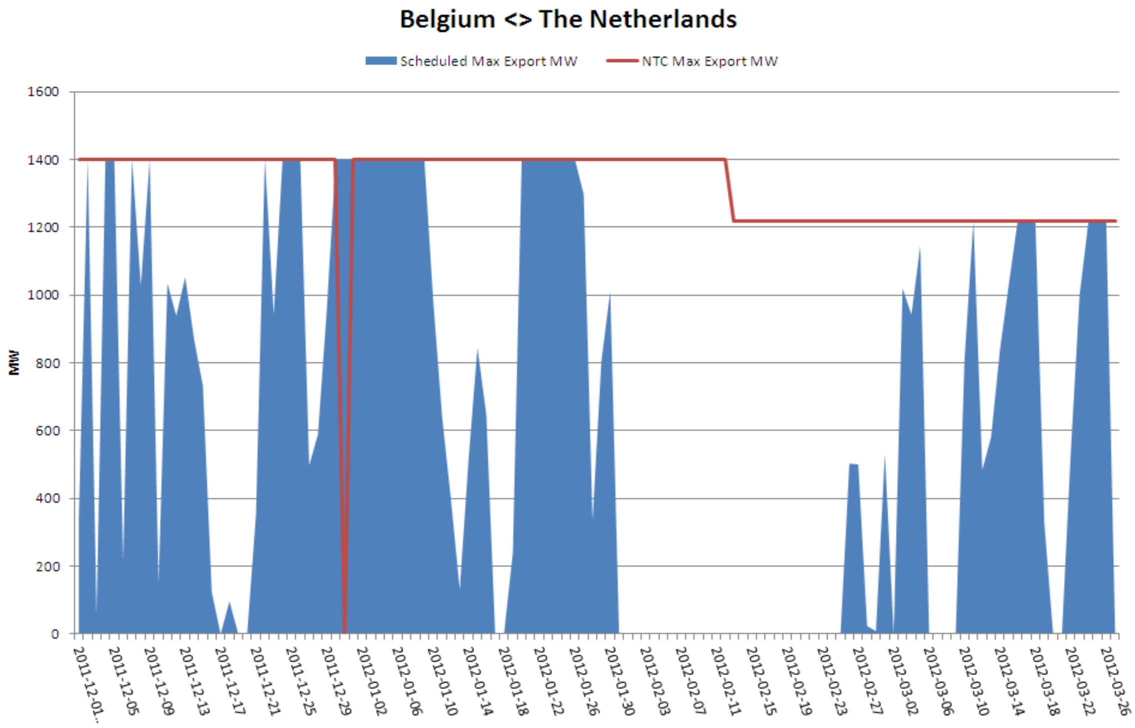


Figure 5: Daily peak utilisation of the capacity on the interconnection between France and Belgium.



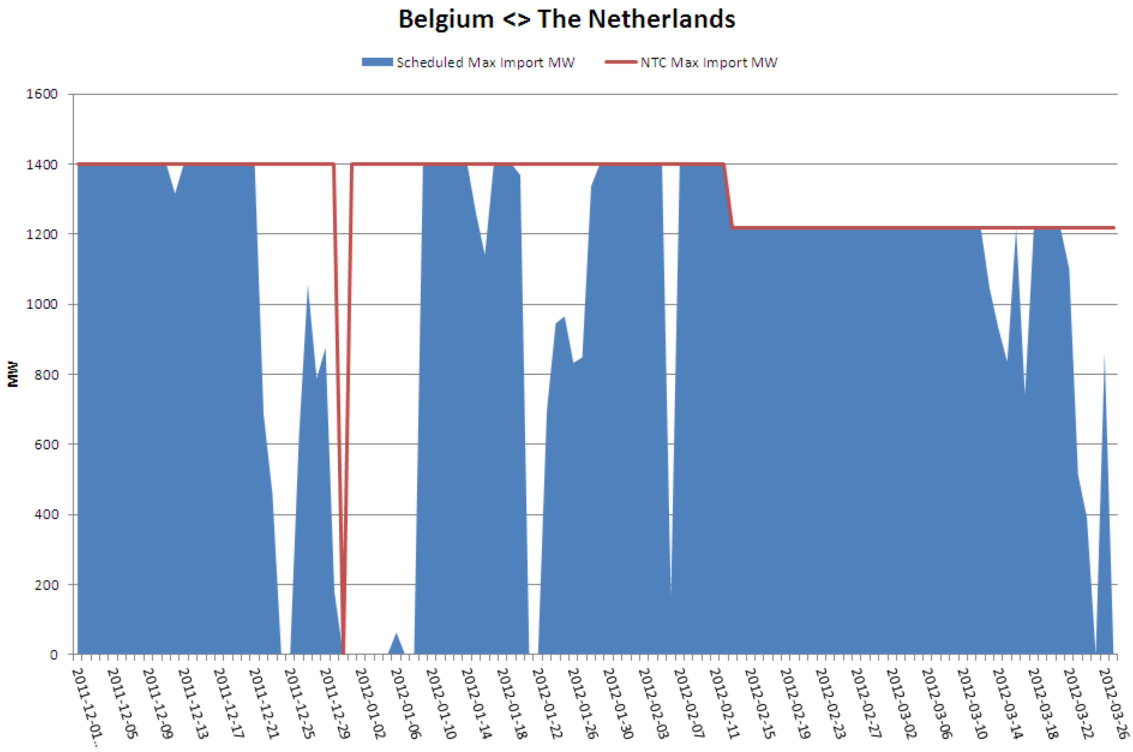


Figure 6: Daily peak utilisation of the capacity on the interconnection between the Netherlands and Belgium.

The most significant variations between the forecasted remaining capacity (evaluation in September 2011) and the observed remaining capacity for the week peaks of summer 2011 were due to higher level of observed unforeseen outages of power units. In particular Elia encountered the unusual situation of the combined unforeseen outages of multiple nuclear power plants. During the severe temperature conditions in the CWE area a structural use of the Belgian PSTs was observed. Furthermore due to the large volume of inflexible generation combined with an increase of renewables in-feed, balancing issues are detected during periods of low loads.

BULGARIA

The monthly consumption during the winter period compared with the same period of the last year is as follows:

December 2010	December 2011	Difference, MWh	Difference, %
3689672	3717355	27683	0.75
January 2011	January 2012		
3910956	3993602	82646	2.11
February 2011	February 2012		
3526928	4005029	478101	13.56
1 March – 21 March 2011	1 March – 21 March 2012		
2474478	2446201	-28277	1.14

Due to the extremely cold wave which lasted from 26 January to 23 February, the consumption increased with more than 13%. The average temperature for this period was 7.3 C' below the normal value for this period.

The coldest day was 1 February 2012, whilst the weighted temperatures of the country were as follows: Tmin = -17.2 C', Tave = - 12.7 C', Tmax= -7.7 C. The peak load of this day was 7444 MW (at 18:00 CET). This is the highest peak load for the last 15 years. The generation mix for the day was: 2082 MW. Thermal – 4237 MW, Hydro – 1650 MW, Renewables – 216 MW. The export was 1057 MW with no imports.

Because of the severe cold weather there were adequacy problems which resulted in cutting off all exports during the periods 21 – 27 January 2012 and 10 – 20 February 2012. Water levels in the big reservoirs were slightly below target levels and hydro plants experienced normal operation in the peak zone of the daily load curve.

The load sensitivity to temperature increased from 90 MW / C' (last winter period) to 97 MW/C" (this winter period daily).

There were no critical outages in the transmission network.

CROATIA

The period of December 2011 was characterized by notably lower consumption when compared to the previous two years.

The main characteristic of the first two winter months in 2012 is the stable operation of the Croatian electrical power system without any remarkable endangerment of power supply security for the customers.

During the cold wave with extremely low temperatures in February 2012, the record daily consumption and record peak load values were registered (the consumption on 6th February 2012 reached a value of 3193 MWh/h which is the highest consumption in history).

Because of heavy weather conditions caused by hurricanes in the coastal area, nearby temporary interruptions of power supply occur. Certain parts of the transmission and distribution network were damaged, that were repaired immediately when the weather conditions allowed it.

In March 2012 the air temperatures rose gradually and consequently the consumption decreased.

The Croatian electrical power system was to a great extent, reliant on the import of energy from the surrounding systems, due to the absence of planned generation in hydro power plants caused by long-lasting unfavorable hydrological conditions during the period of autumn and winter last year.

CYPRUS

Cold weather conditions have resulted to higher energy consumption for heating purposes. However, the reduction of energy usage due to the effects of the economic crisis cannot give us solid statistics of percentage comparison with respect to previous year results.

The high fixed and variable costs of the internal combustion engine generators that are temporarily installed in order to remedy the effect of the destruction of the “Vasilikos” Power Station, in conjunction with the increase of oil prices and the severe weather conditions, have resulted in unprecedented increased electricity bills.

The system had not faced any in adequacy problems. For Cyprus the most stressed periods for system adequacy occur during the summer period.

During the months January and February 2012 the wind penetration to the system was doubled. The capacity factor of total wind generation has reached up to 28% (for these two months) where the average capacity factor of total wind generation is around 15%.

The actual demand reached the level of predictions for normal weather conditions expected. No emergency issues were recorded. Actual versus expectations are monitored weekly on TSO website:

http://www.dsm.org.cy/nqcontent.cfm?a_id=3453&tt=graphic&lang=l1

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CZECH REPUBLIC

During December 2011, January and February 2012 (excluding cold wave) were recorded high transits across Czech Republic. This was due to the high exports of Germany mainly during windy periods. An unusual deficit of power in the South-East region due to unavailable generation in water power plants in dry conditions caused high consumption. The highest transit was up to 3600 MW. The transmission system was more or less on the limit of reliable operation, when all prepared measures were exhausted. The above situations were solved using international re-dispatch (on profile 50HzT - CEPS) and internal grid reconfiguration. It was necessary to use emergency Exchange in order to balance international re-dispatch.

