

Winter Outlook 2018/19

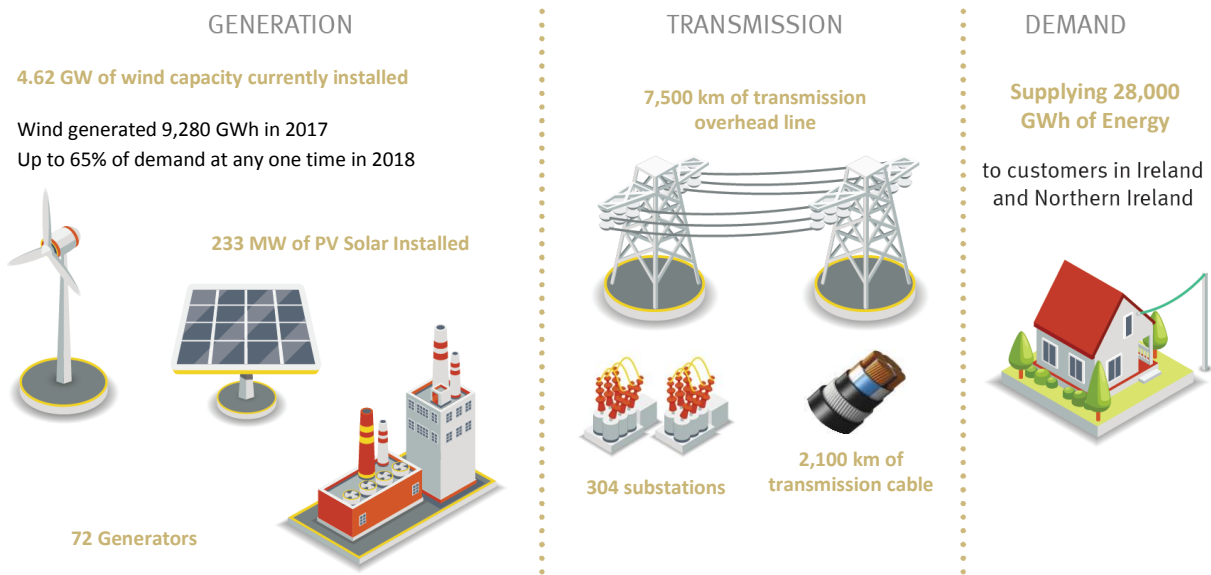
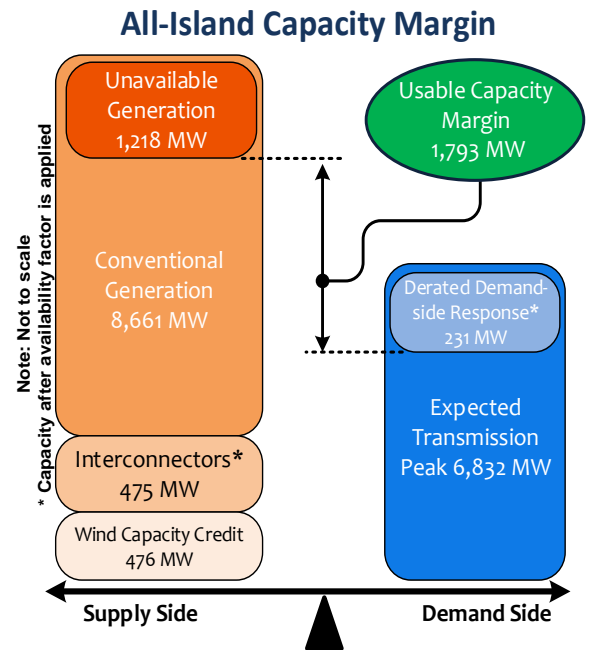
The EirGrid and SONI Winter Outlook is an annual summary that provides information on expected electricity demand and capacity margin on an all-island basis. The capacity margin is the excess generation and interconnection available to meet the peak electricity demand in Ireland and Northern Ireland. The outlook covers the period from 1 November 2018 to 31 January 2019.

