

Little Covenhope, Aymestrey, Herefordshire, HR6 9SY

APPEAL REF. APP/P3040/W/23/3330045

Land East of Hawksworth and Northwest Of Thoroton, Nottinghamshire, NG13 9DB

Rule 6 Party (Hawksworth and Thoroton Action Group) comments on Appellant's DC Sizing Breakdown Note

Mr Urbani's sizing note reiterates his evidence to the inquiry (CD-7.10.2 PDF page 177) that solar panels do not always perform to full capacity in the field. This is well established: solar panels generate at capacity only during periods of optimum sunlight and currently produce no energy at night. Hence, the typical load factor for solar sites is around 11%, as recognised at footnote 4 of the Appellant's Statement of Case. (CD-7.6)

The Appellant provides a plant capacity figure based on a suggested average output from the panels, which is significantly below installed capacity. This figure is irrelevant because National Energy Policy Statement EN-3 is concerned with total capacity and makes no mention of average output.

The Appellant's argument appears to be that overplanting should be permitted to account for the erratic generating capability of solar panels. This is a new argument, introduced after Mr Urbani gave his evidence to the Inquiry.

The Note on Capacity submitted before the opening of the inquiry (CD-7.10.2 – Appendix 5), stated that the installed MWdc capacity of the site would be 78.5MW.

Mr Urbani said in his statement to the Inquiry:

"...STCs (Standard Test Conditions) reflect an idealised scenario that is rarely achieved in reality by a solar farm, and therefore to accommodate this difference in PV module nameplate power rating and real power delivered, solar designers generally oversize the amount of DC capacity compared to the AC. This is known as overplanting. This results in a DC to AC ratio that is greater than 1. This DC to AC

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ratio of more than 1 allows the maximum inverter capacity to be used more often during the day and more energy to be produced – for example in the early morning and late afternoon.”

Overplanting for this purpose is not sanctioned by EN-3, which advises at footnote 92 that:

“Overplanting” refers to the situation in which the installed generating capacity or nameplate capacity of the facility is larger than the generator’s grid connection. This allows developers to take account of degradation in panel array efficiency over time, thereby enabling the grid connection to be maximised across the lifetime of the site. Such reasonable overplanting should be considered acceptable in a planning context so long as it can be justified and the electricity export does not exceed the relevant NSIP installed capacity threshold throughout the operational lifetime of the site and the proposed development and its impacts are assessed through the planning process on the basis of its full extent, including any overplanting.”

The Department for Energy Security and Net Zero confirmed in the ministerial letter dated 22nd May 2024 that *“In the Energy Policy Statement EN-3 guidance, overplanting is countenanced where reasonable, to address panel degradation. Unreasonable overplanting, or overplanting for any other reason, would not be supported.”* (CD-10.2A)

Appellant’s Sizing Calculations

Mr Urbani has not provided the data from which he has calculated average site conditions, and it is unclear whether he has factored in that solar panels can generate more than their rated capacity when conditions exceed STCs. Nevertheless, he assesses that the site would inject an average 33MW (per annum) into the grid. This means that for a significant proportion of the year, the site would be generating well over 49.9MW. (In fact, the energy injected based on Mr Urbani’s calculated average panel energy capacity of 276Wdc would be 35.5MW, not the 33MW given in the table total.)

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The R6P has also pointed out that Mr Urbani's calculations are based on 128,752 solar panels, whereas the agreed number of panels in the Statements of Common Ground is 150,304. The Appellant has declined to confirm the wattage of the proposed panels. Mr Urbani argued during cross examination that 750W panels would be larger than allowed for in the Appellant's illustrative drawings, but he has provided no evidence to demonstrate this.

Even if the Appellant were to use the 610W panels cited by Mr Urbani, 150,304 panels would result in overplanting of 41.6MW, compared with 38.5MW in Mr Urbani's example. If 750W panels were installed overplanting would be some 60MW.

