

ECONOMY, ENERGY AND FAIR WORK COMMITTEE

ENERGY INQUIRY

Addendum to SUBMISSION FROM RENEWABLE ENERGY FOUNDATION

Why Windfarm Constraint Payments have Spiked in 2020

The cost of excess wind power in the first two months of 2020 amounted to £72 million in payments to wind farms to reduce output, mostly (£69 million) in Scotland. Last year's annual total of £139 million was a record, but does not seem likely to remain so for long.

Comparing payments in January and February for all years back to 2012 we find that the total for those months in 2020 is nearly four times that in the next most expensive year, as shown in the following chart.

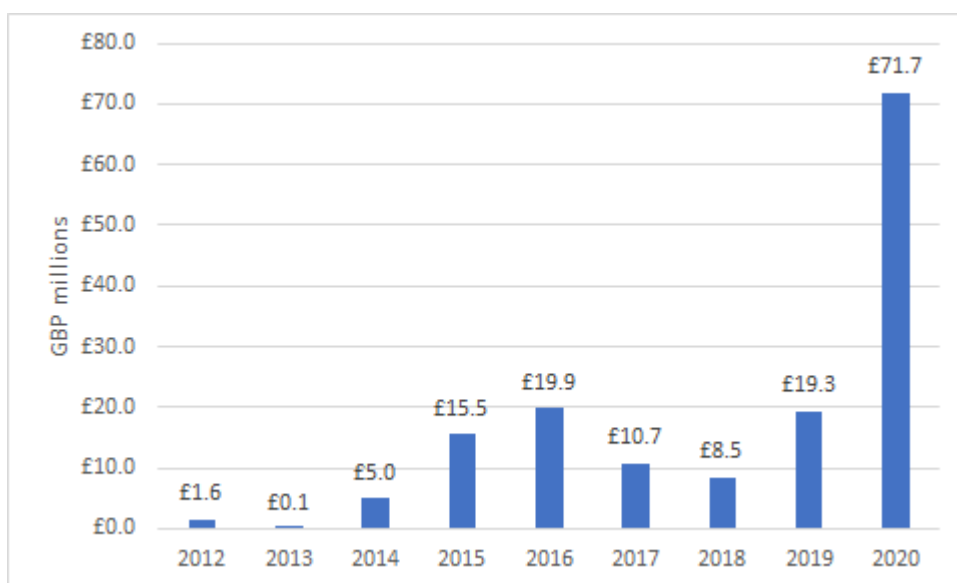


Figure 1. Costs of wind farm constraints for January and February combined, for years from 2012. These costs only include payments made to wind farms in the Balancing Mechanism.

The vast majority (96%) of the January/February 2020 constraint payments went to sixty-two Scottish wind farms, twenty of which received more than £1 million in the first two months of 2020.

Some £30 million in total was paid to eleven wind farms in the Greencoat/Scottish and Southern Energy (SSE) stable and £19 million to fourteen wind farms owned by Scottish Power Renewables (SPR).

Undoubtedly some of this increase in cost must be attributable to the latest failure of the Scotland to England, Western Link High Voltage Direct Current (HVDC)

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interconnector from 10 January 2020 until 23:00 on 7 February 2020. However, as revealed in the following chart of daily constraint costs, Scottish wind farm constraints costs were as high after the Western Link was restored as they were during the outage.