It is expected that there will be adequate capacity to ensure a secure supply of electricity over the coming winter period in Ireland and Northern Ireland. The all-island capacity margin this winter is predicted to be 1,793 MW.

The peak demands in Ireland and Northern Ireland typically do not align. There is expected to be sufficient capacity margin in both jurisdictions to meet their respective peak demands. There is a predicted usable capacity margin of 844 MW over the peak demand in Northern Ireland. There is a predicted usable capacity margin of 1,036 MW over the peak demand in Ireland.

In Ireland, there are a number of forced (unplanned) outages of generators extending into December. While the capacity margin is expected to be adequate to meet forecast peak demand, there may be periods of low capacity margin if further generators are unavailable during low wind conditions over the winter period.

Note: The data used to calculate the capacity margin is the latest available data as of 19 October 2018.



Demand

In recent years the economic downturn led to significant reductions in the peak demand, as illustrated in Figure 1. However, there are signs of economic recovery; on the basis of the median demand forecasts in the Generation Capacity Statement¹ we anticipate an increase in the peak demand to 5,120 MW in Ireland and 1,730 MW in Northern Ireland for 2018.

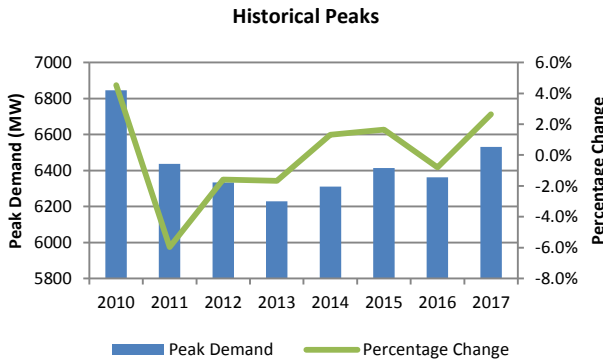


Figure 1 Historical Transmission Peak

Winter Daily Demand Profile

Figure 2 shows a typical winter's day demand profile. Whilst the lowest daily demand period for both jurisdictions is usually co-incident, the peak demand in Northern Ireland usually occurs 15-30 minutes before the daily peak in Ireland. The graph shows the typical shape of the daily demand curve throughout the winter period, with two major demand increases occurring from 06:00 to 08:00 and from 16:00 to 18:00.

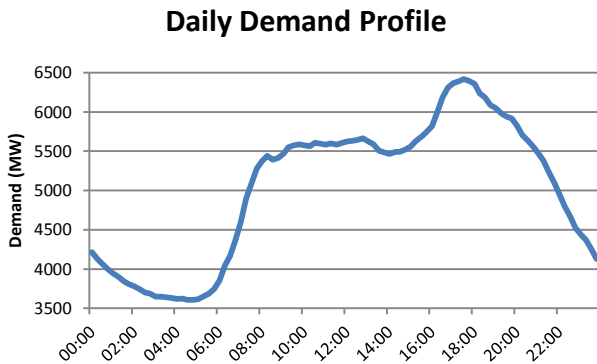


Figure 2 All-Island Daily Transmission Demand Profile

Peak Demand

The annual peak demand in Ireland and Northern Ireland do not always coincide. However, the peak demand for both Ireland and Northern Ireland is most likely to occur during December or January.

¹ Demand Growth based on all-island Generation Capacity Statement 2018-2027 Median Forecast

Last year, the annual peak demand for electricity in Ireland was 4,940 MW. This occurred on 13 December 2017. In Northern Ireland, the annual peak demand was 1,632 MW, occurring on 12 January 2018.

This year, it is expected that the combined peak demand across both jurisdictions will be between 6,570 MW and 7,020 MW. The median value for this winter is 6,830 MW.

Demand Side Units

A Demand Side Unit is a site, or set of aggregated sites, that can be instructed to reduce electricity demand. A combination of on-site generation and/or plant demand shutdown is used to deliver a demand reduction in response to an instruction from EirGrid or SONI.

Contributions towards the capacity margins from demand side response is currently 382 MW in Ireland and 79 MW in Northern Ireland.

