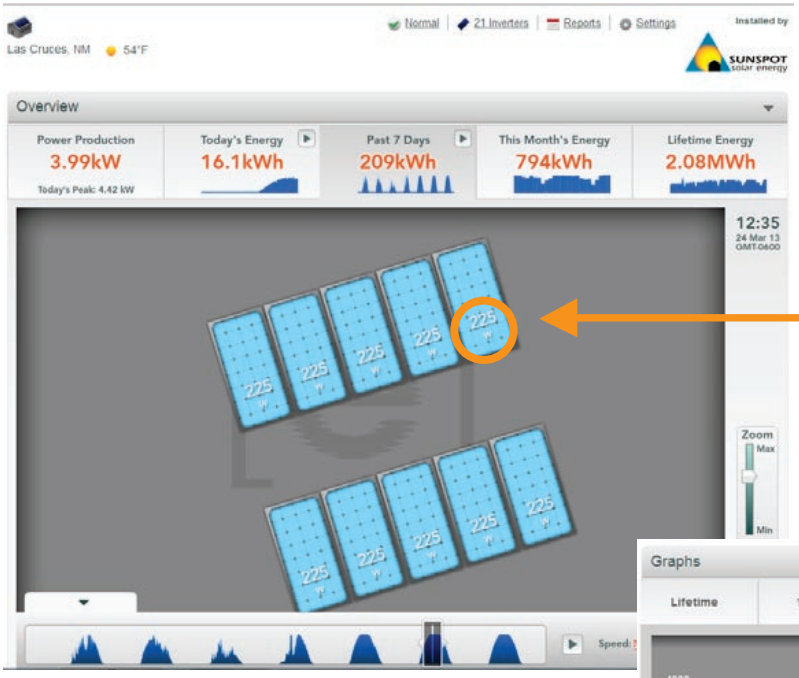
Reduction of Power Output from Undersized Inverters

Power clipping occurs when a PV array is oversized for the inverter with which it is paired. This is an especially important issue in New Mexico, with our high sunlight intensity (i.e. irradiance) due to high elevation and our cold, clear winter days. Due to current product availability, clipping frequently occurs when an individual PV module is paired with a microinverter of insufficient rated power output. We frequently see other companies make the poor design choice of pairing a 255 watt PV module with a microinverter that has a maximum output of 225 watts. Although there is derating of a module's nameplate wattage, in the cooler months, on a sunny day we can actually see output that is equal to the nameplate rating. Not only is energy production lost due to the clipping, but it is also likely shortening the useful life of the inverter, which is being maxed out and shedding excess power via heat.

Example #1: System installed by competitor

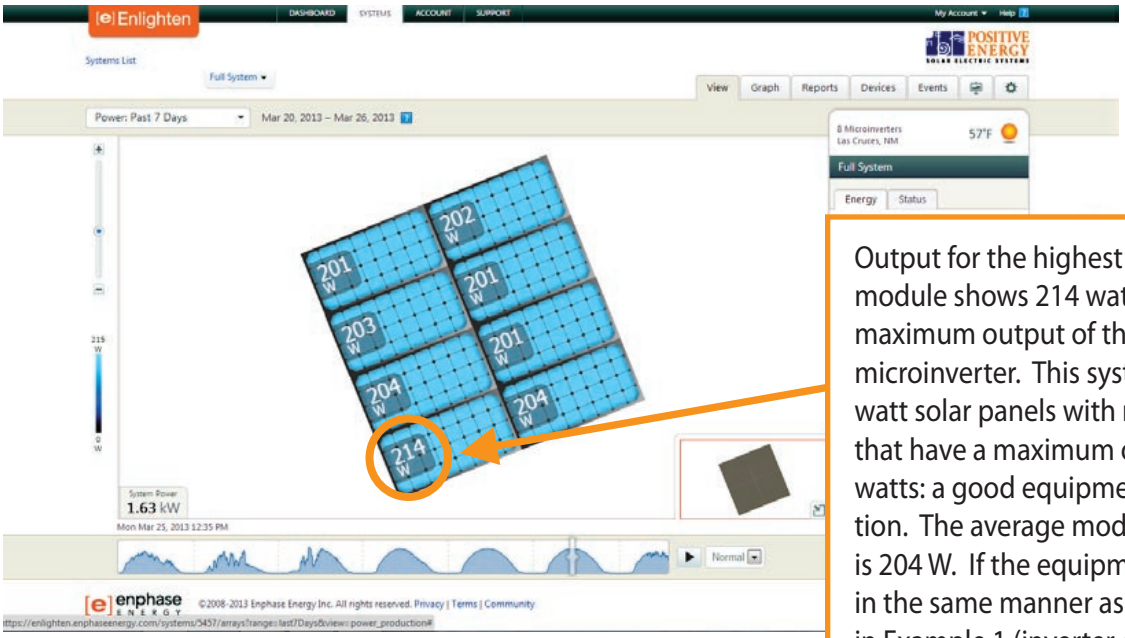
Actual images from local competitor's online public monitoring site:



