

Introduction of a solar feed in tariff in NSW **Submission by the Clean Energy Council**

January 2009

1. Introduction

The Clean Energy Council welcomes the opportunity to provide the Rees Government with input for its consideration into implementing a feed in tariff scheme in NSW.

This review provides an excellent opportunity for NSW to play a major role in Australian feed-in tariff policy development and be at the forefront of support for distributed clean energy technologies like solar PV. Legislating and implementing an effective feed-in tariff will provide a strong incentive to drive the uptake of renewable energy.

The Clean Energy Council is the peak national body for clean energy businesses, representing nearly 400 companies across Australia. The Council supports policies and strategies that can accelerate the deployment and development of clean energy and energy efficiency technologies. Driving down the costs of proven and emerging technologies will be crucial to a speedy global transformation to a low greenhouse emissions energy future. This should be the primary guiding principle of climate change related policies like a feed in tariff.

This growth and increased efficiency will require a range of complementary measures tailored to enhancing different stages of the development pathway. The purpose of these policy measures is to dramatically accelerate the pace at which new technologies enter the market and existing technologies can work their way down the cost curve.

These measures need to be deployed simultaneously, reflecting the wide range of technologies and barriers that need to be overcome. Feed in tariffs (FiT) have been successfully used around the world to encourage the development of proven, distributed energy technologies like photovoltaic cells, micro-wind and micro-hydro technologies. They are complementary to the range of other initiatives being developed in Australia, including a national carbon pollution reduction scheme (CPRS) and a national renewable energy target (RET) of 20 per cent of renewable energy by 2020.

Policies to encourage low-emission technologies are an important hedge against the risk of high greenhouse gas abatement costs. This investment in clean energy technology development and deployment is not costless. Increasing the scale of deployment of

distributed generation technologies using mechanisms like a FiT is part of this investment.

2. Key priorities

A feed in tariff is the most efficient way of directly compensating distributed generators of electricity for the benefits of avoided distribution losses and infrastructure costs they deliver to the electricity grid. Given the nature and operation of electricity markets in Australia, feed in tariffs are best applied at the jurisdictional level. To date different jurisdictions in Australia have applied a wide range of differing rules.

The Clean Energy Council identifies three key priorities for the NSW government in framing the terms of its proposed FiT.

1. It should be gross-metered not net-metered for equity and efficiency considerations;
2. It should operate at sufficient scale to stimulate genuine economies of scale which will in turn help drive down costs; and
3. The size of the FiT should set a guaranteed minimum rate that at the least reflects the value of avoided infrastructure costs and transmission losses and strikes the right balance between industry development, lower costs and affordability

Implementing these three principals will demonstrate that the NSW government is a serious player in energy and climate change policy and regards the solar and other micro-generation industries as potentially substantial contributors to a decarbonised energy market.

The most efficient and equitable type of feed in tariff is gross metered, with unrestricted access from both small and large scale deployment. This avoids discriminating between high peak load onsite users (small businesses, retirees) and those who would benefit from a net metered regime (mainly households who work during the day and consume electricity away from their generation site). In economic terms – if a price is set for the buy back of energy at a point in network, it should be applicable to all energy produced at the site regardless of whether it is used on site or exported, for small generation sites; the impact on energy flows in the grid is the same.

The right settings of unrestricted, gross metered feed in tariffs have the greatest capacity to accelerate the uptake of renewable energy, encouraging economies of scale and scope crucial to making these proven technologies more affordable. They can also encourage local distributed generation, thereby reducing load on the network and distribution losses.

The most widespread type of distributed generation currently deployed in Australia is photovoltaic cells (solar PV). Professor Ross Garnaut's Climate Change Review Final Report refers to solar technology as one area with the potential for exceptional value within Australia¹. With Australia's target of lower emissions, solar PV has the potential to

¹ Garnaut Climate Change Review – Final Report

play an important role in helping to achieve those targets using Australia's abundance of natural light and competitive advantage.

