

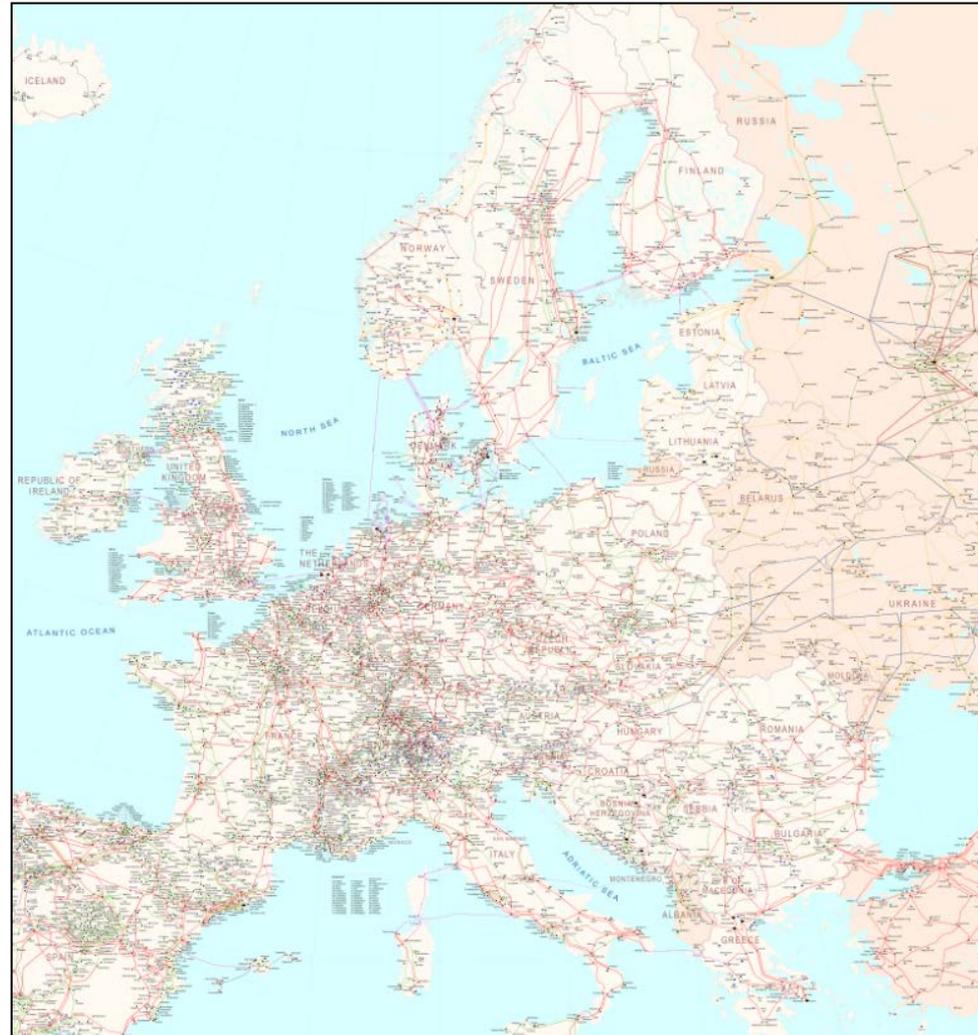
**IEA Electricity Security Advisory Panel: Integrating new
technologies while maintaining resource adequacy**

The role of interconnectors in GB adequacy planning

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ofgem

- **Introduction**
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 - Market context
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Interconnectors in Great Britain (GB)

- GB currently has around 4 GW of installed interconnection capacity*, making up around 5% of total installed generation capacity.
- These connect GB to the Netherlands (1 GW), France (2 GW) and Ireland (1 GW).
- Broadly, GB imports from the Netherlands and France, and exports to Ireland.
- There is a further 7.3 GW of proposed interconnector capacity. This could add Belgium, Denmark and Norway to the list of connected countries.

Market Context

- In recent years Europe has seen further market integration across Europe (ie market coupling) and an increase on the proportion of intermittent generation.
- These factors have created a requirement for further interconnection between countries in order to produce efficient outcomes.

Sources: National Grid, Ofgem

* Moyle has a total capacity of 0.5GW. Since 2012 it has reduced to 250 MW. Mutual Energy, the cable's owner, has announced it will return to full capacity by 2016.

