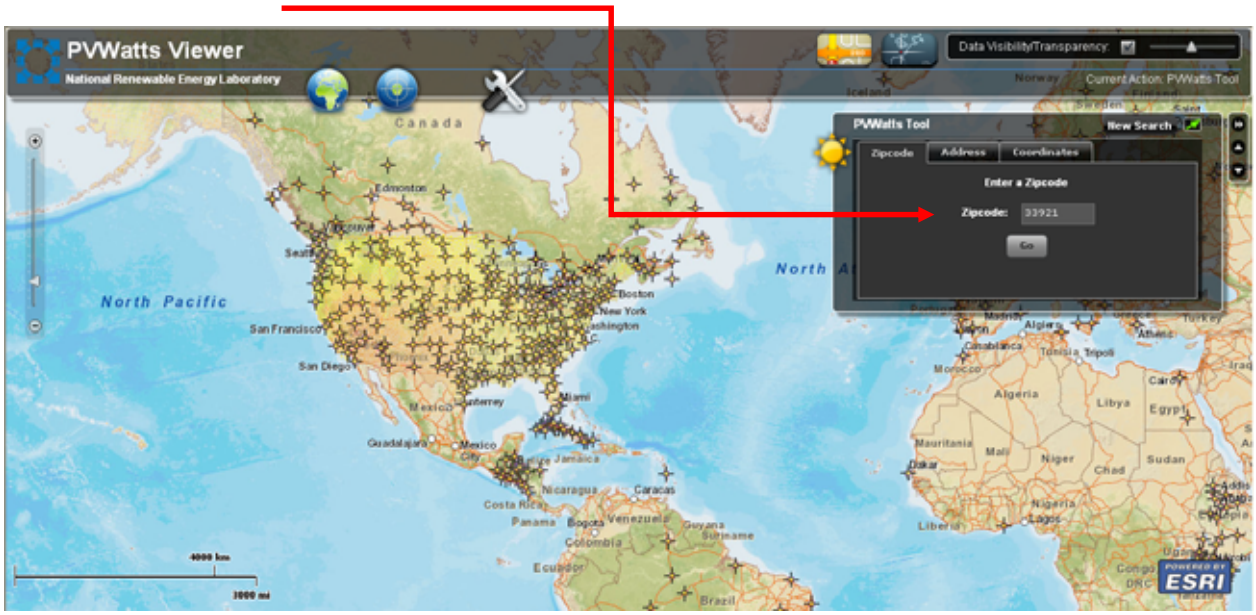
How to Use PVWatts™ Estimating Tool

As a part of Duke Energy's SunSense application process, customers must use NREL's PVWatts™ calculator to determine the estimated energy production from the proposed solar PV system. Below are step-by-step instructions for using the tool. It is suggested that customers complete Sections 3 and 4 of the SunSense Application to use as input references. If you have any questions about required inputs, please consult with your solar installer.

