Summer Outlook 2021

Winter Review 2020-2021

country comments

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ENTSO-E Mission Statement

Who we are

ENTSO-E, the European Network of Transmission System Operators for Electricity, is the **association for the cooperation of the European transmission system operators (TSOs)**. The 42 member TSOs, representing 35 countries, are responsible for the **secure and coordinated operation** of Europe's electricity system, the largest interconnected electrical grid in the world. In addition to its core, historical role in technical cooperation, ENTSO-E is also the common voice of TSOs.

ENTSO-E **brings together the unique expertise of TSOs for the benefit of European citizens** by keeping the lights on, enabling the energy transition, and promoting the completion and optimal functioning of the internal electricity market, including via the fulfilment of the mandates given to ENTSO-E based on EU legislation.

Our mission

ENTSO-E and its members, as the European TSO community, fulfil a common mission: Ensuring the **security of the inter-connected power system in all time frames at pan-European level** and the **optimal functioning and development of the European interconnected electricity markets**, while enabling the integration of electricity generated from renewable energy sources and of emerging technologies.

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Introduction

This document includes individual country reviews on the security of supply situation in their system during the last season. The reviews are also accompanied by country comments on the expected adequacy situation or specific operational conditions during the coming season.

The aim of the retrospective reviews is to present the most important events that occurred during previous season and to compare them to the previous Seasonal Outlook study results. Important or unusual events or conditions in the power system and the remedial actions taken by the TSOs are also mentioned.

Comments on the expected adequacy situation and any additional information are presented to provide more background information about the particular power systems, which might not always be represented in pan-European adequacy models.

Countries did not provide comments or reviews if there was no relevant information to be reported.

Austria

Summer Outlook 2021

No adequacy or downward regulation issues are expected in Austria for the summer of 2021.

Winter Review 2020 – 2021

The winter of 2020-2021 (December, January, February) was mild. Especially in December and March the temperatures were far above the average of the period from 1991-2020. In contrast, January temperatures were below the long-term average. The rapid change from very cold to very mild weather in February was remarkable. In some regions of Austria temperature differences of over 30 degrees were observed within just one week.

Concerning precipitation, the Alps divided Austria into two very different regions this winter. There was significantly more rain and snow in the south of Austria than in an average winter. On the other hand, this winter was very dry on the north side of the Alps, from the northern Tyrolean lowlands over most of Salzburg to Upper Austria, Lower Austria and Vienna.

Cold spells did not lead to any problems with the electricity supply this winter. Furthermore, there were no new load peaks, in part thanks to the lower load due to the COVID-19 pandemic in comparison to the average of 2017-2019. Besides, no tight situations occurred where security of supply would have been endangered.

Belgium

Summer Outlook 2021

No adequacy issues are expected in Belgium for the summer of 2021. There is an increased risk for downward regulation problems in Belgium due to a full revision of a pumped storage unit in combination with non-flexible generation, especially during weekends (reduced load) with a lot of wind and solar production. During these weekends significant export values are expected, where additional measures (nuclear modulation, wind curtailment, CHP reduction, …) is not excluded.

Winter Review 2020 – 2021

Elia encountered no adequacy issues last winter. This was due to good nuclear availability (especially as from the end of December 2020) and generally mild weather. The commissioning of Alegro HVDC cable [1GW] increased the exchange possibilities.

The cold snap in Belgium (>P99 average temperature compared to seasonal temperatures) between 09/12 and 13/02 did not lead to adequacy issues. The reason was threefold:

- There was medium wind production during the cold snap which is usually not the case
- The cross-border capacity was at its maximum since no impacting outage was planned on Elia grid
- The cold snap happened mostly in the North of Europe, which limited the amount of import needs of France. Since the adequacy situation of Elia is strongly linked to this parameter, no issues were encountered in this regard.

On 07/12, imbalance prices in intra-day reached an all-time high upwards of 2000€/MWh. Wrong estimates on the day-ahead market from the market parties was the core of the issue rather than a lack of energy in Belgium.

- According to our estimations, day-ahead market trades to cover Belgian load were off by more than 1GW for some hours of the day.
- On the other hand, RTE imported a lot on the day-ahead market (mean 5GW and up to 10 GW) reducing the amount of capacity leftover for ID market in Belgium.
- Intra-day trades on Nemolink limited the compensation needs for Elia balancing but some moments remained where Elia had to activate expensive balancing products.

The covid outbreak in Belgium had a limited effect on the load, reducing the total consumption of Belgium during the winter by 4%.

Bosnia and Herzegovina

Summer Outlook 2021

No adequacy or downward regulation issues are expected in Bosnia and Herzegovina for the summer of 2021; a positive power balance is expected.

Winter Review 2020 – 2021

In general, there have been no significant disturbances in the electric power system of Bosnia and Herzegovina during the past winter. The consumption in the winter of 2020-2021 was slightly lower than in the winter of 2019-2020 (about 1-2% lower) because of the COVID-19 pandemic.

Maximum hourly consumption in the winter of 2020-2021 was registered on 18 January 2021 at 18.00 and was equal to 1.829 MW. This value is approximately the same as the maximum hourly consumption in the winter of 2019-2020 (1 827 MW).

Separation of the Continental Europe electric power system in two synchronous zones on January 8 also affected the power system in Bosnia and Herzegovina. The biggest frequency value registered in the power system of Bosnia and Herzegovina during this event was about 50.62 Hz. It was stabilized to 50.2 Hz by activation of frequency containment reserve (FCR) and by turning off some generation units in the power system of Bosnia and Herzegovina and other countries in the Southeast synchronous zone.

Bulgaria

Summer Outlook 2021

No adequacy issues are expected in Bulgaria for the summer of 2021 – capacity margins are expected to be well above the required.

Winter Review 2020 – 2021

No significant disturbances in the Bulgarian power system were detected during the winter period 2020–2021. The monthly average temperatures were higher than the normal ones and this together with the COVID-19 second wave led to a reduction in peak loads and energy demand stayed pretty much the same as in the previous winter (2019–2020). Bulgaria remained a significant net exporter through all the winter months.