Electricity Security of Supply Report (ESSR)

- This assessed generation capacity for the next three winters (ie those before the start of the CM in 2018/19).
- The aim is to provide a clear signal of generation adequacy to the market.
- Interconnectors are an area of uncertainty in this outlook.
- It also informs other Ofgem policy areas, such as New Balancing Services (NBS) and the overall capacity National Grid can procure.
- The assessment of interconnectors affects the perceived security of supply risk for upcoming winters, as well as the total generation volume National Grid procure through NBS and the cost of this.

Capacity Market (CM)

- Interconnectors are to be included in GB's 2019/20 T-4 auction for the first time. The auction is due to take place in December 2015.
- All participant capacities in the auction need to be de-rated. This gives an average availability over winter peak periods.
- Each interconnector also needs an individual de-rating factor. This reflects expectations of future imports to GB, as well as technical availability.
- Therefore the way interconnectors are treated can play a key role in the total capacity which is procured and the overall cost.

Cap and Floor

- Main aim is to facilitate interconnector investment and not to assess their role in security of supply.
- For further information, please see <https://www.ofgem.gov.uk/electricity/transmission-networks/electricity-interconnectors>

There are three main organisations involved in interconnector adequacy assessments. These are National Grid (system operator), Department of Energy Climate Change (DECC, government) and Ofgem (regulator). Together with the market, these bodies also co-operate on broader topics of security of supply.

Interconnector adequacy assessments roles

- **Electricity Security of Supply Report**
 - National Grid: Submits de-rating values to Ofgem. This is produced through quantitative analysis.
 - Ofgem: Scrutinises values and arrives at final de-rating factors.
- **Capacity Market**
 - National Grid: Submits de-rating values to DECC. This is produced through their own quantitative analysis.
 - DECC: Decides on the final de-rating value. This is done by undertaking their own quantitative analysis and evaluating National Grid's approach.
 - Ofgem: Scrutinises and feeds into National Grid's and DECC's analysis throughout through our own qualitative analysis.

Broader security of supply roles

- Market: Designed to deliver security of supply in the short- to medium-term.
- National Grid: Obligations to balance the system in an economic, efficient and coordinated manner. They may buy and sell energy, and procures associated balancing services. They also provide valuable information to market participants, and can propose changes to market arrangements.
- DECC: Broadly sets overall policy objectives for security of supply. From 2018/19, the government has set the target level of capacity adequacy and introduced policies to achieve this. They can also act using emergency powers in certain circumstances.
- Ofgem: The market works within a framework that we set to ensure value for money for consumers and quality of service in the overall operation of the system. We ensure that market arrangements are sufficiently designed to encourage security of supply.

Separate quantitative and qualitative assessments have been made relating to future interconnector operations in the Electricity Security of Supply Report and the Capacity Market.

Electricity Security Supply Report

- **Historical analysis**
 - Analysis of the historical performance of interconnectors was used to produce a robust and conservative de-rating value.
 - But using historical values can't be solely relied upon (eg changing market conditions).
- **Qualitative analysis**
 - Qualitative methodology to approximate the de-rating factor for each interconnector.
 - Considered commercial flows and technical availability. It also focused on ranges rather than a single figure.
 - Considered topics such as:
 - GB/European generation adequacy through to 2019/20
 - Future operational regimes (eg market coupling).
 - The types of situations which need to occur to create concurrent system stress.

