Submission by

Alternative Technology Association

On

South Australia's Feed-In Mechanism for Residential Small-Scale Solar Photovoltaic Installations

A Discussion Paper

22nd March 2007

By e-mail to: greenhouse@state.sa.gov.au

For further information or enquiries contact:

Brad Shone
Energy Policy Manager
ATA – Alternative Technology Association
(03) 9631 5406
E-mail: Brad.Shone@ata.org.au

ATA's submission to the *South Australia's Feed-In Mechanism for Residential Small-Scale Solar Photovoltaic Installations* Discussion Paper

The Alternative Technology Association (ATA) welcomes the opportunity to provide comment on the ***South Australia's Feed-In Mechanism for Residential Small-Scale Solar Photovoltaic Installations*** discussion paper (the Discussion Paper), as prepared by the Government of South Australia.

ATA is a not-for-profit organisation established in 1980 to promote the uptake of sustainable technologies in order to protect our environment. The organisation provides service to over 3000 members, who are actively promoting sustainability in their own homes by using good building design and implementing water conservation and renewable energy technologies. ATA advocates in both the government and industry arena for ease of access and continual improvement of these technologies, as well as the production and promotion of information and products needed to change the way we live.

ATA welcomes the initiative of the Government of South Australia in becoming the first jurisdiction in Australia to propose feed-in legislation for renewable energy. South Australia leads the way in the uptake of grid-connected solar photovoltaic (PV) systems across Australia, and a properly designed system of feed-in tariffs will ensure that this leading position continues into the future.

It is vitally important that any proposed feed-in tariff mechanism is ambitious and effective in order to ensure the primary goals of rewarding investors in solar PV systems and increasing the adoption of solar PV across the state. The ATA urges the Government of South Australia to carefully consider the views contained within this submission to ensure such a scheme eventuates.

The widespread adoption of grid-connected solar PV systems provides numerous benefits to the National Electricity Market, the wider economy, the environment, and the community as a whole, including but not limited to:

- direct financial flow-on to residential customers from reduced network augmentation costs and associated network charges;
- lower electricity supply costs resulting from the contribution of PV electricity to the pool at times of peak demand, and resultant decrease in wholesale pool prices;
- greater individual and community control over energy sources;
- generation closer to customers resulting in improved power quality and reduced power losses;
- additional economy-wide benefits of improved supply reliability;
- enhanced energy security through diversification;
- reduced greenhouse gas emissions and associated environmental and economic costs;
- PV industry development resulting in additional employment opportunities; and
- subsequent and ongoing reduction in costs of solar PV technology resulting from economies of scale.

It is imperative that the Government of South Australia consider all of these benefits when assessing an incentive mechanism for solar PV technologies in the residential sector.

This submission provides comment on a number of key aspects of the proposed feed-in tariff regime. Comments, reasoning and recommendations are provided under the relevant section headings as they appear in the Discussion Paper.

The key recommendations from this submission are that the scheme includes:

- ➔ **the introduction of gross production metering, as opposed to the proposed net export;**
- ➔ **a feed–in tariff of *at least* three times the retail rate; and**
- ➔ **that the scheme offers feed-in rates to grid-connected solar PV system owners for at least 10 years**

A.3.3 Net Export Arrangements

ATA strongly believes that the effectiveness of any feed-in mechanism in promoting the uptake of solar PV systems, by adequately rewarding investors in the technology, is dependent on a shift from net export metering to gross production metering. As such, ATA has a number of concerns with the Discussion Paper's proposal to retain a system of net export metering for solar PV installations subject to feed-in tariffs.

Firstly, such an arrangement discriminates against both owners of smaller grid-connected systems and those who are more likely to consume electricity during the day, such as senior citizens or stay-at-home parents. In cases such as these where instantaneous system production rarely exceeds household consumption, system owners rarely exporting electricity to the grid would not be able to receive the benefit for premium feed-in rates offered, and thus would gain very little financial return on their investment.

Secondly, a system of net export metering creates significant uncertainty in the market, both in terms of potential financial return from the feed-in tariffs for system owner, and in the cost of the system for the government and wider community. The introduction of gross metering allows for far clearer estimates of ongoing costs and benefits of the tariffs due to the relative predictability of gross electricity production for a given sized installation over a given time frame.

Under a regime of net export metering, with in-home demand subtracted from production prior to determining the quantity of electricity eligible for the feed-in rate, uncertainty surrounding ongoing demand makes it near impossible for PV system owners to predict the potential payback on their system over the duration of the scheme. Such uncertainty has the potential to act as a significant disincentive for the uptake of solar PV systems.