Croatia

Summer Outlook 2021

Seismic activity, which started in 2020, is still a present threat to the Croatian power system.

Higher demand has to be taken into account during extremely high temperatures. Historical highs are not expected since tourism, an important branch of the Croatian economy, is affected by the COVID-19 pandemic.

Planned maintenance of generation and transmission units will be performed as usual.

Winter Review 2020 – 2021

Demand in the Croatian power system did not reach historical highs during the winter of 2020-2021.

Maximal hourly demand occurred on 15 February 2021 at 20.00. Its value was 2 879 MW, which is pretty much lower than the historical maximum of 3 193 MW

On the other side, total monthly demand was continually higher than in the winter of 2019-2020: around 1.1% in December, 0.9% in January, 1.3% in February, and 7.6% in March.

Favourable weather conditions enabled higher production in domestic hydro and wind power plants. During the largest part of December and January and quite a few periods in February, exports were higher than imports, while imports were dominant in March.

A series of earthquakes occurred in central Croatia, causing great damage to the transmission and distribution systems. An especially strong earthquake with an interruption of supply occurred on 29 December 2020 at 12.19 CET. In spite of this critical situation, regular supply was largely restored during the afternoon of the same day.

Denmark

Summer Outlook 2021

Energinet expects a stable summer period. Power adequacy in DK1 and DK2 seems to be quite good during summer. There are planned maintenances on power plants and yearly maintenances on the HVDC connections and AC connections to the neighbouring countries Sweden, Norway, Germany, and the Netherlands. Maintenance will only take a few days, so there will be no long outage periods due to maintenance.

There will be several reinvestments in 150 kV and 132 kV stations/lines, but these will not affect the capacity on the border connections; there will only be local problems.

Potential critical periods and foreseen countermeasures

DK1 and DK2: Energinet does not expect any problems with downward regulation. Energinet expects countertrade with Germany (TenneT). Normally, there is a need for downward regulation in DK1 and DK2, and the expectation is that Energinet can manage this.

DK1: The capacity on the border with Germany (TenneT) has been increased last summer. That gives a capacity of up to 2500 MW in both directions. There can be some periods with outages in the German grid, but that should not affect the power situation in DK1.

DK2: Kriegers Flak has gone into operation this winter. This gives a new additional interconnection capacity between Denmark and Germany (50Hertz) of up to 400 MW. The capacity depends on the production on the wind farms on German and Danish sides. The wind farm on Danish side is not in full production as it is still under implementation.

Winter Review 2020 – 2021

There were no significant incidents in the Danish price areas, DK1 and DK2, during winter 2020-2021. In January, electricity prices were higher than normal due to cold and calm weather. However, these conditions impacted neither power adequacy nor power balance.

Finland

Sumer Outlook 2021

Typically, summer peak demand in Finland amounts to 60% to 70% of winter peak demand. Therefore, summer is not as critical from an adequacy perspective as winter. However, as summer is the high season for power plant maintenances and overhauls, there is less generation capacity available in summer than in winter. In addition, some maintenance on interconnections is foreseen for the summer season. Some of the maintenance information was not yet available during the time of Summer outlook data collection and thus was left out from this analysis due to the summer outlook timeline and publication time of the Urgent Market Message (UMM). Nevertheless, demand can be met with available generation capacity and a high level of import capacity is also available. No adequacy or downward regulation issues are expected for the coming season.

Regarding the Russian import it should be noted that there are uncertainties due to the impact of capacity payments on the Russian electricity markets. Part of Russian import is modelled as simplified fixed flow and part is modelled as price dependent generation capacity in Finland. These uncertainties however are not expected to have an impact on adequacy for the coming season.

When interpreting the capacities published in dataset for Finland, it should be noted that Finland uses peat for energy production, and for modelling reasons the peat capacity is primarily calculated under the hard coal category.

Winter Review 2020 – 2021

Overall, the past winter was closer to average compared to the previous warm winter. At the Finnish peak demand hour, the consumption was 14 267 MWh, which was still about 900 MWh lower than the all-time high electricity consumption in Finland. The consumption peak occurred on 18 February 2021 between 9:00 and 10:00 EET. At peak consumption, domestic electricity production was 11 191 MW and net imports were 3 067 MW. No adequacy or downward regulation issues were identified during the past season.

France

Summer Outlook 2021

The Covid-19 pandemic should prolong its lowering impact on demand estimated to -2%. This value is highly dependent of the dynamic of the pandemic and the related policies. The dependency of demand to temperature due to air-conditioning become significant above 25°C with up to 700 MW/°C during extreme hot spells.

Meanwhile, the availability of generation should be high enough to ensure upward Adequacy. In particular, the nuclear planning and the hydro stock are close to the 2019 values.

As usual in summer, most likely constraints could come from the downward Adequacy with non-flexible generation exceeding demand and calling for significant export values from France. Interconnection capacities should be high enough to cope with such situation observed on weekends on a regular basis and in July in particular.

Winter Review 2020 – 2021

General comments on past winter conditions

With the economy affected by the COVID-19 pandemic, the demand in France (adjusted for weather fluctuation) was about 2% lower than previous winter. Temperatures were close to average all winter. Considering the high load sensitivity to temperature in France (up to +2 400 MW/°C under long-lasting and severe cold spells), the major source of adequacy risk did not materialize.

The most challenging period was early January, when a cold spell affected a large part of Western Europe. This included France, where temperatures decreased by -3.7°C compared to average. Demand reached its winter peak then at 88 400 MW. As usual, French cross-border exchanges were globally oriented to imports during this cold spell, up to 8 700 MW.

Several strikes put some adequacy stress on the French system, particularly in December and January. Margins were tight and RTE (TSO) had to send alerts to market participants in order to get more balancing offers and on recover margins. In the end, these circumstances didn't lead to adequacy issues in real time.

