Transition Guide: PVWatts API to PowerBill® API

Document Last Updated: January 7, 2014

Introduction

The PowerBill® API is a RESTful API. A valid username, password and client key is required to access this API. A preliminary demo instance of this API is available with requests of the form:

https://powerbill.cleanpower.com/api/v1/SimulateTypicalYear?[QueryStringParams]

After populating the query string parameters, HTTP GET requests of this form may be manually evaluated by entering the URL into a web browser.

The API version is indicated in the URL and is currently v1. If new fields are added that do not disturb the existing schema, they will be added to the existing API version. Client developers should write their code in such a way as to ignore unrecognized attributes or elements so they don’t break when new fields are added.

If requirements change such that the schema must be fundamentally changed, then new versions of the API will be created. At that point, client developers will be encouraged to use the latest API in order to take advantage of new functionality. Existing clients will be able to continue to use older versions of the API without modification.

Sample Request URL

The sample below includes the required parameters for sending a request.

https://powerbill.cleanpower.com/api/v1/SimulateTypicalYear?
PowerModel=CprPVForm&WeatherDataSource=TMY3&Latitude_Degrees=37&Longitude_Degrees=-120&GeneralDerate_Percent=86&Tilt_Degrees=30&Azimuth_Degrees=180&MaxPowerOutput_kWAC=1&EfficiencyRating_Percent=91&NameplateRating_kWDC=0.94&PtcRating_kWDC=0.82&key=CLIENT_KEY
Sample Output

<?xml version="1.0" encoding="UTF-8"?>
<SimulationResponse>
  <RequestURL>/api/v1/SimulateTypicalYear?PowerModel=CprPVForm&amp;WeatherDataSource=TMY3&amp;Latitude_Degrees=37&amp;Longitude_Degrees=-120&amp;GeneralDerate_Percent=86&amp;Tilt_Degrees=30&amp;Azimuth_Degrees=180&amp;MaxPowerOutput_kWAC=1&amp;EfficiencyRating_Percent=91&amp;NameplateRating_kWDC=0.94&amp;PtcRating_kWDC=0.82&amp;key=****2X"
  <Status>Success</Status> xmlns="http://powerbill.cleanpower.com/api/v1"
  <RequestInputs>
    <EnergySite>
      <Location Latitude_Degrees="37" Longitude_Degrees="-120"/>
      <PVSystems>
        <PVSystem Albedo_Percent="17">
          <PVSubsystems>
            <PVSubsystem GeneralDerate_Percent="86">
              <PVArrays>
                <PVArray>
                  <PVModule Count="1" PowerTemperatureCoefficient_PercentPerDegreeC="0.4"
                  NameplateRating_kWDC="0.94" PtcRating_kWDC="0.82"/>
                  <ArrayConfiguration Tracking="Fixed" TrackingRotationLimit_Degrees="45"
                  ModuleRowCount="1" RelativeRowSpacing="3" Azimuth_Degrees="180" Tilt_Degrees="30"/>
                </PVArray>
              </PVArrays>
              <Inverters>
                <Inverter Count="1" MaxPowerOutput_kWAC="1" EfficiencyRating_Percent="91"/>
              </Inverters>
            </PVSubsystem>
          </PVSubsystems>
        </PVSystem>
      </PVSystems>
    </EnergySite>
    <SimulationOptions PowerModel="CprPVForm" IncludeSummary="true" IncludeDebugInfo="true"
    OutputFields=""/>
    <WeatherDataOptions SpatialResolution_Degrees="0.1" TimeResolution_Minutes="60"
    WeatherDataPreference="Auto" WeatherDataSource="TMY3"/>
  </SimulationOptions>
  </RequestInputs>
  <WeatherSourceInformation WeatherSiteName="FRESNO YOSEMITE INTL AP" Latitude_Degrees="36.783"
  Longitude_Degrees="-119.717"/>
  <AnnualSummary>
    <Annual TotalEnergy_kWhAC="1331.249785"/>
    <Monthly>
      <Month MonthName="January" TotalEnergy_kWhAC="47.073207"/>
      <Month MonthName="February" TotalEnergy_kWhAC="76.045435"/>
      <Month MonthName="March" TotalEnergy_kWhAC="110.577359"/>
      <Month MonthName="April" TotalEnergy_kWhAC="135.458421"/>
      <Month MonthName="May" TotalEnergy_kWhAC="142.490923"/>
      <Month MonthName="June" TotalEnergy_kWhAC="145.709628"/>
      <Month MonthName="July" TotalEnergy_kWhAC="147.257870"/>
      <Month MonthName="August" TotalEnergy_kWhAC="150.962086"/>
      <Month MonthName="September" TotalEnergy_kWhAC="128.478773"/>
      <Month MonthName="October" TotalEnergy_kWhAC="115.877883"/>
      <Month MonthName="November" TotalEnergy_kWhAC="75.440005"/>
      <Month MonthName="December" TotalEnergy_kWhAC="55.878195"/>
    </Monthly>
  </AnnualSummary>
</SimulationResponse>
### PVWatts API to PowerBill API Parameter Mapping

The table below shows the PVWatts API parameters and their corresponding PowerBill API parameters. Note that in the PowerBill API, all percentages take on the range 0 to 100 rather than 0 to 1.

