[redacted]

21 Aug 2015

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Dear Mr Borland,

Response to Ofgem open letter dated 10 Aug 2015 Cap and floor regime: Update on Ofgem Initial Project Assessment of the Greenlink interconnector.

Thank you for inviting comments on the Greenlink interconnector IPA. I wish to make the comments set out in the remainder of this letter.

Yours sincerely,

[redacted]

Executive Summary

The Ofgem Paper suggests that Great Britain (GB) may benefit from lower Irish wholesale prices. Since, as discussed in this response, wind energy has little effect on the wholesale price in the I-SEM, this implies that the Irish wholesale price will drop to an unsustainable level, with the following consequences:

1. Fossil fuel fired dispatchable plant in the Irish Single Electricity Market (I-SEM) will require hugely augmented Irish subsidies to avoid being withdrawn from service.
2. Reduced synchronous inertia in the Irish system, giving rise to periods of instability during fluctuating wind conditions.

Furthermore, a cursory analysis of wind patterns in Western Europe shows that due to the geographic proximity of the two islands, shared weather systems mean that there is a high correlation between the average wind velocity in Ireland and that in GB at any point in time.

It is my view that the Greenlink Project will not bring any benefits to the GB consumer or indeed the Irish consumer. The evidence shows that it is simply not economically feasible. In all likelihood, if the interconnector is built, GB will be importing relatively more expensive gas powered generation for most of the time.

Price differentials between I-SEM and BETTA

Ireland currently has the third highest electricity price in the EU (after Denmark and Germany), while the UK is ninth[1]. In this context, the premise that wholesale prices in Ireland will ever be lower than that of the UK is scarcely credible.

- Gas will remain central to Ireland's electricity fuel mix into the future and will therefore set the SMP.
- This is gas that is either imported into Ireland from GB, or shipped in the form of Liquefied Natural Gas (LNG).
- The location of Ireland on the Western periphery of Europe dictates that transmission and/or transport costs result in a wholesale gas cost that is higher than that in GB.

[1] http://ec.europa.eu/eurostat/documents/2995521/6849826/8-27052015-AP-EN.pdf/4f9f295f-bb31-4962-a7a9-b6c4365a5deb

Requirement for conventional generators in the Irish system

The current position is that five of the gas and coal power stations in the Irish system are required to be on load at all times[2]. The current System Non Synchronous Penetration (SNSP) limit is 50%[3] and plans are underway to bring this up to 75%.

NB: It is important to note that nowhere in the world has this level of SNSP been achieved[4].

There are significant uncertainties as to whether this can be achieved. Indeed, ESB Generation, operator of the majority of conventional generation in Ireland, has highlighted these uncertainties to the Energy Regulator[5] (CER) as follows:

- *Due to the uncertainty associated with technical capability of the Irish generation fleet, ESB GWM does not believe that this is an appropriate response from the CER.*

- *If this modification is approved in principle, a future process is created whereby generators will need to seek a derogation for non-compliance with a standard that is not yet established as being feasible.*

- *Generators can only establish their level of compliance post completion of the technical studies.*