Specific events and unexpected situations that occurred during the past winter

On 8 January, the Continental Europe Synchronous Area was separated into two synchronous areas due to a cascade tripping of several transmission network elements in the Balkans. The frequency dropped to 49,745 Hz in the North-West of Europe. On RTE's side, 1 300 MW of industrial load was disconnected due to this frequency excursion, according to the load disconnection service contracted by RTE. This load shedding contributed to frequency stabilization of the North-Western part of Continental Europe in the first seconds following the incident.

Another consequence of the incident was the loss of the HVDC link between Santa Llogaia (Spain) and Baixas (France) that occurred due to an erroneous protection setting of auxiliary sources at a frequency threshold of 49.75 Hz. Auxiliary sources that caused the loss were located at Baixas, French side. Coordinated countertrading between France and Spain was necessary to cope with the loss of interconnection capacity and the protection setting has been corrected.

More details are available in the ENTSO-E interim report.

Germany

Summer Outlook 2021

General information

Due to the German nuclear and coal phase-out, there is a continuous reduction of installed conventional power plant capacities. The pumped-storage power plants (PSPs) of the “Kraftwerksgruppe Obere Ill-Lünersee” (turbine capacity: 2.1 GW; pumping capacity: 1.4 GW), which are installed in Austria but assigned to the German control block, remain in the German dataset. For the same reason, the pumped-storage power plant Kühtai and storage power plant Silz (total turbine capacity: 0.8 GW; total pumping capacity: 0.25 GW) are also included in the German dataset.

The non-market resources for Germany contain:

- **Lignite units in stand–by (“Sicherheitsbereitschaft”):** Lignite-fired power plant blocks with a total capacity of 2.4 GW are currently in backup mode. The lead time in which the power plants are completely available is 240 hours;

- **Grid reserve**: Used to resolve congestions and contains different types of power plants located in Germany. Currently, it comprises a total capacity of 5.6 GW;

- **Out-of-the-market Demand Side Response**: With the Ordinance on Interruptible Load Agreements (AbLaV), interruptible demand can be obliged to take measures to maintain grid and system security. For the purpose of AbLaV, interruptible demand is defined as consumption units, which can reliably reduce their demand for a fixed capacity upon request by the German TSO. Currently, about 1.5 GW of interruptible demand is available (prequalified amount of power).

- **Capacity reserve**: Since 1 October 2020 and until 30 September 2022, a total capacity of 1.1 GW of power plants outside the market is available as reserve for unforeseeable events. These power plants have to be available within maximally 12 hours and are activated in case of a lack of market clearance (D-1 and ID). They can also be used to resolve grid congestions.

A heat wave (prolonged hot and dry period) could constrain power plant availability because of problems with cooling water supply and high water temperatures or fuel transporting problems due to low river levels.

Extensive conventional power plant unavailability abroad can also affect Germany.

No critical periods for maintaining adequacy are expected.

Potentially, the increasing PV generation could lead to high power flows in the German transmission system.

In addition, a situation with high wind generation in the north of Germany and a low PV generation in the south could cause high power flows.

The time around Easter and Whitsunday could be critical concerning voltage problems due to very low demand. In addition to market-based redispatch, grid reserve power plants are used to solve voltage problems, if needed. In periods with high renewable generation and low (regional) demand, high power flows on interconnections are expected. In some power flow situations, regional infeed management of renewables might be necessary to maintain system operation security. Nevertheless, no critical situations are expected.

Winter Review 2020 – 2021

For TransnetBW (TSO) the highest demand was reached on 12 January 2021, equaling 10.9 GW. The other German control areas did not reach historical demand highs.

Maintenance of power plants and grid supply was partially shifted due to COVID-19.

Great Britain

Summer Outlook 2021

This summer we will again be dealing with challenges and uncertainties caused by the COVID-19 pandemic. Last spring and summer, with the country in lockdown, we saw record low demands on the electricity transmission system. We implemented measures to ensure Great Britain consumers continued to receive secure and reliable electricity supplies and are well prepared if similar steps are necessary this summer.

Our central forecast for electricity demand assumes a general relaxation of COVID-19 restrictions through the period April to June, in line with the road map recently announced by the Prime Minister. We have also prepared for other higher and lower demand sensitivities. We have retained the ODFM (Optional Downward Flexibility Management) service we introduced last summer to help manage particularly low demands on the system.

Weather-corrected demand seen on the transmission system at a peak and minimum level will be higher than last summer, as reduced impact is seen from COVID-19 on electricity demand, but lower than summer 2019. Increasing generation connected to the distribution networks also continues to drive down transmission system demands.

The central COVID-19 impact scenario shows that, under normal weather conditions minimum transmission demand is 17.2 GW. Taking weather variability into account, under 1-in-10-year weather conditions this could be as low as 15.7 GW.

Sensitivity analysis shows that with a high impact COVID-19 scenario, minimum demand could go as low as 14.7 GW under 1-in-10-year weather conditions.

These minimum demands are quoted assuming zero exports and this means there is scope for the ESO to take actions to increase demand using exports over the interconnectors.

Supply and Operability

We will be able to meet demand and our reserve requirement at all times throughout summer 2021 under all interconnector scenarios. We expect to have to take actions on the system when demand is very low.

We have retained the Optional Downward Flexibility Management (ODFM) service we introduced last summer to help manage periods of low demand. Under our central case we are not currently forecasting any requirement to use the service, however we may call on it should it be necessary due to weather conditions or COVID-19 impacts on demand.

Weather and system conditions could also lead to more expensive days over the summer at times of high or low demand which may mean we need to make more use of our balancing tools and capabilities to manage the system effectively.

Lower summer demands will also likely increase the amount of work needed to manage high voltage levels.

Interconnector outages planned for this summer are:

- Interconnector France–Angleterre (IFA) pole outage will reduce capability from 2 GW to 1.5 GW from 6 September to 10 September and then further reduce to 1 GW until 17 September due to a bipole outage. Another bipole outage is from 4 October to 29 October and the capacity will reduce to 1 GW.

- Interconnector France–Angleterre (IFA2) is currently on a maintenance and expected to return on 21 May.