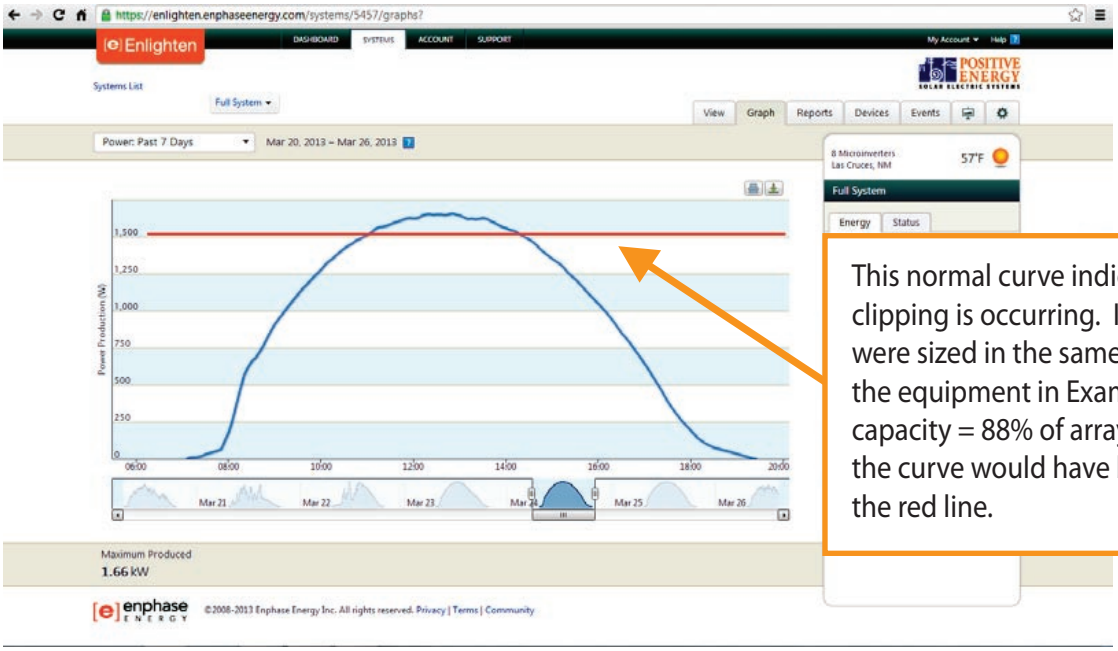
Output for these modules shows 225 W, which is the maximum output for the Enphase m215 microinverter. The output of these modules is clipped because the inverter maximum output is only 88% of the module rated output (255 W). This is a poor combination of equipment.

The top of this curve is flat, indicating that power clipping is occurring. With properly matched equipment, this should look like a normal bell shaped curve.

Example #2: System Installed by Positive Energy Solar



Output for the highest performing module shows 214 watts, under the maximum output of the Enphase m210 microinverter. This system pairs 215 watt solar panels with microinverters that have a maximum output of 219 watts: a good equipment combination. The average module output here is 204 W. If the equipment were sized in the same manner as the equipment in Example 1 (inverter capacity = 88% of module capacity), then each module would have been clipped at 189 W.



This normal curve indicates that no clipping is occurring. If the equipment were sized in the same manner as the equipment in Example 1 (inverter capacity = 88% of array capacity), then the curve would have been clipped at the red line.