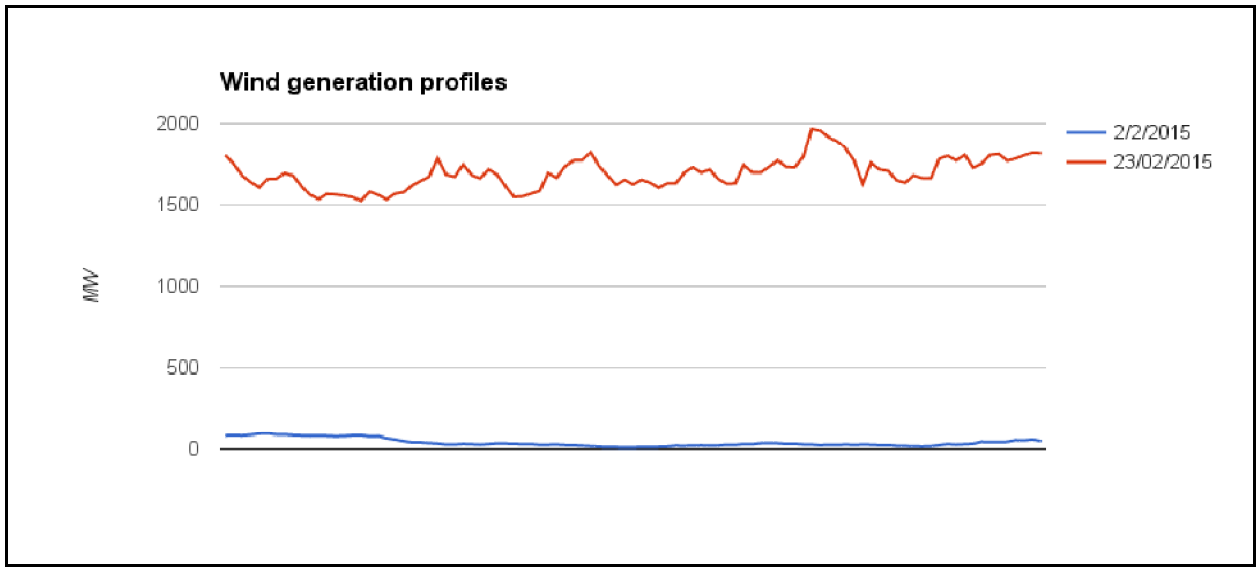
Curtailment of wind and *constrain-on* of conventional generators is a certainty in the I-SEM for the foreseeable future.

As the penetration of intermittent renewable (predominantly wind) generated electricity with priority dispatch increases in the period 2015 to 2020, the requirement for curtailment of wind and *constrain-on* of conventional generators is likely to be a dominant feature of the Irish I-SEM, with multiple fast-acting open cycle gas fired peaking generators necessary to balance the intermittency.

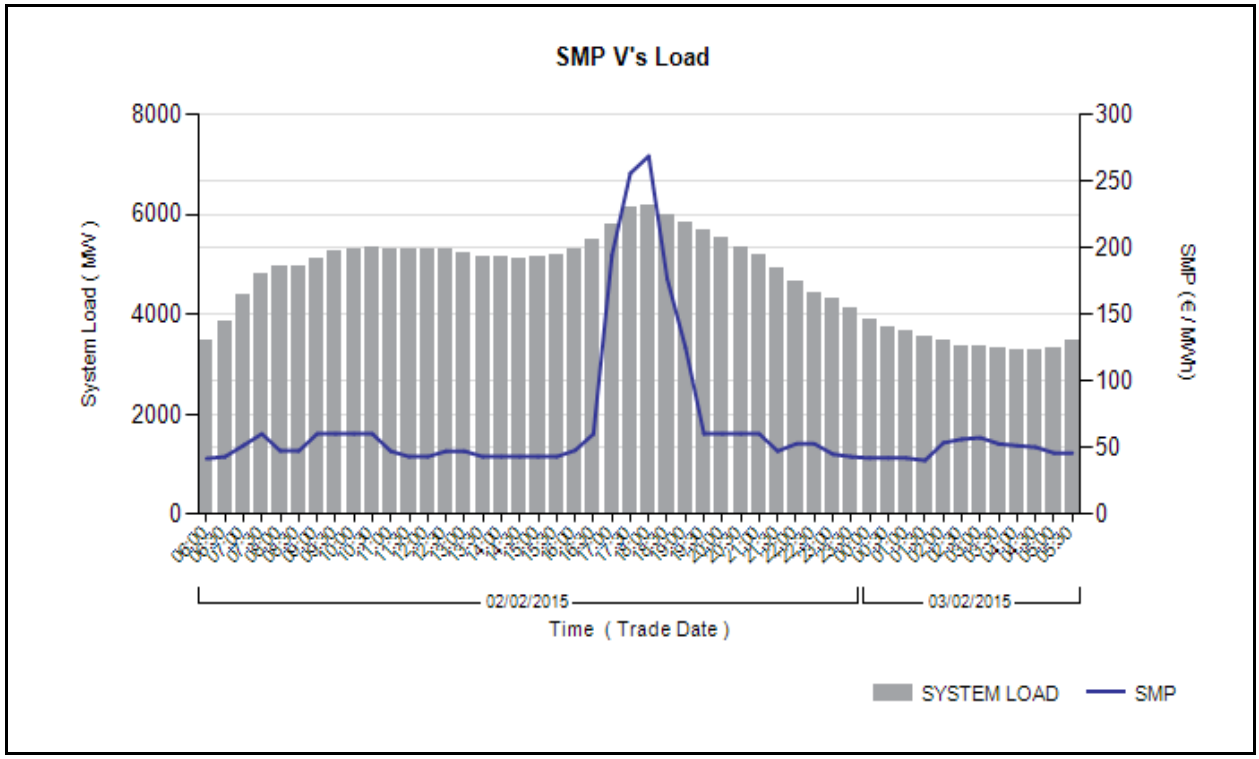
[2]http://www.eirgrid.com/media/OperationalConstraintsUpdateVersion1_28_July_2015.pdf
[3]http://www.eirgrid.com/media/OperationalConstraintsUpdateVersion1_28_July_2015.pdf
[4] This is because Ireland's installed wind capacity is high relative to its small demand.
[5]http://www.cer.ie/docs/000745/CER14081i%20ESB%20GWM%20Response%20to%20CER-13-143.pdf