- BritNed Interconnector to Netherlands is currently on a fault outage and expected to return on 28 May.

- East West Interconnector to Ireland (EWIC) will be on maintenance from 23 August to 12 October.

- Moyle Interconnector to Northern Ireland will be on maintenance from 17 July to 18 July.

- NEMO link to Belgium will be on maintenance from 20 September to 26 September.

- North Sea Link Interconnector to Norway 1 000 MW is commissioning during the summer.

- Eleclink Interconnector to France 1 000 MW is planned to commission later in the year.

Winter Review 2020 – 2021

General comments on past winter conditions

Great Britain had adequate generation supply this winter, but with a smaller forecast margin than we have seen historically (8% compared to 13% for previous year). There were six tighter days when Electricity Market Notices (EMN) were issued and the market responded by providing additional generation. There was a cold spell in early January and this resulted in winter peak transmission system demand of 46.4 GW on 7 January 2021. There were also several periods when wind generation was at sustained lower levels than seasonally expected.

Specific events and unexpected situations that occurred during the past winter

Overall electricity demands were depressed due to COVID-19 lockdown restrictions.

Temperatures were higher than average for most of the winter, about 0.5°C above normal. There was a cold spell in early January and this resulted in winter peak transmission system demand of 46.4 GW on 7 January 2021. The temperatures on this day were about 5.1°C below normal.

There were six days for which an Electricity Market Notice (EMN) was issued for the next day's evening peak demand. These were 4 November 2020, 5 November 2020, 6 December 2020, 6 January 2021, 8 January 2021 and 13 January 2021. These were mostly cold days with lower wind generation resulting in high transmission demand. The markets responded by providing additional generation and the EMNs were cancelled before real time. There was no impact on supply.

There were two days when, following an automated review of margin at four hours before real time, a Capacity Market Notice (CMN) was automatically issued for the evening peak demand. These were on 3 December 2020 and 8 January 2021. The markets responded by providing additional generation, and the notices were cancelled in the following hour. There was no impact on supply.

Flows through interconnectors from France, the Netherlands, and Belgium to Great Britain were close to full capacity on most days at the peak hour.

There were unplanned maintenance outages on the BritNed interconnector to the Netherlands from 8 December 2020 to 7 February 2021 and 9 March 2021 onwards.

There was no major maintenance or any forced outages on any of the other interconnectors (Moyle interconnector to Northern Ireland, EWIC interconnector to the Republic of Ireland, French interconnectors and NEMO interconnector to Belgium).

The new IFA2 interconnector started generating from the end of January 2021.

Highest wind generation recorded was 14.0 GW on 13 February 2021 at 12.30.

Impact of COVID-19

Overall demand levels were affected by COVID-19, with demands lower than had been anticipated in the forward-looking studies done in August 2019. But the demands were slightly higher than planned for in August 2020, as the economy rebounded more strongly than initially anticipated.

Some maintenance work had been delayed from the summer of 2020, which meant there were more network constraints than in a typical winter.

Greece

Summer Outlook 2021

The Greek system is expected to be in balance in the summer of 2021. The level of nationally available generation and the very high estimated hydraulic storage of hydropower stations ensure adequacy and security of the Greek interconnected System, which is not expected to be threatened under normal or severe weather conditions. There is no planning for maintenance during this summer. Moreover, water reserves are expected to be higher than previous year's level.

In very warm periods during the summer, fire incidents can possibly affect the transmission capacity.

Additionally, further limitations of lignite production are likely during the summer period due to the possible withdrawal of old lignite units.

On certain days during Spring season a very limited number of conventional units are in operation due to a high penetration of renewable energy sources. The operation of the system can be stressed in the direction of high voltages and limited reserve capacity.

Potential critical periods and foreseen countermeasures

The most critical period during summer is the period between 10 and 25 July due to the anticipated maximization of the demand in an annual timeframe related to the occurrence of high temperatures. Although the COVID-19 pandemic led to a load decrease, normal load levels are expected during the forthcoming summer.

The role of interconnectors for the forthcoming summer period is important for generation adequacy in the aforementioned case of an increased demand.

The interconnections can play a significant role especially in periods with large variations in system demand. In these cases, IPTO (TSO) could export or import energy to/from other countries depending of the market prices.

Most critical periods for downward regulation and countermeasures

The most critical periods for downward regulating capacity are usually from 0.00 to 6.00 EEST (due to low demand) and from 11.00 to 17.00 EEST (due to high PV production in spring).

The adopted countermeasures are:

- Request of sufficient secondary downward reserve.
- Use of pump units.

Interconnectors are not used for reserve exchange.

Winter Review 2020 – 2021

During last winter, there were few days where severe climatic conditions (cold snaps) occurred; all without consequences for system adequacy and stability. The temperature ranged from a low to a normal level for most of the season.

Cold snaps in winter 2020-2021 did not lead to lack of supply since they were short in duration (2-3 days). Demand has not reached historical highs mainly due to COVID-19 low demand conditions.

Heavy snow on 14-17 February lead to a cut-off of distribution lines in the area of Attica, affecting mainly household customers. The load that was interrupted is estimated at around 600 MW.

The prolongation of the planned outage of two CCGT units in combination with a delay of the rainfall period, which temporarily reduced hydraulic reserves, stressed reserve margins during December. These incidents, however, did not lead to a lack of supply.

The COVID-19 pandemic led to a demand decrease of around 12% compared with an anticipated demand for Winter 2020-2021.

There was no planning for high-level maintenance during winter.

Specific events and unexpected situations that occurred during the past winter

During last winter there were no specific events on any voltage level. The limitation of power production from lignite thermal power plants did not cause problems on the residential and industrial level and in the production of electricity.

Hungary

Summer Outlook 2021

As a result of constantly growing demand, import cannot be ignored during any period. The most critical periods can be caused by severe weather conditions in June and July, since both the system load and the reliably available capacity of units are temperature-dependent.

A further high increase of PV installed capacity is expected in the near future, but the procured amount of system reserve can mitigate the risk of balancing problems.

