

Exhibit F

Carbon Debt Analysis

I. Introduction

This exhibit analyzes the total amount of greenhouse gas (“GHG”) emissions, or carbon footprint, of the 1.97MW solar generation project (“Project”) located at 254 Putnam Road in Pomfret Center, Connecticut, including all aspects of the project over its twenty (20) year life span.

II. Electricity Generated from Project

The Project will produce about 668.89MWh of electricity during its first year of operation. This is determined by using the average number of annual hours in Connecticut where the sun is at its peak and most accessible to the solar panels, the average capacity factor for solar photovoltaic (“PV”) from 2020, and the size of the Project.¹ In total, the Project will produce roughly 13,377.78MWh of electricity during its lifespan.

III. GHG Emissions of Project

According to the National Renewable Energy Laboratory (“NREL”), solar PV projects on average produce 43 grams of carbon dioxide equivalent per kilowatt-hour (“g CO₂e/kWh”) of electricity produced.² This is a cradle-to-grave average, accumulating all factors from resource extraction and construction to decommissioning and recycling. Using this average, the Project will produce roughly .63 tons of CO₂e during its 20-year life span.

IV. Comparing Project GHG Emissions to Natural Gas

This exhibit compares the GHG emissions of the Project to that of natural gas because natural gas is the largest source generating electricity in Connecticut (1.75GWh in Oct. 2021), and therefore, will most likely substitute electricity that is provided by natural gas.³ The EPA states that the CO₂e emission rate for natural gas in Connecticut was 822.02lb/MWh, meaning that for every megawatt hour of electricity produced by natural gas in Connecticut during the year of 2020, there were 822.02 pounds of CO₂e emitted.⁴ Seeing that the Project provides 13,377.78MWh of electricity during its lifespan – while only emitting .63 tons of CO₂e – a natural gas project would emit 5,498.4 tons of CO₂e to achieve producing the same amount of electricity.

¹ *Electric Power Monthly: Table 6.07B. Capacity Factors for Utility Scale Generators Primarily Using Non-Fossil Fuels*, US Energy Information Administration (“EIA”), https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_07_b, (last visited Feb. 2, 2022).

² *Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update*, National Renewable Energy Laboratory, p.3 (Sept. 2021).

³ *Connecticut: State Profile and Energy Estimates Overview*, US EIA, <https://www.eia.gov/state/?sid=CT#tabs-4> (last visited Feb. 2, 2022).

⁴ *Emission & Generation Resource Integrated Database (“eGRID”): Data Explorer*, US Environmental Protection Agency (“EPA”), <https://www.epa.gov/egrid/data-explorer> (last visited Feb. 2, 2022).

The images below portray the GHG equivalencies of the Project, provided by using the US Environmental Protection Agency’s (EPA) Greenhouse Gas Equivalencies Calculator.⁵ Again, the Project replaces almost 5,500 tons of CO₂e, and in doing so, replaces the equivalent amount of CO₂e from the following:

Equivalency Results

[How are they calculated?](#)

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

5,498 Tons

Greenhouse gas emissions from



CO₂ emissions from



⁵ Greenhouse Gas Equivalencies Calculator, US Environmental Protection Agency, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> (last updated Mar. 2021).

Greenhouse gas emissions avoided by



Carbon sequestered by



V. Conclusion

Overall, the net amount of GHG emissions avoided through solar production vastly outweigh the GHG emitted during the initial construction or eventual decommission of the Project, especially when compared to natural gas, the current largest source of electricity generation in Connecticut.