

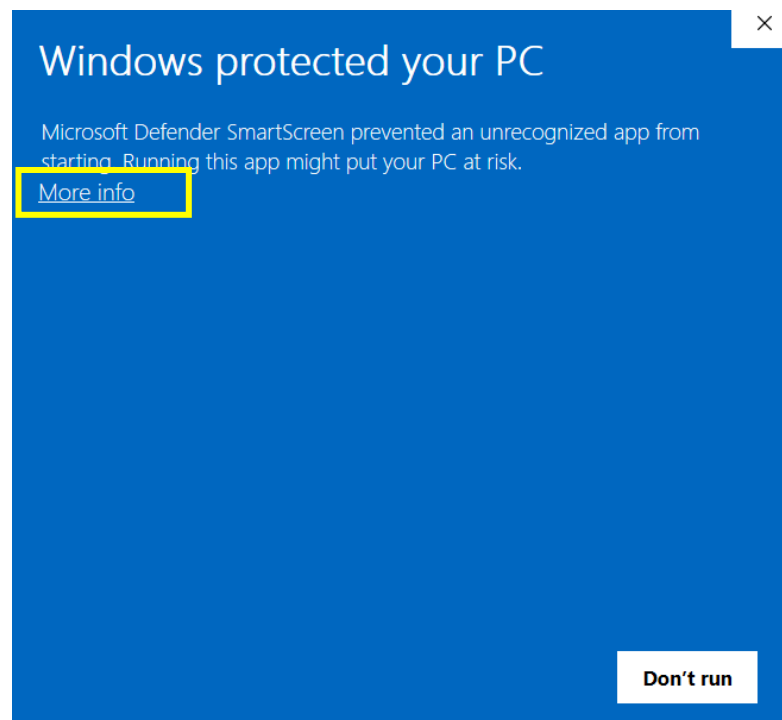
# EcoSizer User Guide

## Steps to Download the .exe File:

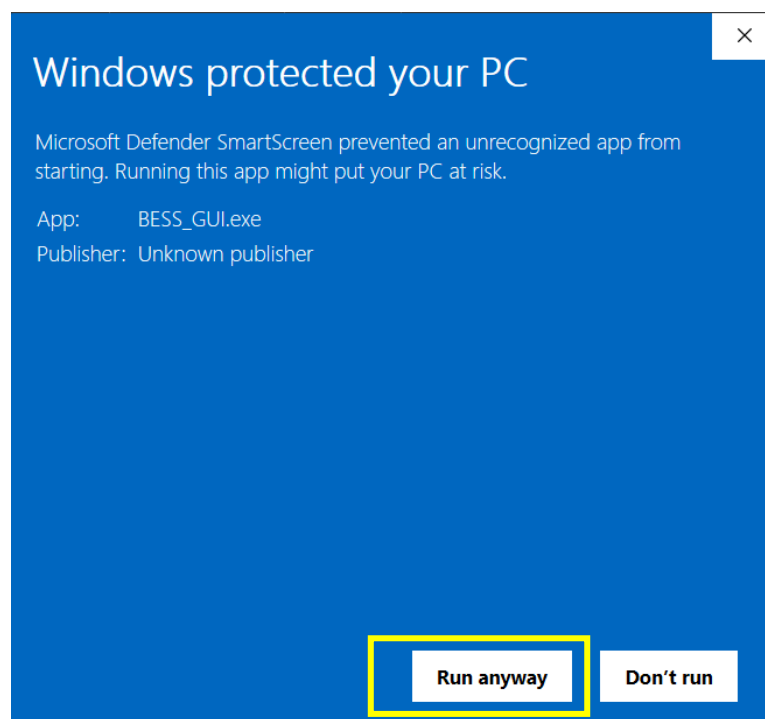
- **Tool Download:**
  - Head over to the EcoSizer project on Github. You can find it by searching online for "Jayasurya-Vardhan/EcoSizer Github".
  - Once on the Github page, navigate to the "Releases" section.
  - Download the latest version of the EcoSizer tool. This will typically be a compressed folder (like a .zip file).
- **Extract the downloaded folder:** Locate the downloaded folder and extract its contents to a convenient location on your computer.
- **Wait for Setup:** After extracting, there might be a short delay for few seconds as the system prepares the .exe file for use. Wait until the file icon updates which represents that its ready to run.
- **Run the .exe File:** Double-click the downloaded .exe file to start the program. This will likely prompt a security warning from Windows Defender.



- **Windows Defender Warning (Safe):** Don't worry! This is just a security check. You can safely click "More info".



- **Run the Program:** Finally, click "Run anyway" to launch the program. It might take a few seconds to open completely as it needs to set the executable path first to run the solver for optimization.