Due to the economic crisis there is still notable decline of load and consumption of around 3% in comparison to levels in 2008.

In the Czech Republic a cold wave was observed from 1st February to 12th February, when the daily average temperature was lower than -10° C on all of these days. On Tuesday 7th the average temperature reached -11,4° C only, while the long term average is -0,2° C for this day. The amount of sunshine was 0.1 hours only, while the long term average is 1.8 hours.

To cover the very high values of the load mentioned above ČEPS had to activate 15 and 30 minute tertiary reserves (i.e. spinning reserve at coal units and gas turbines) up to 250 MW in a few hours. However, it was not necessary to request emergency energy or energy from abroad to ensure the system services.

The maximum gross load was measured on Tuesday 7th February at 12:00. The instantaneous value of the load reached 11328 MW, which corresponds to 10750 MW according to the ENTSO-E load definition. This is slightly lower than the historical peak 11397 MW.

The daily average value of export decreased from 2500 MW (in the week before the cold wave) to 1000 MW (during the cold wave). Even import (up to 180 MW) was observed during few hours.

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DENMARK

The winter was normal and without major difficulties.

The weather situation has not affected the daily operation. It has been a winter with very little snow. The combination of high and low temperatures which can cause glazed frost has virtually not occurred. Therefore, the weather conditions have had practically no influence on the daily operation.

However, there have been a few days with lots of wind. The wind has left dirt on the insulators and that has, among other things, caused one of the 400 kV interconnectors to Sweden to trip. The trip did not cause any problems at first, but later on it became necessary to disconnect both interconnectors to Sweden in order to clean the insulators (both lines were not disconnected at the same time).

The power balance has been quite good during the winter period. There have been practically no situations resulting in a strained power balance. Plenty of power has been available in the system in the form of hydro -, wind -, coal power and so on. Because of the mild winter in Denmark, there has been no need for the same amount of energy as would be the case if the winter had been cold.

Normally, only a few outages in the transmission grid are scheduled during the winter season. However, there have been some disconnections this winter and that is, among other things, due to the preparation of the commissioning of the Anholt offshore wind farm and the 400 kV lines from Kassø to Tjele.

The power plant situation has been quite good during the winter period. As a result of the need for district heating, among other factors, almost all operational plants have been running.

ESTONIA

Domestic generation capacity has been sufficient to cover peak loads during the winter season. The demand has been in accordance with expectation and no particular risks have been observed. The coldest period is the end of January and the first half of February. The temperature at this point was below -25 degrees, at times even below -35 degrees. The peak load was therefore high, although no records were kept. The production even at that time still exceeded the consumption.

No significant risks were identified and no larger risks occurred.

With this said, certain problems did occur with regards to interconnection availability between Estonia and Finland since there were some unplanned outages in Estlink1 in January and February, although this did not cause any serious problems for the power system security of supply.

The most stressed period occurred at the end of January and the beginning of February as the temperatures were lowest at that time with the addition of unplanned outages in Estlink1. Still no large risks occurred at that time for the security of supply as there was sufficient production capacity in Estonia.

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FINLAND

Weather

December was exceptionally warm in Finland. The monthly average temperature was 5 to 8 degrees above the long term average. In January, the average temperature was quite near to the long term average while February was approximately 2 degrees colder than average. In March the average temperature was little above the long term average. The coldest period spanned from the end of January to the beginning of February, weeks 9 and 10 specifically.

Consumption and demand

When temperature variations are taken into account the electricity consumption in December 2011 was remarkably lower than a year before. Moreover, in January, February and March 2012 the figures were lower than a year before but the difference was smaller than in December. The weakened economic situation and its impact on the industry explained the decreased levels of consumption.

Peak demand in the winter period was preliminarily almost 14500 MW (one hour average), source Finnish Energy Industries. The peak demand occurred during the aforementioned cold period, 3rd of February, hour 18 to 19 local time, that is, 17 to 18 CET. The peak was 500 MW lower than the all-time peak a year earlier. For most of the Winter Outlook period the weekly peak demand was remarkably lower than forecast. The significance of the weekly variation however, was due to temperature variations.

Production

The production capacity worked as planned during the winter period.

The production capacity based on the Power Reserve Act reserved for securing the power balance during extreme conditions was not needed.

Necessary frequency, as well as controlled and fast disturbance reserves were available all winter.

Interconnections

There was a constant net import of electricity to Finland at all times.

Due to the very good hydro conditions in Norway and Sweden, imports came primarily from Sweden. Exports to Sweden also existed in December mostly during night hours. In January to March export existed only during a few hours. The new DC-connection between Finland and Sweden was put into operation in the middle of December and for the most part the capacity was sufficient. However, in the middle of February a severe cable fault occurred and the new interconnection was out of operation until the end of Winter Outlook period. Since the fault interconnection capacity had not been sufficient for the market needs, this caused a bottle-neck and price differences between Finland and Sweden.

Market conditions decreased electricity imports from Russia during high load times during the entire period. This differed from the previous years when there was almost full import all the time.

Transmission between Finland and Estonia has varied between full load in both directions. In December there was net import from Estonia to Finland while in January to March there has been net transfer in the opposite direction.

Transmission network

Fingrid's system worked as planned throughout the winter period and the transmission grid did not experience any significant faults affecting the transmission capacity. At the end of December there was an exceptionally strong storm which caused severe damage and long outages in the distribution networks.

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FRANCE

Winter 2011-2012 temperatures were quite above the average temperatures except in February.

February was characterized by a 2 weeks cold spell. Indeed, climatic conditions in February have been severe, with an average temperature lower than 9 °C below seasonal norm, during eleven successive days with a peak at 11 °C below. It was the coolest February since 1986.

Except during February, temperature has been close from seasonal norm:

	Monthly average	Deviation from normal temperature	Deviation from the same month one year before
November	10.3°C	+1.7°C	+2.7 °C
December	7.5 °C	+2.2 °C	+5.3 °C
January	6.1 °C	+1.2 °C	+1.4 °C
February	1.8 °C	-4.6 °C	-4.7 °C

The main risk identified in the Winter Outlook report was the sensitivity of the load to low temperatures. This risk occurred during the entire winter period due to low temperatures.

The French consumption reached a peak at 102 098 MW on the 9th of February (last winter, the peak reached 96 710 MW).

The national consumption adjusted for meteorological contingencies reaches 478.2 TWh in 2011,6.8% less than in 2010, representing the lowest consumption since 2003.

Two reasons explain this decrease:

- During 2011 the average temperature was higher than 0.5 °C above seasonal norm, 2011 was the warmest year since 1900.
- Large scale industry and SMI/SME are still affected by the European economical crisis

The trends of the adjusted consumption (adjusted for winter climate conditions) compared with the same month of the previous winter are as follows:

- +0.1% in November
- -0.2% in December
- +0.3% in January
- +0.7% in February

RTE's website encourages customers to take simple steps to moderate their energy demand, especially during demand peak period.

A cold spell happened during the first two weeks of February.

Generation

Increase of the production capacity connected to the RTE network of about 850 MW due particularly to the connection of 3 combined cycle gas units.

- Increase of installed compensation units of about 570 MVARs
- Further important development of wind generation with an increase of installed capacity of about 1100 MW.
- Important increase of photovoltaic generation on distribution networks which reaches about 1400 MW of installed capacity at the end of the year 2011.
- Excepted for maintenance there was few unavailability for breakdown in the cold spell period.

Demand

Regarding the load, the main issue was the cold spell.

The French consumption reached a peak at 102 098 MW on the 9th of February 2012.

These levels of consumption caused some low voltage problems and induced risk for the security of the system.

As a consequence, RTE has taken some measures:

- RTE used « safety order » to avoid voltage collapse
- RTE used Short Message Service (SMS) and website alert to encourage people to reduce electricity consumption at peak demand period in West and South East regions.

Reinforcement realised during 2011

19 new substations are now connected to the RTE network, including 1 at 400 kV, 7 at 225 kV, 6 at 90 kV and 5 at 63 kV.

RTE has commissioned 656 km of new or refurbished circuits in 2011, whereas the decommissioning and various modifications represent a decrease of 590 km.

Local congestions, loop flows

Low voltage constraints occurred during the period of high consumption.

The whole interconnection capacity has been saturated (9435 MW exchanged). The peak of imported energy per day was reached on the 9th February 2012: 150 MWh

Use of interconnections

A better availability of the French generation fleet in comparison than previous winter 10-11 induced higher level of export compared to previous winter except during February.

The exchange balance is positive this winter (i.e. France remained a net exporter).

