Tools of the Trade: Solar Wind Assessment

NREL SAM model

"The System Advisor Model (SAM) is a free techno-economic software model that facilitates decision-making for people in the renewable energy industry."[1]

Read the model description and instruction: https://samrepo.nrelcloud.org/help/index.html

Download and install the current version. It's free, however, you need register to receive a key by email to use the software.

Technologies

The current version of SAM includes performance models for the following technologies:

- PV
- Battery storage
- Wind
- Concentrating Solar Power (CSP)
- Solar water heating
- Industrial process heat
- Fuel Cells
- Biomass combustion
- Geothermal power

Solar simulation

- Location and resources
- Module
- Inverter
- System design
- Shading and snow
- Losses
- Lifetime
- Battery
- System costs
- Financial Incentives

[1] NREL, https://sam.nrel.gov/

- Rates
- Load

Wind simulation

- Wind resource: NY
- Wind turbine
- Wind farm
- System costs
- Lifetime
- Financial
- Incentives
- Rates
- Load

Bulk simulation

SAM offers some code-based simulation in the samples: https://github.com/NREL/pysam/blob/main/Examples/PySAMWorkshop.ipynb

If you want to learn more about how to write pySAM: https://sam.nrel.gov/software-development-kit-sdk/pysam.html

Understand the weather file: https://sam.nrel.gov/weather-data.html

Further readings

- Valuing Climate Changes: Updating Estimation of the Social Cost of Carbon Dioxide. 2017. Washington, D.C.: National Academies Press. https://doi.org/10.17226/24651.
- Ricke, Katharine, Laurent Drouet, Ken Caldeira, and Massimo Tavoni. 2018. "Country-Level Social Cost of Carbon." Nature Climate Change 8 (10): 895–900. https://doi.org/10.1038/s41558-018-0282-y.