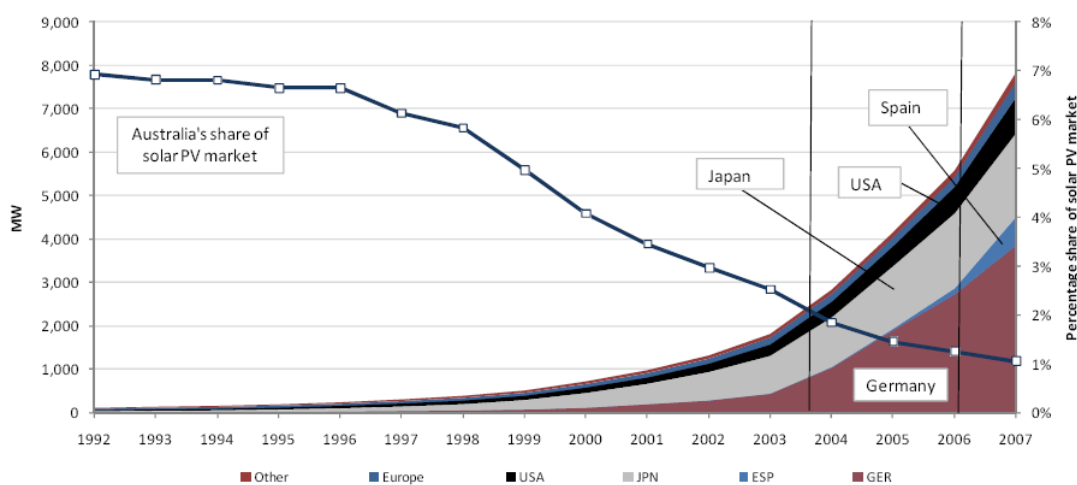
The Council provided a written submission and appeared before the Senate Inquiry into a National Feed-In Tariff last year. This submission details the reasons the Council favours a FiT to support the deployment of solar PV and development of a solar industry in Australia and should be read in conjunction with this document. This submission is also supported by recent analysis by Access Economics into the costs of a feed in tariff for solar PV commissioned by the Council and completed in November 2008.

3. Use of feed in tariffs globally

THE most successful method of accelerating distributed generation technologies like solar PV has been through gross FiTs. These were first introduced in Germany and are now in place in 19 countries in the European Union and a further 25 countries worldwide.

In the last 5 years FiTs have delivered market growth in solar PV of approximately 50% per annum. Grid-connect markets represent 95% of the world demand for solar PV and in 2007 70% of sales in solar PV were made in European countries with FiT schemes adopted (Germany and Spain).

FIGURE 1: GLOBAL SOLAR PV INSTALLATIONS (CUMULATIVE)



Source: IEA (2008)

