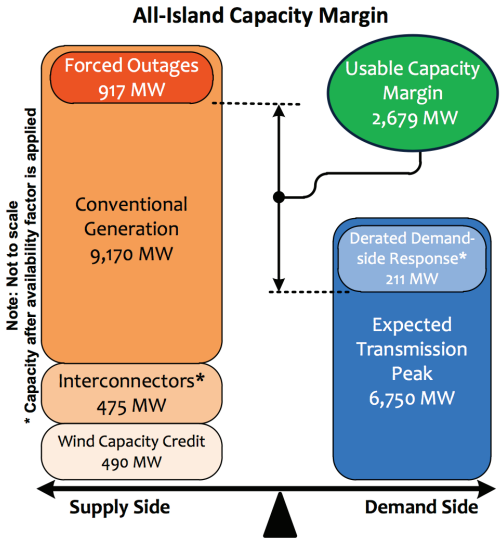
Winter Outlook
2017/18

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 2017 to 31 January 2018.

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 2,679 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 2,083 MW over the peak demand in Ireland. There is a predicted usable capacity margin of 890 MW over the peak demand in Northern Ireland.

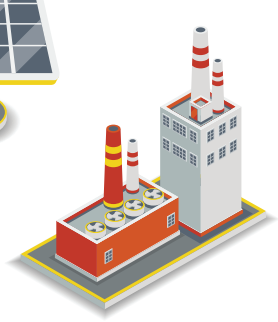


GENERATION

3.97 GW of wind capacity installed

Generating 7645 GWh in 2016
And up to 60% of demand at any one time

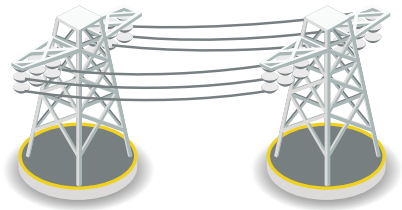
74MW of PV Solar Installed

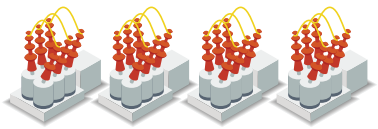


75 Generators

TRANSMISSION

9,600 km of transmission line





and 304 substations

DEMAND

Supplying 37,000 GWh of Energy

to customers in Ireland and Northern Ireland

EIRGRID SONI

Demand

In recent years the economic downturn led to significant reductions in the transmission 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 Statement[1] we anticipate an increase in the transmission peaks to 5,080 MW in Ireland and 1,730 MW in Northern Ireland for 2017.

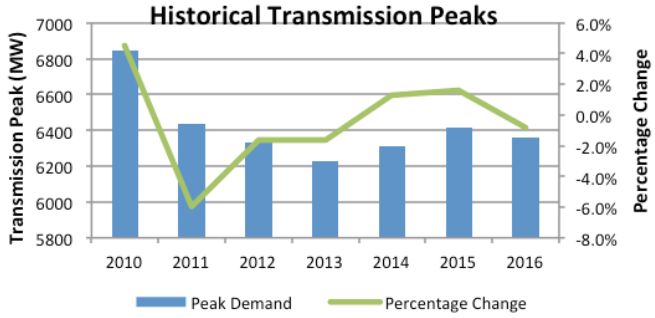


Figure 1 Historical Transmission Peak

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-incidental, 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.

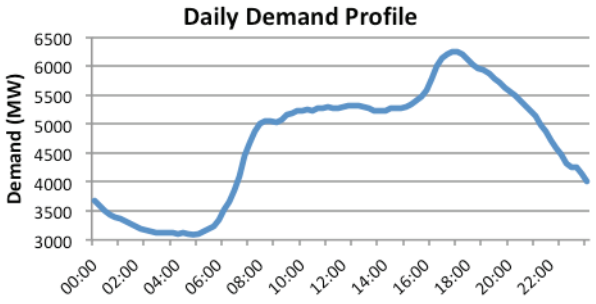


Figure 2 All-Island Daily Transmission Demand Profile

Peak Demand

The annual peak demand in Ireland and Northern Ireland do not generally coincide. In Northern Ireland, the peak may occur at the start or at the end of the year, whereas in Ireland it tends to occur in December.

