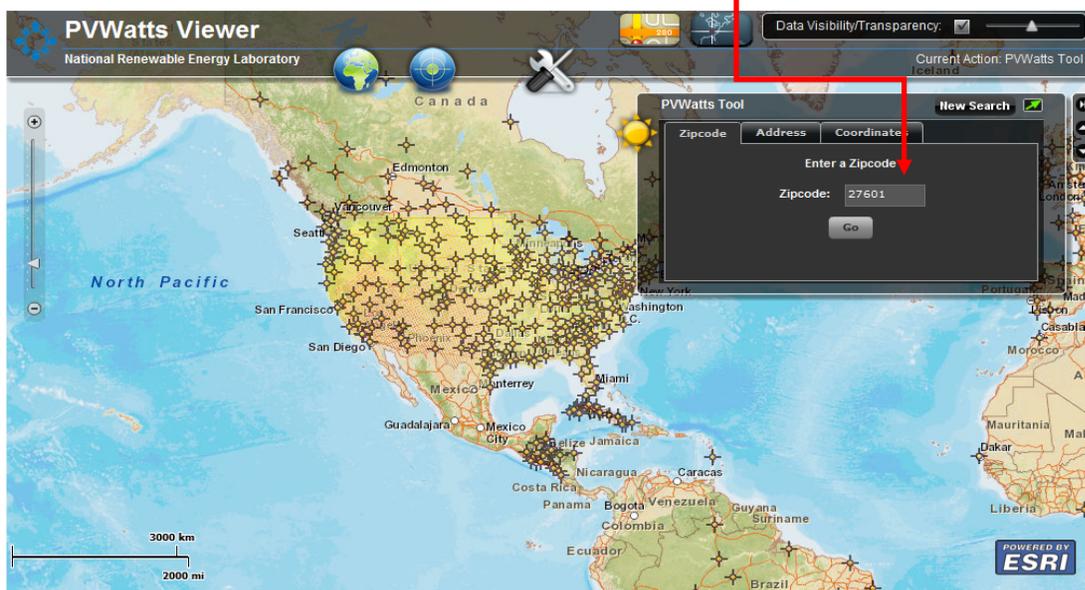


How to Use PVWatts™ Estimating Tool

As a part of Duke Energy Progress' SunSense Solar PV application process, customers must use NREL's PVWatts™ calculator to determine the 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_View/index.html
2. Enter your **zip code** 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 3.6 kW DC example for illustrative purposes. In the areas indicated, insert the following information as noted exactly on your SunSense Solar PV application:

- **DC Rating (kW)**
- **DC to AC Derate Factor***
- **Array Tilt (degrees)**
- **Array Azimuth (degrees)**

After inserting the data, choose **"Calculate"**



Click on **Calculate** if default values are acceptable, or after selecting your system specifications. Click on **Help** for information about system specifications. To use a DC to AC derate factor other than the default, click on **Derate Factor Help** for information.

Site Location:

WBAN Number:	13722
City:	Raleigh
State:	North Carolina
Latitude:	35.87°N
Longitude:	°W
Elevation:	134 m

PV System Specifications:

DC Rating (kW):	<input style="border: 2px solid red;" type="text" value="3.6"/>	
DC to AC Derate Factor:	<input style="border: 2px solid red;" type="text" value="0.75"/>	<input type="button" value="DERATE FACTOR HELP"/>
Array Type:	<input type="text" value="Fixed Tilt"/>	
Fixed Tilt or 1-Axis Tracking System:		
Array Tilt (degrees):	<input style="border: 2px solid red;" type="text" value="33.7"/>	(Default = Latitude)
Array Azimuth (degrees):	<input style="border: 2px solid red;" type="text" value="200"/>	(Default = Equator-Facing)

Energy Data:

Cents per kWh:	<input type="text" value="8.5"/>	(Default = State Average)
----------------	----------------------------------	---------------------------

***The DC to AC Derate factor is provided by your solar installer. The installer may also calculate the derate factor by using "Derate Factor Help". This requires multiple system component inputs. Si _Y'9bYf[mDfc[fYgg reserves the right to request supporting information to verify all calculations.**

- The results screen will appear, indicating the estimated production or AC Energy (kWh) for the proposed system. For the 3.6 kW DC example, PVWatts™ calculates an annual output of 4,549 kWhs. **Insert the annual production number in Section 4 of the SunSense Application.**

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

In this case: $4,549 \text{ kWh} / 2.7 \text{ kW (AC)} = 1,684.81$ or 1685 kWh/kW (AC) (round up)

If the kWh/kW-AC total is LESS than 1200, your Application will NOT BE ACCEPTED.

AC Energy
&
Cost Savings

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification		Results			
City:	Raleigh	Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
State:	North Carolina	1	3.58	296	25.16
Latitude:	35.87° N	2	4.50	337	28.64
Longitude:	78.78° W	3	5.31	423	35.95
Elevation:	134 m	4	5.81	438	37.23
PV System Specifications		5	5.66	425	36.12
DC Rating:	3.6 kW	6	5.88	421	35.79
DC to AC Derate Factor:	0.750	7	5.60	414	35.19
AC Rating:	2.7 kW	8	5.59	412	35.02
Array Type:	Fixed Tilt	9	5.32	386	32.81
Array Tilt:	33.7°	10	5.18	399	33.91
Array Azimuth:	200.0°	11	4.22	325	27.62
Energy Specifications		12	3.35	273	23.21
Cost of Electricity:	8.5 ¢/kWh	Year	5.00	4549	386.67

Output Hourly Performance Data
Output Results as Text

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