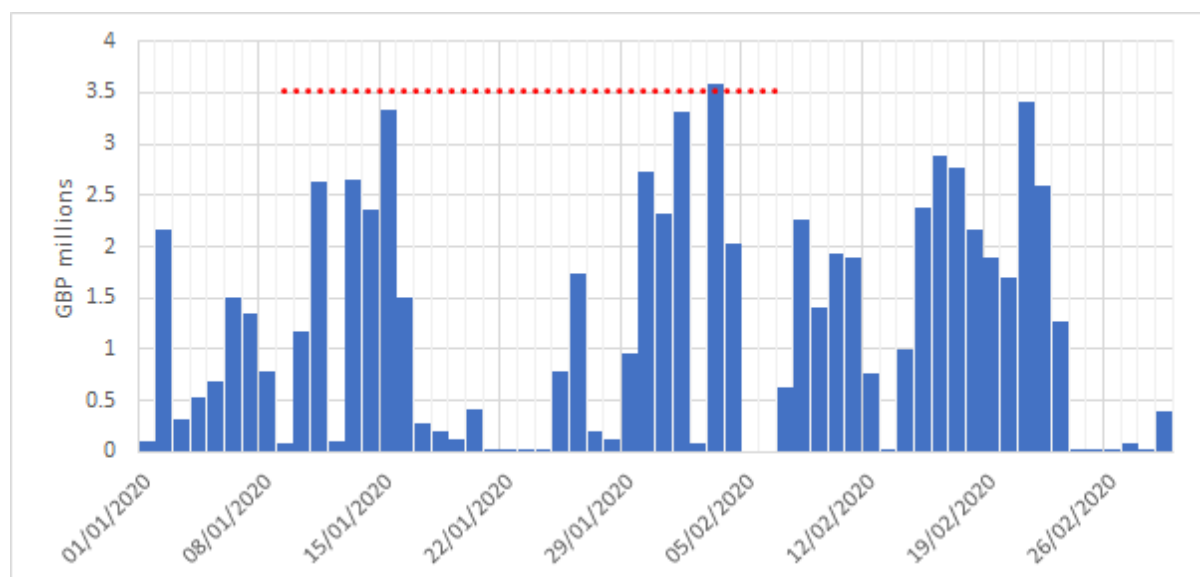


Figure 2. Daily costs of Scottish wind farm constraints for January and February 2020. The dotted red line indicates the dates when the Western Link HVDC interconnector was out of action. These costs only include payments made to wind farms in the Balancing Mechanism.

Scottish constraints for the twenty-nine days that the Western Link interconnector was out of action amounted to £32 million, whereas constraints for the thirty-one days when the interconnector was working amounted to £37 million.

The interconnector does not appear to be providing significant mitigation of the constraint problem. That is extremely disappointing given the cost and the expectations. We should recall that in 2017 Ofgem reported that:

“National Grid has estimated that constraint costs will fall from £140m pa to £0 when the Western HVDC is completed.” [See Footnote 8](#)

This was clearly mistaken. [Ofgem is currently investigating the Western Link’s performance](#) to determine whether the owners have been negligent in operation. It would be at least as important to discover whether National Grid and its co-owner Scottish Power Transmission were unreasonably optimistic at the outset, in their business case, about the consumer benefits to be realised from the Western Link – and whether Ofgem’s cost benefit analysis at the time was reasonable.

The Western Link was built to increase the capacity of the Scotland-England boundary to facilitate the export of Scottish wind power to areas of demand in the south of Great Britain. Its owners – National Grid and Scottish Power Transmission – are permitted to recoup [£1.3 billion, in today’s money, over 45 years](#) via consumers’ electricity bills to pay for it.

Unlike other interconnectors such as those to France, Belgium, Ireland and the Netherlands, data showing how much power is being transferred via the Western

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Link at any one time is not publicly available, meaning that it is difficult to know if it is delivering the consumer benefits claimed.

The original specification of the works provided by [Scottish Power \[Table 2.2\]](#) and [National Grid's 2015 Ten Year Statement \[page 58\]](#) was that the Western Link would increase the capacity of the Scotland-England boundary from 4,400 MW to 6,600 MW.

However, the most recent [Electricity Ten Year Statement for November 2019](#) reports that:

“The boundary capability remains at 5.7 GW with the limit being the post-fault load rating of transformers at Harker [substation].” (p. 41)

Subsequent calculations in the Ten Year Statement indicate that the limit may actually be 5.6 GW, the further reduction being a result of the additional strains caused by embedded generation in the regions abutting the boundary (p. 104).

While it is not possible to see the traffic on the Western Link itself, it is possible to see the aggregate power transfers from Scotland to England that include the Western Link. The following chart shows the maximum daily transfer from Scotland to England.

