Submission by

Alternative Technology Association

on

The IPART Review of Solar Feed-in Tariffs

'Setting a fair and reasonable value for electricity generated by small-scale solar PV units in NSW'

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By Email to: ipart@ipart.nsw.gov.au

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1.0 Introduction

The Alternative Technology Association (ATA) welcomes the opportunity to provide comment on IPART's Draft Report on *Solar feed-in tariffs - Setting a fair and reasonable value for electricity generated by small-scale solar PV units in NSW* ("the Draft Report").

ATA is a national, not-for-profit organisation representing consumers and communities in the renewable energy and energy efficiency marketplace. The organisation currently provides service to approximately 6,000 members nationally who are actively engaged with small, medium and large scale renewable energy projects, energy efficiency and the national electricity market.

ATA provides an 'independent' consumer advice role, both to our members and to the NSW public more broadly. As we are not funded by, and do not have direct links with industry or government, the ATA is a trusted source of advice for our membership and the general public in regards to the economics and environmental benefits of energy technologies. A key specialist area of the ATA's in this regard is financial modelling of the economics of solar investment.

2.0 Overview

The ATA was closely involved in the policy process that lead to the development of the initial NSW gross FiT for solar generation.

Whilst many of the design features of the previous scheme were sound, the economics of the 2010 FiT policy were based on installed PV costs and the subsequent payback incentives relevant to the time period when the policy was developed – i.e. 2008/9. Installed costs around this time were of the order of $10 – $12 a watt (pre-Renewable Energy Certificate [REC] incentive).

In 2010, global silicon prices halved and significant economies of scale in global manufacturing began to flow through the supply chain – virtually halving the installed cost of a PV system in Australia in less than 12 months. No one could have foreseen the magnitude of the price drop in 2011 and the significant impact it would have on the NSW PV market.

This, and the overinvestment that occurred in solar PV in NSW during 2010 and in early 2011, is not a justification for removing or undervaluing electricity generated by distributed solar into the future.

Electricity generated by distributed solar has an inherent value within the national electricity market (NEM) based on a number of discrete components, and that value exists whether the electricity from the solar unit is consumed within a household or commercial property, or fed directly into the grid.

Currently, economic evaluation in Australia of the electricity supplied by distributed generation such as solar PV is inadequate and does not properly reflect the full value provided by these systems within the NEM.

A significant proportion of this undervaluing occurs through failure to acknowledge the impact on wholesale electricity prices – an area of research that is growing significantly. ATA's initial impression of the analysis undertaken by the IPART review to date is that it again fails to properly account for the full value of electricity generated by distributed solar in the NSW network.

3.0 Fair and Reasonable Value

The ATA notes that the IPART report focuses substantially on 'PV exports' – with respect to valuing the electricity generated by solar PV systems.

Attempting to model an economic value based solely on exported electricity from solar PV fails to acknowledge the benefit provided by the reduced demand on the electricity network, including that portion of PV generation that is consumed within the solar customer's property. As such, this approach leads to an undervaluing of the electricity from solar PV.

In this regard, we note that the November IPART Draft Report makes reference to the recent SKM MMA report[1] done for the Clean Energy Council. The SKM MMA modelling found that the fair value of electricity from solar PV is at least 12-16c/kWh. In their report, SKM MMA explicitly state (p2) that their analysis did not consider:

> *'other benefits [that] are also possible such as a reduction in the wholesale price to other customers during peak periods, reduced network losses faced by customers in regions with a high level of uptake'* (page 2).

The results of the SKM MMA modeling are quite clearly the minimum definition of the value of electricity generated by solar PV to electricity retailers. This is already above the amount entertained in the IPART report of 8-10c/kWh.

3.1 Beyond the Value to Retailers

The IPART report is clearly striving to define the value of PV exported electricity to retailers only. Whilst this is fundamental to correctly capturing part of the value of distributed PV, there is also the value to electricity consumers more broadly, that should also be reflected in any FiT rate, and on top of the value to retailers.