Further, the claim that the introduction of gross metering "would create additional costs"[1] is misleading, as, at present, proponents of solar PV systems are already required to install new net export metering when installing their systems at their expense. There is no reason to believe that gross production metering requirements would be any more expensive than net export metering. Indeed, it is possible that, with minimal re-wiring, it would be possible to add a simple (and relatively inexpensive) accumulation meter in addition to existing metering, in order to fulfil the requirements of gross metering.

Under present arrangements, costs to PV owners for net export metering in South Australia is in the order of $300 to $350, including installation. Assuming that the cost of gross production-capable metering is similar, this additional cost to existing solar PV system owners still only represents around four month's worth of gross export for a 1.6kW system installed in Adelaide[2]. Even when subtracting the total benefit which would have been achieved by feed-in tariff payments and avoided electricity costs under a net export metering regime, the additional cost required for a change to gross production metering for existing would be recouped in approximately one year[3].

Whilst it is acknowledged that altering current metering arrangements may lead to minor delays in the introduction of the scheme, ATA believes that the regulatory changes necessary to bring this about are not insurmountable and should be expedited, and that any resulting minor delays would be warranted in order to achieve the best possible results from the scheme design.

---

[1] Government of South Australia, 2007, *South Australia's Feed-In Mechanism for Residential Small-Scale Solar Photovoltaic Installations Discussion Paper*, p. 11

[2] Based on the average system size installed under the PVRP (1.6, as reported on p. 9 of the Discussion Paper) multiplied by the 'zone rating' (1.382), as defined in the Australian Greenhouse Office's *Calculating Renewable Energy Certificates (RECs) For Small Solar Panel (Photovoltaic) Systems* Fact Sheet as a means of calculating total annual output (in MWh) for solar PV systems, multiplied by the assumed $0.44 / kWh feed-in rate. [1.6kW X 1.382 X 0.44 X 1000 = $972.93 / year]

[3] 1.6 kW system @ 1.4 kWh/W annually, 31% returned to the grid @ $0.44 per kWh = $305.50 per annum; plus avoided electricity costs from 69% of production used in the home @ $0.22 per kWh = $340 per annum; total = $645.50. Gross production metering (1.6 kW @ 1.4 kWh/W/yr, $0.44 per kWh) = $985.50 per annum. Differential = $340. Justification for these figures given throughout this submission.

The Discussion Paper claims that net export metering may lead to additional incentives for demand management initiatives by grid-connected system owners. However, ATA believes that the lure of a feed-in tariff would provide a sufficient incentive for owners to reduce their consumption and take advantage of the reimbursement on offer, even under a gross production metering model. The disadvantages and discriminations which would arise from net export as opposed to gross production metering, as outlined above, far outweigh any potential additional demand management benefits and make this proposal extremely undesirable.

A more detailed financial case for gross production metering is made in response to ***B.4.2 Eligibility and Scope Issues***, below.

A.4.1 The 'Market Value' of PV system output in the Electricity Market

Small scale grid-connected solar PV systems have a significant role to play in supplying Australia's electricity demand, with considerable economic, environmental and social benefits in contrast to large, centralised forms of generation. In exploring the concept of the market value of solar PV, the Discussion Paper touches on a number of these benefits, including the ability to provide electricity during times of peak demand. In south-east Australia, demand peaks typically occur on hot summer afternoons, at a time when the generation capacity of solar PV is at its highest and wholesale electricity costs can reach as high as $10,000 per MWh (VoLL).

The Discussion Paper points out that these demand peaks can extend as late as 6PM in South Australia (significantly later than the peak production time for PV systems) as justification for dismissing the full potential for solar PV to have an impact on peak demand. However, it should be noted that South Australia is part of the National Electricity Market (NEM), and peak demand in South Australia does not necessarily coincide with maximum wholesale electricity price, which is more likely to coincide with temporally earlier peaks in the more populous eastern states.

As such, solar PV production in South Australia aligns much better with peak demand in the larger, eastern states, making the widespread installation of solar PV in SA significant in its potential impact on NEM wholesale prices. Further, it is possible to delay the peak production slightly from solar PV systems by merely facing the solar PV arrays slightly west of due north, thus delaying their peak output time.

The Discussion Paper implies that, alone, the relatively limited scale of solar PV would make it difficult to achieve a reduction in peak load significant enough to result in deferred network capacity investment. However, ATA would see the adoption of feed-in tariffs for solar PV to be part of a suite of measures, including significant demand side response initiatives and investment in distributed generation. It is vitally important that, whilst seen in isolation this range of measures may not suffice to achieve network capacity investment, these measures combined would provide the necessary peak load abatement required to achieve significant avoidance of network capacity investment.