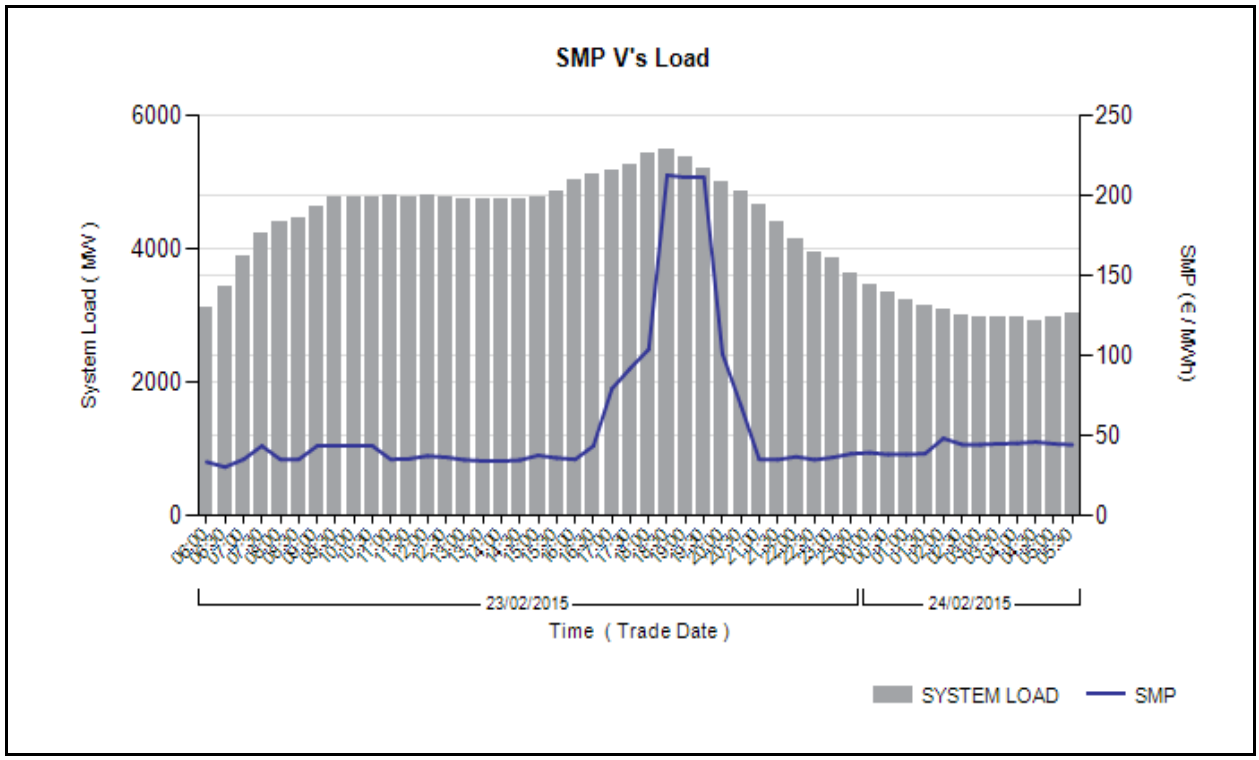
Impact of high wind penetration on Wholesale Prices in I-SEM

From the preceding section, it is apparent that gas will remain the marginal fuel source in the I-SEM and will therefore set the wholesale price for all generator units. A comparison of two dates in February this year shows that there is a wide variability in wind generation output.