Last year, the annual peak demand for electricity in Ireland was 4,760 MW. This occurred on the 21 November 2016. In Northern Ireland, the annual peak demand was 1,641 MW, occurring on 05 December 2016.

This year, it is expected that the combined peak demand across both jurisdictions will be between 6,570 MW and 6,990 MW. The median value for this winter is 6,750 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 353 MW in Ireland and 68 MW in Northern Ireland.

Installed Capacity and Generation Unit Performance

The installed capacity of dispatchable generation in Ireland will be 6,945 MW. The installed capacity of conventional generation in Northern Ireland will be 2,225 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 2016 to August 2017.

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 7%.

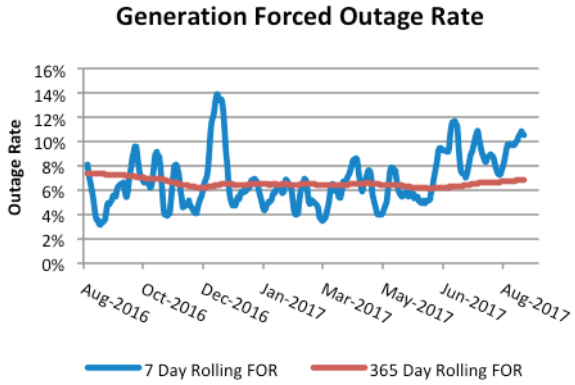


Figure 3 Forced Outage Rates for Conventional Units

Fuel Mix

An estimated all-island fuel mix for 2016 is shown. 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 is met by gas (46.5%).
- Wind energy is the second largest source of energy at 19.9%.
- Coal is the third largest source of fuel, accounting for 17.7% of the all-island fuel mix in 2016.

1 Demand Growth based on all-island Generation Capacity Statement 2017-2026 Median Forecast

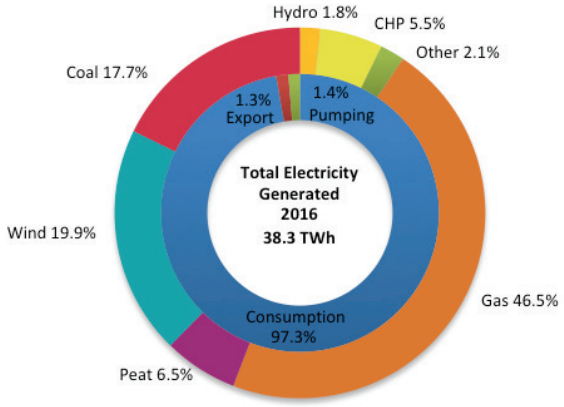


Figure 4 All-Island Fuel Mix in 2016

Wind and Solar Generation

Installed wind generation continues to grow in both jurisdictions. At the time of data freeze in September 2017, all-island installed wind was 3,970 MW, corresponding to an all-island wind capacity credit of 490 MW [2].

This is a greater than 20% increase in installed capacity since 2015.

In Ireland, installed wind capacity has grown by nearly 700 MW in the last year to 3,016 MW, with a corresponding wind capacity credit contribution of 386 MW3 to the overall capacity margin and security of supply.

Installed wind capacity in Northern Ireland is now 954 MW, which corresponds to a wind capacity credit of 158 MW[3].

Installed solar capacity in Northern Ireland is 74 MW. As the winter peak typically occurs after sunset, solar capacity has been assigned a capacity credit of zero.

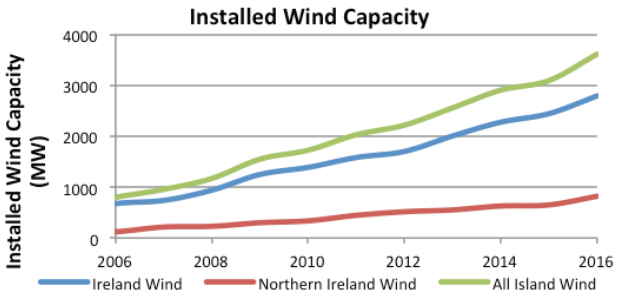


Figure 5 All-Island Installed Wind Capacity

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 2017/18 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 2017/2018 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 2016.