Most critical periods for maintaining adequacy margins and countermeasures

The capacity under maintenance during summer 2021 is between 0.025 and 1.43 GW. The most critical periods are the 18th and 19th weeks of summer when the level of maintenance is approximately 1.43 GW. Even if the level of adequacy complies with the requirement, the Hungarian energy system still suffers from limited reserve capacities in certain markets during these maintenances.

However, the COVID-19 pandemic could influence the power plants' planned maintenances due to a reduced availability of foreign specialists and components. The owners of power plants and MAVIR (TSO) are constantly analysing the possible risks.

Most critical periods for downward regulation and countermeasures

Critical periods for downward regulation are not expected. The available downward regulation reserve can ensure system balance, even in the case of a high level of PV generation.

Winter Review 2020 – 2021

Comments on weather conditions and record for peak load

In the winter of 2020-2021 there were no cold snaps in Hungary. However, the load level of the Hungarian system slightly increased compared to the historical data of the last year despite of the mild winter. The load exceeded the expected level multiple times in February and the power system experienced a new record for peak load on 11 February 2021 equal to 7 119 MW.

In October 2020 a new record for peak PV generation was set at 1 038 MW and was reached once again on 13 February 2021.

Specific incidents related to electricity supply disturbance for consumers:

As a part of the Continental Europe Synchronous Area the Hungarian energy system was also affected by the system separation on 8 January 2021, but the system separation did not have any effect on operating units and system adequacy was guaranteed.

There was no other critical event on the transmission grid during which consumers were affected.

Overview of supply margins

Hungary usually imports between 2 and 3 GW of electricity at the moment of daily peak demand. The major part of this import is necessary to guarantee system adequacy. We had no major issues concerning cross-border exchange during the winter time.

The supply in last winter was sufficient thanks to import and a low number of maintenances. Generation outages occurred during all winter, but did not reach a critical level.

Impact of COVID-19 pandemic on power system

The COVID-19 pandemic did not have a significant impact on the power system in the winter of 2020-2021 since the stricter restriction limited only to the catering sector.

Ireland

Summer Outlook 2021

Generation margins will remain tight throughout the summer period due to extended forced outages of two large CCGT units and planned generation outages.

Winter Review 2020 – 2021

On 7 December 2020 at 17.33 Ireland demand reached a record high of 5 359 MW. The lunch time peak record was set on 11 February 2021 at 13.04 when demand reached 5 041 MW, which was the first time the lunch time peak ever exceeded 5 000 MW.

System Alerts were issued on two occasions during the winter period due to tight generation margins:

9 December 2020

A System Alert was issued between 17.00 and 18.18 where the demand reached a peak of 5 290 MW. Wind generation was 500 MW lower than forecast at approximately 900 MW and a unit failed to synchronise. 1 304 MW (20%) of dispatchable conventional generation was on forced outage out of a total of 6 487 MW, including the unit that failed to synchronise. Northern Ireland also experienced a System Alert on that evening. Emergency Assistance of 200 MW was called on the Moyle Interconnector between Northern Ireland and Great Britain.

6 January 2021

A System Alert was issued between 16.30 and 18.05 where the demand reached a peak of 5 241 MW. Wind generation was approximately 130 MW. 779 MW (12.5%) of dispatchable conventional generation was on forced outage out of a total of 6 250 MW. System Operator trades took place on the East-West Interconnector between Ireland and Great Britain to mitigate. Northern Ireland also experienced a System Alert on that evening.

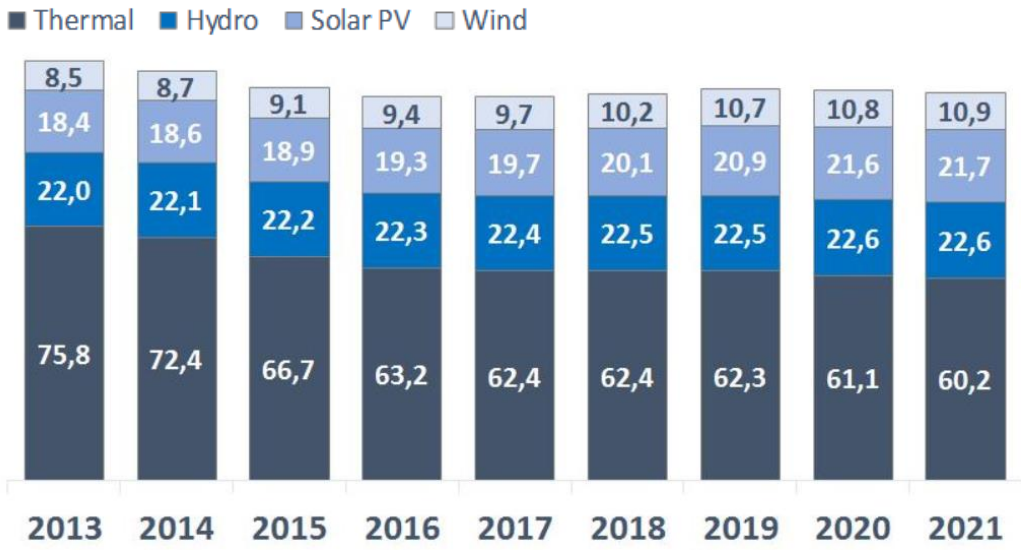
The forced outage rate of conventional dispatchable generation continues to be high with a rate of 25% for the month of February 2021.

Italy

Summer Outlook 2021

Generation capacity in Italy

In recent years, the Italian Power System has faced a significant reduction of the conventional (thermoelectric) power fleet. The growth of variable (e.g. wind and PV) generation, together with a drop-in demand, is putting commercial pressure onto traditional generators, leading to the decommissioning of the oldest power plants. Between 2013 and 2021, the following phenomena affected the power system operation and adequacy in Italy: about 16 GW installed generation was phased out. The total amount of installed conventional power plants fell from 75,8 GW down to 60,2 GW and additional 2,1 GW conventional power capacity is not available due to environmental/ legal constraints and mothballing. This trend can be observed on the Figure below. This phenomenon has been seriously affecting the power system adequacy in Italy and some important warning signals in terms of adequacy on the national level scarcity were already registered in last years during the summer 2015 period as well as for winter 2016/2017.



