

Raywood, Simon

From: Info Tillbridgesolar <[REDACTED]>
Sent: 24 November 2023 15:21
To: Alasdair Broadbent
Subject: RE: Generating capacity of the Tillbridge Solar scheme

Dear Alasdair,

Thank you for your email.

As mentioned in our previous email, Battery and Energy Storage Solution (BESS) has been proposed as part of the Scheme to help increase its effectiveness and to bridge the gap in energy produced during hours of the day when power is not generated.

The BESS is expected to consist of lithium-ion batteries to store electrical energy, which will be located in individual containers or housed within a larger building. The footprint of a container would be a maximum of 12.2m in length, 2.5m in width and 4m in height.

Further details of the BESS design will be available at the detailed design stage which will follow should we receive development consent. Our DCO application is based on a series of parameters that we would need to adhere to when we finalise our design. These parameters are fixed in order to ensure that environmental effects are appropriately assessed.

This approach would allow our detailed design to take account of evolving technology in the BESS field to make sure that when Tillbridge Solar starts operations, it would do so with the most suitable BESS solution available at that time. The final design that we would adopt would need to be signed off by the local authorities and be in accordance with any management and safety plans that form part of our DCO conditions.

If you have any further questions, please contact the community relations team by responding by email (info@tillbridgesolar.com) or telephone (0800 046 9643).

Kind regards,

Anna
Tillbridge Community Relations Team
info@tillbridgesolar.com
0800 [REDACTED]

From: Alasdair Broadbent <[REDACTED]>
Sent: Wednesday, November 22, 2023 8:39 PM
To: Info Tillbridgesolar <info@tillbridgesolar.com>
Subject: Re: Generating capacity of the Tillbridge Solar scheme

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Good evening,

Please can I have further information regarding the type and set up of the battery's that are proposed will be used?

From: Info Tillbridgesolar <info@tillbridgesolar.com>
Sent: 24 July 2023 16:36
To: alasdairbroadbent@hotmail.co.uk <alasdairbroadbent@hotmail.co.uk>
Subject: Generating capacity of the Tillbridge Solar scheme

Dear Alasdair,

Thank you for attending one of our consultation events.

We are following up regarding some more detailed information on the Scheme and specifically the quoted generating capacity and approximate number of homes powered.

Please note that all figures remain indicative at this stage and will change subject to further design refinement.

How many homes will the project power?

The Scheme would provide equivalent energy needs for around 300,000 households with low-cost energy, generated in the UK at a time of great uncertainty within the energy market.

This calculation is based on a number of assumptions, including:

Factor	Definition	Figures
Yearly module degradation	By how much each solar panel decreases in its performance each year	0.35%
Carbon intensity of the local grid	As defined by National Grid ; is the measure of how clean our electricity is, referring to how many grams of carbon dioxide are released to produce a kilowatt hour of electricity.	193 tonnes of CO2/MWh
Carbon intensity of the photovoltaic (PV) panels	Carbon intensity (as defined above) of the PV panels	40 tonnes of CO2/MWh
Average UK household electricity demand	How much electricity each household in the UK uses per year	3.567 MWh/year

Based on the design of the panels, the Scheme would provide 1,065,600 megawatt hours (or 1,065 gigawatt hours) per year to the national grid. With average household electricity demand assumed as 3.567 megawatt hours per year, this works out as just under 300,000 homes (298,738) UK homes being supplied with electricity from the Scheme from the first year of operation (2027).

Should this amount of electricity be generated by a CCGT operating with a typical carbon intensity of 354 tonnes CO₂e/GWh, total emissions would be 20,792,918 tonnes CO₂e. It is reasonable to assume that the solar farm will displace this generation, as it currently acts as the marginal generator and is the type of generating capacity that needs to be replaced if the UK is to meet its net zero targets. It is estimated that the carbon required to construct, operate and decommission the solar farm comes to a total of 1,703,693 tonnes CO₂e. Therefore, we can estimate the net carbon benefit of the scheme as being 20,792,918 – 1,703,693 = **19,089,225** tonnes CO₂e over the entire 60 year design life.

What is solar load factor and how effective/efficient will the Scheme be?

Load factors are a measure of the efficiency of electricity generation. A load factor is defined as the ratio of how much electricity was generated over a certain time period as a proportion of the total generating capacity (Source: [Feed-in Tariff load factor analysis \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611117/Feed-in_Tariff_load_factor_analysis.pdf)).

As with other renewables technologies – such as wind - the effectiveness of solar is dependent on a number of factors, such as weather conditions, the time of day, and the location of the solar panels. Ultimately, the load factor is always lower than 100% due to the natural conditions, such as weather.

Solar panels will produce the energy when the sun is shining so peak times will be in the summer months and usually around mid-day for the strongest sun. On the other hand, less energy will be produced during months with fewer sunlight hours (e.g. during winter months). As is shown in the above source, load factors can vary scheme-by-scheme and by different locations across the UK.

A Battery and Energy Storage Solution (BESS) has been proposed as part of the Scheme to help increase its effectiveness (i.e. increase the load factor), but also to bridge the gap in energy produced during hours of the day where power is not generated (e.g. at sunrise and sunset). The BESS would operate all year round and help manage demand and supply during times of high and low generation.

The entire Scheme (including PV panels and BESS) would contribute to stabilising the national grid. At this stage, without a complete design and layout of the Scheme, we are unable to confirm full details on the load factor. However, by calculating the ratio of the average power output to the maximum power output over a given period of time(years), we have calculated an indicative load factor of around 25%, assuming that batteries can be used to store surplus energy generated by the Scheme.

If you have any questions, please contact the community relations team by responding by email (info@tillbridgesolar.com) or telephone (0800 046 9643).

Kind regards,

Anna

Tillbridge Community Relations Team

info@tillbridgesolar.com

0800 [REDACTED]