	EXPORTS			IMPORTS			CUMULATIVE VOLUME OF EXCHANGES			EXPORT BALANCE*		
	November 2011 GWh	Trend vs. Nov-10	Cum. trend since Jan 1st	Nov 2011 GWh	Trend vs. Nov-10	Cum. trend since Jan 1st	Nov 2011 GWh	Trend vs. Nov-10	Cum. trend since Jan 1st	November 2011 GWh	Trend vs. Nov-10	Cum. trend since Jan 1st
Belgium	432	55%	120%	330	-18%	-62%	762	12%	16%	102	n.s**	n.s***
Germany	684	45%	12%	745	-48%	-47%	1 429	-25%	-24%	-61	94%	n.s***
Switzerland	2 312	6%	9%	121	-73%	-56%	2 433	-7%	-3%	2 191	27%	26%
Italy	1 796	14%	-7%	122	-30%	-26%	1 918	10%	-8%	1 674	20%	-6%
Spain	204	65%	110%	304	101%	-13%	508	85%	33%	-100	n.s**	n.s***
GB	533	-28%	-11%	583	7%	-45%	1 116	-13%	-25%	-50	n.s**	53%
TOTAL	**5 961**	**11%**	**12%**	**2 205**	**-30%**	**-46%**	**8 166**	**-4%**	**-9%**	**3 756**	**70%**	**+77%**

** A negative value indicates a net import balance ** In November 2010, a net total of 126 GWh was imported from Belgium and 28 GWh from Spain; the overall balance showed total net exports to Great Britain of 195 GWh *** in cumulative terms since 1 January 2011, the overall balance shows total net exports to Belgium of 5 639 GWh (compared with net imports of 1 139 GWh in 2010), net exports of 2 660 GWh to Germany (compared with net imports of 5 125 GWh in 2010), and net exports to Spain of 1 163 GWh (compared with net imports of 1 229 GWh in 2010).*

	EXPORTS			IMPORTS			CUMULATIVE VOLUME OF EXCHANGES			EXPORT BALANCE*		
	December 2011 GWh	Trend vs. Dec-10	Cum. trend since Jan 1st	December 2011 GWh	Trend vs. Dec-10	Cum. trend since Jan 1st	December 2011 GWh	Trend vs. Dec-10	Cum. trend since Jan 1st	December 2011 GWh	Trend vs. Dec-10	Cum. trend since Jan 1st
Belgium	516	-6%	102%	361	28%	-57%	877	6%	15%	155	-42%	n.s***
Germany	613	167%	16%	884	-51%	-47%	1 497	-27%	-24%	-271	83%	n.s***
Switzerland	2 416	3%	8%	230	-79%	-60%	2 646	-23%	-5%	2 186	72%	29%
Italy	1 718	55%	-3%	117	-68%	-38%	1 835	25%	-5%	1 601	114%	0%
Spain	673	n.s*	138%	378	-19%	-13%	1 051	96%	39%	295	n.s**	n.s***
GB	986	9%	-9%	220	-58%	-46%	1 206	-15%	-24%	766	98%	59%
TOTAL	**6 922**	**33%**	**13%**	**2 190**	**-52%**	**-47%**	**9 112**	**-6%**	**-8%**	**4 732**	**n.s****	**+89%**

** A negative value indicates a net import balance **In December 2010, exports to Spain totalled 71 GWh. Overall, France imported a net total from Spain of 396 GWh. *** over the whole of 2011, the overall balance showed total net exports to Belgium of 5 793 GWh (compared with net imports of 872 GWh in 2010), total net exports of 2 388 GWh to Germany (compared with net imports of 6 713 GWh in 2010), and net exports to Spain of 1 458 GWh (compared with net imports of 1 625 GWh in 2010).*

	EXPORTS		IMPORTS		CUMULATIVE VOLUME OF EXCHANGES		EXPORT BALANCE *	
	January 2012 GWh	Trend vs. Jan-11	January 2012 GWh	Trend vs. Jan-11	January 2012 GWh	Trend vs. Jan-11	January 2012 GWh	Trend vs. Jan-11
Belgium	662	-16%	278	146%	940	4%	384	-43%
Germany	517	-16%	960	-29%	1 477	-25%	-443	40%
Switzerland	2 366	-5%	171	-67%	2 537	-16%	2 195	11%
Italy	1 581	3%	0**	-100%	1 581	-7%	1 581	16%
Spain	878	n.s**	154	-58%	1 032	103%	724	n.s***
GB	1 038	12%	109	-73%	1 147	-14%	929	79%
TOTAL	**7 042**	**8%**	**1 672**	**-43%**	**8 714**	**-8%**	**5 370**	**50%**

** A negative value indicates a net import balance **In January 2011, exports to Spain totalled 141 GWh, imports from Italy totalled 60 MWh, *** In January 2012, the exchange balance showed net exports to Spain of 724 GWh (compared with net imports of 226 GWh in January 2011).*

	EXPORTS			IMPORTS			VOLUME CUMULE DES ECHANGES			SOLDE EXPORTATEUR*		
	February 2012 GWh	Trend / Feb-11	Cumul. trend since 1st Jan	February 2012 GWh	Trend / Feb-11	Cumul. trend since 1st Jan	February 2012 GWh	Trend / Feb-11	Cumul. trend since 1st Jan	February 2012 GWh	Trend / Feb-11	Cumul. trend since 1st Jan
Belgium	87	-88%	-50%	949	n.s**	n.s***	1 036	25%	14%	-862	n.s**	n.s***
Germany	124	-77%	-45%	1 692	68%	12%	1 816	17%	-6%	-1 568	n.s**	-66%
Switzerland	2 262	-1%	-3%	683	115%	3%	2 945	13%	-2%	1 579	-19%	-4%
Italy	1 486	-12%	-5%	242	n.s**	4%	1 728	-2%	-4%	1 244	-24%	-6%
Spain	254	n.s **	n.s***	565	151%	21%	819	n.s**	142%	-311	-62%	n.s***
GB	291	-57%	-17%	1 089	171%	49%	1 380	28%	5%	-798	n.s**	-83%
TOTAL	**4 504**	**-24%**	**-7%**	**5 220**	**145%**	**+36%**	**9 724**	**21%**	**+5%**	**-716**	**n.s****	**-37%**

** A negative value indicates a net import balance *****In February 2011***, exports to Spain were 33 GWh, imports from Italy were 63 GWh, the cumulative volume of exchanges with Spain was 257 GWh, net exports to Belgium totalled 598 GWh, net imports from Germany were 471 GWh, net exports to GB were 270 GWh, the overall balance of exchanges showed net exports of 3 795 GWh ******in cumulative figures since 1 January***, exports to Spain are 1 133 GWh (compared with 174 GWh in 2011), imports from Belgium are 1 227 GWh (compared with 228 GWh in 2011), the balance of exchanges with Belgium shows net imports of 478 GWh (compared with net exports of 1 276 GWh in 2011, the balance of exchanges with Spain shows net exports of 414 GWh (compared with net imports of 418 GWh in 2011).*

The forecast of French consumption is still difficult to perform due to uncertainties about the recovery of economic activity and its impacts on the electricity demand.

Attention should be paid to the sensitivity of the load to low temperatures and also the availability of the French generation fleet.

GERMANY

Following the decisions of the German government to speed up the nuclear phase out starting with the shutdown of 8 nuclear power plants in Germany immediately after the Fukushima catastrophe, German TSOs conducted numerous grid and system analyses to identify the consequences for the German grid and system and possible European wide consequences.

As a result of those grid analyses, two scenarios had been identified as potentially critical ones:

1) Very high load without wind and photovoltaic feed-in.

2) High load and high wind feed-in, but no generation of photovoltaic sources.

To be prepared for those scenarios the related set of required remedial actions had been prepared during autumn 2011. In cooperation with the German NRA several power plants in Austria (TTG) and western Germany (Amprion and TransnetBW) had been taken under contract in order to provide for emergency power delivery. In addition to existing emergency contracts with APG (TTG), German TSOs Amprion and TransnetBW signed contracts for mutual emergency assistance service with Swissgrid and Terna in order to reinforce the potential of countermeasures to remedy congestions identified within the German transmission grid. Amprion, TTG and TransnetBW adapted the process determination of transmission capacities at the southern and western German borders. Network capacities had been moved from the long/medium term horizons into the short term horizon to contribute to maintain system security during high wind scenarios.

To be able to recognize critical situations well in advance and to prepare the relevant set of remedies German TSOs advanced their operational planning process. By providing a weekly, Germany-wide outlook on the system security German TSOs have been able to identify emerging problems as early as possible and prepare countermeasures in a coordinated way. This includes a common decision making process, when to activate the emergency cold-reserves in Austria, Switzerland and Italy and a process for preventive redispatch between TTG and 50HzT. In December 2011 the improved process was put into force on the operational level.

The situation concerning the generation-load balance during the winter season 2011/12 appeared to be temporarily worse than in the recent years. During Christmas season and during the cold spell in February German TSOs had to deal with high system imbalances. Contracted control reserves had to be fully deployed and backed by additional emergency reserves from Austria and Switzerland.

Between the end of January and 15th February the cold spell in Central Europe resulted into a record high consumption especially in France. As a consequence market prices partially peaked. In those days German TSOs registered high exports towards the western neighbours as the result of market activities when at the same time the control power reserves had to be fully deployed due to mismatch between scheduled generation and forecasted load. Temporarily the balancing power reserves were fully exhausted and had to be backed by emergency power delivery from contracted reserve power plants in Western Germany and Austria and by emergency power delivery from Switzerland and the Netherlands. The situation became even worse due to problems with the gas supply, which reduced the availability of gas power plants in southern Germany. The MEAS contract with Terna could not be used due to limited generation capacities in Italy for the same reason. The cold-reserve in Austria was activated and helped to stabilize the situation.

On 13th February German TSOs were forced to back on emergency measures according to § 13 (2) German Energy Industry Act when ordering the last available power plants to start up.

On single days German TSOs faced serious frequency deviations due continuously increasing mismatch between behaviour of power plant and control programs of the TSOs resulting from underlying market activities. As an example at 11:55 pm on 13th December the frequency reached the unusually high value of 50,16 Hz for about 15 minutes. The magnitude of this frequency deviation was caused mainly by imbalances of Italy and Germany.

The German Grid Control Cooperative has been expanded to neighbouring countries, which now form the International Grid Control Cooperative: Denmark West has joined on January 1st, 2012 after a successful test-phase. TenneT Netherlands and Swissgrid have started their test-phases on February 1st and March 1st respectively.

