**Read Me**

This file describes how to use MATLAB code to estimate potential electricity production using PV. This MATLAB code and the equations are general and can be applied to any location worldwide.

Note that the model takes into account shading due to the rows of panels but not shading due to landscape features (e.g., trees, nearby buildings) external to the model.

The model’s main file is “ProductionModel”. It is located in the same folder with the “functions” folder, which contains the functions the model uses, and the “raw\_data” folder, which contains seven CSV files on which the model relies. The data used are based on BGU values, but these can be adjusted when applied to a different institution or a different location. To apply the data to a different institution or location, the following CSV files must be modified:

Meteorological Data (Rows 6–9): The CSV file contains a table of 8,760 records (not including the titles), as the number of hours in a calendar year (365 × 24) and 10 fields. Four of these fields are the “Year”, “Month”, “Day”, and “Time”. “Year”, “Month”, and “Day” denote the date the measurement was taken, and “Time” represents the time of day when the measurement was taken. The time is displayed in 24-hour format, as shown in the following example: “01:00–02:00”. The remaining six fields are the outputs of the meteorological measurement: “Dry Bulb Temperature” (°C ), “Global Horizontal Irradiation (GHI)” (Wh/m2), “Direct Normal Irradiance (DNI)” (Wh/m2), “Diffuse Horizontal Irradiance (DHI)” (Wh/m2), “Wind Speed” (m/s), and “Albedo”. The data should be input in the following order: “Year” in column A, “Month” in column B, "Day" in column C, and so on.

Potential Areas (Rows 11–13): The CSV file contains tables indicating the potential areas for placing PV panels in the institution. In BGU, for example, there are three types of areas: roofs, parking lots, and the north campus (a planned area for BGU’s future growth). Consequently, each area type is read as a 1D array containing all relevant areas of this type.

Electricity Consumption (Rows 15 and 16): The CSV files contain tables indicating the electricity consumption of the institution, only for comparison. In the monthly table, each row represents a building, and each column represents the building’s monthly electricity consumption. The hourly table represents the total electricity consumption of BGU every hour during the year (8,760 records, excluding titles).

Coefficients (Row 18): The CSV table values are as follows: weighted CO2e emissions associated with the consumption of 1 kWh in kilograms, the price of 1 kWh, the cost of storing 1 kWh, the cost of installing a standard 1 kWh peak PV system, and the cost of installing a complex 1 kWh peak PV system (e.g., in a parking lot). Weighted CO2e emissions are given in kilograms. All other costs are given in NIS.

Panel Parameters (Row 20): The CSV table contains the factory settings of the panel as follows: “Initial Vmpp”, “Initial Impp”, “Temperature Coefficient Pmax”, “Panel Width”, and “Panel Height”. At BGU, we use Jinko Solar 540-watt panels. Therefore, the parameter values are based on those given in this document: [jinkosolar.com/uploads/JKM525-545M-72HL4-TV-F1-EN.pdf](http://www.jinkosolar.com/uploads/JKM525-545M-72HL4-TV-F1-EN.pdf).

Model Parameters (Row 22): The CSV table contains the parameter values listed in Table 2.