Until 2020 "Statistical Data on electricity in Italy" prepared annually by Terna are used. For 2021 onward provisional data are considered.

Since 2017 (SOR 2017), the decommissioning of conventional capacity has reduced: the available thermal capacity is roughly similar to the values of the last years.

Grid reinforcements, developed by the Italian TSO in these last years, also helped to smooth out some effects caused by the power plants decommission (especially in the main islands).

COVID effect on upward adequacy assessment

The analyses were performed with data taking into account the COVID-19 pandemic situation started last year, in March 2020. Thanks to the continuous improvement of the situation, a full recovery was hypothesized at the end of 2021. Because of that, even for the coming summer the load is expected to be lower than past years even in case of heat wave.

Adequacy margins are similar to typical summer values, confirming the necessity of import from neighbouring countries. Critical situations could happen in case of low availability of import (values lower than 10° percentile of registered values). Nevertheless, postponement and/or cancellation of maintenances could be used as countermeasures.

Furthermore, improved regional coordination processes (including regional weekly adequacy assessment - STA project) will support the definition of proper and efficient countermeasures in case the risk of incurring in critical situations will be detected at short term horizon.

Most critical periods for downward regulation and countermeasures

The worst weeks for downward regulation are expected to be the central weeks of August, the starting and the ending part of the summer period (June and September). In order to cope with this risk, the Italian TSO (Terna) prepared preliminary action and emergency plans and, in case of need, will adopt the appropriate countermeasures. In order to guarantee system security, Terna could adopt enhanced coordination with neighbouring TSOs and special remedial actions, such as the curtailment of inflexible generation. Further special actions, such as NTC reductions, could be planned in cooperation with neighbouring TSOs.

Winter Review 2020 – 2021

During last winter, electricity demand was slightly higher (+ 2.7% approximately) compared to the same period of the previous year.

The increase in demand was determined in part by a slight decrease in temperatures (-0.7°C on average) and in part by an increase in consumption, which, without considering the effect of temperatures, was around 1.8%.

During the period under review there were no particular incidents with significant consequences on the electricity system or on the supply of electricity to consumers.

Even the COVID-19 pandemic had no significant impacts on consumption compared to the previous year.

Lithuania

Summer Outlook 2021

Since the last summer season net generating capacity increased by 91 MW and currently is equal to 3 509 MW.

Total volume of power reserves for the summer season will not change significantly and replacement reserves will increase by 42 MW. Reserves will be equal to 917 MW during the whole season which represents 26% of net generating capacity. The maintenance schedule will not be intensive; the largest maintenances will reach 10% of total net generating capacity. This is planned to happen during the maintenance of a generating unit of the Kruonis Pumped Storage Plant on the 40th week of 2021.

Maintenances on Lithuanian DC links with Poland and Sweden are planned on the weeks 19 and 37 of 2021 respectively.

No adequacy or downward regulation issues are expected for the coming season.

Winter Review 2020 – 2021

In the winter of 2020-2021, national consumption was 4% higher than in the winter of 2019-2020. A maximum demand of 2 100 MW was reached on 18 January 2021, while a minimum demand of 1 056 MW was reached on 2 January.

In general, the winter balance portfolio consisted of 37% local generation and 63% imports from neighboring countries. During the winter of 2020-2021, total generation was 5% higher compared to the winter of 2019-2020. Thermal generation grew more than twice (474 GWh) compared to the winter of 2029-2021 and solar power plants produced twice as much (48 GWh) as well. Generation from wind power plants decreased by 33% (372 GWh) as well as hydro generation decreased by 25% (78 GWh). While consumption and local generation grew, imports decreased by 3%.

Lithuania imported 3.1 GWh and exported 0.9 GWh in the winter of 2020-2021. The largest shares of imported electricity were from Sweden (42%) and Russia (29%), while 74% of exports was to Poland.

Import contributed significantly to adequacy in Lithuania. COVID-19 and a colder-than-usual winter increased Lithuanian consumption. However, there were no adequacy issues during this past winter.

Malta

Summer Outlook 2021

No adequacy issues are expected for the summer of 2021.

Adequacy risks in Malta can be reduced through the additional emergency local generation plant capacity, reduction of voltage on the medium voltage network by manual control of transformer tap changers, reduction of load at third party water purification plants on a goodwill basis, and startup of third-party standby generators at large installations, also on a goodwill basis.

Winter Review 2020 – 2021

Demand for the winter of 2020–2021 was close to projections. As at the end of 2020, cumulative demand was 4.5% lower than 2019 and by the end of March 2021, demand remained constant at a cumulative decrease of 4.3% when compared to 2019.

This decrease was influenced by two important factors: the uncharacteristically wilder winter and higher temperatures compared to 2019, and the effects on the economic activity resulting from the COVID-19 measures.

Planned maintenance and inspections were carried out as scheduled and no issues with supply and power plants' availabilities were encountered during the winter season.

Northern Ireland

Summer Outlook 2021

Generation margins in Northern Ireland look to be sufficient throughout the summer period with the outages of large machines currently planned to be sequential.

Winter Review 2020 – 2021

On 6 January 2021 at 17.23 the Northern Ireland demand peaked at 1 627 MW for the winter of 2020-2021. This level of demand is well below the previous Northern Ireland record but coincided with a period of low wind energy (less than 40 MW in total) and high scheduled interconnector export to Great Britain (400 MW). This resulted in the Northern Ireland system being in an Alert state from 16.00 to 20.00, due to low system margin. As the situation was known ahead of time both dual rated Kilroot units were able to be switched over to oil to provide a higher generation output over the peak. All available units were dispatched, with one gas turbine failing to synchronise. As Ireland was also in an Alert state, there was no support available on the North-South interconnector, however a trade with Great-Britain was reached to reduce the export on the Moyle interconnector.

