Heckington Fen Solar Park

ENO10123

Appendix 1 How the numbers are calculated

Applicant: Ecotricity (Heck Fen Solar) Limited

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CONSULTATION REPORT – APPENDIX 1 – HOW THE NUMBERS ARE CALCULATED

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Appendix 1 How the numbers are calculated

The installed capacity for the site is expected to be around 500MWp (Direct Current (DC)) with an export capacity of 400MW (Alternating Current (AC)). Using the 400MW AC (as a conservative approach) – an annual generation for a solar park of this size could generate approximately 385 gigawatt-hours (GWh) of renewable electricity per year. The expected renewable energy generation calculation can be carried out as follows:

400,000kW (400MW x 1,000) x 8,766 (number of hours in a year: 365.25 days (to account for leap years) x 24 hours) x 0.11 (calculated using a Capacity Factor sourced from the Digest of United Kingdom Energy Statistics (DUKES[1]) averaged over five years) = 385,704,000kWh.

Based on this annual electricity generation figure of 385GWh, we estimate that the proposed solar park could supply renewable electricity equivalent to the approximate annual domestic needs of some 133,000 typical UK households per annum (385,704,000kWh ÷ 2,900kWh) based on Ofgem Typical Domestic Consumption Values[2].

Using electricity consumptions figures by BEIS[3] the number of homes powered could be nearly 104,000 (385,704,000kWh ÷ 3,709kWh[4] = 103,991), or using a local average of electricity supply for North Kesteven nearly 100,000 homes (385,704,000kWh ÷ 3,877kWh[4] = 99,485) due to the higher-than-average electricity use locally.

Capacity Factor, or load factor, is a term often used to consider the performance of solar parks (and other forms of generation). It means how much electricity a site generates in a year compared to how much electricity could theoretically have been generated if it were producing at maximum output continuously. An industry standard is to use an average capacity factor over five years (in this case 2017 – 2021 = 11% average) for the purposes of these calculations[1].

Estimated Carbon Dioxide (CO2) Savings: To predict the estimated carbon dioxide emissions from electricity supplied from the solar park to the grid, the current grid mix is considered, which comprises all fuels, including nuclear and renewables. The 2021[5] figure is 198 tonnes of CO2 per GWh of electricity supplied (BEIS[6]), meaning the proposed solar park could result in a yearly saving of 76,369 tonnes of CO2. The proposed solar park will, therefore, make a positive contribution towards the UK Government's climate change objectives. This calculation is 385,704,000 ÷ 1,000,000 (kWh to GWh) x 198gCO2/kWh = 76,369 tonnes per year.

[1] DUKES, July 2022, Load Factors for Renewable Energy Generation, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1094495/DUKES_6.3.xlsx

2 Ofgem. 2020, available at: https://www.ofgem.gov.uk/sites/default/files/docs/2020/01/tdcvs_2020_decision_letter_0.pdf

[3] BEIS, December 2022, Regional and local authority electricity consumption statistics, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1126137/subnational_electricity_consumption_statistics_2005-2021.xlsx

[4] The latest available numbers have been used (2022), which differ slightly from those presented in other communications which used the latest available data at the time.

[5] The 2019 figure previously used was 201 tonnes of CO2 per GWh of electricity supplied, meaning the proposed solar park could result in a yearly saving of 77,527 tonnes of CO2. The 2021 figure (198) is provisional.

[6] BEIS, July 2022, Estimated carbon dioxide emissions from electricity supplied (Table 5.14), available at:

[redacted]

Local domestic household consumption in North Kesteven totals 200GWh per annum, therefore the 385GWh the solar park could produce is well in excess of this. This data is based on BEIS 'regional and local authority electricity consumption statistics'[3]

The calculation for the equivalent number of cars being taken off the road is based off HyNet's website:

HyNet[7] calculated noted that by 2030 they would reduce carbon dioxide emissions by 10 million tonnes every year – the equivalent of taking 4 million cars off the road. Using this equation,10,000,000 by 4,000,000 results in 2.5 tonnes per car. To make this site specific, 75,000 tonnes divided by 2.5 results in the equivalent of 30,000 cars. Further references can be provided upon request.

[7] HyNet. 2022. [redacted]