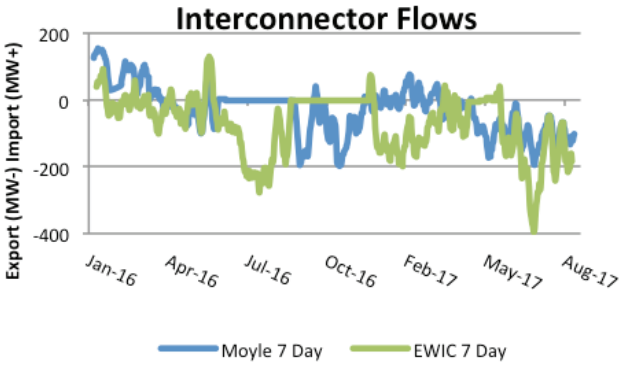


Figure 6 Seven-day rolling average of Import/Export to/from GB

Key Developments over 2016-17

- The Dublin Waste to Energy plant has been energised resulting in an additional 61.5 MW of capacity in Ireland.
- Kilroot 1 increased its oil capacity from 238 MW to 255 MW and Kilroot 2 increased its oil capacity from 238 MW to 258 MW.
- 74 MW of solar generation has been installed in Northern Ireland.
- All-island installed wind generation now exceeds 3,970 MW which corresponds to an all-island wind capacity credit of 490 MW[2].
- Following a successful trial, the System Non-Synchronous Penetration[3] limit has been raised to 60%.
- The export limit on EWIC has been increased from 300 MW to 500 MW under all conditions on a trial basis. The trial to remove the export limit on EWIC for all system conditions is ongoing.

[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.

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 2,679 MW is expected for the week when the all-island peak demand occurs. This overall margin includes the available generation capacity (including typical forced outage probability), the wind capacity credit and imports from GB via the interconnectors assuming that capacity is available.

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.
- A 10% forced outage rate has been assumed for conventional generation.
- In line with the Generation Capacity Statement 2017 – 2026, we assume a 50% availability factor for interconnector capacity.
- A fully intact network will be available.
- In line with the Generation Capacity Statement 2017 – 2026, 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.
- All-Island installed wind capacity of 3,970 MW has been given a capacity credit of 490 MW.
- Due to the winter peak typically occurring after sunset, the 74 MW of 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 Irish and Northern Irish 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 appropriate level of security of supply would be maintained throughout the winter period.

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

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

Conclusion

The outlook for the winter period 2017-18 is that the capacity margin will be sufficient to ensure the appropriate level of 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.

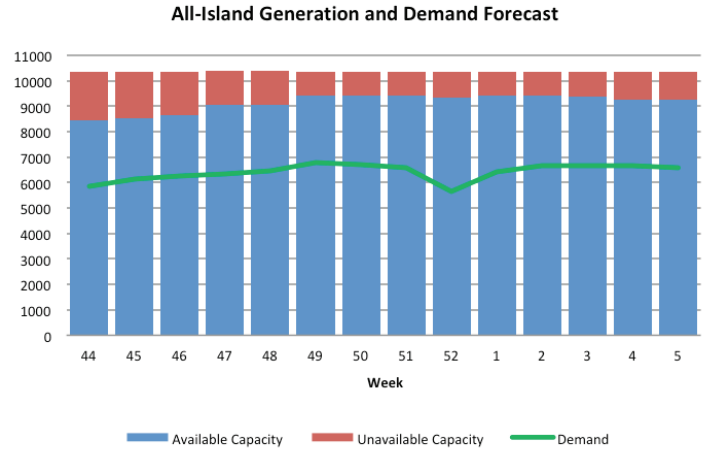


Figure 7 Forecast Weekly Generation Capacity and Demand

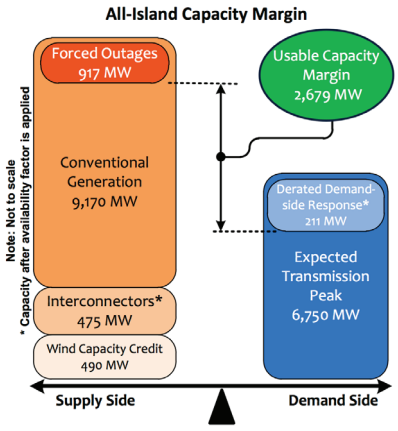


Figure 8 All-Island Margin Forecast for Winter Peak

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