In total there were seven occasions this winter when the Northern Ireland system was in an Alert state due to low system margin. The alerts generally occurred on weekdays between 16.00 and 20.00, over the teatime peak when demand is highest. The main reason for these system alerts was low system margin due to generator unavailability. Generator maintenance in 2020 was disrupted due to COVID-19 which resulted in planned generator outages running into the winter period. Generator forced outages rates over the winter period were also significantly increased this year and most of the system alerts in Northern Ireland were due to overlapping forced outages of large machines. In addition, as in the example given above, there were times throughout the winter period when high levels of demand coupled with low levels of renewable generation and high scheduled exports on the Moyle interconnector had a negative impact on the Northern Ireland system margin. The actions that were taken to manage the Alert states included dispatching all available units, switching Kilroot units to operate on oil where time allowed, trading on the Moyle interconnector to decrease exports or increase imports, when possible, and receiving support from Ireland on the North-South interconnector, when available.

North Macedonia

Summer Outlook 2021

The expected available transmission capacity is sufficient to meet the needs for energy imports, transits and exports for the upcoming summer. The maintenance of the generation units is expected to take place in the period from June to September. No problems in the transmission network are expected even though numerous reconstructions/revitalizations in the power system will take place during the summer period.

During the winter of 2020-2021, Macedonia had a below-average snowfall, which will result in dry hydrology during the upcoming summer period.

Winter Review 2020 – 2021

During the winter period a high-paced reconstruction/revitalization procedure was performed on the power system, which is expected to continue in the upcoming summer period.

Generally, the demand was within the typical average for the winter period and there was no impact due to the COVID-19 pandemic. During this period of 2020-2021 Macedonia had a below-average snowfall, which will result in dry hydrology during the upcoming summer period. Due to the dry hydrology especially in the beginning of the winter period, low reservoir levels were registered at the hydro power plants. Consequently, the government imposed restrictions on the usage of the HPP reservoirs water which resulted in tight system adequacy. Fortunately, all the potential adequacy issues were solved thanks to the corrective measures taken from the TSO. After the first rainy period, all restrictions were lifted and the system continued with normal operation.

On 10 January 2021, the western part of Macedonia was affected by heavy weather conditions which lead to unplanned outages in the local transmission network. Heavy snow mixed with freezing rain caused an outage on two local 110 kV overhead lines and a lack of electricity supply in a small city and neighboring villages (ENS = 100 MWh). These outages were solved within two days of constant work thanks to the coordinated work of our overhead line maintenance team.

Poland

Summer Outlook 2021

Based on data prepared in March 2021, no adequacy risk was identified for Poland in the Summer Outlook simulation

Winter Review 2020 – 2021

During Easter 2021 holiday, on Easter Monday there was a lack of downward regulation due to low demand and high renewables infeed. PSE utilized pumping potential (already during the night), reduced all possible conventional generation, agreed emergency export (in periods when neighbouring TSOs agreed) but there was still the excess of power generation comparing to the demand. As the last resort, PSE took a decision for the first time ever to curtail wind generation. The reduction was effective between 10:00 and 14:00 and amounted to 1000 MW.

In mid-January 2021 a cold spell passed through Poland, causing the increase of energy consumption. On 18.01.2021 at 10:45 the historical peak demand was recorded for the first time in winter 2020/2021. The peak demand was also repeated on 12.02.2021. Both took place at 10:45 and amounted to 25.0 GW

Portugal

Summer Outlook 2021

No adequacy or downward regulation issues are expected in Portugal for the 2021 summer season.

Winter Review 2020 – 2021

Although the winter season was mild in general, the cold spell that hit Portugal in the first two weeks of 2021 set some record values for the electrical system.

In this period, on 13 January, a record daily electricity consumption of 185.1 GWh was registered in Portugal, surpassing the previous record set in 2010. On the previous day, at 19.30 UTC, the record for the maximum load had already been broken, reaching 9 887 MW. This is significantly above the previous record of 9 403MW, which also went back to 2010.

Despite the lockdown in the second half, this was the January with the highest electricity demand ever. It should be noted that these situations did not create grid operation or generation/demand balance issues, even if the largest plant in the system, the Sines coal power plant (1200MW), was decommissioned in late December.

Romania

Summer Outlook 2021

No adequacy issues are expected for Romania for the upcoming summer.

Maintenances are planned on power plants and on elements that are relevant for cross-border exchanges, but demand is expected to be met by available generation and import capacity.

Winter Review 2020 – 2021

During the winter period no adequacy issues were identified due to the availability of power plants, normal temperatures and good import capacity.

The effects of the COVID-19 pandemic on demand were negligible with consumption similar to the previous winter period.

Serbia

Summer Outlook 2021

For the upcoming summer, we do not expect problems to cover demand. Hydro reservoir levels are high and levels of maintenance are moderate. Significant energy exports are expected under normal weather conditions through the summer months.

Under severe weather conditions, i.e., extremely high temperatures and longer dry periods, extremely high peak demand might occur. This might lead to a reduction of planned export of energy. We are not expecting major electricity supply problems.

Winter Review 2020 – 2021

The past winter passed without major problems. After reduced energy exchanges caused by the COVID-19 pandemic in the first half of 2020, the situation stabilized during the second half of 2020. Weather conditions were generally with periods of higher temperatures than usual in January and February 2021 and without longer periods of very low temperatures.

Small amounts of energy imports occurred in the last quarter of 2020 and in January 2021.

Problems that related to the lack of energy in sub-area KOSTT (TSO), which operates within EMS Control Area, persisted until mid-December. On 14 December, by plenary decision of the Regional Group of Continental Europe, a separate control block that consists of OST (TSO) and KOSTT was created. Since then, the Serbian control area is well balanced.

Slovenia

Summer Outlook 2021

For the upcoming summer expected generation and import capacities are sufficient to cover all energy needs of Slovenia. Consequently, we do not expect any adequacy issues.