<table>
<thead>
<tr>
<th>PVWatts API</th>
<th>PowerBill API</th>
<th>Type</th>
<th>Options</th>
<th>Required</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>format</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
<td>The PowerBill API presently only supports XML output.</td>
</tr>
<tr>
<td>api_key</td>
<td>key</td>
<td>string</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>address</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
<td>The PowerBill API presently does not support geocoding.</td>
</tr>
<tr>
<td>lat</td>
<td>Latitude_Degrees</td>
<td>decimal</td>
<td>-90 to 90</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>lon</td>
<td>Longitude_Degrees</td>
<td>decimal</td>
<td>-180 to 180</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>dataset</td>
<td>WeatherDataSource</td>
<td>string</td>
<td>NSRDB_TMY10km2010, TMY3</td>
<td>Yes</td>
<td>Today, NSRDB_TMY10km2010 can only be used with the PVWatts PowerModel and TMY3 can only be used with CprPVForm PowerModel.</td>
</tr>
<tr>
<td>timeframe</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
<td>Monthly and annual aggregated value output can be controlled with the &quot;IncludeSummary&quot; parameter. Hourly time resolution output values are controlled by the &quot;OutputFields&quot; parameter.</td>
</tr>
<tr>
<td>system_size</td>
<td>NameplateRating_kWDC</td>
<td>decimal</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PtcRating_kWDC</td>
<td>decimal</td>
<td></td>
<td>Yes</td>
<td>The PTC rating is not used in PVWatts, but is required for use with the CprPVForm model. For a rough estimate, the PTC rating can be estimated by multiplying the nameplate rating by 0.88. For a list of PTC ratings visit: <a href="http://www.gosolarcalifornia.ca.gov/equipment/pv_modules.php">http://www.gosolarcalifornia.ca.gov/equipment/pv_modules.php</a></td>
</tr>
<tr>
<td>PVWatts API</td>
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<td>Type</td>
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</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
<td>--------</td>
<td>--------------------------------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>&lt;None&gt;</td>
<td>PowerModel</td>
<td>string</td>
<td>CprPVForm, PVWatts</td>
<td>Yes</td>
<td>Today, CprPVForm can only be used with TMY3 WeatherDataSource and PVWatts can only be used with NSRDB_TMY10km2010 WeatherDataSource.</td>
</tr>
<tr>
<td>tilt_eq_lat</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
<td>This functionality can be reproduced by defining the appropriate value in Tilt_Degrees.</td>
</tr>
<tr>
<td>derate</td>
<td>GeneralDerate_Percent</td>
<td>decimal</td>
<td>0 to 100</td>
<td>Yes</td>
<td>The appropriate general derate value you should use is dependent on the PowerModel.</td>
</tr>
<tr>
<td>tilt</td>
<td>Tilt_Degrees</td>
<td>decimal</td>
<td>0 to 90</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>azimuth</td>
<td>Azimuth_Degrees</td>
<td>decimal</td>
<td>0 to 360</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>track_mode</td>
<td>Tracking</td>
<td>string</td>
<td>Fixed, SingleAxis, DualAxis</td>
<td>No</td>
<td>Default is Fixed.</td>
</tr>
<tr>
<td>&lt;None&gt;</td>
<td>MaxPowerOutput_kWAC</td>
<td>decimal</td>
<td></td>
<td>Yes</td>
<td>The maximum AC power output for the inverter.</td>
</tr>
<tr>
<td>&lt;None&gt;</td>
<td>EfficiencyRating_Percent</td>
<td>decimal</td>
<td>0 to 100</td>
<td>Yes</td>
<td>The efficiency rating of the inverter.</td>
</tr>
<tr>
<td>&lt;None&gt;</td>
<td>OutputFields</td>
<td>string</td>
<td>PowerAC, EnergyAC</td>
<td>No</td>
<td>This parameter may be set to be a comma separated list that identifies the fields to be returned in the hourly output.</td>
</tr>
<tr>
<td>&lt;None&gt;</td>
<td>IncludeSummary</td>
<td>boolean</td>
<td>True, False</td>
<td>No</td>
<td>Default is True. If set to true, then a summary of aggregated annual and monthly values will be returned in the response.</td>
</tr>
<tr>
<td>callback</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
<td>The PowerBill API does not support JSONP.</td>
</tr>
</tbody>
</table>