Quarter of an hour products have been introduced at the German energy exchange EEX and from 10th January on German TSOs have started to introduce marketing of RES electricity on a quarter-hourly plan. That makes Germany the first country which uses this measure successfully to counteract frequency peaks at hour-changes.

The situation within the German transmission grid was characterized by significant North-South power flows. Compared to the situation before the Fukushima catastrophe the volatility as well as the amount of southbound load flows increased. This was due to the effect of the first stage of the nuclear phase-out and the steadily increasing installed capacity of RES in Northern Germany. The missing generation capacity in southern Germany was covered by a combination of imports from RTE and CEPS and power transits from the Ruhr area or on windy days from the coastal regions. This led to frequently highly loaded transmission lines at the 50HzT-TenneT interconnection and on the transmission lines between the Ruhr area and south-western Germany.

To maintain system security German TSOs activated an increased amount of grid- and market related measures e.g. redispatch with increasing amount of power to be shifted between control areas. German TSOs faced several days on which they had to activate the full range of available countermeasures within Germany. Cold-reserve power plants in Austria had to be activated on December 8th and 9th to support counteracting the strong North-South power flows caused by high wind feed-in and load conditions.

To maintain voltage stability in the southern region, the existing synchronous generator of Biblis A (one of the shutdown nuclear power plants) equipped with a new drive is therefore used as a phase shifter and supplies since February 2012 the region with reactive power.

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GREAT BRITAIN

The coldest part of the winter was the first half of February when temperatures were well below normal but December and January were warmer than average. The peak winter demand of 56,105 MW occurred at the half hour ending 18:00 hrs on Wednesday 8 February. This was well below the forecast Average Cold Spell peak demand of 57,900 MW. However, the interconnectors were exporting close to 3,000 MW at the time and the total gross system demand was 58,867 MW. This is the highest level of exports ever supplied by Great Britain at the time of winter peak demand. Wind power at the time of the winter peak was 1,560 MW. This was just over 50% of the total, significantly higher than the 8% assumed in the forecast.

At the end of the second week in February, overnight temperatures dropped to unusually low levels. At 08:00 hrs on Saturday 11 February, the temperature had fallen to -13C in some parts of England. During the course of the morning, between 07:00 and 10:00 hrs, there was an accumulation of an exceptional level of generation losses, particularly from CCGTs, that reached a total of 3,500 MW. Generators either did not synchronise on time, tripped or reduced their capability. Some of the losses were related to the cold weather, such as instrument lines freezing, but there was also a high volume of losses due to breakdowns resulting from non-weather related causes. This resulted in despatching Short Term Operating Reserve, requesting Emergency Assistance on the French Interconnector, issuing System Warnings and instructing Demand Control to five Distribution Network Operators (DNOs) in order to maintain the security of the system. All demand control was achieved by voltage reduction and there was no loss of supply.

For the rest of the winter there was sufficient generation available, demand was met in full and no other 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. As a result, coal took a larger proportion of the total generation than gas.

Early on in the winter the French and Britned interconnectors were swinging between import and export but from December onwards they were both generally importing. The only exception to this was during the cold weather in the first half of February when the French interconnector was exporting and Britned was switching between import and export. This meant there were a number of days when power was being wheeled through Great Britain, coming in through Britned and flowing out through the French interconnector. Domestic generation capacity was sufficient to cover peak loads

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GREECE

At the beginning of the winter, Greece experienced less than average storage of water in the hydro reservoirs. These supplies are 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. However, there were prolonged periods with cold weather, but not exceptionally cold, which is not typical.

The demand starting from January was as expected and was slightly higher than the previous year.

Review of the situation

Wind conditions were at 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 1020 MW on the 6th of January at 0700 hrs (CET).

The installed generation capacity of wind parks in the Interconnected System today is MW (1350). A significant increase of wind production is expected in the following years.

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

On the demand side, the following table presents the values of net monthly peak load (forecast and actual). Domestic generation capacity was sufficient to cover peak loads.

	NET MONTHLY PEAK LOAD (Average values per hour in MW)			
	DECEMBER	JANUARY	FEBRUARY	MARCH
Forecast	9000	8800	9000	8400
Actual	8300	8750	8650	8100
Difference	700	50	350	300

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

The peak net electricity demand (excluding pumping loads) for the interconnected system in the winter of 2011-2012 amounted to 8750 MW, on 31/01/2012 at 19:00 hrs (CET).

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

Transmission infrastructures

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

The Greek system continuously used all capacity (NTC) from the neighboring countries in the incoming direction. The NTC was up to 1200MW due to the operation of the 400KV OHLs between Bulgaria and Turkey. In addition, during this winter as well as the forthcoming summer the trial parallel operation between CESA systems and Teias will be continued.

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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 directions Greece-FYROM, Greece-Albania and Greece-Turkey for all time frames. IPTO holds explicit auctions for 100% of the NTC for yearly and daily rights for the Greece-Bulgaria border where for the same border ESO EAD (Bulgaria TSO) conducts an auction for 100% of the monthly NTC. The Auction Rules are fully compliant with Regulation 1228. The same is valid for the Auction Rules for the interconnection with Italy.

Remarkable events

Between the 15th and the 19th of February the Hellenic Gas Transmission System operator declared an emergency situation due to a supply shortage of natural gas. The significant restrictions on natural gas imports to Greece have caused the declaration of an emergency situation by the Hellenic Gas Transmission System Operator due to supply shortage.

As a result, substantial thermal production from natural gas supplied production units was unavailable (approximately 40% of the total) while there was considerable uncertainty with regards to the remaining available production capacity. Due to these exceptional circumstances the Independent Transmission System Operator of Greece, given the state of emergency of the Greek Power System, declared “Force Majeure” on all Greek Interconnections under the relevant Auction Rules.

The alert was lifted on the 20th of February after the availability of natural gas supplied production units returned to normal.

Lessons learned

The fundamental key points for the forthcoming winter will be the consumption of electric energy, particularly if the rate of reduction should continue. Another remarkable point is the change of the load curve during the sunny days (big difference between noon and night peak). If this behavior of load demand continues, it may be useful to review the estimations regarding the needs for energy in the future.

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

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HUNGARY

The winter of 2011-2012 was calm for the Hungarian power system. There was no extremely high demand, whilst the total demand was slightly higher than in the previous year. Outages of generators were rather low and 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.

ICELAND

The installed generation capacity provided acceptable system adequacy during the winter period. In September a new geothermal power plant, rated 90 MW, was started. No new load has been connected corresponding to this, thus the generating capacity margin increased.

No unusual or significant system events occurred during the Winter 2011/12. Prevailing bottlenecks in the transmission system, limited transmission of power between areas, although no shortage of power resulted.

The Icelandic TSO is ironing out plans to remove the bottlenecks by adding new connections between areas.

IRELAND

There were no significant issues during Winter 2011-2012. Last winter was significantly warmer than the previous two cold winters. The winter peak demand of 4,643MW occurred on Tuesday 13th December 2011 at 17:30. This was a decrease of 466MW on the previous winter's peak of 5,109MW. The wind generation at the time of the peak demand was 723MW. Wind generation reached an all-time peak of 1,482MW during the winter period, representing 34% of the generation at that time. Due to the very mild weather throughout the winter period, the demand was on average 7% lower than Winter 2011-2012. The system forced outage rate for December 2011 was 7.6%, which was in line with the system forced outage rate used in the Winter Outlook report. The system remained well within the capacity adequacy standard for the winter period.

ITALY

The adequacy evaluations for the 2011-2012 winter period has not evidenced particular risks for capacity adequacy or peak load cover as well as for the national supply system's. It was a winter season with above average temperatures if compared to the previous period. The only exception during the second week of February was when a very cold wave hit Italy causing a snowfall phenomena in a large part of the country. In addition, low hydro conditions marked the entire winter period: values above the multi-year average capability factor were recorded, confirming a scarce rainfall.

As far as generation side is concerned, any to remark on generation availability in respect to the planned maintenance. The installed generating capacity increase with a significant contribution of the wind farms and photovoltaic solar parks.

As far as demand is concerned, during the winter period load requirements were lower in comparison to the same period of 2010. The record power peak normally present in winter was not exceeded during this period. The only exception to this was during February when, as the result of bad weather, national power peak reached the highest value equal to 53.035 MW (+2,5%). A monthly consumption also marked a small decrease over these months.

New lines and devices put in service reinforced the transmission network, resulting in a reduction of congestions.

The Italian Northern interconnection has been characterized, for the most of the time, by import conditions from the four neighboring 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 essentially characterized by prevalent import conditions towards the Italian system.

In 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. The PST is currently in the testing phase, the starting of operation is scheduled at the end of April.

The total net production registered a decrease of 4,0%, balanced with an increasing of energy exchanged with foreign countries (+11,0%). The monthly hydroelectric capability factor has shown a constant decrease with percentage values below the corresponding values recorded in the previous period of winter. In essence, the same result was evident for the fullness factor of hydro reservoirs.

LATVIA

The last winter (2011-2012), as predicted by TSO, was without any stress periods with regards to system adequacy and all deliverables were on schedule. The fixed load was lower than the estimated load because the average air temperature during the winter was higher (-2 °C) than the winter before (-4 °C) and due to the current economic situation in Latvia, the total load and consumption had a tendency to slightly decrease. Only the peak load in this winter was bigger than the previous year.

