New Jersey's Clean Energy Program™
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New Jersey Board of Public Utilities
Office of Clean Energy

Pay for Performance EB Technical Tip

Modeling PV in Existing Buildings

This technical tip pertains to existing building facilities with on-site PV during baseline year analysis period.

Like most on-site generation equipment, solar PV panels are not an eligible measure in the program and cannot contribute to the 15% savings target. Incentives for PV panels or related SRECs may be available separately from the NJCEP Renewable Energy Programs. Information regarding this program can be found at www.njcleanenergy.com/renewable.

If PV is implemented in the project at any point during P4P participation, it must be separately metered. The metered data must be added back into the building utility data for Incentive #3 submittal to ensure that P4P incentives are not paid for savings related to renewable energy measures.

Existing PV energy equipment must have at least 12 months of historic metered data, must be added to the baseline building utility bills, and must be included within the baseline building model and Model Calibration Tool.

While this technical tip provides an example on how to model PV using eQuest, the same concepts shall be applied to other approved software packages such as Trane Trace, Carrier HAP, and DOE2.1. If the modeling software does not allow explicit PV modeling, PV Watts can be used to calculate solar energy generation.

Key Inputs

- Capacity – capacity of the generator in kW (per inverter if applicable)
- PV Module
- Mount Type
- Number of Inverters

ERP Documentation

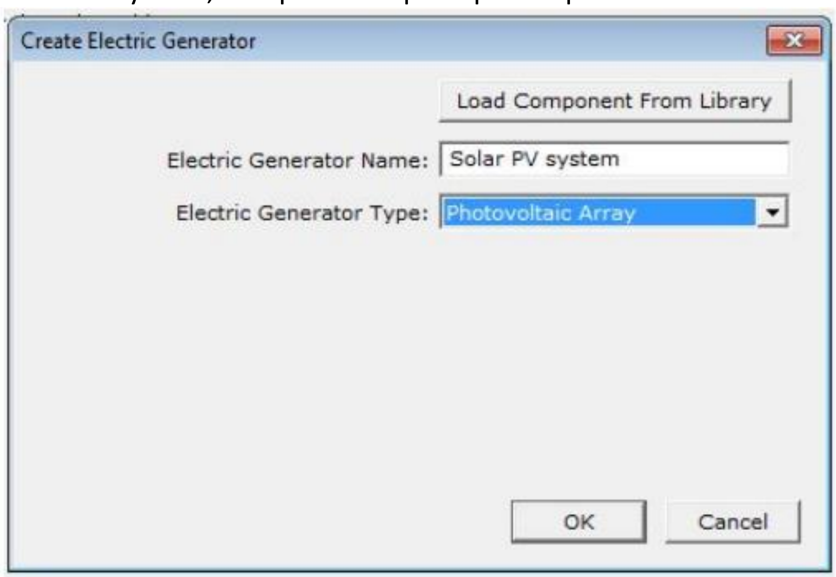
The existing parameters used in Simulation must be clearly detailed in the ERP. The details may be in included in the "Other Mechanical Systems" table of the "Mechanical" tab of the ERP tables. The PV meter should be entered as a separate meter in the utility tab so that measure savings from the model can be allocated amongst grid kWh, solar kWh, natural gas, etc. Although unlikely, any energy efficiency measure that also results in additional solar kWh generation does not qualify for incentives but can count towards the 15% source energy savings target.

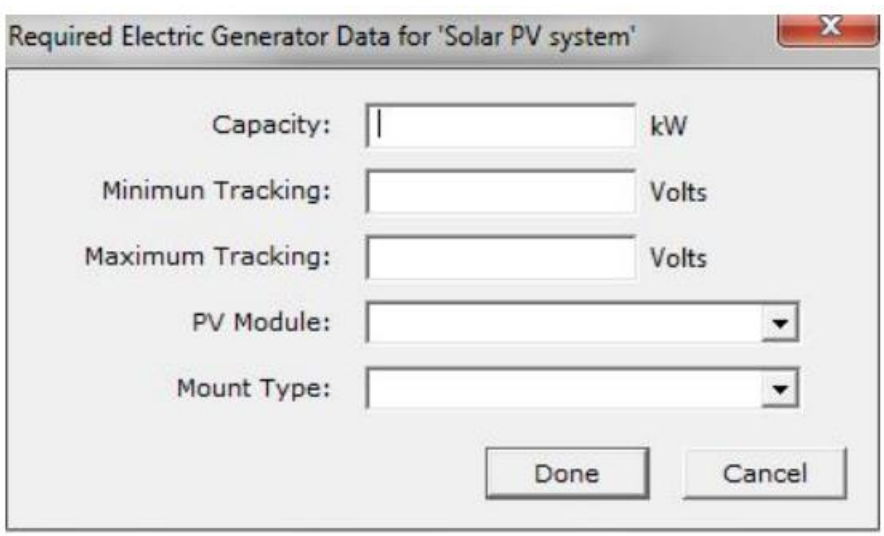
Model Calibration

For calibration purposes, any kWh associated with PV may be bundled with grid kWh and calibrated per the typical process.