On both days the SMP is on average the same, around € 50 / MWh. This coincides with the prevailing gas price, which is currently around € 50-55 MWh.





It is reasonable to conclude that higher penetration of wind into I-SEM will have a minimal effect on the wholesale price.

Reactive response / Inertia Services to GB from Greenlink

Ofgem's initial assessment states[6] :

Reactive response - Reactive power availability on the transmission system affects voltage level. NGET manages voltage levels so that voltage is maintained. Interconnectors are able to provide reactive voltage support and displace the capital cost of reactive equipment required on the network. This benefit depends on the GB connection location however.

The Irish system is simply not capable of providing reactive response to any other market. There is a shortage of reactive voltage support in the Irish system as it is and uncertainty exists as to whether Irish conventional generators will be capable of providing stability to the Irish system, let alone to the UK system, under an SNSP of 75%.

The HDVC East West Interconnector is classified as Non Synchronous by Eirgrid and therefore lacking in inertia[2].

[6] https://www.ofgem.gov.uk/sites/default/files/docs/2015/03/ipa_march_2015_consultation_-_final_0.pdf

Future Wind Generation Capacity in Ireland

The assumption by Element Power (EP) of 6GW of installed wind capacity by 2020 is significantly overstated. As can be seen in the below graph, Eirgrid estimated in 2009 that there would be 3,000MW of wind by 2014[7]. Actual installed wind capacity at the end of 2014[8] was 2,211MW, or 74% of the projection.

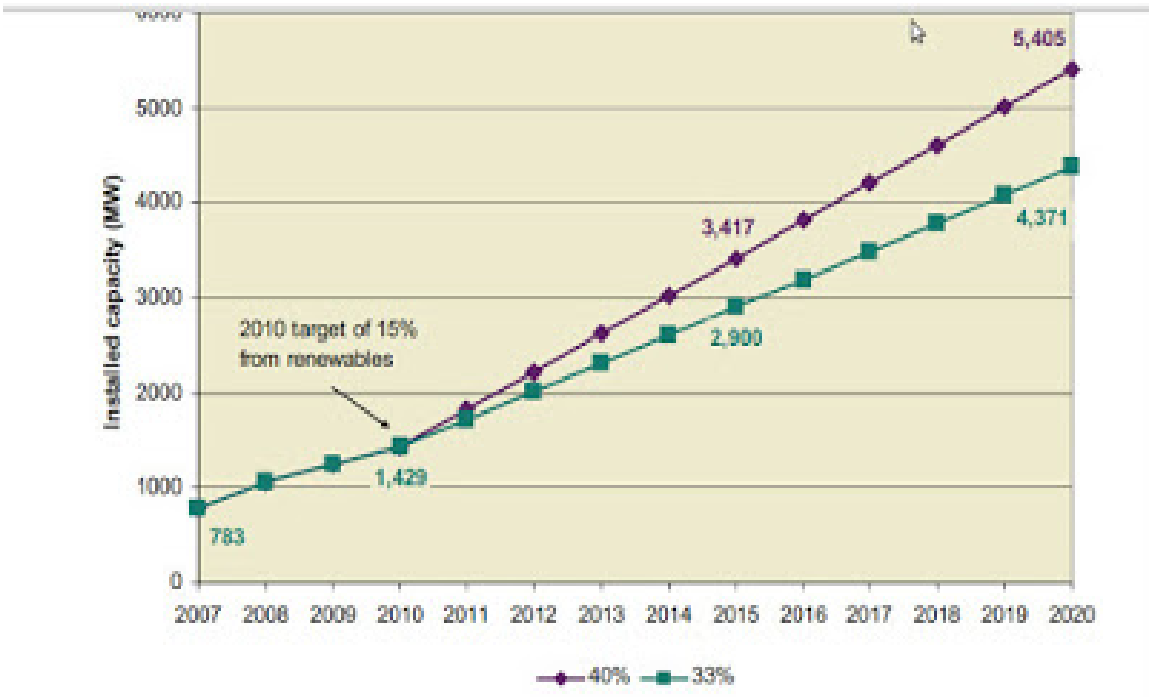


Figure 4-5 Linear projection of installed wind cap required to meet 2020 targets.