1. Access PVWatts™ calculator at http://mapserve3.nrel.gov/PVWatts_Viewer/index.html

2. Enter your **Zipcode, Address or Coordinates** on the first screen and select **"Go"**

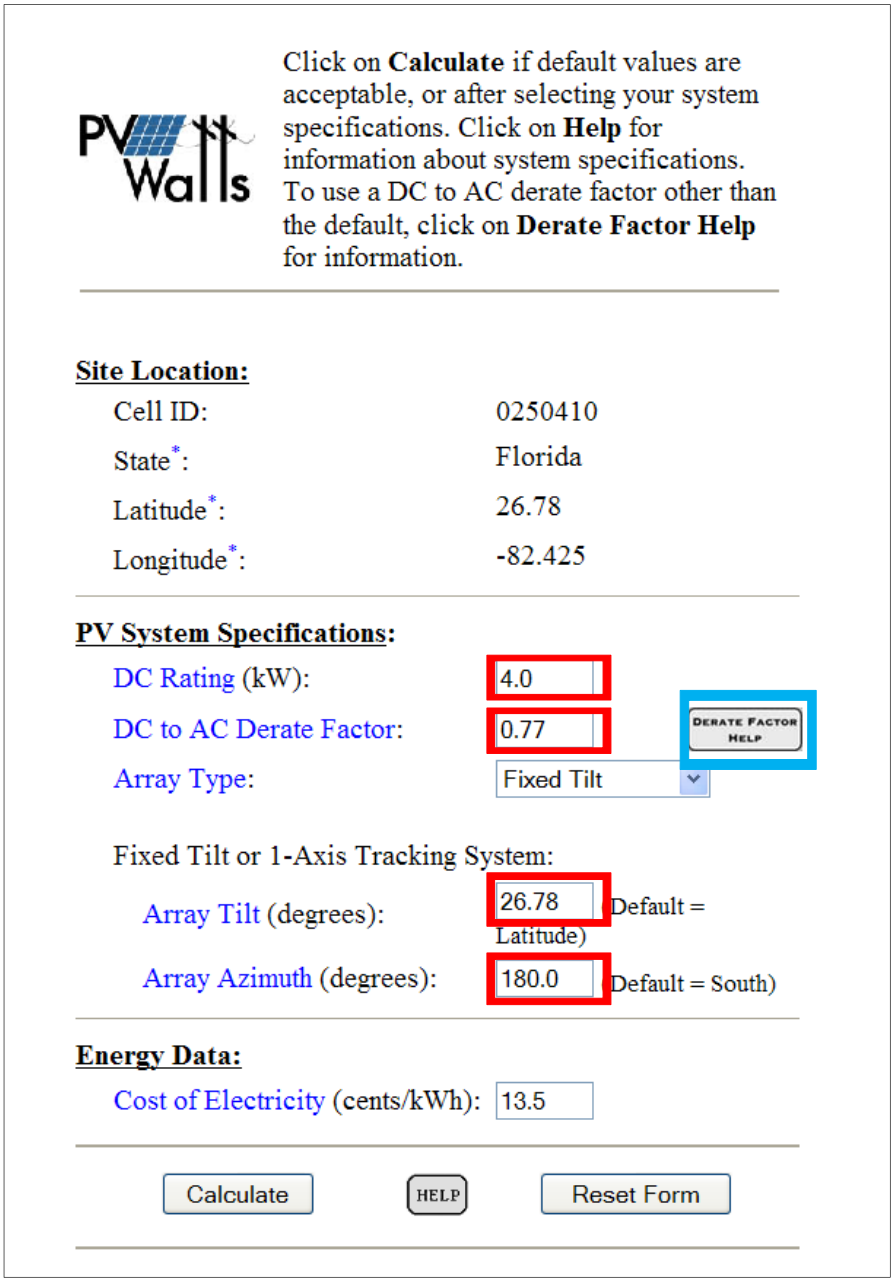


3. The following screen will display these options. Select **"Send to PV Watts"**

4. The next screen will load default values for a sample system. Below is a 4.0 kW DC example for illustrative purposes. In the areas indicated, insert the following information as noted exactly on your SunSense Residential PV Application:

   - **DC Rating (kW)**
   - **DC to AC Derate Factor** (For assistance in determining the Derate Factor, select **"Derate Factor Help"** in blue and see Step 5)
   - **Array Tilt (degrees)**
   - **Array Azimuth (degrees)**

   After inserting the data, select **"Calculate"** below.



5. Derate Factor Help: The DC to AC Derate Factor is usually provided by your solar installer. However, you or the installer may also calculate the derate factor by using this Calculator. This calculator requires multiple system component inputs, several of which are determined by the Solar Site Survey required as part of your application. Duke Energy reserves the right to request supporting information to verify all derate calculations.

   Select **"Help"** below for a full description of each Component Derate Factor and method for determining the value.

Calculator for Overall DC to AC Derate Factor

Component Derate Factors	Component Derate Values	Range of Acceptable Values
PV module nameplate DC rating	0.95	0.80 - 1.05
Inverter and Transformer	0.92	0.88 - 0.98
Mismatch	0.98	0.97 - 0.995
Diodes and connections	0.995	0.99 - 0.997
DC wiring	0.98	0.97 - 0.99
AC wiring	0.99	0.98 - 0.993
Soiling	0.95	0.30 - 0.995
System availability	0.98	0.00 - 0.995
Shading	1.00	0.00 - 1.00
Sun-tracking	1.00	0.95 - 1.00
Age	1.00	0.70 - 1.00
Overall DC to AC derate factor	**0.77** *Default)*	*(PVWATTS*

Calculate Derate Factor

HELP

6. The results screen will appear, indicating the estimated energy production (kWh) for the proposed system. For the 4.0 kW DC example, PVWatts™ calculates an annual output of 5,322 kWhs. **Insert this annual production number in Section 4 of the SunSense Application.**

   To calculate the estimated annual kWh per kW DC production as required in Section 4 of the SunSense Application form, divide the annual kWh production by the system DC Rating.

   In this case: 5,322kWh/4.0 kW DC = 1,330.5 or 1331 kWh/kW DC (round up)

   If the kWh/kW DC total is LESS than 1,000, your Application will NOT BE ACCEPTED.

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 90 characters.)

Station Identification	
Cell ID:	0250410
State:	Florida
Latitude:	26.8 ° N
Longitude:	82.4 ° W
PV System Specifications	
DC Rating:	4.00 kW
DC to AC Derate Factor:	0.770
AC Rating:	3.08 kW
Array Type:	Fixed Tilt
Array Tilt:	26.8 °
Array Azimuth:	180.0 °
Energy Specifications	
Cost of Electricity:	13.5 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	4.67	415	56.02
2	5.17	416	56.16
3	5.80	504	68.04
4	6.17	513	69.25
5	5.73	484	65.34
6	5.35	435	58.73
7	5.18	431	58.19
8	5.38	452	61.02
9	5.25	424	57.24
10	5.35	458	61.83
11	4.75	401	54.13
12	4.41	387	52.25
Year	5.27	5322	718.47

Output Results as Text

After performing the estimate for your system, insert the annual kWh result in Section 4 of the SunSense Application