



The Design of a Feed-in Tariff for Australia

Why a Feed-in Tariff?

In recent years, feed-in tariffs in Australia have been used to support the installation and development of micro-generation – mainly solar photovoltaic (PV) systems and to a lesser extent, small wind systems.

As a mechanism to drive investment in a certain technology for electricity generation, feed-in tariffs have proven internationally to be the most cost effective, efficient industry development mechanism in the absence of a price on carbon. The question then becomes – which technology to support?

Small scale renewable electricity generation systems such as solar PV, small wind and micro-hydro remain more expensive, per MWh generated, than larger forms of renewable and non-renewable generation technologies. The role of micro-generation in the energy mix however, is not to compete on price with large scale generation sources. As such, the benefits of micro-generation should not simply be assessed on a cost per MW, or cost per tonne of CO₂e abatement, basis.

Micro-generation technologies such as solar PV and small wind are primarily about community engagement – they are a way for individuals and communities to directly engage with the renewable energy sector and make a small contribution to reducing their personal, and our national carbon footprint. Every new rooftop solar or small turbine installation creates a new household, small business or community group of renewable energy and climate advocates, and positively influence their broader communities to engage with the issue of climate change.

In addition, solar PV, small wind and micro-hydro systems are a form of distributed generation – which has additional network benefits that are further detailed below.

So, given the policy rationale for supporting the development of our small scale renewable energy sector, how should a feed-in tariff best be designed?

Feed-in Tariff Design

In order to provide an incentive for people to install grid-connected micro-generation, there are three key elements of a feed-in tariff mechanism that need to be considered: the level of the tariff; the means of metering; and the duration of the scheme. It is the combination of these three elements which determine the success or otherwise of a feed-in mechanism.

Grid-connected renewable and low emissions micro-generation has numerous benefits, including reducing greenhouse gas emissions, limiting the growth in peak demand and avoiding (or deferring) the need for expensive network infrastructure augmentation.

A fair price for the feed-in of electricity is one in which the homeowner receives not only full reward for the value of the electricity at the retail rate at the time of production, but also recognises these and other numerous benefits of micro-generation. As such, the ATA strongly believes that an effective scheme would involve a feed-in tariff:

- ⇒ **mandated at 30 – 40 cents per kWh;**
- ⇒ **offered for 15 – 20 years;**
- ⇒ **paid on the entire output of a system via gross production metering; and**
- ⇒ **including a 5% degression rate.**

Tariff Level and Scheme Length

The key element in driving investment in micro-generation via a feed-in tariff is creating a guaranteed return on investment and reducing payback times down to a reasonable level. We believe that a payback period between 5 and 10 years is essential to provide sufficient incentive for householders, community organisations and small businesses to drive private investment in micro-generation.

For this to be achieved, different feed-in rates will be required for different technologies. As an example, with the significant technology cost reductions achieved by solar PV systems over 2009 / 10, a gross metered feed-in tariff rate of between 30c and 40c / kWh, guaranteed for a minimum of 15 years, will see this return on investment achieved in most states.

Metering

It is essential that any feed-in scheme implements a system of gross production metering, whereby a householder, community group or small business is credited for the full production of their system.

Gross production metering – involving either a separate meter, or second element within the meter, to measure the entire generation from the PV system – results in the fairest and most accurate calculation and payment, fully rewarding the system owner for the benefit of their system to the electricity grid. Gross metering is ultimately the simplest and easiest form of metering to understand for all market participants – i.e. consumers, governments and electricity network managers.

From a pure economic perspective, the benefits of micro-generation and their recognition via an appropriate metering arrangement is best articulated by the Garnaut Climate Change Review¹:

“The two externalities from embedded generation are present for every unit of electricity produced, not just the amount sold—implying that gross metering is the more appropriate approach for addressing this market failure.”

A number of Australian states have adopted a system of net export metering, which rewards homeowners for the electricity exported to the grid *minus what is consumed in the home at the time of production*.

In ATA’s view, this system of ‘net export metering’ discriminates against certain classes of micro-generation proponents, as well as making calculation of both the cost of the overall scheme, and the return on investment to the micro-generation proponent, extremely difficult (this is outlined further below).

As an example, for proponents of solar PV, a net export metering regime for feed-in tariffs discriminates against owners of grid-connected systems who are likely to consume electricity during the day, such as senior citizens or stay-at-home parents. In such cases, instantaneous system production would rarely exceed household consumption, meaning this class of customers are not able to receive the benefit from the premium feed-in rates offered, significantly impacting their return on investment.

Further, a system of net export metering creates significant uncertainty in the market, both in regards to the cost of the system for government and the wider community, and for network managers trying to ascertain the level of embedded generation in the electricity grid. The introduction of gross metering allows far clearer estimates of ongoing costs and benefits of the scheme due to the relative predictability of gross electricity production for a given sized installation over a given time frame.