Installed Capacity and Generation Unit Performance

The installed capacity of conventional generation in Ireland is 6,582 MW. The installed capacity of conventional generation in Northern Ireland is 2,079 MW. These installed capacity figures do not allow for forced outages which may occur during the winter period.

Generation Unit Performance

Figure 3 shows the weekly forced outage rate and the 52-week rolling average forced outage rate from September 2017 to September 2018.

Weekly forced outage rates can vary sharply on a week-to-week basis, with security of supply implications. The general trend is flat with an average outage rate of approximately 8%.

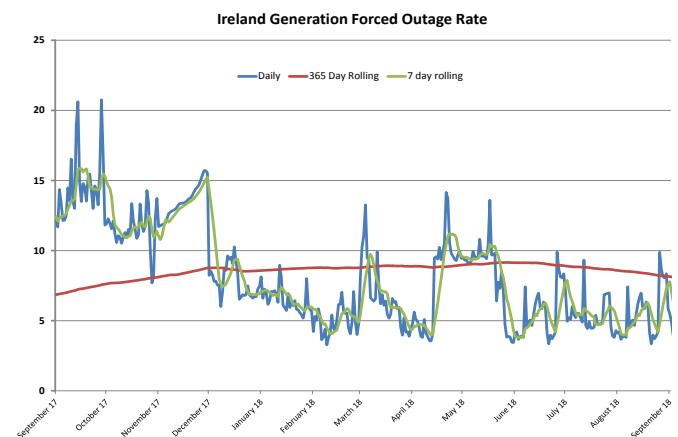


Figure 3 Forced Outage Rates for Conventional Units

Fuel Mix

An estimated all-island fuel mix for 2017 is shown in Figure 4. The figure is based on SONI data for Northern Ireland and the Sustainable Energy Authority Ireland data for Ireland.

- The all-island fuel mix shows that the largest portion of our power generation needs was met by gas (52.5%).
- Wind energy was the second largest source of energy at 26.4%.

- Coal was the third largest source of fuel, accounting for 13.2% of the all-island fuel mix in 2017.

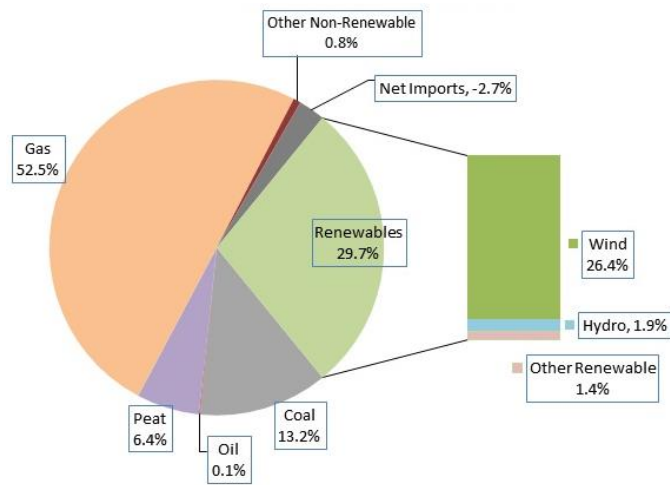


Figure 4 All-Island Fuel Mix in 2017

Wind and Solar Generation

Installed wind generation continues to grow in both jurisdictions. As of September 2018, all-island installed wind was 4,617 MW, corresponding to an all-island wind capacity credit of 476 MW² to the overall capacity margin and security of supply. This is a greater than 40% increase in installed capacity since 2015.

In Ireland, installed wind capacity has grown by nearly 700 MW in the past two years to 3,424 MW, with a corresponding wind capacity credit contribution of 353 MW². Installed wind capacity in Northern Ireland is now 1,193 MW, which corresponds to a wind capacity credit of 123 MW².

Installed dispatchable solar capacity in Northern Ireland is 233 MW. As the winter peak typically occurs after sunset, solar capacity has been assigned a capacity credit of zero.

