

# High-Resolution Floating Solar PV Data Report

## Dataset Description

This dataset contains over two years of 1-minute resolution data collected from four floating solar sites, as well as data from a land-based PV system co-located with one of the floating sites. The dataset includes highly granular module temperature measurements - five modules per floating site, with three sensors per module, totaling 15 module temperature sensors per floating site. In addition to the module temperature data, meteorological data collected at the floating sites is also included, along with traditional PV system-level parameters. The data is intended for analysis of solar energy production, efficiency, and performance degradation over time.

In this report, the FPV Windsor CA (code FSW) is used. This dataset spans from 10/1/2022 to 3/15/2024.

## Important Parameters

- FPV Epp Horizontal irradiance ( $\text{W/m}^2$ )      FHZIRR
- FPV RT1 POA irradiance ( $\text{W/m}^2$ )      FPAIRR
- LPV Epp POA irradiance ( $\text{W/m}^2$ )      LPAIRR

Plane-of-array (POA) irradiance is needed for calculating how much sunlight actually reaches the panels; horizontal irradiance helps validate sensor calibration and can be used if POA data is missing.

- FPV DAS Panel Temp ( $^{\circ}\text{C}$ )      FSTEMP
- RT1 Add'l Panel Temp ( $^{\circ}\text{C}$ )      FPNLTC
- NW A/B/C Panel Temp ( $^{\circ}\text{C}$ ), North A/B/C Panel Temp ( $^{\circ}\text{C}$ )      NWPTMA, NWPTMB, NWPTMC
- NE A/B/C Panel Temp ( $^{\circ}\text{C}$ ), Middle A/B/C Panel Temp ( $^{\circ}\text{C}$ )      NEPTMA, NEPTMB, NEPTMC
- South A/B/C Panel Temp ( $^{\circ}\text{C}$ )      SOPTMA, SOPTMB, SOPTMC

Module temperature directly impacts panel efficiency (temperature coefficient); having multiple sensors across the array lets you spot hotspots or uneven aging.

- FPV DryBulb Temp (°C) FPVDBT
- LPV Vaisala DryBulb Temp (°C) LPVDBT
- FPV Relative Humidity (%) FPV\_RH
- FPV Wind Speed Avg (m/s) FWINDA

Ambient temperature and wind speed let you correct for thermal losses; humidity (and pressure) can affect soiling and spectral losses but is secondary.

- Inverter AC Power Output (kW) INVACP
- Inverter DC Energy Output (kWh) INVACE
- Inverter DC Current (Amps) INVDCI

“Ground truth” for energy yield: instantaneous power, cumulative energy, and DC input current into the inverter. (note, data points in these 3 parameters are all sentinel values, DO NOT USE THIS)

- FPV DAS Battery Volts FSBATT
- LPV DAS Battery Volts FSTEMP

For analyzing the efficiency or health of data-acquisition power system (upkeep and maintenance).

## Parameter Table Index

FSBATT	FPV DAS Battery Volts
FSTEMP	FPV DAS Panel Temp C
NWPTMA	NW A PANEL TEMP C
NWPTMB	NW B PANEL TEMP C
NWPTMC	NW C PANEL TEMP C
NOPTMA	North A PANEL TEMP C
NOPTMB	North B PANEL TEMP C
NOPTMC	North C PANEL TEMP C
NEPTMA	NE A PANEL TEMP C
NEPTMB	NE B PANEL TEMP C
NEPTMC	NE C PANEL TEMP C
MDPTMA	Middle A PANEL TEMP C
MDPTMB	Middle B PANEL TEMP C
MDPTMC	Middle C PANEL TEMP C
SOPTMA	South A PANEL TEMP C
SOPTMB	South B PANEL TEMP C
SOPTMC	South C PANEL TEMP C
FHZIRR	FPV Epp Horiz Irradiance W/m2
FPAIRR	FPV RT1 POA Irradiance W/m2
FPNLTC	RT1 Add'l PANEL TEMP C
WTM1_0	WATER TEMP 1.0ft C

WTM275	WATER TEMP 2.75ft C
WTM4_5	WATER TEMP 4.5ft C
FPVDBT	FPV DryBulb Temp C
FPV_RH	FPV Relative Humidity %
FRAIRP	FPV Relative Air Pressure hPa
FWINDA	FPV Wind Speed Avg m/s
FWINDM	FPV Wind Speed Max m/s
FWINDV	FPV Wind Direction vct Deg
FRSRVD	FPV WS601 Wx Stn Reserved Chan
FPRECT	FPV Precipitation Type
FPRECI	FPV Precipitation Intensity mm/h
FDPTMP	FPV Dew Point Temp C
FWCTMP	FPV Wind Chill Temp C
FPRECD	FPV Precipitation Diff mm
FWNDAC	FPV Wind Speed Actual m/s
FWNDMN	FPV Wind Speed Minimum m/s
FWNDVT	FPV Wind Speed Vector m/s
FPVWBT	FPV Wet Bulb Temp C
FWDIRA	FPV Wind Direction Act Deg
FWDIRN	FPV Wind Direction Min Deg
FWDIRX	FPV Wind Direction Max Deg
FENTHP	FPV Specific Enthalpy kJ/kg
LSBATT	LPV DAS Battery Volts
LSTEMP	LPV DAS Panel Temp C
LPVDBT	LPV Vaisala DryBulb Temp C
LPV_RH	LPV Vaisala Relative Humidity %
LPVDB2	LPV Vaisala bkup DryBulb Temp C
LPVRH2	LPV Vaisala bkup Relative Humidity %
LWINDA	LPV Wind Speed Avg m/s
LPAIRR	LPV Epp POA Irradiance W/m2
INVACP	Inverter AC Power Output (kW)
INVACE	Inverter DC Energy Output (kWh)
INVDCI	Inverter DC Current (Amps)