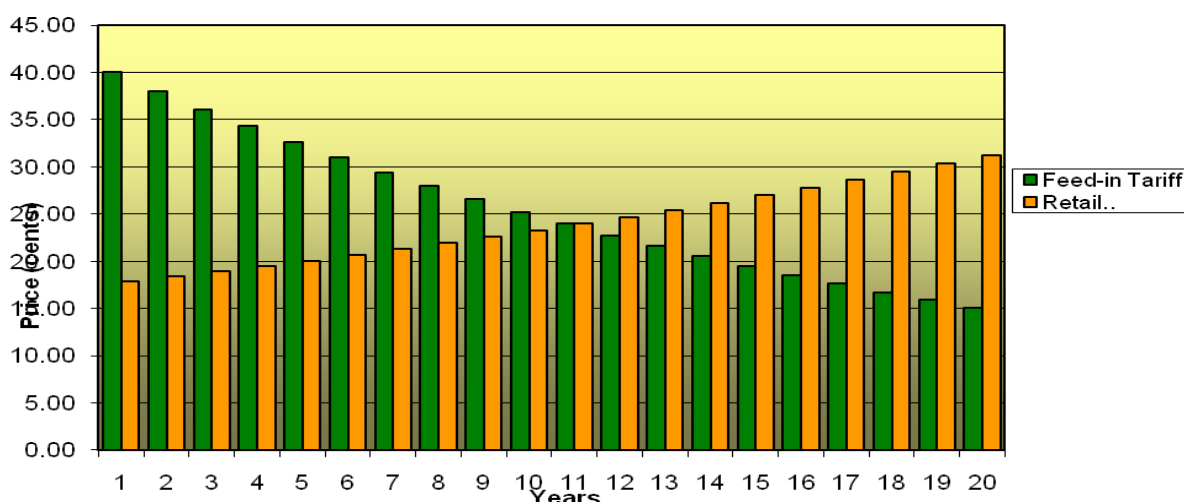
¹ Garnaut, 2008, *The Garnaut Climate Change Review*.

Degression Rate

In order to take into account the economies of scale and technological advances which have, and should continue to drive reductions in installed costs (of solar technologies in particular), the ATA proposes the inclusion of a 5% degression rate of the feed-in tariff. As an example, a 40c / kWh feed-in tariff in year 1 would fall to 38c / kWh in the second year, 36.1c / kWh in the third year, and so on. The degression rate can be used as a 'lever' to influence uptake, should the feed-in tariff be driving too much investment.

In the context of increasing retail prices for grid electricity, and with the eventual introduction of a carbon price, the degression rate should eventually see micro-generation technologies achieve price parity with retail electricity prices.

As an example, an average increase in electricity retail prices of 3% per annum over the next 15 years², and assuming a \$20 / tonne carbon price, a degression of 5% would see price parity reached at the end of the 10 years of the scheme:



Cost of the Scheme

Whilst micro-generation technologies remain more expensive than other forms of electricity generation, and in the continuing absence of a national price on carbon, governments have an imperative to control the costs of feed-in tariffs schemes, such that they do not significantly increase the electricity bills of all contributing consumers.

Modelling undertaken by the ATA during various feed-in tariff policy inquiries suggests that at a state level, a healthy amount of micro-generation can be installed for a few dollars per household per year. As an example, ATA modelled a 150MW solar PV scheme for Victoria over 15 years, with a total cost per average household (i.e. a household consuming approximately 16 kWh per day) of about \$12 per year.

In addition, this cost does not take into account the full value of micro-generation as a distributed form of electricity generation in the network through avoided transmission losses; deferred network augmentation (which can comprise up to 50% of retail electricity charges); and peak time generation (in the case of solar PV), when prices on the spot market can rise to hundreds or even thousands of dollars per MWh.

² based on the average CPI over the past 15 years

With regard to these network benefits, a progress report by the German Government demonstrated that there was in fact a net financial benefit attributable to their feed-in tariff scheme, with the savings from reduced wholesale electricity and fuel imports costs, outweighing the cost of the feed-in tariff by a factor of approximately two-to-one³.

Funding Models and Equity

In order to provide long term certainty for consumers and industry, ATA believes that feed-in tariff schemes should be established over a longer term timeframe and cost recovered through the electricity market. Degression rates can be used to dampen uptake if annual installed capacity is tracking too high.

Cost recovery should be levied across all electricity consumers on a consumption basis via a small increase in electricity tariff. Provided the overall cost of the feed-in tariff scheme is low, and that the broadest base of electricity consumers are levied, the final cost to average consumers should remain insignificant.

With respect to low income households, ATA recognises that an inequitable cross subsidy may exist from a feed-in tariff for this class of customer. Given the upfront capital cost, low income households are unlikely to be able to benefit from the feed-in tariff through the purchase of their own system, and additionally, are likely to be disproportionately affected (as a percentage of income) by the cost increase levied across all electricity consumers.

On this basis, the ATA supports the exclusion of low income households from cost recovery for feed-in tariffs for micro-generation in Australia, or their compensation in line with proposed approaches to deal with the impact of electricity price rises for low income households associated with the *Carbon Pollution Reduction Scheme*.

³ Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) *Renewable Energy Sources Act Progress Report 2007*, BMU, Germany, 2007