In this regard, a proper account must be taken of the value of distributed PV at the wholesale price level and particularly during periods of peak demand. Whilst difficult to land on an exact figure for this value, there is no question that the benefits exist, and a long term 'weight average' can be taken to correctly capture it within a specified FiT rate.

These benefits for all electricity consumers across the network and should be reflected by an appropriate cost pass through to electricity bills in the traditional way that FiTs are structured.

3.2 Merit-Order Effect

The downward pressure on wholesale electricity prices created by the reduction in demand on the supply side of the electricity market, known as the merit-order effect, results in a benefit for all electricity consumers in the form of lower electricity prices.

[1] SKM MMA, *Value of Generation from Small Scale Residential PV Systems – Report to the Clean Energy Council*, July 2011.

This benefit is produced by solar PV systems as the distributed generation and consumption of electricity reduces the demand of electricity from the supply-side generators.

ATA is convinced that the merit-order should be taken into account when assessing a fair and reasonable value a solar feed-in tariff. Ignoring this benefit of solar PV because it is complex is short-changing the PV customers, and therefore cannot be considered to be "fair and reasonable".

In considering a fair and reasonable value for electricity provided to the grid by solar PV systems, it is important to recognise and place a value on this benefit that is provided to all consumers. Not only does the exported energy have the merit-order effect, this effect is also created by the energy consumed locally at the PV system location. The exclusion of locally consumed energy in the Draft Report is therefore not fair and reasonable.

In relation to the merit-order effect, the Draft Report makes the following arguments for why the merit-order effect is excluded from IPART's analysis:

a. it is impractical to attempt to quantify the merit-order effect
b. it is impractical to allocate the value of the benefit induced by the merit-order effect to PV customers
c. reallocating the benefit from all customers to just PV customers would increase electricity prices for non-PV customers

In regards to statement (a) and the "impracticability" of quantifying the value of the merit-order effect, both Federal Ministry in Germany[2] and academic associations, such as the Melbourne Energy Institute (MEI) in Australia[3], have estimated the value of benefit that the merit-order effect has induced in electricity markets in Germany and Australia respectively. In Germany the net position for all consumers, when comparing the benefit of the merit-order effect and the cost due to solar feed-in tariffs and subsidies, was positive – there was a net societal benefit due to the installation of solar PV systems.

Quantifying this value is therefore not only achievable, but also very practical as it can be used to improve regulation. The communications of the benefits of PV systems is also important to governments wanting to decrease the carbon intensity of their jurisdiction by encouraging the uptake of solar PV systems.

ATA agrees with statement (b) and notes that it would not be fair to all consumers if the total benefit to all consumers was passed on to the owners of PV systems. That said, it is not fair or reasonable to expect the owners of PV systems to provide the benefit of lower electricity prices to all consumers without remuneration. It would be fair and reasonable to remunerate the solar PV customers for the benefit their systems provide to all customers.

[2] Renewable Energy Sources in Figures, National and International Development, Federal ministry for the Environment, nature Conservation and nuclear Safety (BmU), 2011. http://www.bmu.de/files/english/pdf/application/pdf/broschuere_ee_zahlen_en_bf.pdf

[3] Presentation: The Future of Solar Power in Australia, 2011. http://energy.unimelb.edu.au/uploads/Future%20of%20Solar%20Power%20in%20Australia%20%28small%29.pdf

Finally, there appears to be some misunderstanding in statement (c) that electricity prices will continue to be lower even without the merit-order effect and that, therefore, passing on some of the benefit of the merit-order effect to PV customers will therefore increase electricity prices to all consumers.

It should be reinforced that the reduction in electricity prices that occurs for all customers when PV systems are installed is *actually due to* the PV systems being installed. Therefore, it is fair and reasonable that the PV customers receive some of the benefit that their system provides to all consumers.

In summary:

- the merit-order effect is quantifiable, as shown by the German Federal Ministry and MEI;
- the merit-order effect has benefits to all consumers;
- it is fair and reasonable to pass on some of the value of the merit-order effect to the market participants (PV customers) that choose to provide a benefit to all consumers.