Mr Urbani's assessment fails to reflect that the solar industry is producing more efficient panels each year, not only in terms of capacity but in their ability to generate energy during low light levels and even at night.

Mr Urbani's calculation of degradation is based on 0.5% per annum for the first 30 years, although he says in his statement that degradation "*is less than 0.5%*" (page 5 of his Statement CD-7.10.2). He has calculated degradation losses for the final ten years of the development at 10-20%, without providing any evidence to justify this rate. He has not made any allowance for the fact that panels are likely to be replaced during the lifetime of the development – especially because the technology is becoming more efficient and the price of panels is continually declining.

Mr Urbani has not made any provision for the fact that the proposed panels will be bi-facial. He says in his Statement that bi-facial panels are only 2-4% more efficient than standard panels, but this does not accord with industry evidence, which advises that bi-facial panels can deliver 10-20% more energy than their mono-facial counterparts in non-tracking systems.

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In addition to the unexplained anomaly in the “average AC injected figure”, the R6P would question some of Mr Urbani’s other calculations. For example, the sizing breakdown is based on an average 30MW of overplanting (25MW to 35MW), although the same table shows that installed dc capacity would be 78.5 MW – so 38.5MW of overplanting. This means that the MW for maximisation of energy production is between 14.5MW and 19.5MW, not 6MW -11MW based on Mr Urbani’s 128,752 panels with 610MW capacity.

There is no explanation for the 6.5 MW – or 8% of 78.5MW – that can be installed before clipping is required. Given the grid connection is on site, there should be minimal loss between the point of generation and injection into the grid.

Conflict with EN-3

Even based on Mr Urbani’s figures, 12.5MW – 17.5MW of the overplanting is to compensate for degradation, meaning 21MW to 26MW is for other purposes.

The proposals are consequently in conflict with EN-3.

The previous iteration of EN-3 was clear on this point. It advised that capacity could be measured either by the capacity of the solar panels or of the inverters. The guidance still says at 2.10.50:

“Because the inverter is separate from the panels, the total capacity of a solar farm can be measured either in terms of the combined capacity of installed solar panels (measured in DC) or in terms of combined capacity of installed inverters (measured in AC).”

Thus EN-3 is concerned with the total capacity of the development, not the average output cited by the Appellant.

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The version of EN-3 adopted in November 2023 says at 2.10.53: *“the maximum combined capacity of the installed inverters (measured in alternating current (AC)) should be used for the purposes of determining solar site capacity.”*

Paragraphs 2.10.51 and 2.10.52 explain that this change was made to bring solar into line with other forms of energy development which *“is switched between DC and AC within a generator before it is measured.”*

There is no suggestion that this change was made to allow solar developers to compensate for the inefficiency of the technology by generating more energy than required to meet a particular threshold and disposing of the surplus. In this case the threshold is that at which the Appellant was required to pursue the Nationally Significant Infrastructure Project (NSIP) procedure, rather than applying for planning permission.

The R6P would also note that the earlier version of EN-3 was in force when the planning application for the appeal proposals was made. The Appellant was, therefore, well aware at the time that the proposals were not sanctioned by the national guidance.

If the Appellant’s approach were accepted, land take for solar development would increase and larger areas would be required in areas with less daylight and sunlight.

EN-3 recognises this at paragraph 2.10.56:

“AC installed export capacity should not be seen as an appropriate tool to constrain the impacts of a solar farm. Applicants should use other measurements, such as panel size, total area and percentage of ground cover to set the maximum extent of development when determining the planning impacts of an application.”

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The letter from the minister for DESNZ confirms that EN-3 “*was consulted on extensively and no issues were raised*”. Thus, the industry was given an opportunity to argue that the constraints on overplanting should take into account the average performance of solar panels and did not do so.

The Appellant’s argument that overplanting is justified to compensate for the inefficiency of solar development has been introduced at a late stage of The Inquiry and only after the capacity of the site was called into question. No policy, legislative or case law justification is offered in support of the Appellant’s approach.

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