The code Simulates hourly solar generation (kW) for a fixed-tilt PV system using NASA POWER weather data and pvlib’s PVWatts model.

What it does

1. Downloads hourly irradiance (GHI, DNI, DHI), temperature, and wind speed from NASA POWER for the given coordinates and dates.
2. Builds a PVWatts model of a fixed-tilt, south-facing array.
3. Computes hourly AC output (kW) and applies a single efficiency factor to represent all system losses.

**Key parameters (with defaults)**

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| Parameter | Default | Meaning |
| lat, lon | *required* | Geographic coordinates (°). |
| tz |  | Output timezone. |
| start\_date, end\_date |  | Simulation period. |
| system\_dc\_kw |  | PV DC nameplate (kW) |
| dc\_ac\_ratio | 1.2 | DC/AC sizing ratio. |
| surface\_tilt\_deg | abs(lat)\* 0.9 | Tilt (°). |
| surface\_azimuth | 180 | Facing south (N. Hemisphere). |
| albedo | 0.25 | Ground reflectance. |
| gamma\_pdc | -0.004 | Temp coefficient (−0.4 % / °C). |
| net\_efficiency | 0.90 | Overall system efficiency (all losses). |