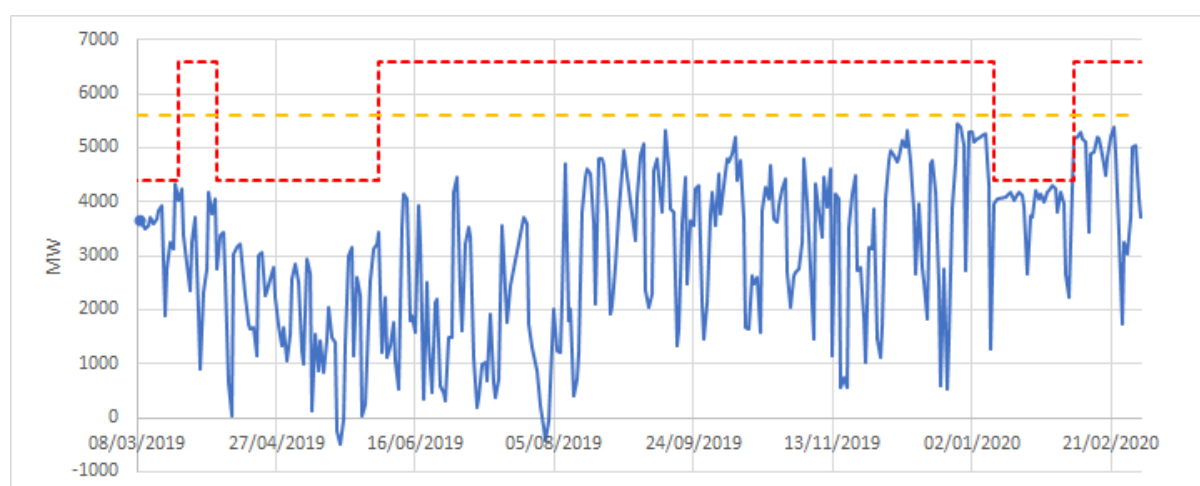


Figure 3. Aggregate maximum daily electricity transfers over the Anglo-Scottish interconnectors, showing (blue line) the maximum daily power transfer from Scotland to England in the last year. The dashed yellow line is at 5,600 MW, the revised boundary limit reported in NG 2019 Ten Year Statement. The dotted red line indicates the maximum boundary capacity of 6,600 MW that it was originally claimed would be achieved when the Western Link HVDC interconnector became active. The three dips in the dotted red line from 6,600 MW to 4,400 MW during the year indicate the dates when the Western Link HVDC interconnector was out of action.

We observe that over the last year, a transfer of 5 GW or more was attained on only 8% of the days. The maximum was approximately 5,450 MW, which is 1,100 MW less than that specified when the Western Link was approved by Ofgem.

Thus, although the consumer is paying for an interconnector designed to add 2,200 MW to the boundary and deliver a total capacity 6,600 MW, the benefit of the

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Western Link has been offset by a reduction in overall transfer capacity caused by problems elsewhere in the system. As noted above, National Grid is apparently acting to protect the Harker substation because of concerns with the post-fault load rating of that substation. REF understands that this is likely to mean that National Grid feels obliged to limit transfers via Harker to provide temporary headroom in the event that there is a fault on the other main route south to England on the eastern side, and it is conceivable (see Fig. 3), though by no means certain, that the Western Link is itself limited to less than its theoretical maximum transfer capacity. Further limitations are, according to National Grid, imposed by concerns related to embedded wind and solar farms near to the Anglo-Scottish grid boundary.

As we have seen, in 2015 National Grid expected the total capacity over the boundary to be 6.6 GW, and was still, as late as 2017, predicting that the Western Link would obviate the need for constraint payments to Scottish wind, so presumably did not foresee the fact that the additional capacity provided would be offset by necessary reductions elsewhere on the boundary.

Electricity networks are complex systems, and predicting their futures is not a trivial matter. But National Grid is a world-leading engineering company and their failure to correctly foresee the total boundary capacity between England and Scotland, and thus to predict constraint payments and their burden on consumers, is surprising.

As it is, consumers are not only paying for an unreliable interconnector that is failing to deliver the full net benefits expected because of other apparently unanticipated network problems, but they are also saddled with the high wind constraint payments caused by the continued growth in wind farms and the lower than anticipated cross border transfer capacity.

This cannot be right, and it is essential that Ofgem explores the matter in depth. Were National Grid and Scottish Power Transmission unreasonably optimistic about the net benefits of the Western Link? Were there alternatives to the Western Link, alternative grid reinforcements for example, that would have represented better value for consumer money, and have a more certain effect on constraint payments? And finally, what role has been played in this matter by almost unfettered Scottish wind farm expansion?

Answers to these questions are badly needed, first with the aim of reducing present consumer costs, but also with a view to ensuring that the errors that have resulted in the current situation do not propagate.

This has some urgency because the latest [National Grid Network Options Assessment January 2020](#) report on forthcoming grid expansion recommends that **three** more Scotland to England interconnectors are built off the East Coast at a projected cost of £8.5 billion to accommodate the expected growth in Scottish wind generation (p. 96).