4. Benefits of feed in tariffs

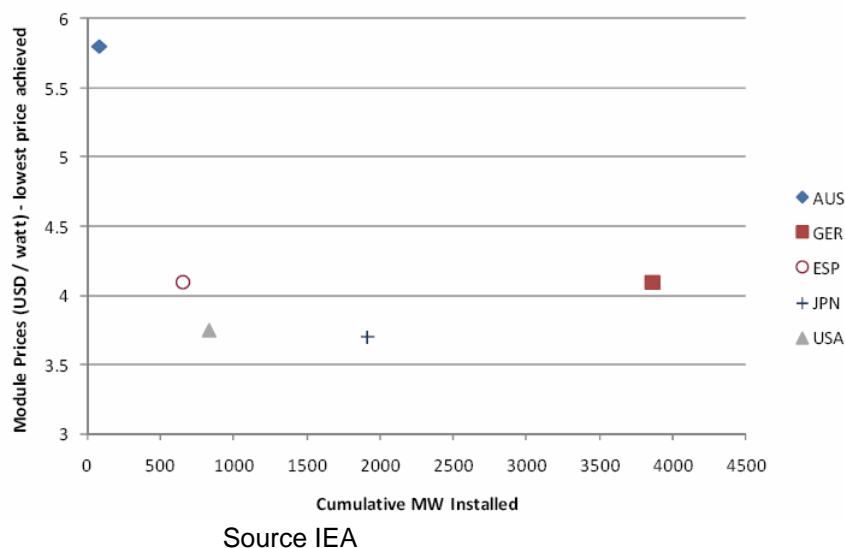
4.1. Avoided network costs

According to an Access Economics Report on 'The Economics of Feed-in Tariffs for solar PV in Australia' commissioned for the Clean Energy Council, transmission and distribution losses averaged 5.6% in Australia during 2006-2007². As Professor Garnaut notes, losses are exponentially related to load, and this non-linear relationship between load and loss means that all customers benefit from reductions in system losses due to the embedded generation. A greater reliance on distributed generation sources assisted by a suitable FiT can reduce this lost capacity by bringing the source of production closer to the final point of use. Sufficient scale deployment of distributed technologies like solar PV delivers further avoided costs by deferring the need for network augmentation and peaking capacity, particularly the growing summer peak load driven by increased use of domestic air conditioners.

4.2. Cost reductions driven by economies of scale

The International Energy Agency (IEA) has found that increased demand for distributed generation technologies like solar PV has been accompanied by falls in PV system prices in overseas markets. Countries with increased scale of solar PV installation have achieved lower costs (Figure 2). Countries with larger scale deployment achieved a generation cost of USD \$4 per watt compared to Australia with a cost of USD \$5.80. To date the uptake of PV in Australia has not been sufficient to realise the economies of scale in production as seen in countries such as Germany³.

Figure 2 - Indicative Module Prices (USD per watt)



² Access Economics - The Economics of Feed-in Tariffs for Solar PV in Australia

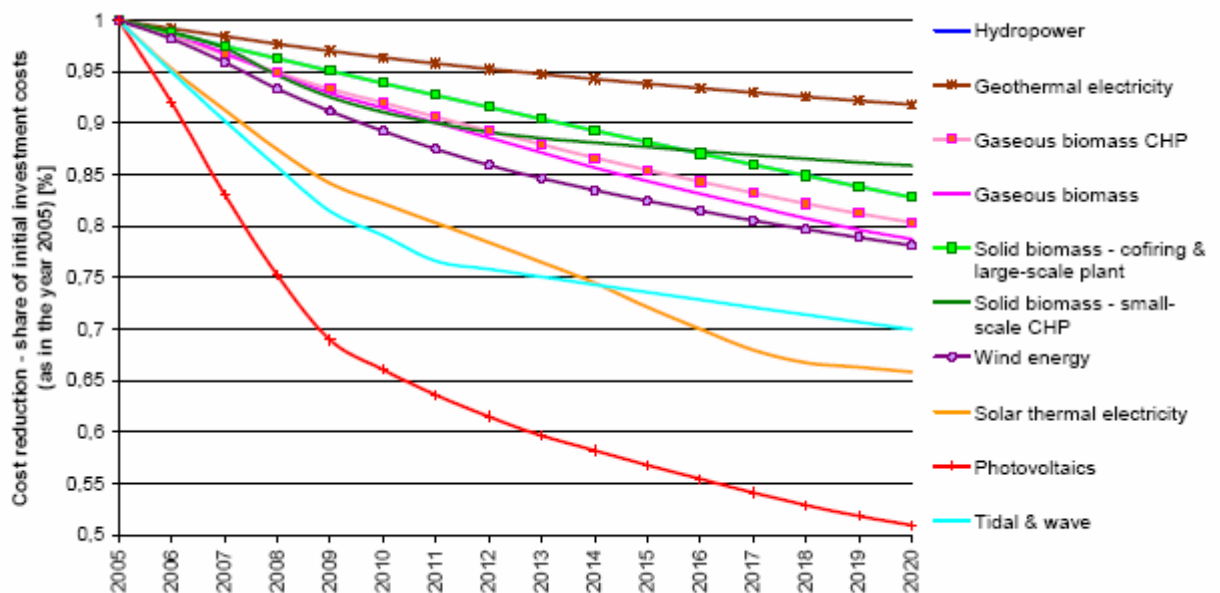
³ IEA Photovoltaic Power Systems (2008) Trends in Photovoltaic Applications

This trend overseas of lower prices would be expected to be mirrored in Australia with the introduction of policies such as a feed-in tariff.