4.0 Return on Investment – the Consumer's Perspective

In order to develop a policy that will retain some level of attractiveness to the end consumer, the policy must consider the return on investment – or 'payback' – to the individual purchasing a solar PV system.

The ATA is the leading organisation in Australia that conducts comprehensive financial payback analysis for consumers considering investing in solar PV.

In general terms, ATA's experience over many years is that household's will not entertain investment in a solar PV system unless the financial payback to them is within a decade. Obviously, the lower the number of years, the greater the consumer interest will be. The ATA does not however support a policy that will deliver payback times in the order of only a few years, as this will naturally lead to over-investment by consumers.

At the same time, the ATA does not support FiT policy that provides an ROI significantly in excess of a decade and up towards 20 years – as such a policy has been proven to be completely unattractive to household and small business investors. A balance of scheme cost, consumer ROI and industry support is achievable and should be the basis for any FiT policy.

Over many years, ATA has developed a robust, peer-reviewed financial model to estimate the range of feasible payback periods for solar investment in every state in Australia, taking into account all current incentives, retail electricity rates, export rates and discount rates.

At the beginning of 2012, in order for a consumer to achieve a payback within 10 years on an average sized system installed in NSW, a FiT in the order of 26-41c/kWh, guaranteed for 10 years, and on a net (or import / export metered) basis, would be required.

The planned reduction in the Federal Solar Credits Scheme multiplier over the next two years will offset further installed cost reductions (e.g. due to further silicon price reductions or manufacturing process improvements). This will ensure that the FiT rate can be maintained over the coming years, without significant over-investment.

The question of financial payback on technology is one based on assumptions. In this regard, we have included all of our detailed modelling assumptions for IPART's review in **Attachment A**.

5.0 Response to Specific Points in IPART Report

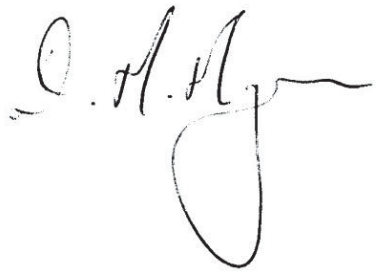
ATA notes a number of instances of flawed logic within the Draft Report, and we provide the following arguments in response to a number of these, in particular contained within Part 1.1:

Statement in Draft Report	ATA Response
'However, we chose to base our recommendation on the financial gain to retailers because it more closely reflects the benefits that PV exports provide to retailers.'	This argument is circular and does not explain why the broader societal financial gain was not considered above the benefits to retailers.
'We found that PV exports are unlikely to provide system-wide benefits that will materially reduce network costs in NSW. Any benefits that arise are likely to be location- and time-specific.'	Many aspects of the NEM are location and/or time specific, however these variances are smeared across all consumers. This is not a reason to exclude the consideration of benefits. Nonetheless ATA agree that distribution network benefits are negligible and likely to be offset by impacts.
'We also found that other potential benefits of PV exports, such as reductions in electricity losses and changes to the pool price and load shape, could not feasibly be captured due to the practical arrangements within the electricity industry.'	The entire purpose of a feed in tariff is to do exactly that – i.e. to capture benefits where the structure of the market does not capture them. It's to address that specific market failure. The reduction in electricity losses in the transmission and distribution networks is tangible, easily measureable across a large scale, and the failure to pass those through to consumers results in solar PV and other distributed generation cross subsidising other energy users.
'Moreover, including these benefits in determining a future feed-in tariff could lead to increased electricity prices, and so would not be consistent with our terms of reference.'	This argument is entirely false: there is no increase to electricity prices if the amount paid for avoided losses and other avoided costs is reflective of the benefits – i.e. if the avoided losses from FiT recipients across NSW amounts to $100M in a year, then including that $100M in payments to FiT recipients has no net impact on electricity prices.
'We consider that this approach, rather than a mandatory feed-in tariff, best supports the competitive market.'	The point of a feed-in tariff is not to support a competitive market, it's to support demand side participation. Existing energy market structures actively work against the interests of distributed generation and competition alone will not provide an incentive to retailers to ensure that feed-in tariffs are offered, so that the benefits of distributed generation can be captured.
'….which could make PV customers unattractive to retailers….'	Again the purpose of a feed-in tariff is to incentivise distributed generation where a range of benefits can be captured across the market. Solar PV customers are already unattractive to retailers per se, but the purpose of a policy to support demand side generation should be in the long term interests of consumers – not the long term interest of retailers.

