

Solar PVs: costly policy mistake or great investment?—Perry Sioshansi's Letter from America

Mirroring the US debate, a recent Australian study stirs controversy on solar PVs.

In May 2015, Grattan Institute, an Australian think tank, published *Sundown, Sunrise: How Australia Can Finally Get Solar Power Right*. Examining the net impact of the 1.4mn Australian homes who have installed solar PVs since 2001, it concluded that “the cost of solar PV uptake has outweighed the benefits by almost \$10bn”. Referring to state-level solar PV support schemes, it said “governments created a policy mess that should never be repeated”. Not pleasant news for politicians who introduced generous feed-in-tariffs (FiTs) to encourage the rapid PV uptake nor the regulators who went along with the popular schemes.

The generous Australian FiTs have, of course, been trimmed back or eliminated in the last couple of years as they have in much of Europe—yet solar PVs remain popular and how consumers should get rewarded or penalised for installing them remains controversial, as everywhere else.

The Grattan report, authored by Tony Wood and David Blower, was welcomed by those who are against solar and renewable support mechanisms, while challenged by others who found major flaws in its methodology, assumptions and conclusions. Solar PV proponents who want to maintain Australia's incredible lead were put on the defensive while the industry incumbents, by and large, remained silent since many are now trying to hedge their bets by becoming solar installers themselves. Ditto for the politicians and regulators, who ultimately get blamed when things go wrong.

Australia's installed solar PV capacity is miniscule in absolute terms on a global scale, yet on a per capita basis, it is among the highest in the world. While few, including Grattan, are against solar energy in principle, its rapid uptake has created problems. For one thing, while solar PVs contribute to meeting the mid-day demand, in most cases, they do not address the industry's peak demand—which in Australia as in California—occurs after the sun sets in late afternoon hours. Moreover, the sun takes away revenues from generators who used to enjoy mid-day peak prices while not reducing or removing the peak demand problem. The peak load problem in fact has become more pronounced over time, creating an Australian version of California's duck curve.

If that were not bad enough, distributed solar has also contributed to falling electricity demand, fortified by improvements in energy efficiency. The net result—there are many contributing factors including gradual loss of energy intensive industry as well as higher retail tariffs—is a hard-to-believe trend. What is more puzzling is that Australia, for the most part, was spared the impact of global financial crisis of 2008, hence the fall in electricity demand cannot be blamed on economic slowdown.

The Australian Energy Market Operator (AEMO) has progressively adjusted its forecasts of consumption, currently showing flat demand through 2022. While this is good if you are a carbon counter, it is not so good if you are a generator or a distribution company whose revenues are volumetrically based. Less volume plus the virtual disappearance of mid-day peaks means lower wholesale prices, less revenues, less profits more or less for everyone in the utility value chain. The story is much the same in parts of the US and Europe, yet significant differences exist in each locality.

Looking at the future, there is little good news for the industry incumbents so long as they stick to their traditional sources of revenues. Adding demand charges and/or increasing fixed charges, for example, can result in additional incentives for consumers to invest in energy storage and become even less dependent on the incumbent providers.

On the topic of energy storage, Grattan points out, as have others, that going off-grid is not a good idea—except for someone who is too far removed from the grid to begin with. The simple explanation is that to provide the reliability that the average customer gets from being connected to the existing grid is hard to duplicate, at any cost/price. Few would disagree, even if you do not agree with Grattan's numbers.

In its conclusions, Grattan says: “Battery storage is coming. Society has paid more for solar PVs than it should have. We should not make the same mistake with battery storage. Nor should it be prevented from forming an integral part of our electric system.”

Grattan's overall assessment of the unintended side-effects of generous FiTs for solar PVs cannot be faulted. A number of similar studies in the US and Europe have come to more or less similar conclusions, namely the fact that if policy-makers and regulators do not get the tariffs right and/or offer overly generous incentives to solar PVs, one might end up with uneconomic outcomes.

A number of US and European studies have concluded, as does Grattan, that in some cases non-solar customers in effect end up subsidising solar customers. The details are site-specific, of course. Moreover, since solar customers tend to be more affluent, this results in wealth transfer from the poor to the rich—not necessarily a good outcome from a societal perspective. The critical question in this case as in others, however, is did the authors get their facts right, did they use appropriate methodology, make reasonable assumptions and draw useful conclusions from their analysis. Not everyone thinks they did.

Among the critics, whose work is noted in Grattan's report, are Bruce Mountain and Paul Szuster of CME, a consultancy based in Melbourne. In response to request for comments, they wrote: "Grattan's conclusion that the subsidies provided to household to install rooftop solar was "a policy mess never to be repeated" is wide of the mark. Our research found that households that in total invested around \$9bn of their own money in rooftop PV between 2009-14 have, on average, achieved a return about the same as the utilities would have expected [...] Our review of Grattan's analysis suggests they have significantly overstated the level of subsidies and what they have called a "societal" net present value calculation is not economically sound. Correcting only the errors of calculation means their estimate of a net cost of \$9.7bn becomes a net benefit of \$1.2bn."

Mountain and Szuster note: "The very rapid development of rooftop PV in Australia was stimulated (largely) by government policies that pulled (through FiTs and capital subsidies) and pushed (through inadequate network regulation and insufficiently competitive retail markets). Far more has been invested in PVs than other generation technologies since the start of the National Electricity Market, and the majority of that investment has been by households not utilities. This is a seismic shift. It has brought a whole new level of dynamism to value chains hitherto characterised by monopoly and oligopoly. In the process it is creating wonderful new opportunities for households and businesses. Or as neatly put by one of the utilities, advertising their wares on the side of a tram: "don't waste your roof, make energy fresh daily."

The solar PV debate in Australia mirrors those in the US, Europe and—in time—elsewhere. The issues are nearly identical; the politics and policy agenda is not. And in the case of Australia, plentiful sunshine, ample land with a high percentage of customers living in detached homes with big roofs plus high retail tariffs have combined to produce the highest penetration rates of residential rooftop PVs anywhere.

The latest forecast from the AEMO, reckons that rooftop solar—currently around 4.2 GW—will continue to grow to as much as 25GW by 2034. It says that at some point in the next decade, the installed capacity of rooftop solar will overtake that of coal-fired generation, currently around 27GW—much of which may be shut down during the same period.

Fossil fuels are being challenged. The rapid uptake of solar PVs has been so dramatic that AEMO now has separate categories for electricity demand—from centralised generators and distributed sources, primarily rooftop solar. AEMO expects the residential PV market to grow at around 600MW-700MW a year, with the commercial market also growing strongly. Under one of its scenarios, however, solar PV installations could grow much faster, with a 20% higher total between 2024 and 2034, or around 25GW. This is nearly double AEMO's solar forecast three years ago.

What makes the growth of solar PVs more pronounced is that Australia's overall demand has fallen on average by 1.5% in the last five years—a situation that may be turning around with demand forecasted to grow by 2.1% in the next three years.

Perry Sioshansi is a specialist in electricity sector restructuring. He is founder and president of Menlo Energy Economics and is the editor and publisher of *EEnergy Informer*, from which we have sourced this article, and which we commend.