The European Commission (EC), in their recent *Communication from the Commission to the Council and the European Parliament on the Renewable Energy Roadmap*, reported that photovoltaic systems are more than 60 per cent cheaper today than they were in 1990.

The IEA predicts that potential future solar PV capital cost reductions between 2005 and 2010 could be 5 per cent per annum and 4 per cent between 2011 and 2025. The increasing supply of silicon and increase in conversion efficiencies are also expected to reduce costs.

Figure 3 - Estimated rate of unit cost reduction for renewable electricity generation technologies *Source: European Commission*



5. Key design features of a feed in tariff

The key principles which have underpinned the success of FiTs are summarized below:

- Gross Generation – reward total generation not just that which is exported
- Apply to all sectors – is open to not just the residential sector but commercial, industrial as well. Shopping centres, distribution centres, kindergartens, train stations, airports should all be able to access the FiT scheme.

- Scheme long enough and rate high enough – should be sufficient to provide a return on capital investment of less than ten years. The scheme should be in place for no less than 15 years to provide investor confidence.

The key principles the Council supports are as follows:

5.1. Gross metering

The Clean Energy Council supports the use of gross metering as it better rewards investment in all the clean distributed peak energy generated and is more equitable than net metering and better represents the true economic value of the energy produced.

Export (net) metering only values the *surplus* electricity generated by a distributed generation source. In the case of solar PV this discriminates against those who are at home during the day – such as families with young children, the elderly and their carers, those who run a business from home. These people have domestic electricity load (consumption) profiles which tend to be higher in the middle of the day when PV power production is at its peak. Owners of solar PV generation who tend not to be home during the day benefit from a net feed in tariff only because at times of peak supply they are consuming electricity somewhere else, such as an office. This accidental benefit should not be the basis for compensation.

Regardless of whether or not the solar PV owner is at home, a system of the same size and similar location will still produce the same amount of electricity, and thereby will still result in the same greenhouse abatement and demand reduction impact on the grid. The fact that a family exports less or no electricity to the grid during the day compared to the couple is of no consequence, as in the absence of the solar PV, the family would have created a much larger load on the grid.

Export metering, in a situation where a higher than retail tariff is paid to the owner for their exported electricity, essentially values the greenhouse abatement and demand reduction from a working couple's system more highly than demand reduction from a family or pensioner's solar PV system.

The peak energy and power produced by the system is worth the same amount to society, regardless of whether it provides 2kW of demand reduction on-site or 2kW of capacity available to the grid.

5.1.1 Gross metering offers investment certainty

One of the essential criteria of a successful feed-in tariff is that it provides a stable investment climate and investment certainty – based on a clear payback period. Only gross production metering can provide this climate of investment certainty.

Under net metering, the rate of export to the grid of a particular system will depend on a variety of factors – how large the system is and what the energy consumption pattern of the household is – i.e. how much energy is consumed in the middle of the day?

By definition, this means that there is not a standard rate of export to the grid which any purchaser can expect when they are considering buying a solar PV system, as there is a huge variability between systems. While studies conducted by the University of NSW established export rates in their study of a community in Western Sydney (based around system sizes of 1kW) and, based on these, modelled export rates according to system sizes and household loads. There was a significant range of rates expected according to varying parameters and in addition these rates could well be geographical and socio-economically dependent.⁴ Furthermore, the South Australian Government's discussion paper *South Australia's Feed-in Mechanism for Residential Small Scale Solar Photovoltaic Installations* reported data from South Australian PV systems, which showed a large range of export rates of between 10-50 per cent across the systems.

Prior to purchase of the system it is highly unlikely that customers will have the necessary understanding of their daily electricity consumption profile necessary to accurately forecast their export rate. Such a scenario creates an extremely complex environment in which to make a purchase that takes into account the likely payback period of their system and hence to obtain any finance necessary to purchase the equipment.