During the winter all CHP power plants worked according to plan, and had no gas delivery restrictions. February saw the start of the cold weather period for Latvia when air temperature decreased to -25 °C and heat and electricity consumption in the entire area increased steadily. The Daugava River HPP worked by water inflow level and covered daily peak loads during the entire winter period. Latvia has only a small number of wind power plants and additional new wind power plants are scheduled for 2012. In light of this, these generation units do not take a significant sense for system adequacy and power system balance.

Repair works on the Latvia – Estonia border were scheduled for the winter period, although they failed to materialize. Some repair works on the interconnection between Latvia – Lithuania went according to schedule and the repairs did not significantly disturb electricity

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deliverables to Lithuania from Estonia and Latvia. The winter period also saw transmission lines repairs in the internal transmission grid, although these repairs did not disturb the transfer of electricity from production parts to consumption parts.

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LITHUANIA

The winter of 2011/2012 was unusual in comparison with usual climates, although it was very similar to previous winters: the beginning of the winter was quite warm, with low precipitation levels, while the coldest period was during weeks 5-6 with a lowest average daily temperature of -24°C. No risks were expected.

An intense situation in the region was observed during weeks 5 and 6. Average temperature for this period reached -17.4°C which increased consumption throughout the entire region. An additional fossil fuel generating unit in Lithuania was started to cover the internal consumption, although the major part of total Lithuanian consumption was covered by import from the Kaliningrad area, Belarus and Russia. Despite the fact that the level of necessary system services increased, the adequacy of ancillary services had been maintained and no emergency situation had occurred during weeks 5 and 6.

Total consumption during winter 2011/2012 was 2.7%, lower than the previous year, although the peak demand was significantly higher and reached 1885 MW in comparison with 1734 MW during the last winter.

System adequacy had been secured without any risks.

LUXEMBOURG

The average temperature during the winter, with the exception of February, was rather high when compared to the average of the last years. In February the temperature fell to under –10 C° during a long period. The winter period was also characterized by low precipitation and snowfall. In general the winter conditions were not severe and had no influence on the security of supply in the grid.

During the cold spell of February, the gas imports rose to a new peak. Gas availability during extreme cold spells must be analysed for CCGT plants and cogeneration production units.

The load flow situation during February in the European grid, particularly due to the demand of France, could have some negative effects on the supply of Luxembourg,.

Luxembourg has two high voltage grids, the public grid of Creos connected to Germany, and the industrial grid, connected to Belgium. For both grids the interconnection capacity will be sufficient to cover n-1 security. In normal operation, the grids are not interconnected meaning that there is no possibility for transit flows. In emergency cases, mutual reserves can be made available to the other grid. In temperature stressed situations, the load increase can be supported by the lines. No generation depending on very low temperatures exist in our country.

MONTENEGRO

The electric power balance for this period was negative due to bad hydrological conditions meaning that we had to import electricity.

The most stressed period of the 2011/2012 winter was during February as a result of extreme weather conditions. Extremely bad weather conditions, including low temperatures, strong wind and snow over the whole country caused extremely high consumption. Due to the above mentioned conditions, the government of the Montenegro introduced an “emergency situation”. There were no reductions in power supply of electricity at the lower network (household customers), with the exception of public and decorative lights and for industrial consumers at 110 kV.

There were no critical outages/events in the Montenegrin transmission network at 400 kV and 220 kV level, except for part of the 110 kV network in the North of country which were out of work for several days.

FORMER YUGOSLAV REPUBLIC OF MACEDONIA

The power situation in the R. Macedonia was in accordance with the forecast, at least until the end of January and February, when it became terribly difficult due to the incremented electricity consumption caused by the constant extremely low temperatures on the continent. During this period the accumulated water volume in lakes was low because of the continuously unfavorable hydro-meteorological conditions.

Extreme cold weather in February with temperatures dropping down below -20°C, caused extremely high consumption. The total consumption was highly dependent on temperature (the biggest parts of households use electricity for heating purposes). In light of this situation, several measures have been introduced: some elementary schools were closed, industrial customers were called upon to reduce the consumption, municipalities to reduce public and decorative lights, and households were informed due to the necessity of electricity savings.

Every winter period, when the load is at the maximum level, it is satisfied to a high extent by import (approximately one third of the total demands).

Under conditions of maximum electricity consumption, extremely low temperatures accompanied by heavy snowfalls, low level of storage lakes, and electricity import to supply the eligible and tariff consumers by the neighboring countries in the R. Macedonia, the following measures were undertaken in February by the neighboring countries:

- R. Bulgaria forbade electricity export generated by the production capacities in the territory of the R. Bulgaria.
- R. Romania suspended the right to use the cross-border transmission capacities obtained at auctions for electricity export from R. Romania.
- R. Serbia suspended the cross-border transmission capacity market in the direction towards the Republic of Serbia, R.
- Greece introduced measures relating to the prohibition of electricity export until the demands of consumers in R. Greece are satisfied.

The measures introduced in the neighboring countries had a significant influence on electricity supply and delivery for the needs of import to the R. Macedonia. This resulted in reduced electricity delivery to eligible and tariff consumers by their deliverers.

Under such conditions, the Government of the R. Macedonia was forced to introduce crisis power status whereby measures and activities were introduced relating to a reduction in electricity consumption under the Law on Energy and the Ordinance on criteria and conditions for proclamation of a crisis.

Pursuant to the Law on Trade, a decision was also made for a reduction in the electricity export from the generating capacities in the territory of the R. Macedonia during the period between February 13, 2012 and February 29, 2012. We would like to stress that this measure caused neither a decrease in, nor interruption of, the previously agreed upon export transactions.

Electricity transit through the power system in the R. Macedonia is neither limited nor reduction is introduced to the right to using the cross-border capacities.

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NORTHERN IRELAND

The 2011/12 winter was significantly warmer than the previous two extreme cold winters, and at times there were differences in temperatures of up to 30°C in comparison to the 2010/11 winter. December 2011 was one of the mildest on record in comparison to December 2010 which was one of the coldest on record. Consequently, the transmission network experienced no major ice accretion or storm damage during the 2011/12 winter period.

The 2011/12 winter peak demand (based on sent-out / exported generation) was 1,740MW and occurred on Monday 12th December 2011 at 17:30. This was a decrease of 37MW on the previous year's peak of 1,777MW.

Due to the very mild weather throughout the 2011/12 winter period, the NI demand on average was 5.2% lower than over the 2010-2011 winter period.

Wind generation at the time of the peak demand was 330MW out of a total installed wind capacity of 405MW, contributing approximately 19% of the peak demand. Wind generation also reached an all-time peak of 378MW during the 2011/12 winter period, representing approximately 24% of the generation at that time.

The overall generation forced outage rate (excluding the Moyle Interconnector) for December 2011 was 5.75%, which was broadly in line with the system forced outage rate used in the both the ENTSO-E Winter Outlook report and the joint EirGrid/SONI All-island Winter Outlook Report.

A significant reduction in generation adequacy occurred over the winter period due to ongoing cable faults on both poles of the Moyle Interconnector. One cable was restored to service on 18th January 2012, with the second cable being restored on 19th February 2012.

Despite very few planned generation outages over the winter period, forced outages also occurred on large conventional generating units, which on top of the Moyle faults meant extra pressure on the Northern Ireland demand-generation balance.

To try and ensure that the Northern Ireland Generation Adequacy Standard of 4.9 hours/year Loss of Load Expectation (LOLE) was met throughout the winter period and that no load shedding occurred due to lack of generation, SONI was dependent on increased imports from the Republic of Ireland.

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NETHERLANDS

The winter of 2011-2012 was characterized by a longer period of dry and frosty weather without heavy snowfall or glazed frost periods. Consequently, we have not experienced significant or unusual events in the Dutch Transmission Grid or with any generation.

In the Netherlands we have a standard protocol for the role of TenneT within prolonged periods of warm and or cold weather[2]. During the winter of 2011-2012 we have not put this protocol into effect.

The peak demand during the winter of 2011-2012 was 16.791 MW and occurred on Wednesday 14th of December 2011 at 17:15. This was a decrease of 937 MW (5.3%) in comparison with the peak off the 2010-2011 winter which was 17.728 MW (13th of December 2010 at 17:15).

Large wind generation in the North of Germany did not cause extra unforeseen flows or events through the Dutch grid from the Northern part towards the Southern part in the Northwest European area during most of the winter period.

However, during the cold period at the beginning of February the Netherlands faced relatively large loop flows / transit flows in the North to South direction, towards France. Just before the end of the cold period ELIA had a forced outage of the Phase Shifter in Zandvliet on February 10th and consequently severe limitations to control North-to-South flows in the CWE region were experienced. The loss of this grid element in combination with allocated market capacities led to very stressful, nearly critical grid situations in Belgium, The Netherlands, and by extension the entire CWE region.

Similar or more severe situations require better coordination in the CWE region for the allocation of capacities in the summer 2012 and the winter 2012-2013.

[2] http://www.tennet.org/english/operational_management/coolingwater.aspx

NORWAY

The winter period of 2011/2012 was approximately 3 °C milder than normal, with 25 % more precipitation than normal. High temperatures resulted in lower demand. High inflow and high reservoir content resulted in high production and large export. The hydrological balance was above normal through the winter period.

There was a capacity deficit in weeks 5 and 6 in the Nordic power-system, due to a low nuclear production in Sweden. This resulted in high prices in the Nordic price areas.

The winter period as a whole, has been milder and with more inflow than normal. A storm hit Norway at the end of week 51, which resulted in serious faults and breakdowns in the grid, especially in the South and West of Norway.

A new all time high production record was set during certain weeks this winter, but this did not cause any serious problems.