6.0 Further Contact

Thank you for the opportunity to provide comment to this process and please do not hesitate to contact us at Damien.Moyse@ata.org.au or on (03) 9631 5417.

Yours sincerely



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Appendix A

ATA NSW FiT Payback Modelling

This document outlines ATA's modelling approach for a future feed-in tariff (FiT) for NSW and the rationale behind the choice of parameters.

1. Detailed Modelling Approach

The ATA's model includes the following characteristics:

- Discounting of future revenue and costs;
- Indexation of future retail energy costs;
- Estimation of solar generation based on long-term averages of solar insolation from the Australian Bureau of Meteorology;
- De-rating to account for soiling and the degradation of solar panels over time;
- Incorporated two-part time-of-use (ToU) tariffs and single rate flat tariffs to estimate the value of displaced import of electricity;
- Incorporated cost of inverter replacement after completion of its estimated lifetime (i.e. 15 years).

The ATA payback period modelling approach is mature, having been developed and refined over the past four years.

2. Choice of Model Parameters

2.1 Capital Cost of Solar PV Systems

As one of our primary consultancy services, ATA has significant experience in the analysis of capital costs for solar PV, and we are engaged to undertake a number of independent tender reviews for bulk buy and single system projects for local councils, community groups and the private sector.

Through this experience, ATA has developed a comprehensive knowledge of the relationship between price, component quality and warranty.

Generally speaking, as price decreases, the quality of system components also decrease and the warranties provide less coverage. Warranties on the components and installation of solar PV systems can be summarised into the following categories:

a) PV panel product or performance warranty, either:

- provided by the panel manufacturer (generally not Australian-based) and covers manufacturing defects. Where a product is bought into Australia the importer takes on responsibility for the manufacturer's warranty, however this often does not amount to an effective protection for most consumers; and/or
- provided by the panel manufacturer and is expressed as the guaranteed percentage output after a number of installed years (e.g. guaranteed 80% of rated output after 25 years);

b) PV system installation warranty – provided by the system installer (an on-site warranty, typically between one and ten years);

c) Inverter product warranty – provided by the inverter manufacturer and sometimes extended by the installer. Covers manufacturing defects.

ATA's experience is that there is commonly a trade off between the upfront cost of a PV system and the level of protection from inferior quality products and sub-standard installations that is afforded by the warranty bundle. For this reason, when performing modelling for solar payback, it is important not to choose the cheapest market price available as this will only consider inferior products and installation procedures, often with an unacceptably low level of consumer protection.

In ATA's experience, offers with acceptable quality and consumer protections are in the order of 20-25% higher than the lowest cost PV systems advertised.

In addition, choosing the lowest available market price does not take into account the availability of solar PV systems with that level of market price within regional areas (regional areas attracting a premium due to transport costs and proximity of installers / components).

Based on our most recent analysis, ATA estimates the current price for fully installed solar PV systems of a reasonable quality and warranty coverage is in the range of $4.50 – $5.00 per watt before any rebates or subsidies. This price is expected to continue to decrease in 2012 and beyond, with the major influence of installed system cost being manufacturing improvements and economies of scale internationally, and a reduction in global silicon prices.

To allow for the forecast decrease of the cost of solar PV panels in 2012, the ATA has used $4.00 per watt to represent the future cost of a fully installed system. From this point, the multiplier reduction under the Federal *Solar Credits Scheme* should broadly keep pace with technology cost reductions, to maintain paybacks at a relatively consistent level, such that no additional discount is required for technology cost reductions for the purpose of this modelling exercise.