The current federal Government rebate scheme (Solar Homes and Community Program) is expected to end on 30 June 2009 and be replaced by a multiplier on the number of Renewable Energy certificates that can be created (Solar Credits). This multiplier is due to ramp down over a few years. The best way of providing investor certainty going forward is to transition from the Solar Credits into a credible gross metered FiT.

Net metering therefore provides no investment certainty to the customer in terms of a predictable payback period; it would act as a barrier to uptake and undermine the primary advantage of the feed-in tariff as a mechanism to drive significant industry growth – investment certainty.

5.1.2 Export metering disadvantages owners of smaller PV systems

Customers who cannot afford larger systems are also disproportionately discriminated against under an export metering system, as a bigger percentage of the production of their system is used up in the household

⁴ Australian PVPS Consortium and the Centre for Environmental Markets, University of NSW (2007) *Submission to the Government of South Australia Discussion Paper on South Australia's Feed-in Mechanism for Residential Small-Scale Solar Photovoltaic Installations*.

meeting ongoing demand i.e. from fridges etc, with less solar energy exported. This means that PV owners receive less income from the energy production of their system although, as for the above example, the systems have benefited the grid to the same amount proportionate to their size and investment.

5.1.3 Implications for metering practices

Some parties have held up current metering practices as an impediment to gross production metering. While it is true that currently most systems are net metered, it is quite possible to change practice to gross production metering. In Victoria, electricity retailer AGL is now requiring gross metering for all customers' systems with whom they enter into an electricity buy-back contract.

5.2. Timeframe

In order to create market certainty, attract investment and deliver meaningful economic and environmental dividends:

- A Feed in Tariff (FiT) should guarantee payment to the system owner for a minimum of 15 years, reflecting the minimum working life of the system. The feed-in rate for each installation should be a set figure applicable for 15 years from the date of installation.
- To ensure the industry has the time to fully develop, the program should be available for installations installed anytime over the coming 15 years. This will mean that buy-back rates will need to be available for 30 years; that is 15 years after the last installation.

5.3. Guaranteed connection and purchase

Electricity retailers and network providers should guarantee that solar PV systems which comply with technical connection requirements imposed by Australian Standards and State or Territory regulators will be connected and all their generation purchased.

5.4. Funding a feed in tariff

Revenue to pay for the FiT should be raised through an across-the-board levy on DNSPs. This would mean that retailers with high uptake of the FiT would not be disadvantaged and the levy is placed across the broadest section of energy users.

Alternatively the funds could be raised and deployed through a third party organisation.

The scheme should be established so that electricity retailers are not required to shoulder any financial burden resulting from the introduction of a gross tariff.

The Clean Energy Council would support the NSW scheme adopting a model similar to that outlined by the Bill for the South Australian feed-in tariff – whereby it is a condition of a licence authorising the operation of a distribution network

that the Distribution Network Service Providers allow a domestic customer to feed into the network electricity generated by a qualifying generator and that the DNSP will credit against a customer's network charges, the amounts payable for the feed-in tariff. The electricity retailers are then required to pass this amount on as per usual billing process.

5.5. Feed in tariff cap

A feed in tariff should not be capped at the household level of 1.5 kW. It should be increased up to 200kW systems to allow the maximum benefit of economies of scale from large scale deployment as well as encouraging development and deployment of cheaper or more cost effective solar cells, whilst retaining their status as truly embedded generation sources.

As a result the Clean Energy Council believes that feed-in tariffs should apply to all sectors including residential customers, community buildings and the commercial and industrial sector. Not only would this maximise the benefits of the scheme in terms of demand management, but it would also open up demand in a significantly larger market place for all forms of distributed generation. The respective industries will be better placed to drive down costs by accessing greater economies of scale.

Feed-in schemes internationally have succeeded through ensuring the large scale uptake of distributed generation technologies like solar PV in the commercial market. These schemes have been designed to ensure that these systems have been seen as an attractive investment by the commercial sector.