## Using the EcoSizer Tools:

There are two models of the EcoSizer tool available, each designed for a specific purpose:

1. **EcoSizer Storage:** This tool helps you determine the ideal battery storage capacity to complement your existing solar photovoltaic (PV) system.
2. **EcoSizer SunVault:** This tool is geared towards designing solar and battery storage systems for new homes. It helps you size both the solar PV system and the Battery Energy Storage System (BESS) to meet your requirements.

Both EcoSizer tools boast a user-friendly interface with minimal differences. This makes it easy to switch between the tools if your needs evolve, requiring you to adjust only the relevant parameters specific to your project.

- **Setting Up Your Simulation:** After you click “Run anyway” in last step the EcoSizer interface will appear. Here, you can configure various parameters related to your preferences.

The screenshot displays the EcoSizer interface, which is divided into three main sections: **Configure Parameters**, **Energy Distribution Overview**, and **Financial Analysis**.

- Configure Parameters:** This section contains five sliders for adjusting system parameters:
  - PV CAPEX (500-2500 €/kWp):** A slider with a value of 500.
  - BESS CAPEX (300-1500 €/kWh):** A slider with a value of 300.
  - Electricity Price (1-100 €-cents/kWh):** A slider with a value of 0.
  - Feed-in Tariff (1-20 €-cents/kWh):** A slider with a value of 0.
  - Demand (1000-20000 kWh/Yr):** A slider with a value of 0.A **Run Simulation** button is located at the bottom of this section.
- Optimal System Capacities:** This section is located below the configuration parameters and contains two icons: a solar panel icon and a battery icon, each followed by a text input field for displaying optimal capacities.
- Energy Distribution Overview:** This is a large, empty rectangular area intended for visualizing energy distribution data.
- Financial Analysis:** This is a large, empty rectangular area intended for displaying financial analysis results. At the bottom of this section, there are two buttons: **Update Report** and **Save as PDF**.

- **Running the Simulation:** Once you've entered your desired parameters, click the "Run Simulation" button. The tool will analyse your inputs then starts simulation to calculate the optimal capacities for your energy system.

The screenshot shows a 'Configure Parameters' window with five sliders and a 'Run Simulation' button. The sliders are set to the following values:

Parameter	Value
PV CAPEX (500-2500 €/kWp):	1500
BESS CAPEX (300-1500 €/kWh):	700
Electricity Price (1-100 €-cents/kWh):	42
Feed-in Tariff (1-20 €-cents/kWh):	7
Demand (1000-20000 kWh/Yr):	9000

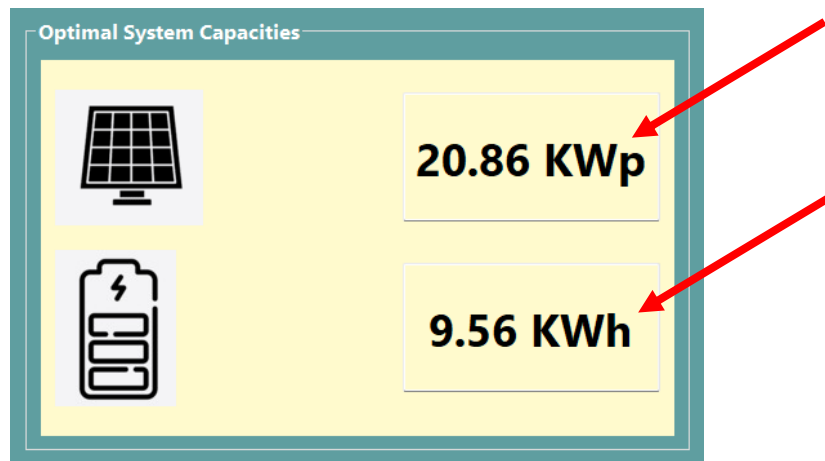
The 'Run Simulation' button is highlighted with a red box, and a red arrow points to it from the right.

- Once you click the button, the status of the simulation is shown with different dialogues to keep you updated.