Scheduled maintenance of generation units is similar to previous years. The two most important scheduled maintenances relate to the nuclear power plant Krško - NEK (700 MW) in the period from 1 April until 4 May 2021 and the thermal power plant Šoštanj – TEŠ6 (539 MW) in the period from 8 May until 17 July 2021. Both periods are considered as periods with relatively low loads. We therefore do not expect any adequacy issues. During the periods from 27 March until 2 April and from 25 September until 1 October 2021, the only pumping hydro power plant in Slovenia with a nominal power of 180 MW (ČHE AVČE) will be in maintenance. We therefore expect that in the event of low load an export of maximally 100 MW might be required.

Winter Review 2020 – 2021

The winter was mild, without long periods of extremely low temperatures and without plenty of snow precipitation. Demand and its peaks were approximately 5% lower compared to the previous year, possibly due to the impact of a mild winter and also of the COVID-19 pandemic.

Our grid experienced some relatively short unplanned outages of thermal power plant TEŠ6, however we did not identify any adequacy issues at these events. The main incident occurred on 29th of December 2020 when an Earthquake shaked our neighbouring country Croatia, with epicentre near the city of Petrinje. Due to the earthquake the substation Tumbri (Croatia) was damaged and the outage disturbance was transmited to the neighbouring substation Krško in Slovenia. Consequently the turbine protection was activated in the Nuclear power plant Krško and the plant was offline till the 6th of January 2021, due to some extensive testing. No damage to the power plant was identified. During that period TEŠ6 was in planned maintenance, so our two biggest power plants were simultaneously not available, however our import capacities together with available reserves was sufficient for covering all our energy needs and all our consumers experienced no energy shortages.

Another major event occurred on 8 January when the Continental Europe Synchronous Area was separated into two synchronous areas due to cascade trippings of several transmission network elements in the Balkans, however this event had no effect on our grid from system adequacy point of view.

Spain

Summer Outlook 2021

No adequacy issues are expected for the forthcoming summer.

Winter Review 2020 – 2021

No lack of supply took place in the Spanish peninsular system during the winter of 2020-2021.

Although the temperatures were close to the average during the rest of the winter, the month of January was colder than average. From 7 January, the snowstorm “Filomena” hit mainly the center of Spain (including the capital, Madrid) and was followed by a cold spell with record low temperatures. The prices for electricity increased during that situation, mainly in the hours when the contribution from renewable energy sources was lower. The price of electricity was also influenced by the increase of the price of gas. No adequacy issues took place.

The demand level reached the peak value of 42 GW on 8 January, due to the snowstorm and the low temperatures. Such a high value had not been reached since 2012, although it is far below the historical peak demand which took place in 2007 (45 GW).

There were some incidents in the transmission network due to the snowstorm, but electricity supply was not affected. The main network incident was related to the split of the Continental Europe interconnected system in two synchronous areas, which caused a frequency deviation of -255 mHz in the western area. The HVDC link between Santa Llogaia (Spain) and Baixas (France) was lost due to the protection setting of the auxiliary sources at Baixas, at a frequency threshold of 49.75 Hz. Coordinated countertrading between France and Spain was necessary to cope with the loss of interconnection capacity. The protection setting has been corrected.

Concerning the supply margins, there were no occurrences of tight margins during the winter period.

Concerning the influence of COVID-19, the demand was on average similar to the previous year (looking to the period November-March). There was a higher number of maintenances of power units in November because of delays due to the COVID-19 pandemic. These didn’t affect the adequacy of the system.

Sweden

Summer Outlook 2021

Last summer, as maintenance work coincided with nuclear plants having prolonged revisions due to pandemic measures and/or low prices, the Swedish TSO chose to procure stability services from some producers to maintain margins of system reliability. For the upcoming summer, special procurement is not deemed necessary as the outage and revisions situation is more favorable after scheduled project work could be completed last year. However, new east-west flows through the Swedish grid causes capacity restrictions which will affect possible export and import flows during the summer.

The risk of low frequency stability is generally higher during the summer when less synchronous power plants are in operation. The Nordic TSOs will thus procure e fast frequency reserves on a regular basis on order to handle situations with possible low inertia. Situations with high excess of generation – generated by an increase share of renewable energy sources – can cause issues with high frequency due to limited possibilities to downregulate theses sources currently. However, the high share of hydropower expects to handle the power balance even in these situations thanks to the increased export capacity from the Nordic power system (i.e. NordLink and Kriegers Flak).

The risk of high voltages is generally higher during the summer when the consumption drops during nights and weekends. Voltage stability and regulation is increasingly important to assure during the summer months and to coordinate these needs with planned outages for investments and maintenance.

Lastly, possible heat waves during the summer can affect the power system since capacities are dependent on ambient temperatures. Capacities will therefore vary during the summer with respect to the weather forecasts and expected load flow conditions. Heat waves also increase the risk for forest fires that might force the TSO to take lines out of operation if the fires are close by.

Winter Review 2020 – 2021

The winter was generally mild, but a colder period hit Sweden in February, with peak demand occurring in the morning of 12th February with a net import on 500 MW for that hour. Overall, Sweden's net export was around 6.4 TWh for the winter season, even though certain areas in Sweden was occasionally dependent on import from neighboring countries.

The strategic reserve was not activated during the winter but ordered to the highest level of readiness with minimal production in operation three times. In addition, the TSO ordered to reduce the startup time for the strategic reserve seven times due to low adequacy margins.

Switzerland

Summer Outlook 2021

No adequacy issues are expected for the forthcoming summer.

Winter Review 2020 – 2021

In the autumn, sometimes very high transit and import flows appeared on the northern border and in the regions of neighbouring countries close to Switzerland. During the middle and the end of the winter period, high loading appeared on branches in the southern Alpine region.

Atmospheric causes (snow, ice, wind) punctually led to disturbances in the Alpine region.

The temperature was sometimes high compared to the average, therefore the maximal loadings of lines sometimes had to be lowered.

Temporary grid configurations were built because of some renovation projects in substations; these temporary grid configurations sometimes led to a locally lower availability and operation flexibility.