Example: Modeling PV in eQuest

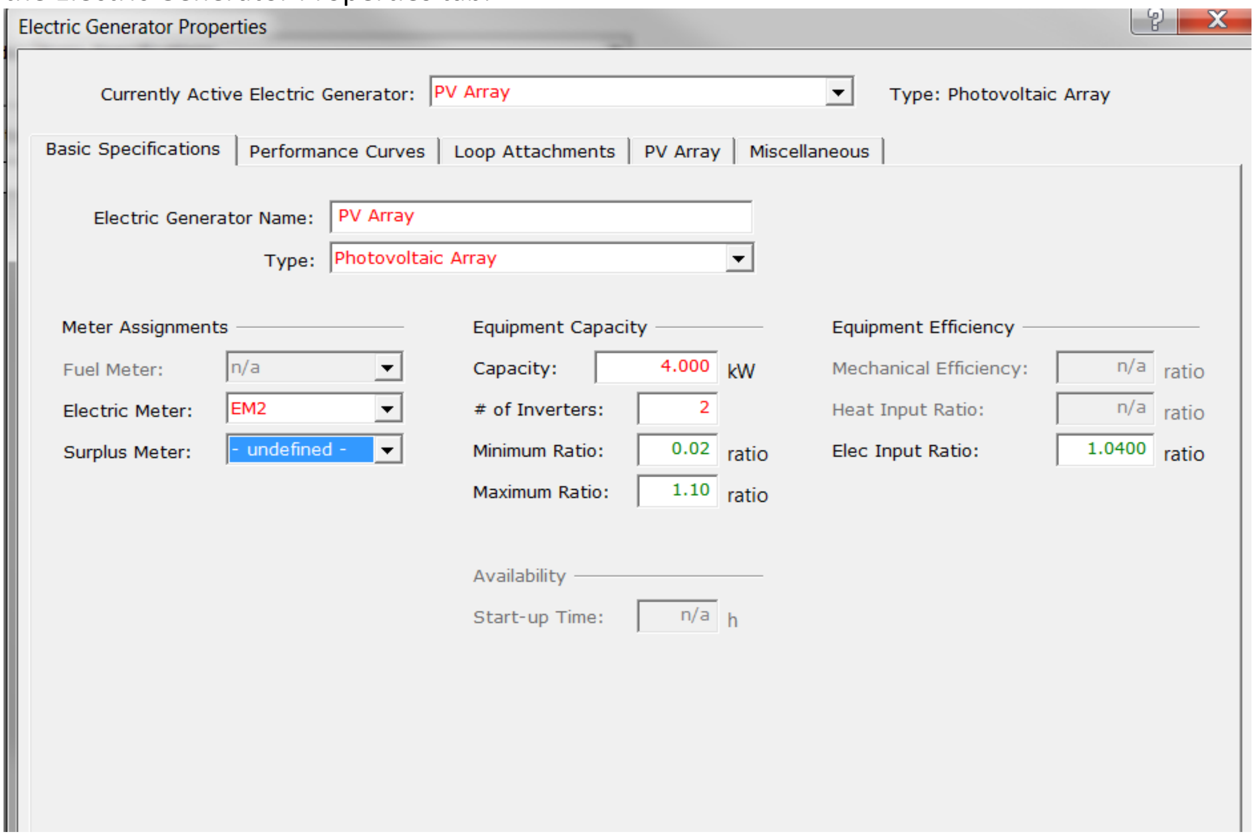
To model PV in eQuest, create an electric generator, then select PV array. Using the characteristics of the PV system, complete the prompted inputs.





