

## Australia's new Solar Map

### Background

PV systems in Australia are mainly connected into the distribution network. The majority are behind the meter, with PV output serving local loads and not separately metered. Hence it is not possible to discern the exact impact that distributed PV is having on overall electricity demand, or on peak load. The latter has been of special interest in recent years, since increasing peak loads, particularly on hot summer days that result in high levels of air conditioner use, have driven significant expenditure on network upgrades, with associated electricity price increases for consumers.

While the value of PV for most of its 1 million or more owners lies most directly in the energy it produces, for the electricity system as a whole, the ability of PV to reduce load at peak times is also of interest.

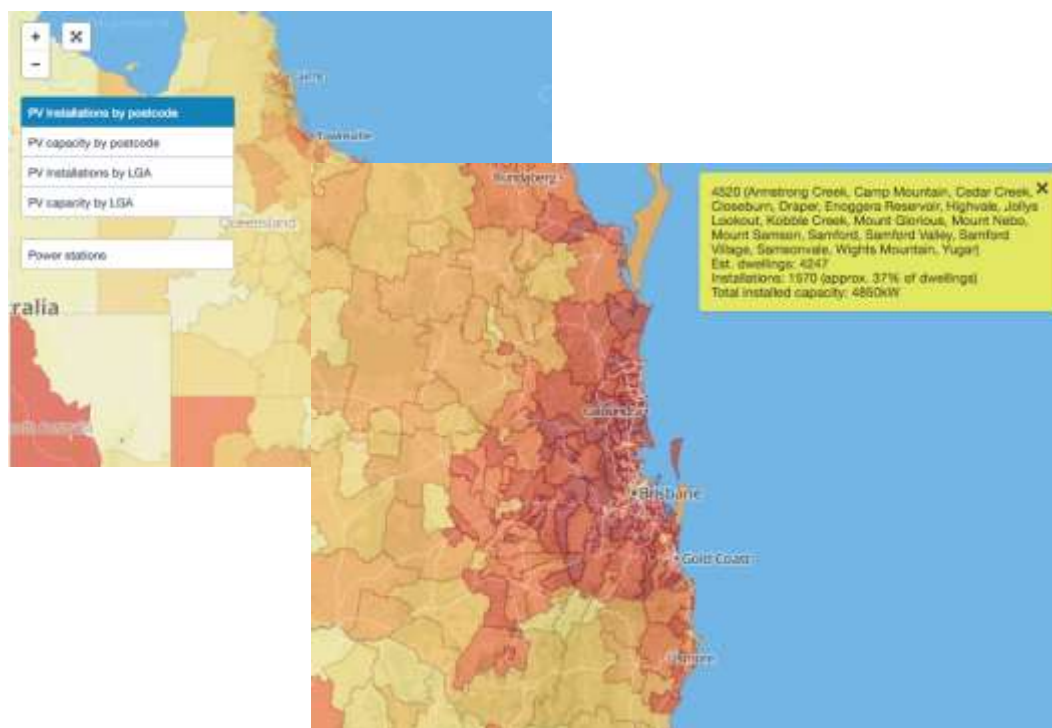
The new Solar Map, developed for the APVI by researchers at UNSW Australia, with support from ARENA, is proving a valuable resource for assessing PV impacts. During recent hot weather across the country, the Map was widely used by industry, the media and analysts. The site has had over 14,000 hits since its launch in late 2013, with over 6000 hits over the hot weather week of 13-17 January. Over this hot week, PV was shown to move the daytime peak in South Australia by between 10 minutes to 3.5 hours and contributed nearly 12% of SA load at 11:30am (NEM time) on 13<sup>th</sup> January. PV has been seen to contribute over 25% of South Australia's load on numerous occasions in recent months, the highest being just over 29% on 12<sup>th</sup> October 2013.

### Information on the Map, sources of data and how the charts are generated

The Solar Map provides live estimates of how much electricity is being generated by PV in each State, and the impact on load profiles throughout the National Electricity Market (NEM), and the Western Australian SWIS power market.

The map collects live NEM and SWIS load data at a 5 min resolution and PV data from over 1700 PV systems from solar enthusiast's PVOutput.org website at up to 10 min resolution, to provide a live estimate of the performance and contribution to electricity demand of all PV systems in each state and territory.

The map also shows the number of PV installations, their capacity (kW) and an estimate of the percentage of households with PV by postcode and Local Government Area, using data on PV systems that have claimed Renewable Energy Certificates from the Clean Energy Regulator (CER) and the Australian Bureau of Statistics (ABS) census data on dwellings. Charts track how the market has developed over time. Annual energy produced in each State is then estimated on the basis of CER's renewable energy certificate zone multipliers. The locations of PV power stations (100kW or larger) are indicated on the map, and links are also provided to live datasets at the University of Queensland and the Desert Knowledge Australia Solar Centre in Alice Springs.



### Plans for future enhancements

The APVI has plans for continued enhancement of the Solar Map. Some of these include:

- Pairing PV data with weather data to map PV performance by climate type.
- Expanding the live PV data set. SMA Australia, the most popular inverter brand in Australia, is a project partner on the PV Map and will be contributing data from their vast database of web-enabled inverters. Addition of data from a sub-set of their systems will enable the accuracy and spatial resolution of the Solar Map to be greatly improved.
- The mapping of electricity network information, which may be used to assist PV customers finding relevant information about connecting to the network, such as system size limits, application processes and technical requirements in their area.
- A GIS-based map for assessing PV potential on capital city rooftops. This information will be of interest to local government planners and policy makers, with solar access a big issue as PV penetration levels rise. Similar mapping projects in the US include the Mapdwell project ( <http://en.mapdwell.com/> ) and the NYC Solar Map (<http://www.nycsolarmap.com/>).
- APVI is also assessing opportunities for integrating irradiance and PV output forecasting into the map.