POLAND

The cold weather spell that occurred **in the two first weeks of February**, with temperatures down to -25 degrees Celsjus led to tight power balance situation with generating power reserves at minimum level necessary for secure system operation on couple of days. This was due to high demand, which three times reached the highest ever level, the last one on February 7th at about 24 000 MW (net) breaking the previous maximum peak recorded in January 2010. Apart from some cooling water restrictions in two coal plants located on Vistula river (resulting from exceptionally dry autumn) the availability of generating units was maintained on usual level. This allowed to handle the situation with normal operating procedures, except some hours when supportive power from Swedish system was necessary to keep the system in balance.

Since the high pressure system responsible for this cold spell brought (two first weeks of February), as expected, also a low wind situation in the region there were no load flows problems in the Polish power system and its borders due to transit flows. However, it is worth to mention that before and after this period, i.e. in December, January and late February we experienced many days when high wind generation in the north of the Continent combined with high import in the south east of Europe (result of dry autumn) led to extremely high transit flows resulting in periodical unsecure operation of the interconnected system in Central East Europe, i.e. not fulfillment of n-1 rule with a danger of cascade tripping of tie lines. To illustrate the size of this phenomenon it is enough to mention that in just 4 months (October 2011 to January 2012) in order to keep Polish – German border in secure operating conditions we had to activate with 50 Herzt Transmission cross border redispatch with the energy volume higher than for the whole three years before, i.e. since 2008 when we first used this extraordinary countermeasure.

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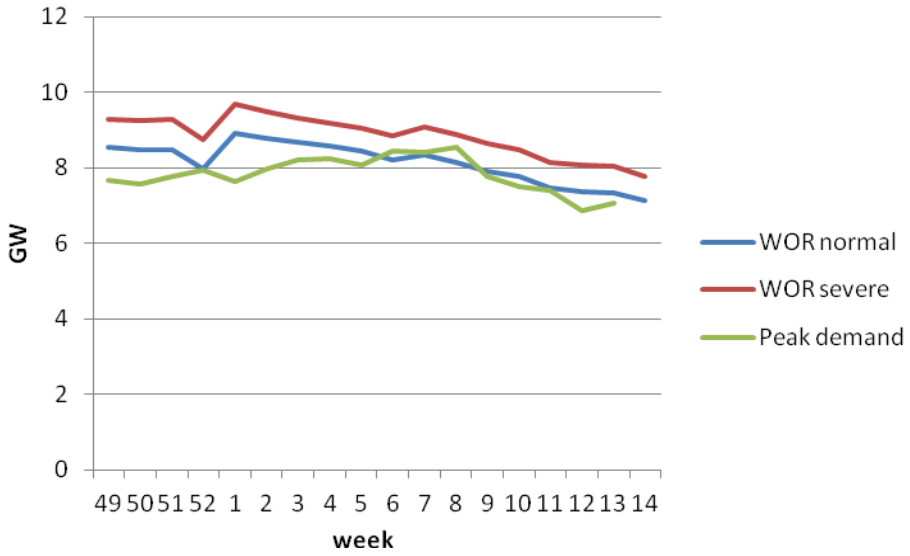
PORTUGAL

The winter season in Portugal was remarkably atypical, with temperatures consistently above the average, and clean days with almost no precipitation. This was, in part, the reason for the 10.3% drop of the electricity demand in December and 5.6% in January. However, in fact, since October, when the financial adjustment program imposed a strong increase of electricity prices, we have identified a negative trend.

As a consequence, the observed peak demand was lower than identified in the normal scenario of the Winter Outlook Report. In February, when a cold spell was registered for a few days, and March, when mild weather occurred more frequently, peak demand fitted the normal condition scenario.



On the generation side, wind availability was in accordance with that expected in the normal condition scenario. Hydro generation performed closer to the severe condition scenario.

In general, the system operation was performed between the comfortable margins identified in the report. Electricity supply resorted strongly to imports but that was essentially driven by market conditions.

REPUBLIC OF SERBIA

In Serbia, a very long period of extreme cold weather in February 2012 caused extremely high consumption. It should be noted that, due to high share of households, the total consumption in Serbia is highly dependent on temperature (due to high level of usage of electricity for heating).

Additionally, domestic production capabilities were limited for several reasons. Due to the long-lasting draught in SEE region, the hydro reservoirs were left at 30% of the maximal value and the river inflows were very low compared to average winter levels, with further decreases forecast. As a consequence, the hydro power plants' output was significantly reduced for a longer period of time, which also caused a reduction of on-site coal reserves in thermal power plants at a critical level. Problems in coal production and transport caused by extremely low temperatures also appeared.

From January 30th until February 15th daily average temperature was below 0 ºC. In many regions, especially in Central and South parts of Serbia, temperatures dropped below -20°C, and thus caused extremely high consumption of over 162 GWh (for normal winter conditions in February, the expected daily consumption in Serbia is app. 140 GWh).

The security of supply was supposed to be supported by very high contracted imports (app. 20 GWh per day) compared to a situation with earlier planned imports in February 2012 (app. 5 GWh/day).

In January and February 2012, several disturbances were indicated in the electricity market in the SEE region, as follows:

- ESO EAD informed neighboring TSOs that Bulgarian Ministry of Economy, Energy and Tourism suspended all exports from Bulgaria in the periods January 21 - January 28 and February 10 – February 20.
- On February 9 HTSO informed neighboring TSOs that their scheduling was not available due to a trade union strike.
- On February 10 Transelectrica informed neighbouring TSOs that starting from February 10 the curtailment of electricity export from Romania would be implemented.

With the above mentioned degradation of security of supply and regional electricity market disturbances, several measures were introduced by the Government when announcing the Emergency situation caused by Force Majeure on the whole territory of the Republic:

- From February 3 elementary and high schools were closed, industrial customers were called upon to reduce the consumption, municipalities to reduce public and decorative lights, whilst households were informed of the necessity of electricity savings.
- From February 8 some state owned companies were closed, whilst private companies were called upon to close or to reduce consumption.

The Serbian Government measures described above, by our estimation, reduced the load by up to 300 MW. However, after the curtailment of electricity export from Bulgaria and Romania, affecting import to Serbia and possibility covering demand, on February 10, 2012, late evening the Serbian Government partially suspended the cross-border import capacity rights (the part belonging to EMS and already allocated to market participants). They then ordered EMS to reallocate 50% of import capacities for the purpose of maintaining security of supply inside Serbia in the period February 11 – February 29, thus maintaining the physical

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safety of persons and system integrity. More specifically, the Government concluded that without this measure the risks to expose the households to blackouts would not be acceptable taking into consideration the extreme weather conditions which have already caused casualties throughout Serbia. It is important to stress that this measure did not cancel the overall transit over the Serbian network which remained available through the other 50% import cross border capacities and non-affected export cross border capacities.

During that period, EMS had no problems with regards the operation of transmission system in Serbia till February 10 and there was even enough necessary system reserve. On February 10, due to low energy reserve (power was available at all times), in order to prolong possibility to supply the load, EMS had to introduce the voltage reductions. It must be noted that N-1 criterion in the region was satisfied at all times. On February 11, in the afternoon the effects of the partial cross border capacity market suspension and other measures yielded results and it was clear that the further deterioration of the system operation conditions was halted, with the situation becoming normalized in the following days.

ROMANIA

During the winter of 2011-2012 the precipitation amounts were largely normal in December 2011 and January 2012. There were hard snow falls during the entire month of February. For December 2011 and January 2012 the temperatures were higher than the climatological averages. For February 2012 the temperature was lower than the climatological averages with deviation in the range of -2 0 C and -10 0 C.

The decrease of the temperature in February 2012 led to low natural gas pressure, which affected the generation of gas fired power plants. During the same period the natural gas consumption for domestic use was increased.

During the 19th of February until the 23rd of February, 2012, Transelectrica faced a difficult situation in the Romanian Power System caused by the serious energy deficit.

Due to the energy deficit between 19th of February until the 23rd of February, 2012 Transelectrica took countermeasures which led to the limitation of the electricity exports originating from Romania.

Due to the lower than expected temperature and hard snow falls during the February 2012, Transelectrica has faced a difficult situation in the Romanian Power System caused by serious energy deficit, as a result of:

- Low hydro flows on the Danube and on several other internal rivers, with the consequence of very low water levels in the storage lakes and activation of force majeure clause by SC Hidroelectrica S.A. (the main reserve supplier).
- Very low temperatures (which have led to an increase of natural gas consumption for domestic use).
- Difficulties in supplying coal (both hard coal and lignite) and natural gas, as well as fuel oil use in power plants, in conditions of very cold weather and blizzard.

In these circumstances, Transelectrica has informed all neighbouring TSOs and market participants about the necessity to adopt safety measures consisting of limitation of the electricity exports originating from Romania. Transelectrica has attempted to find the best solution in order to minimize the effects of capacity and/or schedules curtailment. That is why, after the closure of the day-ahead process, Transelectrica have reduced pro-rata the notified schedules corresponding to daily capacity rights only for some hourly intervals, on the dates of 10, 11 and 13 February. The notified transits of electricity were exempt from these measures. The exchange programs were not changed independently by Translectrica, instead they were discussed with all our neighboring TSOs and final versions were a result of this matching process: ESO-EAD accepted the changes from 10, 11 and 13 February, whilst MAVIR accepted the changes from 11 and 13 February, and EMS has not accepted any change.

For the 14-23.02.2012 the allocated capacities on Romanian - Bulgarian and Romanian-Hungarian borders were reduced 100 %, but only for certain hours during each days. Also for this period the notified transits of electricity were exempt from these measures.

- low hydro flows on the Danube and on several other internal rivers, with the consequence of very low water levels in the storage lakes and activation of force majeure clause by SC Hidroelectrica S.A. (the main reserve supplier).
- Very low temperatures (which have led to an increase of natural gas consumption for domestic use).
- Difficulties in supplying coal (both hard coal and lignite) and natural gas, as well as fuel oil use in power plants, in conditions of very cold weather and blizzard.