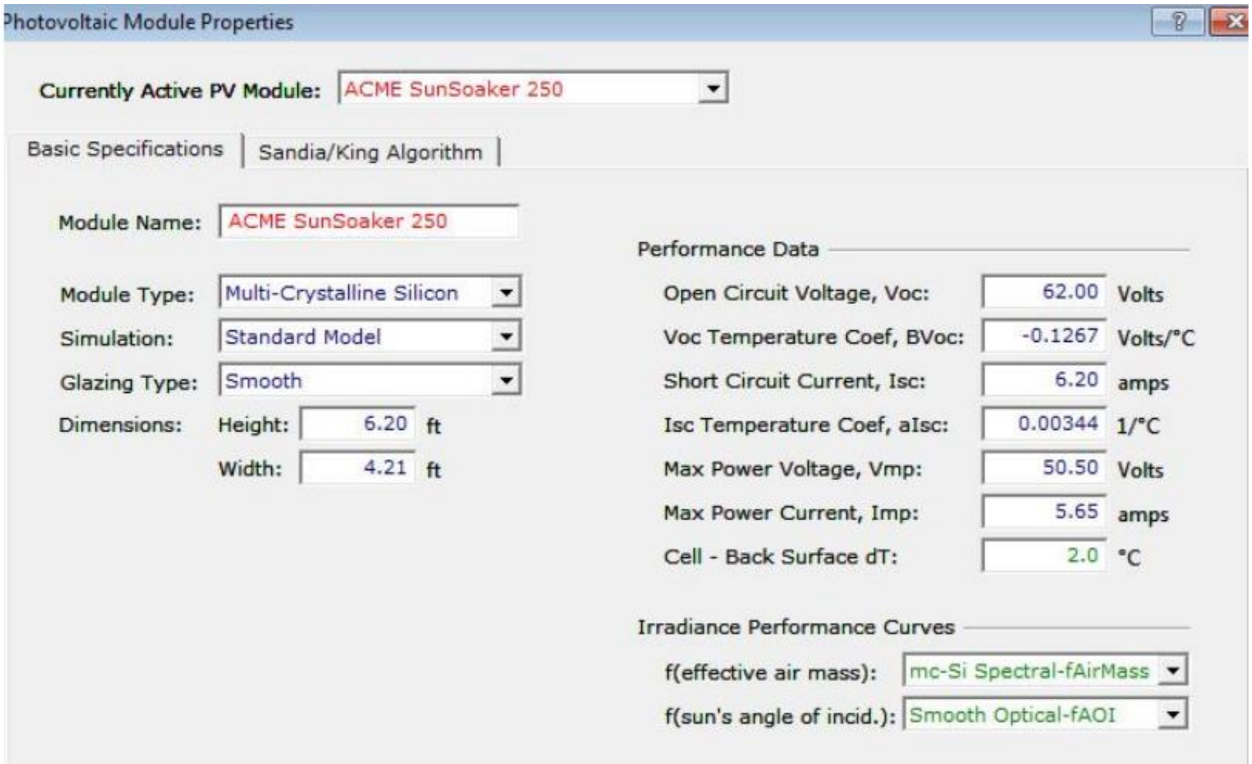
*If using building surface for the mount type, select the exterior wall or roof where the PV system is installed. The Sandia Laboratory in Los Alamos, New Mexico, USA maintains a database of PV modules that may be downloaded from their website.

Once the PV Array is created, a separate electric meter must be assigned. This can be done on the Electric Generator Properties tab.