In addition to the direct market value of solar PV, it is important to recognise the range of additional potential benefits and advantages of embedded solar PV generation. These include:

- improved supply reliability through generation diversity;
- greater individual and community control over energy sources;
- reduced dependence on a small number of large remotely located generators;
- generation closer to customers resulting in improved power quality and reduced power losses;
- reduced greenhouse gas emissions and consequent economy-wide benefits, resulting from reduced transmission losses and the use of renewable forms of electricity generation; and
- improved employment opportunities, with small-scale renewable projects providing more jobs per MWh of electricity produced than conventional energy sources.

This range of benefits cannot be underestimated when considering the implementation of an incentive such as a feed-in tariff for solar PV, and ATA would encourage the Government of South Australia to consider all of the above when determining the extent to which grid-connect solar PV electricity is undervalued in the market.

A.4.2.2 Proportion of electricity returned to the grid

The estimate given for total PV electricity production of 2,200,000 kWh appears to be based on inaccurate calculations, hence giving false figures for the average proportion of electricity production from solar PV systems being returned to the grid. More accurately, using the ETSA figures of 2,510 kW of installed capacity and a typical PV output of 1400 kWh per kW installed, total production from solar PV should be 3,514,000 kWh annually, giving a figure closer to 30% of average annual production returned to the grid.

As such, the statement that "the same financial benefit could accrue to an average PV owner if the feed-in rate under a net export model was twice that under a gross production model"[4] is incorrect. In fact, a feed-in rate under a net export model of more then three times that under a gross production model would be necessary to achieve the same financial benefit for the PV system owner.

On this basis, ATA believes many of the assumptions contained within the Discussion Paper about relative benefits of the differing metering models are inaccurate, leading to an unfounded favouring of the net export metering option. Net export metering clearly disadvantages PV system owners and ATA strongly urges the Government of South Australia to prefer a system of gross production metering. This will not only more accurately and fairly reward investors in grid-connected solar systems, but also allow for greater accuracy in estimating the total proportion of electricity returned to the grid.

A.4.2.3 Comparison of Costs

It is extremely difficult to determine the cost of the scheme under a net export metering regime. The assumption of 50% of total system production returned to the grid is based on inaccurate calculations, as shown above. Indeed, studies by eminent researchers in the field, such as Muriel Watt, give figures closer to 25% of total system output[5], with 31% an accurate estimate from the ETSA figures given in the Discussion Paper[6]. Using a 31% figure, the maximum cost for the scheme assuming the installation of 10MW of capacity, is closer to $1.9 million, rather than the $3.08 million quoted.

However, as noted in the Discussion Paper, this figure does not include the market value of the solar electricity, with retailers already offering retail rates for electricity from PV systems. As solar PV is a distributed form of generation, the value of electricity generated is that of the retail electricity price, even *before* considering additional market values, such as production at times of peak demand, avoided network augmentation and environmental costs from greenhouse gas (and other) pollution, etc. Under such a scenario, using retail rates as the (albeit undervalued) market value, the true cost of the scheme should be assumed to be the *additional* cost for the feed-in tariff on top of the perceived market value, reducing this figure further to $955,000 per annum.

Even under a gross production metering regime, with a market value of $0.22 per kWh (assumed retail rate given in the Discussion Paper), the *additional* cost of a feed-in tariff at twice the retail rate would be $3.08 million. By applying total revenue and average consumption data provided in Appendix A, and assuming the cost is spread across all metered customers, the cost to customers is as low as $1.54 per annum or 0.15% increase in electricity prices. When limiting the cost of the scheme to residential and small business customers, the average additional cost to a householder's electricity bill is in the order of $3.38 per anum, or 0.32% extra.

These costs are further reduced, when considering the direct financial flow-on to residential customers from reduced network augmentation costs and associated network charges (presently approximately 50% of retail electricity charges) and lower peak wholesale pool prices. Consequently, ATA strongly

[4] Government of South Australia, 2007, *South Australia's Feed-In Mechanism for Residential Small-Scale Solar Photovoltaic Installations Discussion Paper*, p. 17

[5] Watt et al, 2005,*Tariff Implications for the Value of PV to Residential Customers*, University of NSW [ANSZEZ Renewable Energy for a Sustainable Future Conference, 2005]

[6] Based on 2,510 kW of installed capacity, a typical PV output of 1,400 kWh per kW installed, and a total recorded excess of 1,100,145 kWh, as reported on page 16 of the Discussion Paper.
[1,100,145 / (2,510 x 1,400) x 100 = 31.3%]

believes that these costs for 10MW of solar PV capacity are negligible and clearly not prohibitive, even to the most disadvantaged consumers. With appropriate concessions for low-income customers, the cost of such a scheme under a gross production metering is readily affordable, even with the undervalued market value of PV electricity set at the retail rate, as in the above examples.

