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Written evidence submitted by Dr Benny Peiser (Director, Global Warming Policy Foundation)

Dear Mr Stride

Wake Effects and Offshore the Feasibility of the Government's Offshore Wind Plans

This letter is an addendum to evidence already provided to the Committee to the Net Zero inquiry.[1]

The Treasury Committee will of course be aware that the Prime Minister has committed the United Kingdom to an additional 30 GW of offshore wind capacity, to deliver a total of 40 GW by 2030. As long-term observers of the renewables industry we have doubts both as to the technical feasibility and the economic tolerability of the target.

New evidence suggests that turbines and complete wind farms will need to be more generously separated than hitherto in order to reduce mutual interference affecting performance. This implies that the Prime Minister's target can only be met by moving further out to sea, into deeper water, and perhaps with a higher proportion of floating turbines. This will certainly be much more expensive than anticipated, and might not even be feasible due to other constraints.

We believe that this matter should be considered in your inquiry into the costs of achieving the overall Net Zero target of which the Prime Minister's aspiration for offshore wind forms a part.

The new evidence bearing on this point is drawn from the audited accounts of the Burbo Bank and Burbo Bank Extension wind farms, which are adjacent to one another, as can be seen in the following image:

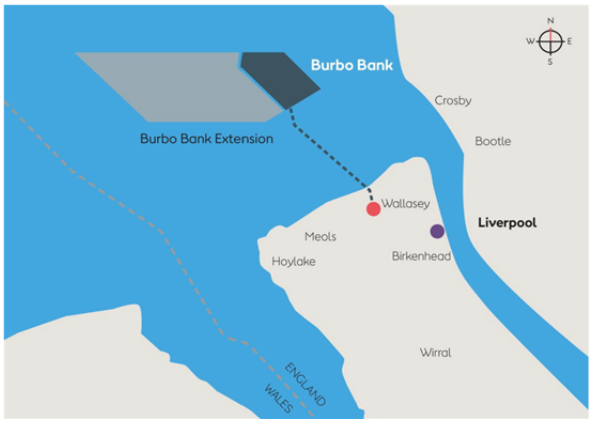

Figure 1: Map showing relation of Burbo Bank and Burbo Bank Extension wind farms. Source: Ørsted.

[1] https://committees.parliament.uk/writtenevidence/9757/pdf/

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It has long been recognised that wind turbines are liable to cause "wake effects", whereby upwind turbines not only take the wind from those downwind, affecting performance, but cause wind flows over the downstream turbines to be more turbulent, with implications for maintenance. Hitherto, wake effects largely occurred within wind farms, and could be absorbed by the overall business and concealed from examination. Anecdotal evidence of degraded performance could be found, but it remained anecdotal.

However, as new windfarms are installed next to existing ones, they are starting to affect each other's performance. Where the two wind farms have different owners, there are clear conflicts of commercial interest and these become publicly visible.

The first hard evidence of which we are aware has now emerged in the case of the Burbo wind farms. Burbo Extension is controlled by the Danish energy giant Ørsted and a number of pension funds and is next to the earlier Ørsted Burbo project, which has a different ownership structure. The 2019 accounts of Burbo Extension describe a provision of about £18 million to compensate the shareholders of Ørsted Burbo for wake effects caused by the new project.[2] The provision is being released at the rate of about £1.9 million per year, which is roughly 6% of Ørsted Burbo's turnover. Importantly, the provision is being added to each year, which means that the companies are revising the estimates of the wake effects upwards as they learn more about the impact on Burbo's performance.

The accounts provide concrete evidence that the industry has underestimated the importance of wake effects, and thus to overestimate the resource potential of a given site and, still more importantly given the Prime Minister's plan for 30 GW of additional wind power, the resource potential of a given area.

We infer that it is entirely conceivable that locating sites sufficiently distant from each other to avoid wake effects as serious as those observed in the Burbo case will drive developers into deeper water, which is much more expensive, or even to floating installations, which are more expensive still. It is possible that due to other constraints, such as shipping and environmental considerations, suitable sites may not be available.

We urge the Committee to investigate this matter in relation to the cost and feasibility of the Prime Minister's target.

In relation to this, we feel the Committee should also bear in mind the clear evidence, again from audited accounts, that the costs of offshore and indeed onshore wind have not been falling in recent years, as has been conclusively shown in econometric analyses by Professor Gordon Hughes.[3] Both capital costs and, crucially, operational costs are rising.

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[2] https://find-and-update.company-information.service.gov.uk/company/07307131/filing-history

[3] Gordon Hughes, *Wind Power Economics: Rhetoric and Reality* (REF, 2020). https://www.ref.org.uk/refblog/365-wind-power-economics-rhetoric-and-reality

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Combined with wake effects, there are strong reasons for doubting that 30 GW of additional offshore wind is a realistic target.

November 2020