

Retail grid parity for Photovoltaics

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The roof mounted photovoltaic (PV) market is a very large and valuable early market for solar PV systems, because such systems compete against the retail rather than wholesale price of electricity.

Retail grid parity occurs when the levelised cost of electricity from a roof-mounted PV system falls below the retail price of electricity from the grid. Following the achievement of retail grid parity, self-sustaining and rapid growth in PV deployment becomes feasible.

The key requirement for retail grid parity to be effective is net-metering: the feed-in tariff should be set at close to the domestic electricity tariff of (i.e. the electricity meter runs backwards and forwards at similar rates).

Summary of results

Retail grid parity is now widespread within Australia for small systems, helped by rapidly falling PV prices, increasing electricity tariffs, the Renewable Energy Target (RET) and the impending carbon price.

- For 1.5 kW domestic systems, retail grid parity has been achieved everywhere
- For larger (>5 kW) domestic systems, retail grid parity has been achieved everywhere except Tasmania, Victoria and the ACT. [Larger systems are not optimum for RET support.]

Retail grid parity for PV systems on domestic, commercial and industrial buildings will be ubiquitous in Australia by 2015. It will also be very widespread for the 6 billion people living in sunny temperate regions (i.e. excluding northern regions of Europe, Asia and North America).

The cost of large ground-mounted PV systems is well below that of small domestic roof-mounted systems. However, because wholesale electricity tariffs are well below retail tariffs, wholesale PV grid parity is some years away.

Analysis

A discounted cash flow analysis was performed of the cost of electricity from domestic roof-mounted PV systems for the 8 Australian capital cities and Alice Springs. The parameters are:

Item	Value	Comments
System cost	\$5,500/kWp	Average fully installed cost for small systems during 2011/12, excluding RECs support
Inflation rate	3%	
Interest rate	8%	Approximate mortgage rate - translates to 5% real interest rate
Performance ratio	75%	Accounts for real world losses: elevated temperature, dirt, partial shading, 0.5%/year module degradation, power handling losses
System lifetime	25 years	Typical guarantee period
Maintenance	0.5%/year	Mostly to cover inverter replacement
Insolation	Australian Solar Radiation Data Handbook. N-facing plane tilted at 20 deg.	
Domestic tariffs	17-33 c/kWh	Tariffs vary between cities. Population-weighted average is 24 c/kWh. Consumption range: 10-20 kWh/day.
Long term carbon price	\$25/tonne	Starting July 2012 at \$23/tonne and rising thereafter
Solar Credits	\$30/REC	Deemed for 15 years, with the PV multiplier of 3 (2 from July 2012 and 1 from July 2013 to 2020)