Installed Wind Capacity

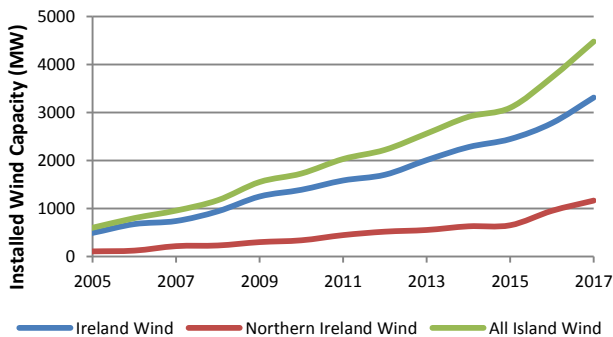


Figure 5 All-Island Installed Wind Capacity

Interconnection

The East West Interconnector (EWIC) links the electricity grids of Ireland and Great Britain (GB) through a High Voltage Direct Current (HVDC) undersea cable. The available net transfer capacity (NTC) from GB to Ireland for winter 2018/19 is expected to be 500 MW.

The Moyle Interconnector links the electricity grids of Northern Ireland and Great Britain through two HVDC undersea cables. The total installed capacity of the link is 500 MW but the transfer capability is constrained by network limitations on both sides. The available NTC from GB to Northern Ireland for winter 2018/2019 is expected to be 450 MW.

Both Ireland and Northern Ireland have been net importers of electricity from GB in previous years. However, both jurisdictions were net exporters to GB in 2017.

Interconnector Flows

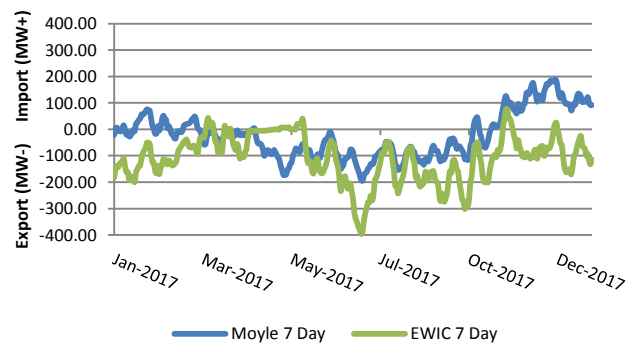


Figure 6 Seven-day rolling average of Import from/Export to GB

Key Developments over 2018

- Marina MRC generator closed on 10 September 2018 and Aghada AD1 generator closed on the 30 September 2018.
- Following a successful trial, the System Non-Synchronous Penetration³ limit has been raised to 65%.
- The all-island wind energy record was broken on 14 March 2018 with 3,655 MW of wind on the system.
- All-island installed wind capacity now exceeds 4,617 MW which corresponds to an all-island wind capacity credit of 476 MW.
- Installed dispatchable solar capacity in Northern Ireland is currently 233 MW.

Expected Outlook

Analysis was carried out to examine the ability to meet peak demands over the winter period.

An all-island capacity margin of over 1,793 MW is expected. This overall margin includes the available generation capacity (including typical forced outage probability), the wind capacity credit and imports from GB via the interconnectors.

² Given the variable nature of wind power, the wind capacity credit expresses how much conventional power generation can be avoided or replaced by a certain level of wind power.

³ System Non-Synchronous Penetration is a real-time measure of the percentage of generation that comes from non-synchronous sources such as wind and HVDC interconnector imports relative to system demand.

Security of supply is dependent on a number of factors, not just the capacity margin. The following assumptions have been used:

- There will be uninterrupted reserves of natural gas from the Corrib and Kinsale Gas fields as well as from the Moffat terminal with no shortage issues.
- Ballylumford B5 generator is excluded from the Northern Ireland assumed installed generation capacity from 31 December 2018, the date on which the Local Reserve Service Agreement will lapse.
- A 10% forced outage rate for available conventional generation is assumed except where the known total generator forced outages exceed 10%. In these cases the value of known generator forced outages is used instead.
- Unavailable Generation takes into account the forced outage rate, scheduled outages and a known operational constraint on Dispatchable Generation in the South region⁴.
- In line with the T-1 I-SEM Capacity Auction, we assume the capacity credit value of undersea interconnectors to be 50%.
- A fully intact network will be available.
- In line with the Generation Capacity Statement 2018 – 2027, we assume limited interconnection between Ireland and Northern Ireland grids, restricting north-south tie-line flow to 100 MW and south-north tie-line flow to 200 MW.
- Demand Side Units are energy limited and we have assumed an availability factor of 50% of their capacity based on statistical analysis of historical data.
- The availability of system services will not affect capacity margin.