2.2 STC Price

Due to the market power of electricity retailers under the RET scheme, the value of STCs traded under the SRES since January 2011 has hovered between the low $20s and the low $30s. This retailer market power is likely to continue into the short to medium term, where the majority of STCs are traded outside of the Clearing House, as PV installers and suppliers are unable to hold over surplus STCs until the clearing house cap is periodically corrected.

In the interests of being conservative, the ATA has used $30 per STC for this modelling exercise.

2.3 Retail Electricity Prices

ATA is aware that NSW solar customers may remain on their existing flat tariff for electricity import (i.e. from the grid to the household / small business), or that they may be reassigned to time-of-use (ToU) tariffs on a two-part basis (i.e. peak/off-peak).

To reflect this, ATA has used the following two rates for electricity import to model the savings to solar customers through the use of solar electricity instead of grid electricity:

- 20c/kWh for a single flat rate tariff;
- 25c/kWh for peak and 10c/kWh for off-peak for a two-part ToU tariff.

Also, retail electricity prices are set to increase over the coming years due to both network infrastructure upgrades and carbon pricing amongst other factors. Using economic modelling of retail electricity prices presented by the CSIRO report *Intelligent Grid*[1] as a guide, ATA has selected the middle scenario of retail electricity increases comprising 8% per year in the first 5 years, 6% per year in the following 5 years, and 3% per year thereafter.

2.4 Discount Rate

ATA has used a discount rate of 6% for the payback modelling, which represents the available interest that a consumer would expect to be paid in a standard bank saving account.

2.5 STC Multiplier Changes

The current STC multiplier value of 3 has been used for this modelling exercise. As mentioned above, the multiplier reduction under the Federal Solar Credits Scheme should broadly keep pace with technology cost reductions over the next few years.

2.6 Percentage of Generated Electricity Exported to Grid (Export Rate)

For the three system sizes modelled (1.5kW, 2.0kW and 3.0 kW), ATA have chosen the values of 25%, 50% and 75% for the percentage of exported electricity to the grid. These values of export percentage represent the variation present in the community due to differing energy usage patterns and levels of energy efficiency.

3. Modelling Results

Using ATA's payback period model, in order to achieve a sub-10 year payback for the majority of consumers in NSW (as outlined in the various scenarios below), a feed-in tariff rate in the order of 15-53c / kWh would be required, with a scheme duration of 10 years. **Error! Reference source not found.** outlines the modelling results of the various system size and export rate scenarios.

Table 1: Payback by System size by Retail Tariff for NSW

System size	Retail Tariff	FiT Rate required under 25% export	FiT Rate required under 50% export	FiT Rate required under 75% export
1.5 kW	20c / kWh	18-28c/kWh	18-21c/kWh	22-26c/kWh
1.5 kW	25c & 10c / kWh	15-25c/kWh	20-25c/kWh	22-25c/kWh
2.0 kW	20c / kWh	29-41c/kWh	27-33c/kWh	26-30c/kWh
2.0 kW	25c & 10c / kWh	27-38c/kWh	26-32c/kWh	26-30c/kWh
3.0 kW	20c / kWh	41-53c/kWh	33-39c/kWh	30-34c/kWh
3.0 kW	25c & 10c / kWh	38-51c/kWh	32-38c/kWh	30-34c/kWh

[1] Intelligent Grid, CSIRO, 2009. http://www.csiro.au/files/files/ptyb.pdf

In relation to the results shown in **Table 1** above, it should be noted that the average system size in NSW is between 1.8 and 2.1 kW[2]. Therefore, using the 2.0 kW scenarios shown in **Table 1**, a feed-in tariff rate of 26-41c / kWh would be required to achieve a sub-10 year payback for an average solar power system in NSW.

[2] Solar Bonus Scheme, Forecast NSW PV Capacity and Tariff Payments, AECOM, 2010. http://www.trade.nsw.gov.au/__data/assets/pdf_file/0016/360142/AECOM-REPORT-for-Solar-Bonus-Scheme-Review.pdf