Capacity Market

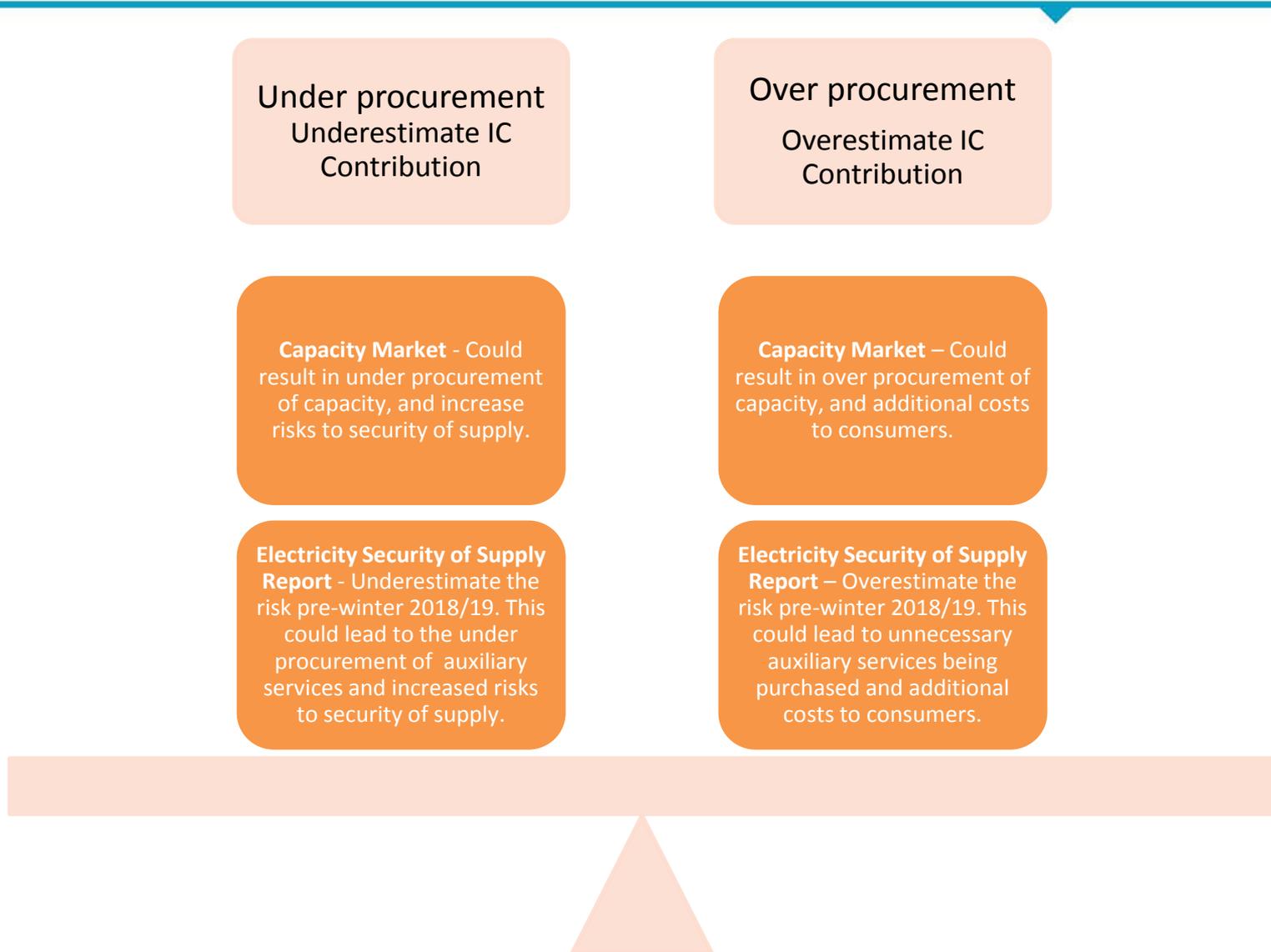
- As well as the analysis feeding in to the ESSR, a forward looking methodology was employed
 - Ran a pan-European model covering multiple scenarios developed by National Grid.
 - Model outputs were combined with background research (eg weather analysis, generation availability etc).
 - The combination of these two approaches produced a final de-rating factor for the forward looking approach.

- Two sets of de-rating factors have been produced:
 - In July 2015's ESSR, de-rating factors were used to estimate the contribution to generation over the next three winters of existing GB interconnectors.
 - In June 2015 DECC published their final interconnector de-rating factors for the 2019/20 T-4 auction. This list included existing interconnectors plus two interconnectors expected to be in operation by 2019/20: Eleclink (France) and NEMO (Belgium).

Interconnector	ESSR De-rating Factor	CM De-rating Factor
IFA (France)	62%	52%
BritNED (Netherlands)	59%	69%
Moyle and EWIC (Ireland)	0%	6%
Eleclink (France)	N/A	56%
NEMO (Belgium)	N/A	54%

Sources:
 NG: <http://fes.nationalgrid.com/>
 DECC <https://www.gov.uk/government/news/decc-sets-out-its-capacity-market-parameters-for-201920-auction>

Interconnectors in Ofgem's adequacy assessments – Trade-off



Challenges

- Interconnectors respond to market signals → need to forecast prices to forecast flows
 - Interconnectors flow from low to high price zones. Understanding future prices can be very challenging on a European level given the number of factors that affect them.
- GB recently joined NWE Day Ahead market coupling → past flows provide limited information for future flows
 - This new development could alter the behaviour of interconnectors. The impact isn't yet fully understood.

Additional Information

- We have identified several areas during our assessments where additional information would be useful:
 - Generation adequacy assessments for integrated markets.
 - The impact of market coupling on interconnector flows
 - How do domestic markets react to periods of system stress?
 - How do interconnector flows change during coinciding periods of system stress between interconnected markets?
 - Understanding better how weather events correlate across interconnected markets

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