- Due to the winter peak typically occurring after sunset, the installed solar capacity has been assigned a capacity credit of zero.

North South Tie-Line

The ability to exchange power over the North-South tie-lines between the Ireland transmission system and the Northern Ireland transmission system is an important feature of the Single Electricity Market. The level of import/export available at any point in time is dependent on generation availability in Ireland and Northern Ireland, the status of the Moyle interconnector, the status of the transmission network on both the Ireland and Northern Ireland systems and operating reserve requirements.

Expected Outlook

The analysis shows that there should be sufficient generation capacity this winter to meet peak demands and reserve requirements and that the security of supply standard will be maintained throughout the winter period.

Figure 7 shows the weekly generation capacity and peak demand forecast incorporating known outage dates at the time of publication.

Figure 8 shows the expected overall margin during the week when the estimated peak demand occurs.

Conclusion

The outlook for the winter period 2018-19 is that the capacity margin will be sufficient to ensure the security of supply standards are maintained in Ireland and Northern Ireland. EirGrid and SONI will continue to manage and monitor the system carefully and to keep all relevant stakeholders updated.

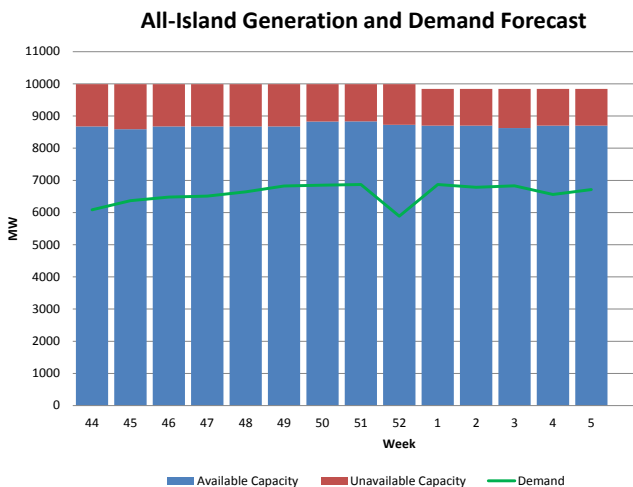


Figure 7 Forecast Weekly Generation Capacity and Demand

- All-Island installed wind capacity of 4,617 MW has been given a capacity credit of 476 MW.

⁴ A weekly Constraint Update report is published on the [SEM-O website](#) detailing forecast constraints

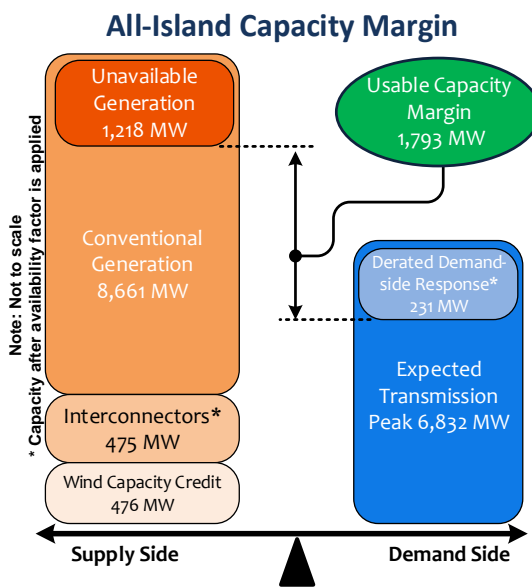


Figure 8 All-Island Margin Forecast for Winter 2018/19

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Disclaimer: While every effort has been made in the compilation of this Winter Outlook to ensure that the information contained herein is correct, EirGrid and SONI cannot accept responsibility or liability whatsoever for any damage howsoever caused by reliance on the information presented here. Note that the fuel mix is reliant on third party data.