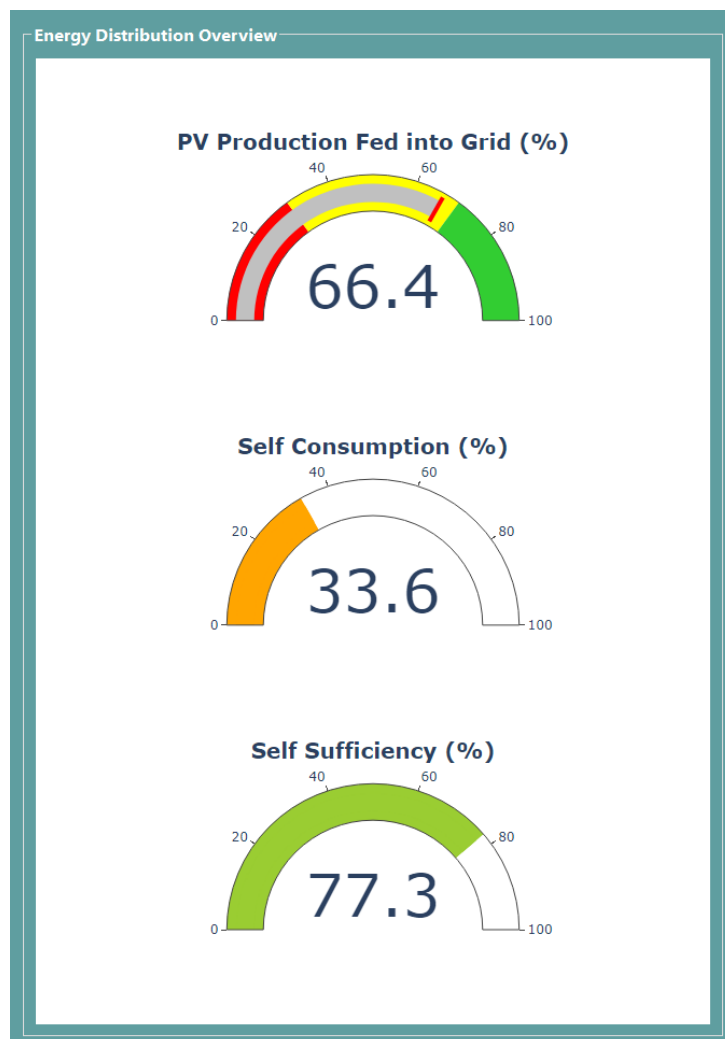
**Simulation in Progress.....**

**Simulation Finished, Updating Results.....**

- **Viewing Results:** After the simulation completes, you'll see the recommended system capacity displayed on the screen.



- Additionally, graphs will update in the "Energy Distribution" section, providing valuable insights into your system's performance.



- **Financial Analysis:** To view the financial benefits of your particular system, click the "Update Report" button. This will generate a report with estimated costs and savings. You can also save this report for future reference.

Financial Analysis	
Description	Value
Electricity Price	42 €-cents/kWh
Feed-in Tariff (FiT)	7 €-cents/kWh
PV System Capacity	20.86 kWp
Energy Demand	9000 kWh/Yr
Yearly Energy Costs (Without PV+BESS)	
Energy bill for Grid Import	3780.00 €/Yr
Yearly Energy Costs (With PV+BESS)	
Total PV Generated	19628.01 kWh
Fed-into-Grid	12761.57 kWh
Income from FiT	893.31 €
Grid Import	2229.84 kWh
Energy bill for Grid Import	936.53 €/Yr
Investment Costs	
PV-CAPEX	1500 €/kWp
BESS-CAPEX	700 €/kWh
PV Investment	31290.00 €
BESS Investment	6692.00 €
Total Investments	37982.00 €
Savings and Payback Period	
Energy bill Savings (with PV+BESS)	3736.78 €/Yr
Payback Period	10.16 Yr
Disclaimer: Results and analysis are just estimations and may vary in real-world scenarios	
<div>Update Report</div> <div>Save as PDF</div>	

- **Rerunning Simulations:** The EcoSizer allows you to adjust parameters and rerun the simulation as many times as needed. This lets you explore different system configurations and find the optimal solution for your specific household.

## Tool Limitations:

- Maximum PV capacity considered is up to 30 kWp, catering to typical household scenarios.
- The PV feed-in profile is based on the location from the central part of Germany, impacting the tool's accuracy in regions with significantly different solar profiles.
- For Energy demand a standard Household BDEW Profile is used.
- In the PV+BESS model, the maximum PV capacity is dependent on the feed-in tariff (FiT). If FiT is 8 and above, the maximum capacity is 10 kWp; otherwise, it is capped at 30 kWp, following amendments to the EEG considering partial feed-in.
- The tool assumes a system lifetime of 25 years for PV and 10 years for Battery Storage.
- The battery efficiency is set at 95% in the calculations.
- The tool is set to use "GLPK" solver for optimization and the solver settings are currently compatible only with Windows. This restricts usage for users on macOS and Linux systems.

## Abbreviations:

- |         |   |                                 |
|---------|---|---------------------------------|
| • CAPEX | - | Capital Expenditure             |
| • FiT   | - | Feed-in-Tariff                  |
| • PV    | - | Photovoltaic                    |
| • BESS  | - | Battery Energy Storage System   |
| • OEMOF | - | Open Energy Modelling Framework |
| • €     | - | Euro                            |