During the January and February 2012 months there were no planned or unplanned outages in the Romanian transmission network.

Certain actions could be taken into account, although they do not depend on TSO:

- A more judicious HPP production scheduling is necessary during the summer, so that they enter the winter with sufficient reserves.
- The increase of natural gas stored during the summer.

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SLOVAKIA

A warm December and January, a very cold February, and a very dry March. This was the weather of winter 2011/2012 in brief. The first half of February was very cold, and average temperature of February was only -4.4 °C (-3.8 °C lower than in 02/2011). But average temperature during this winter was 1.7 °C (last winter 0.8 °C).

There was a decrease of consumption (-1.89 %) and also production (-5.06 %) of electricity from December to March, when compared to the same period of winter 2010/2011. Concerning production, there was a high decrease from hydraulic (-19 %) and fossil fuels (-17 %) power plants. The winter peak load was recorded on Tuesday, 7th February 2012 at 18:00, 4 395 MW, (compared to the peak of winter 2010/2011 at the level 4 342 MW recorded in December 2010).

Import of electricity (338.4 GWh) increased significantly (winter 2010/2011 only 1.7 GWh). From December 2011 to February 2012 the total import was 483.4 GWh, and in March 2012 there was an export of 145 GWh. Import of electricity shared around 3.3 % of winter consumption 2011/2012. High import was caused by electricity trades rather than by the lack of generation capacities in Slovakia.

High electricity transit flows via the transmission system of Slovakia which began in July 2011 also continued in winter period 2011/2012. High transits of electricity from the North-West to the South-East of Europe were caused by high production of electricity in renewable sources in the North of Germany and deficit of production in the South-East of Europe. Due to high power flows, on many occasions the reliability criterion n-1 was not fulfilled. The loading of some transmission lines was above 80 or even 90%, and in some hours it was at the limit of the permanent transmission loading of the lines (e.g. tie-line between SK and UA). To prevent serious disturbances which could also spread to the neighbouring systems, (cascade tripping of transmission lines) and to unload lines of the transmission system of Slovakia, which were at the limit of their transmission capacities, reconfigurations (changes) of connection in the selected substations (Lemešany and Varín) were performed many times during the period between 29th December 2011 and 9th March 2012.

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SLOVENIA

Average monthly winter temperatures for Ljubljana were 3.3°C in December, 1.6°C in January, -3.2°C in February and 10.1°C in March. The lowest monthly temperatures in the winter period were -17.7°C in December, -20.1°C in January and -23.4°C in February. December, January and March were warmer than the historical monthly average; February was colder than the historical monthly average. The precipitation in December was above the historical monthly average but in January, February and March the precipitation was below the historical monthly average.

There were no risks identified in the Winter Outlook 2011/2012 and no unexpected situations arose.

The consumption in the winter period was higher than estimated. The consumption of industrial consumers was higher for around 6 % (approx. 40 GWh) and the consumption of distribution companies was lower for around 0,1 % (approx. 4 GWh). The total consumption of electrical energy on transmission network in the winter 2011/2012 period was around 0,8 % (36 GWh) higher than estimated.

Data from pumped storage hydro power plant Avče is currently not included in the calculated data because of power plant outage. In the winter period in Slovenian EPS three unplanned outages of thermo aggregates occurred. The outage of unit 4 in TPP Šoštanj with installed capacity of 248 MW occurred on January 4th with a duration of 1 hour and on March 9th with a duration of 1 hour and 50 minutes. The outage of unit 5 in TPP Šoštanj with installed capacity of 305 MW occurred on January 31st with a duration of 1 hour and 44 minutes. Due to a major defect, the pump-storage hydro power plant Avče on Soča River was not in operation during the entire winter period. There were an additional 9 planned hydro generator overhauls and 8 unplanned hydro generator outages in the winter 2011/2012 period. All these overhauls and outages were on the 110 kV network of power plants with installed capacity below 100 MW. None of the outages had an effect on the energy supply.

The numbers in the table below show that Slovenia was net exporter in the first 4 weeks of the observed period (49th week 2011 – 52nd week 2011), exporting 91 MW on average per hour and net importer in the first 14 weeks in 2012, importing 41 MW on average per hour. The saldo balance of Slovenia varied from max 22.5 GWh (export of energy) to min -25.6 GWh (import of energy) at the weekly level.

		SI-IT		SI-AT		SI-HR	
Year	Week	Imp [GWh]	Exp [GWh]	Imp [GWh]	Exp [GWh]	Imp [GWh]	Exp [GWh]
2011	49	3,46	69,52	58,49	3,68	56,73	66,18
2011	50	0,31	97,07	46,71	6,49	88,08	54,06
2011	51	4,17	71,34	56,66	2,96	64,70	63,13
2011	52	3,62	65,56	57,27	0,80	58,38	59,16
2012	1	9,30	26,52	59,19	0,21	34,24	62,70
2012	2	0,65	85,17	76,02	1,12	69,06	63,37
2012	3	0,80	85,68	97,41	0,35	61,23	71,39
2012	4	0,61	79,30	100,92	0,01	59,59	78,54
2012	5	0,50	81,10	99,91	0,53	72,16	65,37
2012	6	4,87	50,10	114,22	0,42	37,59	93,53
2012	7	3,80	34,20	101,42	0,16	31,22	84,31
2012	8	1,21	60,79	57,43	1,09	64,38	52,64
2012	9	0,54	95,30	62,48	1,55	90,17	53,34
2012	10	1,19	85,76	93,46	0,89	73,13	77,74
2012	11	1,07	84,08	100,09	0,73	64,06	81,14
2012	12	0,47	90,43	74,45	1,24	87,55	59,85
2012	13	0,74	73,76	77,55	0,67	75,28	64,22
2012	14	0,81	84,01	97,13	0,03	57,27	84,95

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SPAIN

General weather conditions have been milder than usual during this period of time. The demand values have been remarkably lower than last year due to the economic and financial crisis. There have not been significant stress level for the system adequacy, and the generation overhauls were as expected.

Actual demand was lower than expected for the months of December, January and February. The winter peak demand was reached in the first half of February 2012 (43010 MW), due to the low temperatures during that period. However, this winter peak demand was much lower than the historical peak demand (44900 MW, reached during winter 2007).

December 2011:

Temperatures have been slightly higher than average (effect on demand decrease of 1%).

Water inflows in reservoirs were lower than the average (44% of average).

Slightly lower specific wind production than in December 2010 (decrease of 4%).

January 2012:

Temperatures have been slightly higher than average (effect on demand decrease of 1.8%).

Water inflows in reservoirs were much lower than the average (25% of average).

There was lower specific wind production than in January 2011 (decrease of 11%)

February 2012:

Temperatures have been slightly lower than average. (effect on demand increase of 1.9%).

Water inflows in reservoirs were much lower than average (20% of average).

Higher specific wind production than in February 2011 (increase of 22%).

March 2012:

Temperatures have been above the average. There was no remarkable effect on demand.

There was lower specific wind production than in March 2011(a decrease of 20%). Domestic generation capacity was sufficient to cover peak loads.

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SWEDEN

Overall, the winter of 2011/2012 has been a very mild winter. The only exception was in early February when the temperatures decreased drastically. At this period the temperature in Southern Sweden was around -15 °C, while some areas in the Northern parts of Sweden recorded temperatures below -30 °C. Week 5 was particularly cold as the temperatures fell gradually from Wednesday to Saturday. It was on this Friday morning, on the 3rd of February, that the highest consumption was recorded for the winter of 2011/2012. The consumption was then in line with the prognosis made in the previous Winter Outlook Report; somewhat lower than during the severe scenario, but higher than during the normal scenario. If the temperatures recorded on the following day, which came to be the coldest during the winter, had occurred on a weekday, it is likely that the consumption would have been in line with the severe scenario (approx. 27,8 GW) which would have been an all-time high.

At the time of peak consumption Sweden had imports from Norway, Denmark and Germany, and exported to Finland, with zero exchanges with Poland. This was as expected, just as it was expected that the hydro power was run maximally (around 13,7 GW, out of an installed capacity of 16,2 GW, can be run at the same time due to hydrological constraints). However, the production at the nuclear power plants was far lower than estimated, and at the time of peak consumption only 6 out of 10 units were in production. However, since the availability of nuclear power has been uncertain in recent years, and since the nuclear power generation was known as the largest source of error in the prognosis, this low nuclear scenario was not unthinkable. All other power sources were producing as predicted, all though the wind power production was higher than during a typical scenario.

Svenska Kraftnät had to activate part of the peak load reserve during week 5 to maintain operational security. This reserve consists of both production and consumption reduction, which through a financial agreement with Svenska Kraftnät is contracted during each winter. This reserve acts as an extra resource to ensure a satisfactory power balance in Sweden.

As no maintenances which affect the power balance are usually planned for during the winter unless it is essential, the grid has been more or less intact during the period. Fenno-Skan 2, an 800 MW HVDC link between Sweden and Finland, was commissioned at the beginning of the winter of 2011/2012. Unfortunately the submarine cable was damaged in February, and the interconnection has therefore been estimated to be out of service until the beginning of May 2012.

SWITZERLAND

December 2011 was characterized by relatively high temperatures. Precipitation was below average in Southern Switzerland and above average in the rest of the country.

In January 2012 the temperature was also above average and the month was marked by a lot of precipitation.

In February 2012 the temperature was exceptionally low, and there was very little precipitation.

March 2012 was marked by a highly above average temperature and was very dry.