Under net metering, not only would the revenue stream from these sources be unpredictable, on weekdays it would be highly unlikely that such a system would actually export any energy to the grid as it would be likely to be used entirely by the business at the point of generation. Ironically, the very reason why these systems are of significant value to the network would ensure low expected income to such a sector.

5.6. Grid-connection agreements

The application and approval processes for connection of PV systems to the grid should be streamlined. Ideally, the FiT arrangements should be incorporated directly into this process. One of the barriers to the uptake of solar PV is the complexity of the agreements needed with the network and retail business. The Council is currently working on a project with the aid of Federal government funding to streamline this process and the NSW Government is urged to ensure that its electricity businesses embrace the project and assist in streamlining the connection processes.

5.7. Degression

The FiT rate for new installations should decrease by 5% to capture cost reduction potential as industry moves down the cost learning curve. That is, the price set for buy-back under the scheme should drop by 5% per year to ensure that the industry is driven to reduce costs.

5.8. Other design

What factors should be considered in setting a tariff rate?

Solar PV unlike conventional centralized technologies provides many unrecognised benefits that are not fully valued in the market due to today's market failures and regulatory hurdles. These include:

1. Peak Pricing – Solar PV produces energy at times of high system demand
2. Distributional Benefits
3. Industry development
4. Transmission losses
5. Network augmentation
6. Greenhouse Gas savings

There is some research which suggests that in order to motivate wholesale uptake of solar PV across all sectors will require payback on the system up to 10 years. Analysis by Access Economics for the Clean Energy Council indicated a national FiT deploying 3,000 MW at this rate of payback will cost \$17.9 billion.

The FiT rate should therefore be tiered according to different size systems being installed, taking into account economies of scale. It should be based on a fixed pricing rate.

Should the tariff be paid to solar PV owners by electricity distributor or the electricity retailer?

The electricity distributor should pay the tariff via the electricity. The model supported by the Council in this area alone would be similar to that adopted by SA.

How long should the Government maintain the FiT and should the rate be fixed for the entire life of the program or varied in over time?

A FiT should be adopted to encourage the adoption and diffusion of solar and other embedded clean technologies so that ultimately they become cheaper and competitive with conventional power sources.

The FiT rate applied to different technologies and should take into account the technologies maturity and therefore it would follow that as the technologies gain in maturity and reduce in costs, the feed in tariff rate should be adjusted downwards as well.

What eligibility criteria should exist for the FiT?

All sectors of the community should be eligible for a FiT it should not just be limited to residential or small businesses.

It should extend in reach such that it extends to the commercial and industrial sector.

Harmonisation

Most States have already or are in the process of implementing a FiT. There are now a range of differing schemes across the country. South Australia, Queensland and Victoria have net metered FiTs while Western Australia and the

ACT have gross metered FiTs. NSW should take a lead and move towards the most equitable and efficient tariff for the long term benefit consumers and the industry by moving to a gross metered FiT.

This will avoid the need for NSW to change its scheme when the proposed commonwealth solar multiplier ends and there is a transition to the gross FiT needed for the continuing deployment of solar PV.

6. Conclusion

Tariff Rate: The rate should be set with due consideration of other federal Government incentives and provide a 10 year payback period. The rate should reduce over time to encourage industry cost improvements.

Energy Production: The tariff should be based on gross production to provide the investor certainty and recognising the true economic value of the energy generated

Payment: The additional costs of the tariff should be collected through network charges. The regulator would need to allow these additional costs to be collected as a levy spread across the whole consumer base. The financial relationship with the solar PV owner would, however, be through the regulator.

Duration: The tariff for each site should run for 15 years, and the whole program should be legislated to run for 30 years.

Eligibility: To ensure the maximum opportunity for the industry to expand to reach the critical mass to force costs down, the policy needs to be applicable for larger commercial and industrial sites as well as domestic sites.

Technology: While the majority of installations will be solar PV, to drive the uptake of other embedded generation, tariffs should be set for a range of technologies including micro-wind, micro-hydro and small biomass generation. The rate for each tariff may be set at a different level.



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