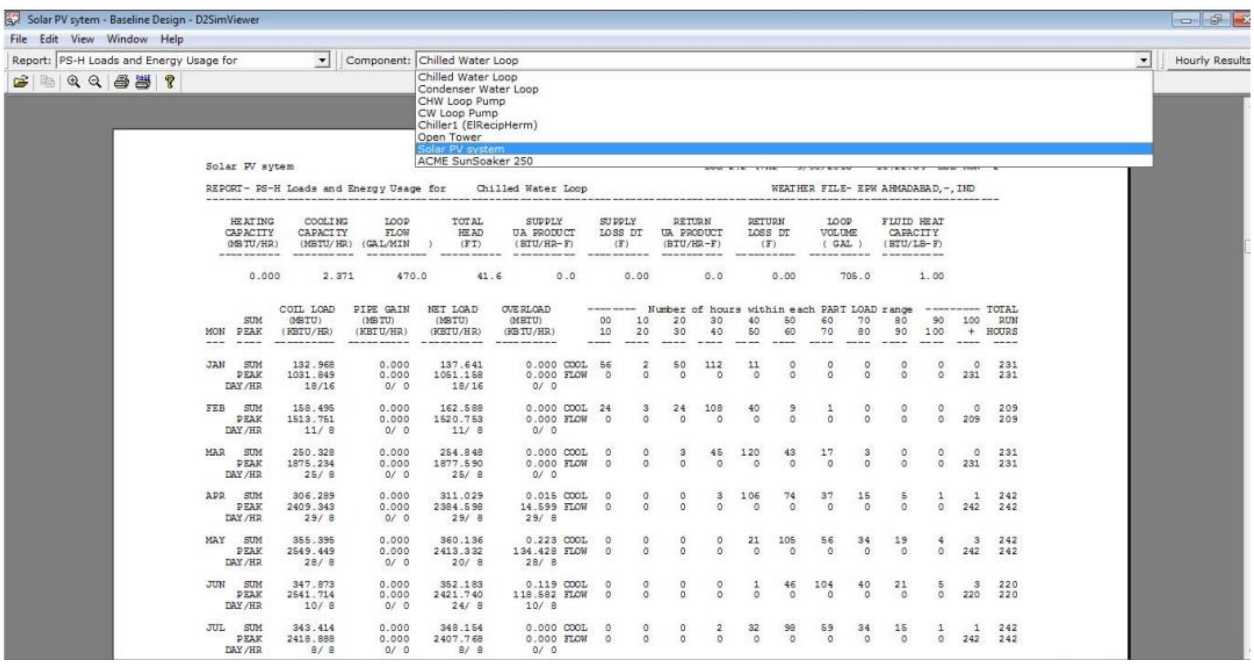


Once completed, you can use the component tree to select the PV Module and change the input data as necessary.

*If surplus power generated is sold, a surplus meter should be specified as well. The meter type specified shall be “Electric-sale”



The PS-H Loads and Energy Usage report will show the results of the simulation.



Solar PV sytem

REPORT- PS-H Loads and Energy Usage for Chilled Water Loop WEATHER FILE- EPW AHMADABAD,-,IND

HEATING CAPACITY (MBTU/HR)	COOLING CAPACITY (MBTU/HR)	LOOP FLOW (GAL/MIN)	TOTAL HEAD (FT)	SUPPLY UA PRODUCT (BTU/HR-F)	SUPPLY LOSS DT (F)	RETURN UA PRODUCT (BTU/HR-F)	RETURN LOSS DT (F)	LOOP VOLUME (GAL)	FLUID HEAT CAPACITY (BTU/LB-F)
0.000	2.371	470.0	41.6	0.0	0.00	0.0	0.00	705.0	1.00

MON	SUM PEAK	COIL LOAD (MBTU) (KBTU/HR)	PIPE GAIN (MBTU) (KBTU/HR)	NET LOAD (MBTU) (KBTU/HR)	OVERLOAD (MBTU) (KBTU/HR)		00 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 100	100 +	TOTAL RUN HOURS
JAN	SUM	132.968	0.000	137.641	0.000	COOL	56	2	50	112	11	0	0	0	0	0	0	231
	PEAK	1031.849	0.000	1051.158	0.000	FLOW	0	0	0	0	0	0	0	0	0	0	231	231
	DAY/HR	18/16	0/ 0	18/16	0/ 0													
FEB	SUM	158.495	0.000	162.588	0.000	COOL	24	3	24	108	40	9	1	0	0	0	0	209
	PEAK	1513.751	0.000	1520.753	0.000	FLOW	0	0	0	0	0	0	0	0	0	0	209	209
	DAY/HR	11/ 8	0/ 0	11/ 8	0/ 0													
MAR	SUM	250.328	0.000	254.848	0.000	COOL	0	0	3	45	120	43	17	3	0	0	0	231
	PEAK	1875.234	0.000	1877.590	0.000	FLOW	0	0	0	0	0	0	0	0	0	0	231	231
	DAY/HR	25/ 8	0/ 0	25/ 8	0/ 0													
APR	SUM	306.289	0.000	311.029	0.015	COOL	0	0	0	3	106	74	37	15	5	1	1	242
	PEAK	2409.343	0.000	2384.598	14.599	FLOW	0	0	0	0	0	0	0	0	0	0	242	242
	DAY/HR	29/ 8	0/ 0	29/ 8	29/ 8													
MAY	SUM	355.395	0.000	360.136	0.223	COOL	0	0	0	0	21	105	56	34	19	4	3	242
	PEAK	2549.449	0.000	2413.332	134.428	FLOW	0	0	0	0	0	0	0	0	0	0	242	242
	DAY/HR	28/ 8	0/ 0	20/ 8	28/ 8													
JUN	SUM	347.873	0.000	352.183	0.119	COOL	0	0	0	0	1	46	104	40	21	5	3	220
	PEAK	2541.714	0.000	2421.740	118.582	FLOW	0	0	0	0	0	0	0	0	0	0	220	220
	DAY/HR	10/ 8	0/ 0	24/ 8	10/ 8													
JUL	SUM	343.414	0.000	348.154	0.000	COOL	0	0	0	2	32	98	59	34	15	1	1	242
	PEAK	2418.888	0.000	2407.768	0.000	FLOW	0	0	0	0	0	0	0	0	0	0	242	242
	DAY/HR	8/ 8	0/ 0	8/ 8	0/ 0													