The additional economy-wide benefits of improved supply reliability, enhanced energy security through diversification, reduced greenhouse gas emissions, and industry development resulting in additional employment opportunities, along with the subsequent and ongoing reduction in costs of solar PV technology resulting from economies of scale, make the case for an enhanced feed-in tariff based on gross production metering a very compelling one.

B.4.2 Eligibility and Scope Issues

ATA has concerns with the limited price on offer, the duration of the scheme and the use of net export metering to calculate eligible electricity. Calculations based on the figures provided in the Discussion Paper show that, under a net export metering regime, with a feed-in tariff of twice the retail rate ($0.44 per kWh), the total financial benefit achieved from a typically-sized 1.6 kW system is $3230 over 5 years[7]. This is less than the current levels of financial support offered under the federal Photovoltaic Rebate Program (PVRP).

Assuming an installed cost of $10 per Watt and thus a total installed system cost of $16,000 it would take more than 30 years to payback such a system under these terms, even with the current level of support offered by the PVRP. With the future of the PVRP in doubt, a feed in tariff of twice the retail rate on net export for five years would be extremely unlikely to significantly boost investment in solar PV systems.

ATA believes that in order to properly stimulate growth in the adoption of grid-connected solar PV technology, realistic and achievable payback times must be ascertainable for proponents. Working on calculations for a 1.6 kW system, payback for the system under the feed-in tariff would be achieved by either extending the scheme to 25 years (at proposed rates) or increasing the level of support to $4.12 per kWh, or by a combination of the two. (For example, the same result could be achieved with a feed-in rate of $1.05 for 15 years.) In addition, these figures vary greatly with the uncertainty associated with net export metering.

The situation is greatly improved, however, under a scheme utilising gross production metering. Under such a regime, extending the scheme to 16 years at proposed rates would achieve financial payback within this timeframe; as would increasing the feed-in rate to $1.43 per kWh for the proposed 5 year duration. Utilising gross production metering, financial payback can be with feed-in rates two-and-a-half times the retail rate and scheme duration of 15 years.

In order to achieve realistic and desirable payback periods for the significant investment required to install a grid-connected solar PV system, it is imperative that the feed-in tariff on offer is higher than the proposal of twice the retail rate, the scheme duration is longer than the proposed 5 years, and that payment of any feed-in tariff be made on the total production from solar PV systems, through the adoption of gross production metering.

Key Recommendations

Grid-connected solar PV electricity has the potential to provide numerous benefits to the National Electricity Market, the wider economy, the environment, and the community as a whole. However, in order to stimulate the growth of this vital sector it is essential that these benefits are able to be

[7] 1.6 kW system @ 1.4 kWh/W annually, 31% returned to the grid for 5 years = $1,530. Plus a further $1,700 in avoided electricity costs from 69% of production used in the home (@ $0.22 per kWh retail rate).

captured by solar PV system proponents in financial terms. The introduction of a mandated feed-in tariff for solar PV systems has the potential to reward PV owners and reflect the true benefit of their investment.

ATA calls on the Government of South Australia to ensure that any feed-in mechanism contain the following vital ingredients for success:

- ➔ **The application of gross production metering to capture the full value of electricity generated**
- ➔ **A feed–in tariff of *at least* three times the retail rate to properly reward investors**
- ➔ **Scheme duration of at least 10 years to ensure that proponents of solar PV systems are able to recoup their capital investment in realistic timeframe.**

Without these elements, the scheme will fail in its primary objective of adequately rewarding investors in solar PV systems, and it is extremely unlikely that anything near the level of 10MW of installed solar PV capacity would be achieved.

Further Contact

ATA commends the Government of South Australia for establishing a feed-in mechanism for small-scale solar PV electricity, and would welcome the opportunity to discuss any aspect of this submission further. Please direct any questions or further correspondence to Brad Shone, Energy Policy Manager, on (03) 9631 5406 or by email at Brad.Shone@ata.org.au

Yours sincerely,

Brad Shone
Energy Policy Manager
ATA – Alternative Technology Association