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Mr Jeremy Pocklington CB
Permanent Secretary
Dept for Energy Security and Net Zero
3–8 Whitehall Place
London SW1A 2AW

26 November 2024

Dear Mr Pocklington

Thank you for Ms Inwood's response to the letter Professor Hughes and I sent regarding DESNZ's estimates of the levelised cost of renewables.

Unfortunately, Ms Inwood's letter confirms that DESNZ's estimates of levelised costs of renewables are erroneous, with serious impacts on estimates of the cost of Net Zero.

As I am sure you are aware, the levelised cost is, in simple terms, the lifetime costs of the generator divided by its lifetime output.[1] In estimating the lifetime output, the capacity factor – the percentage of nameplate capacity delivered – is a key input.

As Professor Hughes and I noted, there is a major discrepancy between the capacity factors of extant windfarms – lifetime averages are likely to be in the mid-30s percent – and the 61% figure used by DESNZ. Ms Inwood's reply clarifies why this is.

> *"To enable comparison across technology classes it is standard for LCOE estimates to be calculated assuming that they operate at their technical maximum."*

A 61% capacity factor is perfectly reasonable as a *peak* capacity factor – calculated over an hour, perhaps – since output levels frequently reach this level during periods of high wind speeds. However, a peak capacity factor is completely irrelevant to a calculation of the levelised cost, since at other times the output will be much lower, and at times will fall to zero. The only capacity factor that is relevant to levelised cost is the expected annual average.[2]

In essence, DESNZ's levelised cost figure assumes that the wind is blowing a gale *at all times over its 25-year lifetime*. The levelised cost should be approximately 50% higher than as stated by your department, based on this error alone. The cost of delivering Net Zero will therefore be considerably higher – more than £300 billion of capital cost and nearly the same again in operational costs, by my calculations. I should perhaps note at this point that Ms Inwood has not addressed the concerns Professor Hughes and I raised about the unit capital and operational cost assumptions used by DESNZ, so the true error is likely to be larger still.

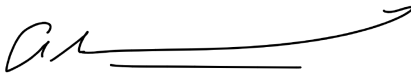
[1] I am sure we both understand that the approach is a discounted cashflow, but this point is irrelevant to the issue at hand.
[2] The annual average will decline over the windfarm lifetime. To discount the cashflows correctly a model of output each year is required, but a lifetime average will give a rough figure as an alternative.

It is also worthy of note that DESNZ's figure for the onshore wind capacity factor, of 48%, also appears to represent peak output rather than an annual average.

Once other known problems with official and quasi-official estimates of decarbonising the grid and the economy are taken into account – examples include the failure to correctly model long-term wind variation[3] and temperature-dependent electricity demand, both factors which will cause costs to be considerably understated – the cumulative error is likely to be of the order of a trillion pounds.

All of the studies that use DESNZ's figures also understate the cost. The list of such studies is extensive, and includes NESO,[4] the OBR,[5] the National Infrastructure Commission,[6] the Royal Society,[7] and the Royal Academy of Engineering.[8] I have copied these organisations, together with others who are likely to be interested, so that they are aware. All have been led astray by your department's publications. I assume that you will discuss these issues with the Secretary of State yourself.

Yours sincerely,



Andrew Montford
Director, Net Zero Watch

cc:
The Rt Hon Lord Frost CMG
Fintan Slye, NESO
Richard Hughes, OBR
James Heath, National Infrastructure Commission
Professor Sir Paul Nurse, Royal Society
Professor Sir Christopher Llewellyn Smith, Royal Society
Dr Seamus Garvey, Royal Society/University of Nottingham
Professor Michael Kelly, University of Cambridge/Royal Society
Dr John Lazar, Royal Academy of Engineering
Rt Hon Bill Esterson MP, House of Commons Energy Security and Net Zero Committee
Rt Hon Claire Coutinho MP
Richard Tice MP

[3] https://www.telegraph.co.uk/news/2024/01/20/climate-change-wind-farms-royal-society-green-energy/
[4] NESO, Clean Power 2030. DESNZ cost estimates cited on p.75.
[5] OBR. Fiscal Risks and Sustainability, July 2023. See p.82.
[6] NIC, Second National Infrastructure Assessment, 2023. See p.40.
[7] C Llewellyn Smith et al. Large-scale electricity storage. Royal Society, 2023. See p.82 (citation is to BEIS rather than DESNZ).
[8] NEPC. Critical materials: demand-side resource efficiency measures for sustainability and resilience. RA Engineering, 2024.