No risk was identified in the Winter Outlook Report.

Dependence on the not-yet-available data of the Swiss Federal Office of Energy prevented the TSO from delivering more specific reports.

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

ENTSO-E

Summer Outlook 2012 and Winter Review 2011-2012 Report

(SOWR 2012)

Questionnaire and data collection guideline document

Important:

The period covered by the Summer Outlook Report will be from 6th of June 2012 (week 23) to 25th of September 2012 (week 39).

Deadline for submitting answers to this questionnaire and data in the Excel spreadsheet is Friday the 30th of March 2012.

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FOREWORD

The “Summer Outlook 2012 and Winter Review 2011-2012 Report” will be published on ENTSO-E web-site and communicated to the Electricity Cross-Border Committee of the European Commission3.

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 neighboring regions under both normal and severe conditions. Hence the requirement for TSOs to give an indication of their best estimate of minimum NTC values between countries is essential for this analysis. It is recognized 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 neighboring 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.

This is a significant change from previous summer outlook reports in terms of analysis of the submitted returns and being the first year of attempting to do this analysis. Based on the analysis, it is envisaged that these improvements will be embedded into all summer and winter outlook reports.

The format of the final report “Summer Outlook 2012 and Winter Review Report 2011-2012” will be:

Main Report (about 15 pages)

Executive Summary

Introduction and methodology

[3] "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.

Winter Review 2011-12

Summer Outlook 2012 (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 2010-2011 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 terminology4.

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

INPUT FROM EACH COUNTRY

The input expected from each country comprises 3 main parts:

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 analyzed 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 one-page or half-a-page synopsis and 1-2 pages 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, including a section for additional comments to highlight the issues that are particularly relevant for that country this summer.

QUANTITATIVE ELEMENTS

See attached Excel spreadsheet.

The data is requested for synchronous time each Wednesday (11:00 CET) in order to allow meaningful analysis when determining cross border flows. It is recognized that this may not be the peak demand in every region in the summer but 11:00 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 January with updates in order to take into account the increased knowledge of the situation since the last SAF (outages, status of hydro reserves, etc.).

An additional requirement is in PART E of the Excel spreadsheet 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. A synchronous time of each Sunday 03:00 CET is chosen as this represents the minimum European demand point.

GUIDELINES FOR COMMENTS

Each TSO is requested to provide the following information:

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 demand minimum periods

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.

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 that for countries that rely on imports, that they are available from neighboring countries. To do this analysis, each TSO is requested to give its best estimate of the minimum NTC that it anticipates will be available.

This is a significant change from previous Summer Outlook reports and is driven by a desire to have a confidence check that adequacy can be maintained for each country under both normal and severe conditions. It builds on the successful analysis that was completed for the previous Winter Outlook report.

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

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of the analysis, additional questions may be asked from the relevant TSOs if particular country boundaries are considered critical.

This is the first year that the Summer Outlook report has attempted to do this sort of analysis and follows on from the successful analysis in the previous Winter Outlook report.

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. This is the first time that this analysis has been carried out and it is anticipated that lessons will be learnt that will be applied to future reports.

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GUIDELINES FOR COMPLETING THE SPREADSHEET

The analysis is country based and not control area nor bid area based. It is recognized 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 11:00 CET

for each month of the considered period namely the third Wednesday of each week at 11:00 CET

for typical weeks or days (at least the third Wednesday of July) at 11:00 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 neighboring 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 neighboring regions.

It is recognized 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

Where outage rate for wind not readily known, can set outage rate to zero and put all data for outage rates, load factors into unused capacity.
Example shown has a combined unused capacity of 70% for normal conditions

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[5] 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 December 7 to April 4. Possible load reductions in normal conditions should be mentioned (line 14). It results in the Net weekly peak load for NORMAL conditions (line 15).

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 useable 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.

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

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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 neighboring country ensure that the neighboring country has also included the contract as an export contract.

A change for the spreadsheet for this year is to highlight the country from which the firm contract exists. If there is more than one country then please highlight either via a comment in the spreadsheet or by return. 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 neighboring countries that are able to provide exports.

It is recognized 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 of the minimum NTC and may be different from what is publicly published. It is recognized 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 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 recognized that for many TSOs, it is not possible to calculate weekly values and hence a best estimate on the minimum value taking into account known variables (such as planned maintenances) is requested.

It is recognized 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

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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.

Simultaneous value manually overwritten at 0.3 to reflect conditions that while each separate country can have 0.2GW of flow, there is an overall restriction of 0.3 across all three countries.

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 website6. 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 has been added with 4 additional data items requested. The intention is to analyze 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:

[6] https://www.entsoe.eu/fileadmin/template/other/images/map_entsoe.png

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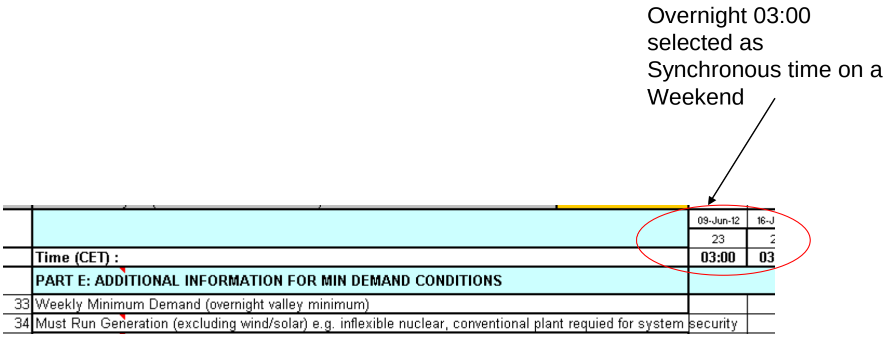


A description of what information is requested is:

Weekly Minimum Demand (line 33): this is requested for 03:00 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 (8th)

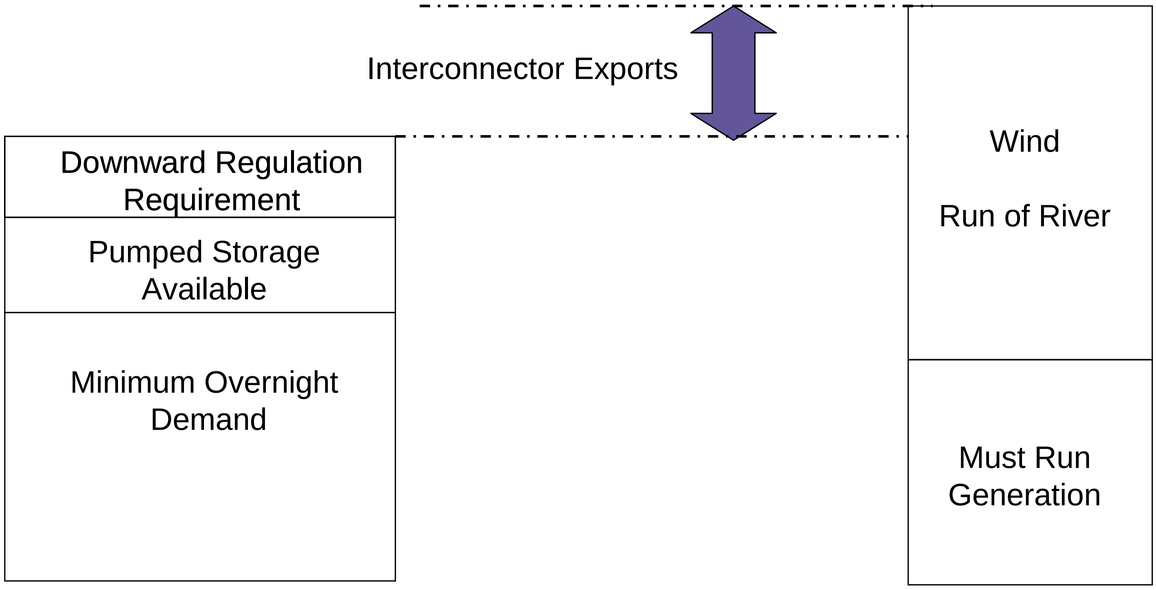
Must Run Generation (line 34): the data should include the level of inflexible (i.e. not sensitive to price) generation that is anticipated to be running across the minimum demand periods. Thus it is anticipated that for most TSOs this will include a level of nuclear generation, CHP, Biomass and Coal and Gas generation that is always on the system to maintain overall system security and voltage regulation. The user is specifically not asked 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 (line35): 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 (line 36): 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 (line 37): this is the level of pumped storage capacity and is requested as it is that it is different from the value requested in 4b.

The intention of the analysis is to look at high wind, run of river, 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 there is a solution. This is described graphically below:



It is anticipated that the colored 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 renewable scenario.

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QUESTIONS AND COMMENTS

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

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?

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

Please indicate how the submitted NTC values have been derived.

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

Issues, if any, associated with utilizing 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)

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

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

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

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

Any other issues of relevance that are not covered above?

Winter Review 2011-2012 Introduction and Questionnaire

Following the publication of the ENTSO-E winter outlook report, it 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; 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 2011) is available to view at:

https://www.entsoe.eu/fileadmin/user_upload/_library/publications/entsoe/outlookreports/20111124_Winter_Outlook_2011-2012__Summer_Review_2011.pdf

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Questionnaire on Winter Review 2011-2012

1. General Commentary on Winter Conditions

Recalling main features and risks factors of the Winter Outlook Report, please provide a brief overview of Winter 2011-2012:

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 2011/2012

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 (egg. 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 neighboring states

Transmission infrastructure: outages (planned/unplanned), reinforcement realized, notable network conditions (local congestion, loop flows etc.)

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

4. Lessons Learned for Winter 2012

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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