Furthermore, many new wind farm applications have been challenged in the Irish Courts due to the fact that Ireland's National Renewable Energy Action Plan (NREAP) was deemed legally non-compliant by UNECE Compliance Committee in July 2014[9], which introduces a further measure of uncertainty to network planning.

It is therefore unlikely that the level of wind deployment will reach projected levels in the short to medium term.

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[7] Eirgrid Generation Adequacy Statement 2009-2015
http://www.eirgrid.com/media/GAR%202009-2015.pdf1

[8] Eirgrid All Island Wind and Fuel Mix Summary 2014
http://www.eirgrid.com/media/All_Island_Wind_and_Fuel_Mix_Summary_2014.pdf

[9] http://www.unece.org/environmental-policy/conventions/public-participation/aarhus-convention/tfwg/envppcc/pre-admissibilitycommunications/ireland-european-platform.html

SNSP Limit on the Irish system

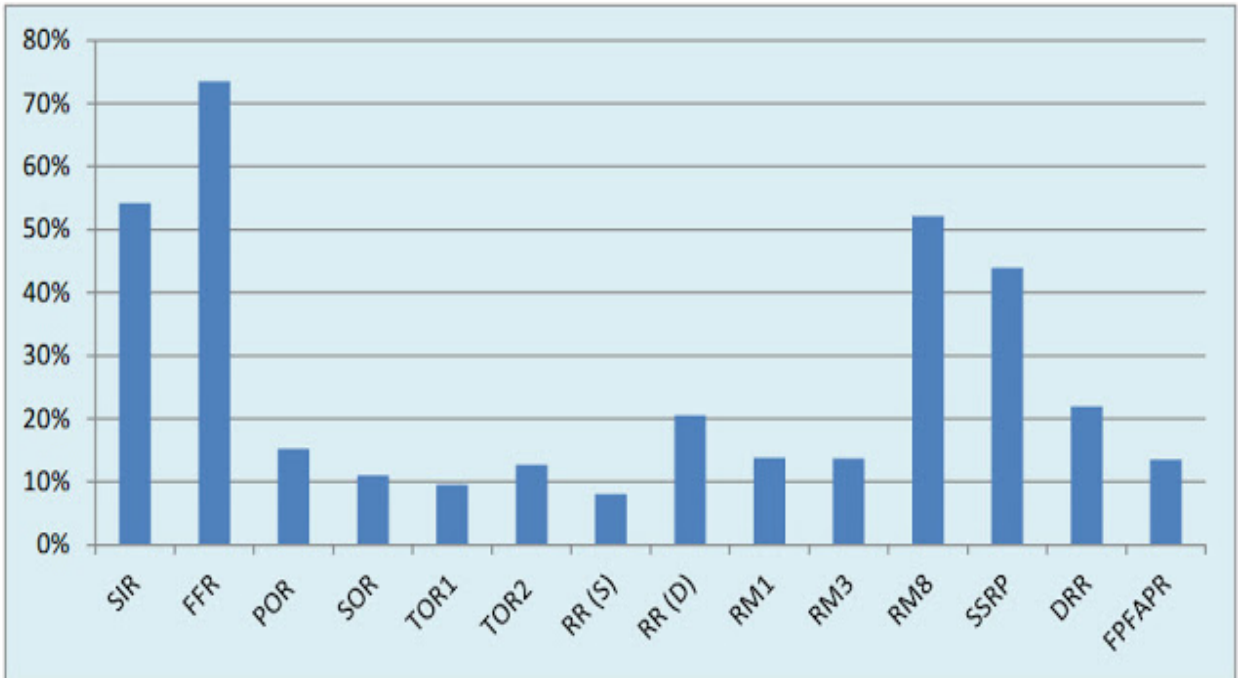
In the Ofgem paper, there is an assessment of *"Impacts of Greenlink on GB with SNSP limit excluded from I-SEM scheduling"*

It is envisaged by Eirgrid and the Irish Single Electricity Market Operator (I-SEM-O) that the SNSP limit by 2017 will be 75%. Nobody is suggesting that there will be no limit and that 100% wind will ever be allowed into the system :

- *The DS3 Programme aims to address the various factors that influence the SNSP limit, with the ultimate aim of increasing the limit from 50% to 75%*[10].

Indeed, I-SEM-O are currently making arrangements for increasing the installed capability from conventional generators to maintain grid stability at 75% SNSP[11] :

Figure 4: Required Increase in Installed Capability to Achieve SNSP of 75% under the Selected Scenario



These generators will require compensation from the wholesale market for running on these low loads during high wind penetrations. It is recognised that at these low loads, generators consume more fuel than on normal loads due to operational inefficiencies.

[10] *Eirgrid DS3 Programme Brochure* http://www.eirgrid.com/media/DS3_Programme_Brochure.pdf
[11] I-SEM Committee, DS3 System Services Procurement Design and Emerging Thinking, 19th December 2014

Even under the scenario that EP propose, given lower wholesale prices, and hence the exit of conventional baseload plant from the market, this benefit to GB will be negated by the loss of potential ancillary service benefits such as Fast Frequency Response (FFR) envisaged in the Ofgem analysis (as conventional plant will be shutdown).

The reason for an SNSP limit is to maintain inertia and system stability. If GB envisage benefits from lower wholesale prices in the Irish I-SEM due to large amounts of non-synchronous wind, then it cannot expect to at the same time receive synchronous inertia services. Lower wholesale costs in Ireland means higher constraint costs for GB.

This suggests that the following assertion in the Ofgem paper under *Implications for project assessment* is flawed :

- *However, the combined effect of both changes, together with non quantified upside potential from fast frequency response, would potentially provide such a justification*

Curtailment of wind energy in the Irish system

The most recent analysis of wind curtailment in Ireland shows that for 2013, total annual wind curtailment was 3.5% of total available wind energy[12]. As previously stated, the prevailing SNSP limit is 50%. Therefore, this demonstrates that SNSP (mostly wind) rarely goes above the 50% limit. One can then surmise that increasing the SNSP limit to 75% will not reduce curtailment of wind by any significant amount, simply because high levels of wind energy do not occur regularly in Ireland.

Wind maps for Europe show that the higher capacity factors for wind farms in Ireland occur in and around North and Western coastal regions[13]. EP are currently planning to construct two large wind farms in the Irish midlands[14] - an area with lower than average wind speeds, and consequently lower capacity factors.

Large amounts of surplus wind energy are simply not available to make this project feasible in terms of *"a strategic piece of infrastructure which provides access to Ireland's rich renewable resources"*[15].

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[12] http://www.eirgrid.com/media/Annual_Wind_Constraint_and_Curtailment_Report_2013_Non_Technical_Summary.pdf

[13] http://turbotricity.com/training/wind-energy-information/

[14] 120MW Emlagh Wind Farm (http://emlaghwindfarm.ie/) and 125MW Maighne Wind Farm (http://maighnewindfarm.ie/). http://www.elpower.com/operations/markets/europe/ireland

[15] Quote taken from EP statement on Greenlink project in March 2015 http://www.elpower.com/news/greenlink-developers-disappointed-and-surprised-ofgems-minded-decision

Glossary

BETTA	British Electricity Trading and Transmission Arrangements
Eirgrid	The Irish TSO
EP	Element Power
FFR	Fast Frequency Response
GB	Great Britain
I-SEM	Irish Single Electricity Market
I-SEM-O	Irish Single Electricity Market Operator
LNG	Liquefied Natural Gas
NREAP	Irish National Renewable Energy Action Plan
SNSP	System Non-Synchronous Penetration
SMP	System Marginal Price from which the wholesale price of electricity is derived in I-SEM